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Connecting conditionals: a corpus-based approach to conditional constructions in Dutch

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Citation

Reuneker, A. (2022, January 26). *Connecting conditionals: a corpus-based approach to conditional constructions in Dutch*. LOT dissertation series. LOT, Amsterdam. Retrieved from <https://hdl.handle.net/1887/3251082>

Version: Publisher's Version

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Downloaded from: <https://hdl.handle.net/1887/3251082>

Note: To cite this publication please use the final published version (if applicable).

Connecting Conditionals

A Corpus-Based Approach to Conditional
Constructions in Dutch

Published by

LOT
Kloveniersburgwal 48
1012 CX Amsterdam
The Netherlands

phone: +31 20 525 2461

e-mail: lot@uva.nl
<http://www.lotschool.nl>

Cover illustration: *Moroccan Horseshoer*, by Marià Fortuny, c. 1870.

ISBN: 978-94-6093-395-0
DOI: <https://dx.medra.org/10.48273/LOT0610>
NUR: 616

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Connecting Conditionals
A Corpus-Based Approach to Conditional
Constructions in Dutch

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof. dr. ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op woensdag 26 januari 2022
klokke 15.00 uur

door

Alex Reuneker

geboren te Leidschendam
in 1985

Promotor: prof. dr. A. Verhagen
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prof. dr. T. J. M. Sanders (Utrecht University)



This research was supported by the Netherlands Organisation for Scientific Research (NWO) under project number 023.005.085.

This dissertation is dedicated to Eva.
Thank you for everything.

*If a being suffers there can be no moral justification for
refusing to take that suffering into consideration.*
Peter Singer, *Animal Liberation* (1975, p. 8)

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Acknowledgements

Although writing this dissertation was at times a solitary experience, I have been fortunate to be supported by many people. I would like to take the liberty to thank them and to acknowledge the importance of having bright, kind and loving people around.

Sincere gratitude goes to my promotor Arie Verhagen for his encouragement, and for sharing his knowledge and insights on linguistics and topics well beyond. His lectures were an important instigator for pursuing a PhD, and I value the academic and personal advice he has given me. I would also like to thank my co-promotor Ronny Boogaart, who has supported and motivated me, and who has shared with me his extensive knowledge of linguistics. He also taught me important values in life, and became a friend with whom I could talk about virtually anything. I could not have wished for better support.

My appreciation goes to NWO for funding this research, and to my *alma mater* Leiden University and its gifted lecturers for their insights and enthusiasm. I am also grateful to LUCL, especially to Sjeff Barbiers, Maarit van Gammeren, Gijsbert Rutten, and Niels Schiller for their help, and to Henrike Jansen for support and the tea talks that brightened up many days of corpus annotation. Ton van der Wouden and Barend Beekhuizen provided feedback on several parts of this dissertation, for which I am very grateful. Furthermore, for collegiality and friendliness, I would like to thank Maaïke Belien, Louise Cornelis, Jenny Doetjes, Egbert Fortuin, Ton van Haaften, Maarten van Leeuwen, Saskia Lensink, Katja Lubina, Olga van Marion, Esther Op de Beek, Roosmaryn Pilgram, Tanja Simons, Marina Terkourafi, Ingrid Tienen, Vivien Waszink, and Marijke van der Wal. I would also like to thank my fellow PhD's Kate Bellamy, Eleanor Dutton, Aliza Glasbergen-Plas, Lena Karvovskaya, Olga Kepinska, Morana Lukač, Maaïke van Naerssen, Bobby Ruijgrok, Benjamin Suchard, Alexander Vertegaal, and Cesko Voeten for being there and sharing experiences, and Þorbjörg Þorvaldsdóttir and Aljoša Šorgo for co-organising the Linguistics Movie Nights. Thanks also go to Maarten Bogaards, who aided in the corpus annotation during an internship. I would like to thank my fellow lin-

guists for everything I learned during numerous conferences and the meetings of the National Graduate School of Linguistics, Vaclav Brezina, Andrew Hardie, and Tony McEnery for insights gained during the summer schools on Corpus Linguistics of 2015 and 2016 in Nottingham and Lancaster, Martin Hilpert and Natalia Levshina for sharing their knowledge at the Societas Linguistica Europaea (SLE) Summer School of 2017 in Neuchâtel, and Adele Goldberg, Anne Bezuidenhout and Stefan Th. Gries for insightful lectures and for discussing parts of this dissertation at the Linguistic Society of America (LSA) Institute of 2019 in California. Thanks also go to the students in Leiden. I believe we have learned a lot from each other.

I would like to thank my family and friends for their love and care. Gratitude goes to my father Leo, for planting a seed that grew into a keen interest in pragmatics by frequently ending what some would call ill-formed utterances with *Je begrijpt toch wat ik bedoelt?*, and my mother Mary for believing in me and for always being there. I also want to mention my brother and sisters, especially Sandra and her family, who have been a great support and inspiration in difficult times. I am grateful for the care of my parents-in-law, Conny and Stanley Rieborn, who have taught me that caring for others does not have to go at the expense of taking care of oneself. I would like to thank Sophie Konings, Julien Groenenboom, Laurens Dorival, Erik Ekkelenkamp, and Raymond Matai for their friendship. A warm thank you also goes to Michiel Hopman, who always took time for a cup of coffee – freshly brewed, or, if need be, heated up on a camping stove. Thanks go to my fellow runners at AV Fortuna and Rotterdam Atletiek for politely listening to endless musings on linguistics during long runs and between intervals, and especially to Carla Ophorst for advice on and beyond athletics. I would like to thank my former manager Petra Visser for the opportunities she provided, and, together with Theo Mak, for teaching me to trust myself, and to see the good in others.

Finally, and most importantly, I would like to express immense gratitude to my wife, Eva Rieborn. Without your love, support, and almost limitless patience, I could not have completed this dissertation, and my life would not have been as rich and loving as I feel it is now. Writing a dissertation was a daunting task, and proved a great burden on you too. Having someone to rely on, talk to, and to be around has been essential. You made it bearable and I cannot thank you enough. I look forward to all that lies ahead for us.

Symbols and notation conventions

The symbols used in this dissertation are based mainly on Huang (2017), Levinson (2000), and Magnus (2015) and adapted to fit current purposes.

p	proposition p
q	proposition q
$\top$	truth-conditionally true
$\perp$	truth-conditionally false
$\rightarrow$	ordinary conditional (natural language <i>if</i>)
$\supset$	material conditional (logical <i>if</i>)
$\approx$	conventional truth-conditional meaning
$\approx\approx$	conventional non-truth-conditional meaning
$+>>$	conventional implicature
$+>$	conversational implicature
$\neg, \sim$	negation
$\wedge$	conjunction (logical <i>and</i>)
$\vee$	disjunction (logical <i>or</i>)
$\leftrightarrow$	equivalence (<i>iff</i> , ‘if and only if’)
$\imath$	definite description
$Q_{n_2}+>$	conversational implicature through second sub-maxim of maxim of quantity (cf. Grice, 1989; letters for maxim, number for sub-maxim)
$\#$	infelicitous utterance
$*$	ungrammatical sentence
$?$	questionable utterance or sentence

CHAPTER 1

Introduction

Conditionals enable us to express our thoughts about possible states of the world. As such, they form ‘an essential part of human reasoning and decision making’ (Evans & Over, 2004, p. 1), i.e., they are ‘essential to practical reasoning about what to do, as well as to much reasoning about what is the case’ (Edgington, 2021, p. 1). Conditionals are involved, as Hartmann and Hahn (2020, p. 981) mention, in ‘every aspect of our thinking, from the mundane and everyday such as “if you eat too much cheese, you will have nightmares” to the most fundamental concerns as in “if global warming isn’t halted, sea levels will rise dramatically”’. That conditionals are instrumental in cognition can also be observed clearly in a recent ‘kids only’ special issue of Dutch newspaper *NRC* from March 27th, 2021, in which the use of the ‘if-then trick’ in (1) below is presented as one of a number of ‘super powers for your head’.

- (1) You often already know what your pitfalls are. For example, you know from experience that you often immediately crash down on the couch like a bag of potatoes because you are tired after a day of school. You can get out of that trap by imagine vividly beforehand how you would like to behave when you leave school. For example, *‘If I’m about to crash down on the couch after school, I’ll start programming my own game’* [emphasis added]. The trick is imagining the situation as clearly as possible in advance. This helps you to stick to your own resolutions. (de Jong, 2021, p. 11)

This simple example shows how we can and in fact do use conditional thought to reason about our own actions, and, as we will see shortly, about those of others.

2 Connecting Conditionals

In communication, we use conditionals, most prominently *if-then* sentences, to express thoughts about situations we are unsure about, situations we judge to be hypothetical, likely or unlikely, or situations we deem contrary to our current knowledge of the world (*what if...*). We decide to take an umbrella *if* it rains; *if* someone is rude, we evaluate her or his behaviour as inappropriate; we infer that one has to have been married *if* she is called a widow; and we can use conditionals to reason from arguments to conclusions, as Agatha Christie's famous detective Hercule Poirot shows in (2) below by reasoning about the question who has opened the window prior to the murder of Roger Ackroyd.

- (2) "Who opened it? Clearly only Mr. Ackroyd himself could have done so, and for one of two reasons. Either because the room became unbearably hot (but since the fire was nearly out and there was a sharp drop in temperature last night, that cannot be the reason,) or because he admitted some one that way. And *if he admitted some one that way* [emphasis added], it must have been some one well known to him, since he had previously shown himself uneasy on the subject of that same window." (Christie, 1926, p. 64, *The Murder of Roger Ackroyd*)

As the newspaper excerpt in (1) above shows, however, one of course does not need to be a famous detective to use conditionals. As Williamson (2020, p. 3) argues, 'hypothetical thinking is central to human cognitive life, from the naïve to the super-sophisticated. [...] We rely on hypothetical thinking in deciding what to do. Choosing between two alternative courses of action, you compare what will happen if you take one course with what will happen if you take the other'.

Whereas many studies focus on specific types of conditionals, or limit conditionals to those uses in which some kind of formal reasoning is involved, one needs only to look around to see that conditionals are used in many everyday situations. In various cases, the use of a conditional may not even be viewed as a reasoning task in the first place, as in (3) below.

- (3) Maybe you will have to help me. We're not running our lives according to some account book. *If you need me, use me* [emphasis added]. Don't you see? Why do you have to be so rigid? (Murakami, 1987a, p. 10, *Norwegian Wood*)

In this example, instead of reasoning, the main character of Murakami's novel *Norwegian Wood*, Toru Watanabe, uses a conditional to contextualise an offer he makes his girlfriend Naoko. Whenever conditional thought is expressed in communication, a linguistic form has to be used. In the examples in (2) and (3), the subordinate clauses *if he admitted some one that way* and *if you need me* are introduced by the default conditional conjunction *if*. Although both examples use the same conjunction, the functions of the conditional clauses differ. The first conditional clause provides an argument for the conclusion that *it must*

have been some one well known to him presented in the main clause, and the second offers a context for the offer *use me* performed by uttering the main clause.

This dissertation focuses on various uses of conditionals, without excluding any use *a priori*. Moreover, by including both the meaning and form of conditionals, this study strives to answer the question how the grammar of conditionals contributes to their various uses and meanings. This question is, of course, phrased in only very general terms, and before properly formulating the main research questions of this study, which will be done by embedding the question above into the literature in chapter 2, I will offer a brief introduction to the subject of conditionals in this chapter.

In section 1.1, I will introduce conditionals as the subject of this dissertation. I will provide a general description of conditionals, together with a brief overview of different perspectives offered in the vast body of literature on conditionals. In section 1.2, then, I will introduce the main aim of this study. In section 1.3, I will introduce the theoretical background to this study, after which, in section 1.4, I will briefly introduce the data and methodology used. Next, in section 1.5, I will discuss the theoretical and methodological contributions of this dissertation to the field of linguistics in general, and the study of conditionals specifically. Finally, I will provide an overview of this dissertation in section 1.6, so the reader can choose which of the chapters may best suit their interests – *if* not all, of course.

1.1 Conditionals

Conditionals have been the subject of debates between scholars for centuries, as we will see in detail in the following chapters. Many of those debates revolve around the question concerning the general meaning of conditionals. To this day, this question elicits many different answers. In actual language use, the meaning of conditionals is not general, however, as they are used in specific ‘usage events’ (cf. Langacker, 1988b, p. 14; Verhagen, 2005, p. 24). Conditionals are used frequently, and seemingly without much difficulty or effort, to guide our actions, as in (4), or to predict those of others, as in (5).

(4) If I want to lose weight, then I should not eat yet another piece of cake.

(5) Peter will not go to the party if I am going.

We also use conditionals to argue about contrary-to-fact situations, as in (6), to reason logically, as in (7), and even to be polite, as in (8).

(6) If the train would have been on time, I would have been at the office already.

(7) If his wife died, he must be a widower.

(8) I very much like your dress, if I may say so.

4 Connecting Conditionals

With respect to their linguistic form, conditional thoughts, i.e., those thoughts in which one situation is dependent on another, often hypothetical situation, are expressed as complex sentences. All conditionals above are formed by combining a dependent (subordinate) clause and an independent (main) clause by means of a conjunction, usually, as in these examples, *if*.

Given their status as primary reasoning devices, it comes as no surprise that conditionals have been at the centre of attention in several academic disciplines, ranging from philosophy (for an overview, see e.g., Bennett, 2003) and linguistics (see e.g., Traugott et al., 1986; Athanasiadou & Dirven, 1997b; Liu, 2019a), to psychology (see e.g., Evans & Over, 2004; Oaksford & Chater, 2012), and computer science (see e.g., Crocco, Fariñas del Cerro & Herzig, 1995; Mirolo & Izu, 2019). Within linguistics, semantic studies have focused mainly on truth conditions, and have roughly equated the meaning of natural language conditionals ('if p , (then) q ' or ' $p \rightarrow q$ ') with material implication in logic (' $p \supset q$ ') in an attempt to answer the question in which situations a conditional should be considered true (see e.g., Sanford, 1989; Bennett, 2004; Magnus, 2015; Wason, 1968; Lewis, 1976; Jackson, 2006; von Fintel, 2011; Fugard et al., 2011; see also section 1.2 below). Other scholars criticise such logic-oriented analyses, for instance on psychological and pragmatic grounds (see e.g., Dancygier & Sweetser, 2005, pp. 13–14; Bonnefon, 2009; Boogaart & Reuneker, 2017). Usage-based analyses of conditionals often swiftly dismiss formal semantic approaches because of mismatches between the 'natural language conjunction *if*' and its equivalent operator in logic (see e.g., Athanasiadou & Dirven, 1997a; Declerck & Reed, 2001; Dancygier & Sweetser, 2005). As, from the perspective of natural language in actual usage contexts, linguists have been concerned with both the form and function of conditionals, several alternatives to the 'material analysis' have been proposed to account for conditionals in everyday language, such as Sweetser's (1990) account, in which she distinguishes between conditionals in different domains. Conditionals in the content domain express a connection in the real-world domain of causes and effects, as in (4) to (6) above, whereas conditionals in the epistemic domain express a connection extended from the content domain to the inferential domain of arguments and conclusions, as in (7) above. Finally, conditionals in the pragmatic domain express a connection even further extended into the domain of speech acts, as in (3) and (8). These domains have been demonstrated to be valid cognitive categorisations of reasoning processes by Verbrugge et al. (2007).

In argumentation theory, conditionals are crucially involved in the analysis of valid and invalid rules of inference (*modus ponens*, *modus tollens*; affirming the consequent, denying the antecedent respectively), and they may be used in the formulation of the major or *connecting* premise in arguments (see e.g., Toulmin, 2003; Horsella & Sindermann, 1992, p. 133; van Eemeren et al., 2014, Chapter 4; van Eemeren & Snoeck Henkemans, 2017, pp. 50–51). As such, they are used to connect a minor premise to a standpoint in order to arrive at a conclusion. In (9) below, for instance, the standpoint *Daniel is no athlete* is arrived at by combining the minor premise *he can't climb the stairs without*

losing his breath with the (conditional) major premise *if he were an athlete, he would have stamina* (see e.g., Gerlofs, 2009; van Eemeren, Grootendorst & Snoeck Henkemans, 2002).

- (9) Daniel is no athlete. If he were an athlete, he would have stamina. But he can't climb the stairs without losing his breath. (Gerlofs, 2009, p. 89)

In recent pragma-dialectical argumentation theory, the initial focus on dialectic goals of presenting reasonable arguments has been extended with the rhetorical goal of persuading the interlocutor (cf. van Eemeren, 2010). In the concept of *strategic manoeuvring*, maximising this persuasiveness is combined with adhering to dialectic standards, and the choice to explicitly express a conditional in an argument, as is done in (9), is considered such a strategic manoeuvre (see e.g., Jansen, 2003, 2011; Reunecker & Boogaart, 2013).

In pragmatic and psychological research, conditionals are often analysed in terms of their implicatures (cf. Grice, 1975), i.e., in terms of what they are used for at speech-act level.¹ Fillenbaum (1986) and Evans (2005) show that conditionals are often interpreted as inducements or advice, and as such are understood by their perlocutionary effect (cf. Austin, 1962). Indeed, any cooperative language user will recognise (10) as a request to get the hearer to fix the car, whereas (11) is used as a threat to deter the hearer from coming any closer.

- (10) If you fix the car I'll give you \$100. (Fillenbaum, 1986, p. 179)

- (11) If you come any closer I'll shoot. (Fillenbaum, 1986, p. 179)

Thompson, Evans and Handley (2005) provide further experimental evidence for this argumentative view by showing that people construct inferences beyond the information explicitly given in conditional statements. On a more global level, Mercier and Sperber (2011, 2019) hypothesise that the evolutionary roots of reasoning, and with it, the use of conditionals, are primarily argumentative, as does Tomasello (2014).²

As I hope to have shown, at least in part, conditionals are instrumental in human reasoning, and this explains the attention devoted to the topic within a wide range of disciplines. The analysis of conditionals in natural language is at the very heart of this dissertation, and we will come back to linguistic accounts of conditionals in more detail in chapter 2. Before doing so, however, and having addressed, in general terms, the object of this study, I will address the main aim of this dissertation in the next section.

¹Note that analysing a conditional statement as a whole in terms of speech acts is not the same as analysing the relation between their parts in terms of the speech-act domain (see above, and Sweetser, 1990, Chapter 5), although the two perspectives are by no means incompatible.

²For a discussion and comparison of these views, see Verhagen (2021).

1.2 Main aim

In general terms, this dissertation attempts to answer the following questions: which meanings are expressed by sentences that have the form of a conditional statement, and how do these meanings relate to the grammatical properties of those sentences? These questions clearly need to be specified and reformulated in order to be answered. As mentioned above, the proper formulation of the central research question is postponed until chapter 2, because it needs to be embedded in the body of literature on conditionals available. This does not mean, however, that the question cannot be narrowed down to function as a guide for the remainder of this introductory chapter. In this section, therefore, I provide a preliminary specification of the question above by focusing on two linguistic aspects of conditionals: their meaning, and their form.

As we briefly discussed above, in many studies of conditionals, the meaning of a conditional statement, like any other statement, is defined in terms of truth conditions, i.e., what does the world have to be like in order for the statement to be judged true?³ In many formal accounts, the conditional conjunction *if* in natural language is equated with the conditional (or ‘material’) operator $\supset$ in logic. In such accounts, conditionals are evaluated true in all cases except those in which the statement in the conditional clause, the antecedent or *p*, is true and the statement in the main clause, the consequent or *q*, is false. Take, for instance, the conditional statement from Noakes’s *Lore of Running* in (12) below.

- (12) The essential feature during this period of running is not to become breathless or overly tired. The average training pace will probably be 5 to 7 min/km; *if you are able to train at that pace, you will be able to run the marathon.* (Noakes, 1991, p. 202)

Now suppose that you are indeed able to run at an average pace between 5 to 7 minutes per kilometre, but you find out that you are not able to run a marathon. In that case, the author of (12) may be held accountable for a false statement, or, at least, poor advice. Of course, there can be many reasons why, even while being able to run at a certain pace, one would not be able to finish the marathon, but this is irrelevant to the strictly truth-conditional evaluation of (12). In actual language use, however, such reasons are indeed relevant, and what is generally denoted by the term ‘meaning’ is not limited to truth conditions alone (for a discussion on the term ‘meaning’, see Verhagen, 2019, p. 62, and the following chapters of this dissertation).

Two such ‘non-truth-conditional’ aspects of meaning are central topics in this dissertation. First, as I argue in chapter 2, by using the conditional conjunction *if*, as opposed to an assertive conjunction like *since*, a speaker cannot assert the statement it expresses. Although a coach may express (12) while at the same

³Or ‘a world’ in a possible-worlds semantics (see Kripke, 1959 and, for an overview, see Partee, 2010, pp. 15–20).

time witnessing his pupil running at an average pace of 5 minutes per kilometre around the track, it would be odd to do so without further reason. Next, for a coherent interpretation, there should be a kind of connection between the conditional clause and the main clause. Whereas the conditional in (12) conveys that being able to train at a certain pace causes or enables running the marathon, in (13), one would be hard-pressed to find such a connection and in consequence, many readers will find this a strange, or incoherent utterance at least (hence the ? sign; see the list of symbols on page xxi).

(13) ? If you are able to train at that pace, you will have a sister named Mary.

From a purely truth-conditional point of view, however, the conditional in (13) is true in any case it turns out the hearer indeed has a sister named Mary. Such puzzles have been at the heart of many debates on conditionals.

In the next chapter, I will discuss the concept of conditionality and the term ‘meaning’ in more narrow terms, which allows for a more specific analysis of these and other vital aspects of the analysis of conditionals. For now, however, I will use the examples above to ask the following question: to what extent does the conditional conjunction *if* used in natural language differ from the conditional operator $\supset$ used in logic? As this question mentions the linguistic notion of conjunction, it brings us to the second aspect of the study of conditionals, namely the grammatical form of conditionals.

As I mentioned right at the start of this chapter, one has to choose a linguistic form to express a thought in conversation, and using a conditional forms no exception. Expressing conditionals involves choices of grammatical form. Let us look again at the example in (9), repeated below for convenience.

(9) Daniel is no athlete. If he were an athlete, he would have stamina. But he can’t climb the stairs without losing his breath. (Gerlofs, 2009, p. 89)

In this example, the speaker uses the past subjunctive of the verb *to be* (*were*). The verb form is not used however to refer to the past, but to convey a negative stance towards Daniel being an athlete, a phenomenon sometimes called ‘fake tense’ (cf. Iatridou, 2000).⁴ When we change the tense of (9) from the past subjunctive *were* into simple present *is*, as in (14), we can see a corresponding change in meaning.

(14) # Daniel is no athlete. If he is an athlete, he has stamina. (But he can’t climb the stairs without losing his breath.)

The change in meaning concerns what we will refer to as ‘epistemic distance’ in chapter 2. This negative stance, i.e., some sort of negative belief, is what is removed from (9) in (14), which would, consequently, become inconsistent (#) with the conclusion that Daniel is not an athlete preceding it, and the statement that he cannot climb the stairs without losing his breath following

⁴Note that in Dutch, a regular simple past tense verb form can be used to express such a negative stance (e.g., ‘Als hij een atleet was [...]’). See section 5.4.

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it. These and other grammatical means are what speakers in natural language can employ to express various types of conditional thoughts. While this may seem obvious, the study of conditionals has focused for a large part on the meaning of the conjunction *if* or its counterparts in other languages, and in effect, numerous debates revolve around the question what *if* means. This is not to say that there is no body of literature on the role of other grammatical features, tense being the primary candidate, but the grammar of conditionals does not end there. Contrasting (4) and (5), repeated below for convenience, for instance, shows two clause orders, i.e., a sentence-initial conditional clause, and a sentence-final conditional clause.

(4) If I want to lose weight, then I *should* not eat yet another piece of cake.

(5) Peter *will* not go to the party if I am going.

In examples (4), (5) above, and (6) and (7) repeated below, we see the modal verbs *should*, *will*, and *would*, and *must* respectively.

(6) If the train *would* have been on time, I *would* have been at the office already.

(7) If his wife died, he *must* be a widower.

While modality in conditionals too has been researched extensively, differences in clause order and other grammatical features, such as the presence or absence of *then*, have attracted less attention, and they have not been studied together at a large scale. As we will discuss below in section 1.3, it can be expected that differences in grammatical form systematically correspond, on some level, to differences in interpretation. If we indeed assume, for now, such a systematic relation between meaning and form, the second question introduced at the start of this section becomes more specific: to what extent are the grammatical form and the meaning of conditionals in natural language related? To be able to address this question sufficiently, I will discuss the theoretical background next in section 1.3.

1.3 Theoretical background

In the previous section, I described the use of conditionals in natural language in preliminary terms of meaning and form. The study of these two linguistic aspects of conditionals, and especially their relation, will guide the research presented in this dissertation. Before addressing the question of how the meaning and form of conditionals are related in natural language in detail in the next chapters, I provide a brief description of the theoretical framework used to pursue an answer.

The first question concerns the meaning of conditionals. In this dissertation, I take ‘meaning’ to include more than truth-conditional semantics alone. In Gamut’s (1991, p. 195) words, ‘there are aspects of meaning which lie beyond

the reach of logical semantics'. In chapter 2, I address this issue in great detail using the pragmatic framework of implicatures, presented in Grice's seminal work 'Logic and Conversation' (1975), in which he laid the groundwork for analysing meaning beyond the evaluation of statements as true or false. Grice developed his framework of implicatures to account for aspects of meaning that fall out of the scope of truth-conditional logic. In order to account for differences between logic and language, such as those discussed in the previous section, but without sacrificing the logical analysis of natural language, Grice (1989, p. 24) introduced the term 'implicature' to refer to what is 'implied, suggested, meant' instead of what was explicitly said. Semantics, in this view, resides in the analysis of meaning in terms of a truth-conditional evaluation of what was said, whereas pragmatics deals with implicatures, i.e., those aspects of meaning that fall beyond truth values (see e.g., Ariel, 2010, Chapter 1). A classic example, adapted from Grice (1989, p. 8) in (15), makes this clear.

(15) He took off his trousers and got into bed.

In a truth-conditional analysis, the conjunction *and* is identical to its logical counterpart $\wedge$. In logic, $\wedge$ is non-commutative, meaning that $p \wedge q$ and $q \wedge p$ are, by definition, true under exactly the same circumstances. If we reverse the order of statements in (15), however, as in Grice's original example reproduced in (16) below, the temporal order of the subject first taking off his trousers and then getting into bed is lost.

(16) He got into bed and took off his trousers. (Grice, 1989, p. 8)

In a purely logical analysis, the evaluations of (15) and (16) are identical, whereas in natural language, the two are clearly different (see also Grice, 1989, Chapter 1; Birner, 2013, p. 41; Blakemore & Carston, 1999). The temporal order in (15) is, in Grice's terms, implicated: it is non-truth-conditional meaning, but it is still meaning ('it is part of the meaning, or part of *one* meaning, of "and" to convey temporal succession' Grice, 1989, p. 8). Such implicatures can be conventionally attached to linguistic forms, or context-dependent to varying degrees.

The phenomena Grice (1989, p. 8) was famously interested in were those 'expressions which are candidates for being natural analogues to logical constants and which may, or may not, "diverge" in meaning from the related constants (considered as elements in a classical logic, standardly interpreted)'. Returning to the topic of conditionals, we can already begin to see how the discussion of 'added meanings' in the previous section points to the fact that *if* in natural language and $\supset$ in logic constitute such a pair of operators 'diverging' in meaning. Although truth-conditional and non-truth-conditional analyses are often presented as conflicting or incompatible analyses (see below and the next chapter), this small example shows how a pragmatic analysis of natural language may help to identify various meaning aspects, without ignoring either its truth-conditional, or its non-truth-conditional components, as is explicitly argued for by Boogaart and Reuneker (2017, pp. 203–204). In this study, I use

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the term ‘meaning’ to include both truth-conditional and non-truth-conditional meaning, and the term ‘implicature’ to refer to those aspects of meaning that are non-truth-conditional.⁵ Although many advantages have been made in the field of pragmatics since Grice’s initial contributions, in a considerable number of theories his original ideas still hold, most notably in the accounts by Horn (1984) and Levinson (2000). In this dissertation, I will only resort to specific frameworks of pragmatics in case they are needed for the discussion at hand, and significantly contribute to the analysis. This is not because I deem Grice’s theory superior necessarily, but because it is widely known within linguistics and thus serves a broad audience of readers.

The second question concerns the form of conditionals, and even importantly, its relation to meaning. To analyse these two dimensions of natural language, I will use the framework of Construction Grammar, (see e.g., Fillmore, Kay & O’Connor, 1988; Goldberg, 1995; Croft & Cruse, 2004, Chapters 9-11; Verhagen, 2005). The central idea in this framework is that the meaning, in the broad sense discussed above, and the form of linguistic utterances should not be studied in isolation, but in unison. In construction grammar, ‘grammatical units’, ranging from morphemes (cf. Booij, 2018) to complete phrases (cf. Goldberg, 1995), are fundamentally symbolic, i.e., they are ‘pairings of grammatical form and the corresponding meaning or semantic structure’, and as a consequence, they involve correspondence relations between form and meaning, or ‘symbolic links’ (cf. Croft & Cruse, 2004, p. 260). Constructions are, in other words, ‘conventionalised pairings of form and meaning’ (cf. Boogaart, 2009, p. 230). Next to this first principle (i.e., constructions are of a fundamentally symbolic nature), Croft and Cruse (2004, Chapter 10) opt for two other essential principles of construction grammar. The second principle is that all grammatical knowledge can be represented as such constructions, from general patterns such as Argument Structure Constructions, which determine the basic clause types of a language ‘and constrain the interpretation of “who did what to whom”’ (Goldberg, 1995, Chapter 1; Goldberg, 2019, Chapter 3), to more specific patterns found in grammar, such as the ‘*way* construction’ e.g., ‘Pat pushed her way out of the room’ (Goldberg, 1996, p. 29; Israel, 1996; Verhagen, 2003), caused motion constructions, e.g., ‘Pat sneezed the napkin off the table’ (see again Goldberg, 1995, p. 3; and e.g., Kemmer & Verhagen, 1994), and ditransitive constructions, e.g., ‘Pat faxed Bill the letter’ (see Goldberg, 1995, p. 3; and e.g., Coleman, 2009). The third principle, finally, is that such constructions are not stored in isolation, but in relation to each other through inheritance hierarchies. More specific constructions are stored lower in the taxonomy and inherit properties of their more abstract parent constructions, which reside higher in the taxonomy of constructions, while adding syntactic and semantic properties at their own level in the taxonomy. Our grammars, in this sense, are ‘more like a map than a shopping list’ (cf. Michaelis & Lambrecht, 1996, p. 216).

⁵In chapter 2, these and related terms will be addressed explicitly and in more detail.

As I mentioned briefly already, and as I will discuss in more detail in the next chapter, the study of conditionals has focused for a large part on the meaning of the conjunction *if*. From the perspective of construction grammar, however, it makes sense to take into account the complete form of a conditional, i.e., its grammar, including not only the lexical element *if*, but also the fact that, as a conjunction, it combines two clauses, each with their own syntactic and semantic properties (see Dancygier & Sweetser, 2005, pp. 7–15; Boogaart & Reuneker, 2017, pp. 201–204; Iatridou, 2021). In this view, the meaning of a conditional is not solely attributed to *if*, but also to the formal properties of the two clauses the conjunction connects, including tense, as we saw above, clause order, modal marking, use of resumptive *then*, and, for instance, focus particles such as *only* or *even*. Furthermore, as discussed above, in this dissertation the concept of meaning is taken to include both truth-conditional and non-truth-conditional meaning. As truth-conditional approaches to meaning in formal semantics, and (inter)subjective approaches to meaning in construction grammar, and in cognitive linguistics in general, are often seen as fundamentally different (see chapter 2), it is necessary to briefly discuss the combination of both approaches to language as proposed in this dissertation. There is, as Israel (2011, p. 19) argues, no *a priori* conflict between truth-conditional semantics and construction grammar. Construction grammar is, in principle a ‘non-modular’ theory, as ‘semantics, information structure, and pragmatics are interrelated; all play a role in linguistic function. Such functions are part of our overall conceptual system and not a separate modular component’ (Goldberg, 2013, p. 16; see also e.g., Fillmore, 1985; Lakoff, 1987; Langacker, 1987), and as such construction grammar ‘does not distinguish between semantics and pragmatics as two separate and autonomous modules that are in systematic interaction with each other’ (Finkbeiner, 2019, p. 173). As both types of meaning, i.e., semantics and pragmatics, are part of one conceptual system (Langacker, 1987; referred to in Finkbeiner, 2019, p. 173), in construction grammar, it is customary to pursue a combined analysis without distinguishing between these types of meaning (see for discussion e.g., Leclercq, 2020), but it is, in my view, equally viable to pursue a combined analysis which is explicit in its treatment of those types of meaning, without necessarily positing two separate systems. Israel (2011, p. 16), argues, following Kay (1990), that ‘the conventional content of a construction can include constraints on its use’, i.e., the meaning of a construction may include contributions to both truth-conditional meaning, and to non-truth-conditional meaning. What is coded by a construction (see below) can put constraints both on ‘the expressed propositional content’ and on ‘the kinds of contexts in which an expression can be used’ (i.e., non-truth-conditional meaning; Israel, 2011, p. 18). In his analysis of scalar operators, such as *any*, *ever* and *some*, Israel shows that their contributions are not ‘always evident in their truth-conditional effects’, as can be seen in comparing (17) and (18) below.

(17) None of my friends use heroin.

(Israel, 2011, p. 166)

- (18) None of my friends *ever* use heroin. (Israel, 2011, p. 166)

Language users, however, Israel (2011, pp. 166–167) argues, have strong intuitions about meaning differences between utterances with and without these operators. This suggests that linguistic units such as constructions may have different types of meaning. Israel (2011, p. 19) mentions that ‘while many formal semanticists have perhaps paid too little attention to the subjective and inter-subjective aspects of meaning, it is equally true that some cognitive linguists have tended to scant its objective and referential aspects’. While it would go too far to discuss this point in more detail in this introduction, I will treat grammatical constructions as linguistic means for carrying both truth-conditional meaning and non-truth-conditional meaning, and, in order to be analytically and terminologically clear, I will analyse these meaning aspects by using Grice’s distinction between ‘what is said’ and ‘what is implicated’. We will come back to this point extensively in the next chapters (especially in sections 2.3 and 2.4), and I will further address the question of where to situate different types of meanings in grammatical constructions in the final discussion in chapter 7 (see section 7.4). For now, it is important to note that the combined approach proposed enables an analysis in which both semantics and pragmatics play a role, in order to test to what extent implicatures frequently licensed by grammatical features of conditionals become, to a certain degree, conventionalised as grammatical constructions. This, in a nutshell, is what I strive to find out in this dissertation.

From chapter 2 onwards, I will offer a more detailed account of conditionals in terms of pragmatics and construction grammar, but I hope to have shown already how such an approach can be fruitful in the analysis of conditionals in natural language, and consequently, in answering the question to what extent the form and meaning of conditionals in natural language are related.

1.4 Data and methodology

A general research question and theoretical framework do not yet enable the study of conditionals in natural language. For that, we need actual natural language data. As both pragmatics and construction grammar stress the importance of language in use and in context (see e.g., Blakemore, 2002, Chapter 1; Ariel, 2008, Chapter 1; Rühlemann & Aijmer, 2015), I will adopt a ‘usage-based’ approach to the study of conditionals, for which I provide a number of arguments in this section.

As discussed above, grammatical constructions are form-meaning pairings which have conventionalised by means of the general cognitive ability of categorisation. Langacker (1988a, p. 131), who coined the term “‘usage-based’ model of language structure”, argues for a ‘bottom-up’ approach to language, in which linguistic utterances, just like other experiences, are individual events that are produced and perceived by language users. In perception, these individual usage events will show similarities to other linguistic events, as well

as differences, and by comparing between usage events, language users employ their cognitive abilities to categorise them into more general categories (see e.g., Lakoff, 1987; Verhagen, 2009; Harnad, 2017). Linguistic utterances showing many similarities frequently form the basis for more robust cognitive categories in which the form of the utterance and its function or meaning are stored. In other words, ‘the factors that produce the phenomena to be explained are in a very fundamental sense aspects of the use that human beings make of language’ (Verhagen, 2005, p. 24). In this view, there is no fundamental difference between grammatical rules and the ‘word list’ or lexicon (cf. Fillmore, Kay & O’Connor, 1988; Goldberg, 1995). As Goldberg (2019, p. 73) explains in detail in her recent work, learners of a language create ‘lossy memory traces of formal patterns and their associated messages-in-context’ first, then new traces are related to existing traces, which create ‘emergent clusters’ of both form and meaning aspects of an utterance. These clusters, then, are constructions, ‘learned pairings of form and function’, which become strengthened and more easily usable when newly experienced linguistic events, both in comprehension and production, overlap with existing clusters, and the construction becomes more variable with each variation. Finally, novel expressions are based on combinations of existing constructions.⁶ Although this dissertation does not focus on language acquisition, the key here is that in this view on language, all linguistic knowledge consists of form-meaning pairings based on the entrenchment of actual language use (see also Schmid, 2020). Therefore, given the questions this dissertation strives to answer, it is actual language use, i.e., specific linguistic events, that should form the empirical basis for the analysis of conditionals.

The usage-based approach to language I opt for in this study is a theoretical choice, but it also has methodological consequences, i.e., it strongly suggests a corpus-based methodology (for introductions and overviews, see e.g., Biber, Conrad & Reppen, 1998; Baker, Hardie & McEnery, 2006; Gries, 2009, Chapter 2; McCarthy & O’Keeffe, 2012; McEnery & Hardie, 2012). This means that, after the theoretical part of this dissertation, from chapter 4 onwards, I will use recorded and stored language data to inspect both the grammar and meaning of conditionals. I will construct a corpus of Dutch conditionals for a language specific corpus study, mainly because I believe a language-specific study is needed (see section 4.3.2 for arguments), and because I agree with Verhagen (2005, p. 25), who argues ‘that a deep understanding of details and subtleties [of the native language] is required to make discourse data bear on theoretical issues’ (see also Verhagen, 2000). The qualitative analysis of conditionals will be informed by ample discussion of the literature available in chapters 2 to 5, and examples of conditionals are, of course, analysed in detail.

⁶See Goldberg (2019, Chapter 4) for a much more elaborate discussion of the creativity of language.

For the substantial quantitative part of the research needed to answer the questions central in this dissertation, a fairly large amount of linguistic data needs to be analysed. Standard techniques from descriptive and inferential statistics will be used in chapter 5 to report on the individual distributions of grammatical features of conditionals in Dutch. In order to identify ‘patterns of use’ of conditionals, i.e., grammatical features of conditionals and their contributions to meaning, I employ several machine-learning techniques, most notably clustering algorithms, in chapter 6. The relation to the ‘emergent clusters’ mentioned by Goldberg above is not straightforward necessarily (see chapter 6), but clustering conditionals on the significant co-occurrence of formal (grammatical) features does relate to the formation of constructions in learning a language. In this sense, a construction is viewed as a ‘probabilistic association between syntactic and semantic properties’ (cf. Alishahi & Stevenson, 2008, p. 829; see also Beekhuizen, 2015, Chapter 2), to which I will come back in chapter 6.

1.5 Contributions to the linguistic study of conditionals

Now that the subject, main aim, theoretical background and methodology of this study are introduced, I would like to address briefly the envisioned contributions of this dissertation to the field of linguistics in general and the study of conditionals specifically, before introducing the structure of this dissertation in section 1.6.

This study aims to contribute to the study of conditionals, and the field of linguistics in several ways. First, it offers a detailed analysis of conditionals in which a truth-conditional approach, and a non-truth-conditional approach are combined to identify clearly the different meaning aspects of conditionals in natural language (chapter 2). As such, I hope it will not only contribute to the study of conditionals, but also to the study of semantics and pragmatics in general. Second, this dissertation provides an analysis of conditionals in which the study of their meaning and form are combined using the approach of construction grammar outlined above. Whereas many studies on conditionals have focused the meaning of *if* and the contribution of a small number of grammatical features, this study systematically investigates the contribution of other grammatical properties of conditionals suggested to be of influence in the literature (chapter 5), including such features as clause order, syntactic integration and the sentence type of the consequent. Third, an extensive and thorough overview of classifications of conditionals is offered (chapter 3). This overview ranges from studies of conditionals in classical Greek, to recent attempts at explaining different uses of conditionals. As the body of literature on conditionals is vast, an overview focused on finding types of conditionals and their grammatical features creates a novel inventory of linguistic accounts of conditionals. Fourth, this study investigates conditionals in Dutch corpus data,

both from the spoken and written mode, whereas available studies largely focus on conditionals in written English (chapters 4 to 6). This dissertation offers a language-specific analysis of Dutch conditionals, and an extensive, corpus-based overview of the grammar of Dutch conditionals (chapter 5). This includes an account of data annotation, together with annotation guidelines, and a systematic approach to optimising annotation reliability, adhering to the principle of ‘total accountability’ (cf. McEnery & Hardie, 2012, p. 14), which, despite several suggestions in the literature (see e.g., Krippendorff, 2004; Spooren & Degand, 2010; Artstein & Poesio, 2008; Bolognesi, Pilgram & van den Heerik, 2017), is still not standard practice in the field. As the grammatical features included in this study are suggested in the literature on English conditionals mostly, this dissertation also offers a contrastive analysis of the grammar of Dutch and English conditionals. Fifth and final, this dissertation offers a novel methodological approach to investigating the relation between grammar and meaning. It uses a combination of in-depth pragmatic analysis to construct hypotheses about conditional constructions, and applies both proven and state-of-the-art machine-learning techniques for clustering data on a carefully balanced corpus of Dutch conditionals.

These contributions need, of course, to be borne out by the research itself. Therefore, we return to them in the last chapter, chapter 7.

1.6 Structure of this dissertation

To answer the questions introduced in section 1.2 above, I will start this dissertation by discussing existing analyses of conditionals in chapter 2. In that chapter, I focus on the pragmatics of conditionals, i.e., those meaning aspects that lie beyond standard logic-oriented analyses of conditionals. Based on the discussion of the relevant literature, I present a preliminary analysis of their non-truth-conditional meaning in terms of two implicatures, namely those of ‘unassertiveness’, and those of ‘connectedness’. I will also address the issue of the degree of conventionalisation of these implicatures, which is highly relevant, because it connects the approaches of pragmatics and construction grammar in this dissertation. The implicatures mentioned will structure the discussion of accounts of conditionals from various sub-disciplines in linguistics, which I will present in chapter 3. This chapter discusses existing classifications of conditionals and serves two main purposes. First, it presents an overview of classifications of conditionals in the literature. The overview is structured by the two implicatures mentioned above, and it is directed at uncovering the various implicatures that may be licensed by conditionals in natural language. Second, it provides an overview of grammatical features of conditionals that the literature suggests to be related to these implicatures. After introducing and discussing the data selection, arguments for a language-specific study, the corpus set-up, and quantitative analyses in chapter 4, I present a corpus-based inventory of the grammatical features of Dutch conditionals in chapter 5. This

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chapter too serves a dual purpose. First, it provides an overview of the grammar of Dutch conditionals, and second, it describes the distributions of features that serve as input for the clustering of conditionals presented in chapter 6. In this latter chapter, I present a novel approach to identifying conditional constructions using clustering techniques and the framework of construction grammar to explore the extent to which the grammar of conditional constructions (form) influences their specific implicatures (meaning). Finally, in chapter 7, I will offer a final conclusion based on the results presented in this dissertation, and I will discuss their implications for the analysis of conditionals in natural language, both from a theoretical and a methodological standpoint.

CHAPTER 2

Semantics and pragmatics of conditionals

2.1 Introduction

As we saw at the start of the previous chapter, conditionals enable us to reason and argue about possible states of the world, and they have received attention within several academic disciplines (for references, see chapter 1). Within linguistics, the field in which this study is carried out, researchers have been concerned with both the form and function of conditionals in natural language. Logical analyses traditionally describe the meaning of conditionals in truth-conditional terms by roughly equating ‘if p , (then) q ’ ($p \rightarrow q$) with material implication in logic ($p \supset q$), whereas usage-based analyses often swiftly dismiss such an approach because of mismatches between the conjunction *if* in natural language and its equivalent operator in logic.

The aim of this chapter is to provide an account of conditionals in natural language which does justice to both the rich tradition of logical analyses of conditionals as material implication, and the grammatical and pragmatic analysis of conditionals as conjunctions and constructions in language use. One might think it strange that such widely diverging perspectives on one phenomenon exist, even within a single academic field, but I will use the differences in these approaches to provide a clear picture of the topic of this dissertation: conditionals in natural language. This chapter provides the background to the main question of this study: How are conditionals used in natural language? Of course, one cannot expect such a general and, as we will see in this chapter, heavily debated question to be answered in full. Therefore, the function of this chapter is not only to provide an overview of the literature on the subject

at hand, but also to use the insights from the literature to narrow down the question above, and to provide the necessary terminology and definitions for analysing conditionals in natural language.

Before discussing any analyses of conditionals, I deem it necessary to properly introduce conditionals as the object of this study, and to describe their characteristics in section 2.2. In section 2.3, I will present an overview of truth-conditional analyses of conditionals, and I will discuss in some detail the discrepancies between the (narrowly defined) truth-conditional meaning of conditionals, and the (more broadly defined) meaning and use of conditionals in natural language. Next, in section 2.4, the analysis of non-truth-conditional meaning or *pragmatics* of conditionals is introduced.¹ I then take the two main discrepancies mentioned above as a starting point for a detailed analysis of the ‘unassertiveness’ and ‘connectedness’ of conditionals in sections 2.5 and 2.6 respectively. As announced in chapter 1, this culminates in more narrowly defined research questions, which are presented in section 2.7, and will guide us through the rest of this dissertation. Finally, in section 2.8, I will present the conclusion to this chapter.

2.2 Conditionals in natural language

2.2.1 Introduction

Conditionals in natural language typically consist of a subordinate *if*-clause functioning as the antecedent, and a main clause functioning as the consequent, as in the example in (1) below.²

- (1) If I catch the train, I will come on time. (Dancygier & Mioduszewska, 1984, p. 122)

In this example, the complex sentence consists of two clauses, the antecedent and consequent respectively, which both express a proposition, which will be referred to as *p* and *q* respectively.³ To be clear on terms from the start, I will use the term ‘sentence’ as referring to a linguistic object composed of words. The

¹Of course, viewing non-truth-conditional meaning as ‘pragmatics’ is a choice in itself. This point will be discussed in section 2.4 as well.

²Different terms for *antecedent* and *consequent* are used in the literature on conditionals. This is partly because of theoretical differences, but the terms are also used interchangeably. Here the term *antecedent* is used for the subordinate *if*-clause of a conditional sentence, also called *protasis*. The term *consequent* is used for the main clause, also called *apodosis*. The main benefit of not using *if*-clause and main clause is that the terms antecedent and consequent can also be applied to less canonical constructions.

³Different disciplines and traditions have different ways of referring to the propositions presented in conditionals. Generally, *A* and *C* are used to refer to the antecedent and consequent of the linguistic expression of the conditional, while *p* and *q*, *P* and *Q*, and sometimes *A* and *B* are used to refer to the individual propositions. For the interested reader, I note here that the use of *P* and *Q* (and *R*) for propositions is attributed to Russell in *The Principles of Mathematics* (1903, p. 3), although they can also be found in Boole’s earlier *An Investigation of The Laws of Thought on Which are Founded the Mathematical Theories of Logic and*

term ‘proposition’ is used for what a sentence expresses and what can be evaluated in terms of truth conditions, resulting in a truth value (i.e., $\top$ or *true*, and $\perp$ or *false*). When a sentence is actually spoken or written in a communicative context (for a more elaborate discussion of using language as ‘joint actions,’ see Clark, 1996, Chapter 1), I will use the term ‘utterance’. Returning to conditionals, the literature shows a considerable number of accounts concerned with different types of connections between antecedents and consequents. The connection between p (‘I catch the train’) and q (‘I will come on time’) in (1) is, in Dancygier and Mioduszevska’s terms, consequential: catching the train is presented as the cause of arriving on time (cf. Dancygier & Mioduszevska, 1984, p. 122).⁴ Although this connection may seem straightforward at first, it is at the heart of a long-lasting discussion concerning the analysis of the natural language conjunction *if* (‘If p , (then) q ’) in terms of the logical operator of implication ($p \rightarrow q$).

Defining what exactly constitutes a conditional in natural language is ‘extremely difficult, if not impossible’ (Declerck & Reed, 2001, p. 8). According to Haiman (1978, p. 564), ‘neither linguists nor philosophers have suggested a coherent explication for ordinary-language conditionals’. Gazdar (1979, p. 83) addresses a number of ‘sticky issues surrounding natural language conditionals’ and Levinson (2000, p. 208) remarks that ‘unfortunately [...], a good semantic analysis of conditionals still eludes us’. Wierzbicka (1997, p. 18) argues that most literature on conditionals does not identify what conditionals actually are. From this, it may seem that defining the object of this study is indeed impossible. However, as Feger (2001, p. 1968) remarks, sometimes there is no ‘well-defined population of objects [...] and a preliminary selection has to be made intuitively’. Before resorting to such intuitions, however, I find it worthwhile to discuss suggestions and definitions offered in the literature available.

The aim of the current section is to describe the characteristics of conditionals in natural language, as a way of characterising the object of this study. I will do this by first discussing the use of conditionals in terms of their function in natural language in section 2.2.2. Next, I will discuss the use of conditionals in terms of their form in natural language in section 2.2.3. Based on insights from these two complementary perspectives, I will formulate characteristics of conditionals in section 2.2.4, and in section 2.2.5 I will offer a brief conclusion before moving on to the truth-conditional meaning of conditionals in section 2.3.

Probabilities (1854, p. 148). Indeed, the classifications prior to or around the publication of Russell’s work discussed in section 3.2, do not use P and Q for the propositions. (Sometimes, X and Y are used.) This might, however, also reflect their focus on grammar instead of logic. Following common practice in recent linguistic literature on conditionals, p is used here to refer to the proposition in the antecedent and q to refer to the proposition in the consequent.

⁴One could argue for a connection in terms of enablement instead of causality here, as a somewhat weaker form of causality seems to be expressed. See also section 3.3.7.

2.2.2 Functions of conditionals

Two different perspectives are helpful in trying to provide a clear picture of conditionals, although they are, in practice, not easily separated. The first perspective is the semasiological approach (see e.g., Geeraerts, 2017, p. 161), in which we start out with addressing the concept of conditionality by focusing on the default form of conditionals and asking the question ‘what does *if* mean?’.⁵ The second perspective is the onomasiological approach, in which the perspective is to answer the question ‘how is conditionality expressed?’. We will start in this section by addressing the first question, and the second question will be addressed in section 2.2.3.

Elliott (1981, p. 4) defines a conditional as ‘a two-clause sentence in which the first clause states a supposition or hypothesis and the second clause states the results if that condition is met’. He follows Smyth (1920, p. 512) in arguing that the subordinate clause expresses a supposed or assumed case from which, if accepted, the conclusion in the main clause follows. In suppositional theories of conditionals, ‘the basic concept required for the interpretation of *if*-sentences is that of supposing [...]’. To assert ‘If p , q ’ is to assert q within the scope of the supposition that p ’ (Mackie, 1972, pp. 92–93; for a recent suppositional account, see Carter, 2021). Rescher (2007, p. 2) argues conditionals to be ‘statement-connective statements [of which] the consequent [...] spells out what follows from the acceptance or supposition of the antecedent’. Rescher extends the structure of conditionals to bi-partite sentences (i.e., not necessarily bi-clausal) in which the acceptance of the antecedent leads to what is expressed in the consequent. This resembles the characterisation of conditionals by Nieuwint (1992, p. 178), who defines the use of a conditional as a ‘contingent commitment to q , which becomes operative as soon as p materialises’. Similarly, Quirk et al. (1985, pp. 991, 1089) characterise conditionals as sentences in which the situation in the main clause is ‘consequent on the fulfilment of the condition expressed in the subordinate clause’.

Funk (1985, p. 369) characterises conditional sentences as ‘those complex sentences expressing a conditional relation which consist of at least two, usually finite, clauses one of which describes a conditioning event [...] while the other [...] describes an event whose assertion is shown as depending on the truth of the conditioning event’. In a similar fashion, van der Auwera (1986, p. 200) puts forward the ‘Sufficiency Hypothesis’ in which ‘ p is a sufficient condition for q ’. Stalnaker (1968, pp. 101–102), following Ramsey (1950, p. 248), describes a conditional as a device for adding an antecedent to ‘your stock of beliefs,’ adjusting conflicting beliefs and evaluating the conditional depending on the truth of proposition q expressed in the consequent. Although the framework differs, Sweetser’s (1990, p. 127) description adheres to this view

⁵Note that, for now, the term ‘function’ is used rather than *meaning*, as the latter would already have implications for further analysis. Also note that ‘function’ is not used here to denote the various speech acts (cf. Austin, 1962; Searle, 1979) that may be performed using conditionals.

of a conditional clause as ‘the introduction to a hypothetical world’. Palmer (1986, p. 189) characterises conditionals as ‘sentences [that] are unlike all others in that both the subordinate clause (the protasis) and the main clause (the apodosis) are non-factual’. In Palmer’s (1986, p. 189) account, a conditional sentence ‘merely indicates the dependence of the truth of one proposition upon the truth of another’. This connects to Schiffrin’s (1992, pp. 165–166) remark that ‘there is a widespread belief that these two general semantic properties – non-factuality and event dependency – hold for all conditionals, despite many specific differences among them’.⁶

The different uses of the conjunction *if* mentioned above point to less central cases, described as follows by Huddleston and Pullum (2002, p. 741): ‘it must be borne in mind that the general term “conditional” is assigned to the *if* construction on the basis of its characteristic use and that there are some less central uses of *if* that do not impose conditions in the everyday sense of that term’. An example of such ‘less central uses’ is Austin’s ‘speech-act conditional’ in (2) below.

- (2) There are biscuits on the sideboard if you want them. (Austin, 1970, p. 212)

It can be seen why, from a formal point of view, such ‘pragmatic conditionals’ are of less interest, because they ‘do not state in any sense conditions under which the consequent is true, rather they seem to somehow operate on a higher speech act level’ (von Fintel, 2011, p. 1517).⁷ The inclusion of certain uses of *if*-clauses is dependent on the theoretical framework one starts from, and, consequently, the goals of the analysis. This can explicitly be seen in Mauck and Portner’s (2006) review of Declerck and Reed’s (2001) typology of conditionals (see also section 3.3). Mauck and Portner (2006, p. 1334) remark that pragmatic conditionals such as the example in (2) ‘seem to be conditional in form – in the sense of having a two-clause structure with the subordinate clause introduced by *if* – but do not have what would typically be considered a conditional meaning. We are unsure whether they should be included in a formal analysis of conditionals’. Accordingly, von Fintel (2011, p. 1517) presents an overview of formal analyses of conditionals and remarks that the pragmatic type ‘often gets short shrift (as it will here [...])’. Sanford (1989, p. 5) remarks that ‘non-declarative examples such as these are commonly neglected by theoretical treatments of conditionals, and I shall continue this tradition of negligence’. In this study, however, I do treat these cases as conditionals, because their form is similar to ‘regular’ conditionals and thus may be analysed as part of the same constructional network, i.e., ‘a family of closely related senses’ (Goldberg, 1995, p. 31). The perspective taken here is that, like the central cases of conditionals in the approaches mentioned above, constructions similar in form similarly express what may be termed provisionally ‘a relation of contingency’ between

⁶See sections 2.5 and 2.6 for detailed analyses of these properties.

⁷This is not to say that they are of *no* interest in formal analyses. See, for instance, DeRose and Grandy (1999), Siegel (2006), Predelli (2009), referred to by von Fintel (2011).

antecedent and consequent (cf. Prasad et al., 2017, p. 29). In more syntactic terms, following Haegeman (2003, p. 318), both *if*-clauses inside and outside the matrix domain (i.e., relating to event structure or discourse structure respectively), resulting in *event* (or *causal, consequential*) *conditionals* and *premise conditionals* (such as *pragmatic conditionals*) are treated as conditionals.⁸

Moving on to another perspective, Kratzer (2012, p. 106) offers a different analysis of conditionals and declares the traditional analysis of conditionals in terms of implication in logic, which is the subject of section 2.3, as ‘the story of a syntactic mistake’. She argues that *if*-clauses are devices for restricting the domains of operators and she expands Lewis’s (1973b) ‘restrictor analysis’ of counterfactuals (see section 2.5.4) to (indicative) conditionals. Her view is that ‘the job of *if*-clauses in modalised conditionals is simple: they restrict the modal base of the associated modal in the matrix clause,’ as her characterisation in (3) shows.

- (3) (*If*), (*necessarily*)
 (*If*), (*possibly*)
 (*If*), (*probably*) (Kratzer, 2012, p. 64)

In Kratzer’s (2012, p. 105) account, consequents of conditionals without explicit modals are ‘implicitly modalised’.⁹

A risk tied to the semasiological perspective on conditionality is that it may include uses of *if*-clauses that do not express a condition in any sense. We need to exclude known ‘non-conditional’ uses of *if*, most notably those exemplified by Declerck and Reed (2001), presented in (4) and (5) below.

- (4) He works *as if* his life depended on it. (Declerck & Reed, 2001, p. 9)
 (5) I don’t know *if* he really did it on purpose. (Declerck & Reed, 2001, p. 9)

In (4), *if* does not introduce a condition, but is part of the larger conjunction *as if* introducing a comparison, and in (5) *if* is the equivalent of *whether*. As I will focus on Dutch conditionals from chapter 4 onwards, the language-specific cases of non-conditional use of the conjunction *als* ‘if’, such as in the example in (6) below, will be discussed in detail in the chapter mentioned.

- (6) En hoe hoe is uh Aurea *als* collega? (fn006712)
 And how is Aurea as a colleague?

In contrast to the attempts at capturing the concept of conditionals discussed above, Wierzbicka (1997, p. 18) argues that ‘the concept of IF [...] cannot be meaningfully defined in terms of any other concepts’.¹⁰ Comrie’s (1986, p. 96)

⁸For more analyses of ‘biscuit conditionals,’ see e.g., Bach and Harnish (1979), van der Auwera (1986), Iatridou (1991, Chapter 2), Siegel (2006), Ebert, Endriss and Hinterwimmer (2008).

⁹For a recent discussion of views on *if*-clauses as restrictors of either overt or covert epistemic modals in the main clause, see e.g., Rothschild (2021), Ciardelli (2021).

¹⁰Notice here Wierzbicka (1997, p. 18) uses capitals in ‘IF’ here to refer not to the lexical item *if*, but to ‘concept’ or ‘conceptual primitive’ and (even) to a ‘lexical universal’.

definition of conditionals as the combination of ‘material implication with the relevance of a causal relation from the protasis to the apodosis’ introduces (implied) causality, which is not tenable according to Wierzbicka. In Wierzbicka’s example in (7) for instance, this implied causality is present, while it is not in (8). After all, the latter example cannot be interpreted as the speaker suggesting she forgives him *as a result of* the insulting.¹¹

(7) If it rains, I will stay at home. [...] (Wierzbicka, 1997, p. 19)

(8) If he insults me, I will forgive him. (Wierzbicka, 1997, p. 20)

Another example Wierzbicka (1997) provides of problems attached to existing definitions of conditionality is Braine’s (1978, p. 2) characterisation of conditionals as statements ‘of the form *if p then q* [that] invite the inference *if q then p* or *if not p then not q*’.¹² Wierzbicka (1997, pp. 17, 51–52) criticises this characterisation for being inherently circular, because the concept of ‘inference’ itself rests on the concept of *if* and she argues for *IF* as a ‘conceptual primitive’. As such, she argues, the concept of conditionality is on par with concepts like *not*, *know* and *think*, which can only be clarified by means of examples or ‘canonical sentences,’ but cannot be properly defined in other terms. Accounts such as Johnson-Laird’s (1986), in which *if* is characterised as ‘a cue to consider a possible or hypothetical state of affairs,’ are criticised by Wierzbicka (1997, p. 17) because using a term like *hypothetical* does not explain *if*, as it is semantically more complex.

Although Wierzbicka’s arguments point to a circularity in defining conditionality in terms of inference, hypotheticality or contingency, I will use the discussed accounts in order to arrive at a provisional understanding of conditionals. For now, it will therefore suffice to characterise the function of the conditional conjunction *if* as combining two clauses which present propositions *p* and *q* into one complex sentence in which the latter is in some sense contingent on the former.¹³

2.2.3 Forms of conditionals

As I mentioned in the previous section, a second route to come to a basic understanding of what conditionals are, is the onomasiological approach, through which we will identify conditionality not in terms of its default form *if*, but by identifying how the concept of conditionality, albeit provisionally characterised, is expressed in natural language. To do so, we can use the discussion

¹¹However, as with the example in (1), the connection may be characterised as less stringently causal in terms of the aforementioned *enablement* (cf. van der Auwera, 1986; Sweetser, 1990).

¹²Although it is not mentioned by Wierzbicka, this definition is attributed by Braine to Geis and Zwicky (1971).

¹³Of course, the wording here leaves a lot to be desired. For instance, what does it mean for propositions to be contingent? Such issues will be discussed at length later on in this chapter.

in the previous section, which can be captured by Athanasiadou and Dirven's (1997a, p. 62) characterisation of 'the main feature of conditionality' as 'the mutual dependency between the two propositions in the sub-clause and in the main clause of conditional sentences'.¹⁴

Elder and Jaszczolt (2016, p. 38) argue that 'there are various uses of conditional sentences that have little claim to the conditionality of the corresponding thought and, on the other hand, there are various natural language expressions that strongly convey conditional thoughts as their primary intended meanings, despite being far removed from the syntactic form of a two-clause "if *p*, *q*" sentence'. Most studies indeed equate conditionals with the set of complex sentences involving a subordinate clause introduced by *if*.¹⁵ Declerck and Reed (2001, pp. 8–9) define conditionals as 'two-clause structures' in which one is introduced by *if* or 'a word or phrase that has a meaning similar to *if* [...]'. The possibility of paraphrasing an utterance in the form of an *if*-statement however does not necessarily mean that the original utterance is conditional, as, for instance, Mauck and Portner (2006, p. 1331) argue. On the other hand, examples like (9) and (10) suggest that other constructions, such as verb-first clauses and even prepositional phrases, can function as antecedents of conditionals, as in (9) and (10) respectively.

- (9) Had he done that, I would have been happy. (Comrie, 1986, p. 87)
'If he had done that, I would have been happy.'

- (10) That course is mandatory: without a license, the couple will not be permitted to marry. (Reuneker, 2016, p. 126)
'The couple will not be permitted to marry if they do not have a license.'

Although in this study I will focus on conditionals expressed by means of *if* and Dutch *als* 'if', for future research, I consider it important to include such 'non-prototypical' conditional constructions, because they may identify specific niches of meaning associated with conditionals that are less apparent from the general meaning of the default markers of conditionality (cf. Levinson's 'M-principle,' which states that a marked expression receives a non-stereotypical interpretation; see Levinson, 2000, p. 39).

Gabrielatos (2010, p. 205; 2021) identifies constructions which resemble conditional *if* by scoring the degree to which they are marked for modality, which points to conditionals introduced by *supposing*, *provided* and *in case*. Comparing such constructions to *if* also shows that focusing on the meaning of *if* as a single conjunction does not do justice to form-meaning pairings as defined in construction grammar (cf. Goldberg, 1995, p. 4). This shifts the focus from the single lexical element *if* in isolation, to its grammatical and functional place in

¹⁴Note that the aforementioned circularity can also be found here, because Athanasiadou and Dirven include the phrase 'conditional sentences,' which, if left out, leads to inclusion of other bi-clausal structures, such as those in which the clauses are connected by a causal conjunction.

¹⁵See Dancygier and Sweetser (2005, p. 6) for discussion.

the linguistic context, which here means that it functions as a conjunction in a structure combining two verb phrases (see also Dancygier & Sweetser, 2005, pp. 7–15). In this view, the meaning of a conditional is not solely attributed to *if*, but also to the fact that there are two verb phrases combined into a complex sentence, and to the characteristics of those verb phrases, including, for example, their order and tense. It is, in this perspective, not strange that other elements, such as those found by Gabrielatos (2010), can be used to express meanings related to constructions in which *if* is used. Conditionals can then be seen as constructions, i.e., as *grammatical* means for connecting clauses in natural language, instead of *semantic* operators functioning on propositions in logic. This point will be taken up later in this chapter.

2.2.4 Characteristics of conditionals

In the previous sections, I discussed several accounts of conditionals. What most of the accounts share is the implicit assumption that there is one defining characteristic or a set thereof that is common to all conditionals. However, according to Goldberg (2006, p. 167), with reference to the work of Rosch (1978), in arguing for a functionalist approach to Subject-Auxiliary Inversion, such an assumption is ‘widely recognised to be false’. Because of this, in combination with the observation that previous studies have not reached consensus on a definition, and because we are still in the introductory section of this dissertation, I will refrain from trying to provide a final definition. Instead, I will list the three main characteristics of natural language conditionals that have become apparent from the current discussion.

First, conditionals are expressed as bi-partite grammatical structures. ‘Bi-partite’ does not mean that the complex sentence must contain two complete clauses. Rather, the parts called ‘antecedent’ and ‘consequent’ are linguistic structures which express a proposition that can be evaluated truth-conditionally. Second, although the antecedent and consequent are often equated with the propositions they express, namely p and q , the conditional as a whole does not assert either of these propositions. Whether this should be called ‘hypotheticality,’ ‘non-factuality’ or ‘unassertiveness’ will be discussed in detail in sections 2.4 and 2.5. Third, a conditional presents the consequent as contingent on the antecedent. How this contingency should be analysed will be discussed too, in section 2.6.

2.2.5 Conclusion

As I mentioned before, the discussion in this section was not intended to provide a full understanding of natural language conditionals. Rather, I have reviewed accounts of conditionals in terms of their function and form to arrive at a provisional characterisation of conditionals as complex sentences in which the antecedent expresses a proposition p on which proposition q presented in the consequent is contingent, without actually asserting either of those propos-

itions. This enables us to include bi-partite structures ranging from default *if*-conditionals as in (11) to, for example, *in case*-conditionals as in (12) and conditional pseudo-imperatives as in (13), which, according to Clark (1993), ‘seem to have the sense of conditionals’.¹⁶

(11) *If you increase your cadence*, you will run faster.

(12) *In case of an emergency*, use the stairs.

(13) *Open the Guardian* and you’ll find three misprints on every page. (Clark, 1993, p. 79)

At the same time, treating conditionals as expressions which assert neither proposition expressed in each of their parts enables us to exclude other bi-partite constructions, most notably what is considered *if*’s ‘stronger sibling’ *since*, as contrasted in the minimal pair in (14) and (15) below.

(14) If John comes, I’ll go. [...] (Levinson, 2000, p. 37).

(15) Since John comes, I’ll go.

According to Levinson (2000, p. 37), the conditional in (14) licenses the implicature ‘Maybe he will, maybe he won’t’. This is not the case for *since* in (15). We will discuss the status of this implicature in more detail in section 2.4 on the non-truth-conditional meaning of conditionals, but first, we will discuss the truth-conditional analyses of conditionals in section 2.3.

2.3 Truth-conditional meaning of conditionals

2.3.1 Introduction

The logical analysis of natural language conditionals has a long and rich history. The main aim of this paragraph is to provide the background to the problem addressed in this dissertation, namely the differences between the use of the conditional operator of implication in formal logic ($\supset$) on the one hand, and conditional constructions, such as the conjunction *if* ($\rightarrow$), in natural languages on the other hand. In this section, I will discuss the truth-conditional analysis of conditionals in section 2.3.2. Next, I will discuss the problems connected to this analysis in section 2.3.3. This will provide the basis for two main issues connected to natural language conditionals, which will be addressed after the conclusion to this section in 2.3.4.

¹⁶See also Fortuin and Boogaart (2009) on conditional imperatives, and Łyda and Zasowska (2021) for a recent corpus-based study of this construction used as a means for the speech act of threatening.

2.3.2 Material implication

As Dancygier (1998, p. 1) remarks, conditionals have been studied since Aristotle. The first truth-conditional analysis of conditionals is attributed to Philo of Megara (300 BC) and to his tutor Dioduros Cronus, and with the added notion of *incompatibility*, to Chrysippus (279 BC; see Sanford, 1989, pp. 13–25).¹⁷ The question of what a conditional means, how it should be evaluated, and what problems surround it, can also be found in Cicero’s (106 BC) *Academica*, as can be seen below.

In this very thing, which the dialecticians teach among the elements of their art, how one ought to judge whether an argument be true or false which is connected in this manner, “If it is day, it [the sun] shines,” how great a contest there is; – Diodorus has one opinion, Philo another, Chrysippus a third. Need I say more? (Cooper, 1978, p. 158)

This shows not only that the study of conditionals has an extensive history, but also that the study of conditionals has been surrounded by problems from the start. According to Kneale and Kneale (1962, p. 134), the ancient Greeks used conditionals as statements in dialectical arguments to arrive at valid inferences in scholarly debate.¹⁸ Conditionals were confined then to those uses in which the consequent followed logically from the antecedent, such as in (16) below.

(16) If x is a prime number, x can only be divided by 1 and x .

In Philo’s view, the definition of a true conditional is that it cannot have a true antecedent and a false consequent. So, in (16), if the antecedent is true, the consequent cannot be false. However, it is not the case that this view uncontroversially determines the meaning of conditionals. As Kneale and Kneale (1962, pp. 128–138) show, from the start, different views on the analysis of conditionals have been defended and one of the most illustrative debates has been whether or not the core meaning of conditionals should be described in terms of what we will discuss below as ‘material implication’ (i.e., Philo’s view, ‘necessary connexion’ cf. Kneale and Kneale, 1962, p. 138), or in terms of what has been called the ‘defective truth table’ in which a conditional with a false antecedent tells us nothing about the truth of the conditional itself.¹⁹ As Bennett

¹⁷In the Philonian view, any conditional with a false antecedent is always true. For Chrysippus, however, a conditional is false when the denial of the antecedent is incompatible with the consequent, i.e., supposing that it is true that Johnny plays the guitar, ‘If Johnny does not play the guitar, Johnny plays the guitar’ is true in the Philonian view, because the antecedent is false, but it is false in the Chrysippian view, because the consequent is incompatible with the denial of the antecedent.

¹⁸See also Bennett (2004, p. 192) for a brief discussion on the history of logic and rhetoric. See, again, Kneale and Kneale (1962) for a more elaborate discussion.

¹⁹Note that ‘necessary connexion’ here refers to entailment, not a non-truth-conditional connection between p and q . We will discuss this latter connection in much more detail in section 2.6.

(2004, pp. 114–115) remarks, it would be a mistake to consider the use of the conditional as in (16), for which p entails q (i.e., the truth of p ensures that of q), as the only use, even though, as Kneale and Kneale write, it may be the case that the first analyses of conditionals were indeed inspired solely by their use as statements syllogistic reasoning.

It was Frege’s (1879) *Begriffsschrift* and Whitehead and Russell’s discussion of it in *Principia Mathematica* (1910, p. 7) that set the truth-conditional or, as Whitehead and Russell called it, ‘material’ analysis of conditionals (i.e., the Philonian view as discussed above) as the basis of the subsequent logical systems.²⁰ In the most basic of logical systems, *sentential* or *propositional logic*, an atomic sentence (an indivisible statement) is treated as a linguist object expressing a proposition. Truth conditions then are the conditions to be met in order for that proposition to be evaluated as true. In other words, we need to formulate what a possible world has to look like for the proposition to be true. Note that whether or not the actual world is like that possible world is not contained in a truth condition. The truth value assigned to a proposition is the result of its actual evaluation with respect to a possible world. As many utterances (i.e., sentences uttered in a specific context) are performed in relation to the actual world, that world is a likely candidate for evaluation of the proposition, which then comes down to whether or not the actual world resembles a possible world compatible with the proposition at hand. The evaluation of a proposition makes use of the ‘principle of bivalence,’ which is the following.

There are exactly two truth-values, $\top$ and $\perp$. Every meaningful sentence, simple or compound, has one or other, but not both, of these truth-values.
(Forbes, 1994, p. 45)

The evaluation of a proposition must, following this principle, result in one of two values: a proposition can have either $\top$ (*true*) or $\perp$ (*false*) as its truth value.

In a sentential or propositional logic, each statement is represented by a letter, such as p or q , and can be used in complex statements by applying the connectives $\neg$ (negation, *not*), $\wedge$ (conjunction, *and*), $\vee$ (disjunction, *or*), $\rightarrow$ (implication, *if... then*) and $\leftrightarrow$ (equivalence, *if and only if*). Within truth-conditional analyses, the meaning of complex statements, built up from one or more statements and the aforementioned operators, is calculated through the compositionality principle (attributed to Frege; see a.o. Dowty, Wall & Peters, 1981, p. 42, Hale, 1997, p. 249, Bunt & Muskens, 1999, p. 8) as ‘a function of the meanings of its parts and of how they are syntactically combined’ (Partee, 2007, p. 147) using the aforementioned logical operators. In such a truth-conditional analysis, ‘if p , q ’ or ‘ $p \rightarrow q$ ’ is logically equivalent to material implication as used in truth-conditional logic, i.e., ‘ $p \supset q$,’ which in terms of our discussion above

²⁰Although Sanford (1989, p. 52) argues that ‘more careful writers these days avoid “material implication” and say that “ $p \rightarrow q$ ” is a material conditional,’ the term ‘material implication’ is still regularly used (see e.g., von Fintel, 2011; Magnus, 2015). To avoid terminological confusion, I will also use the term ‘material implication’ in this dissertation.

means that the statement ' $p \rightarrow q$ ' has exactly the same truth conditions as ' $p \supset q$ '. This 'horseshoe analysis' is thus strictly truth-conditional,²¹ meaning that the truth of the conditional statement as a whole is determined solely by the operator $\supset$ and the individual values of p and q (the aforementioned 'syntactic combination'), as presented in Table 2.1.

Table 2.1:
Truth table of $P \supset Q$

	P	Q	$P \supset Q$
1	$\top$	$\top$	$\top$
2	$\top$	$\perp$	$\perp$
3	$\perp$	$\top$	$\top$
4	$\perp$	$\perp$	$\top$

As can be seen in Table 2.1, in the analysis of 'if P , Q ' as ' $P \supset Q$,' we determine the meaning of the conditional statement by defining under which conditions or truth values of p and q it is true. A conditional statement is then equivalent to ' $\neg(P \wedge \neg Q)$,' as this is the only line (line 2) in Table 2.1 which has the value $\perp$ for ' $P \supset Q$ '. This means that only a conditional statement in which P has the value $\top$ and Q has the value $\perp$ is false as a whole (cf. Grice, 1989, p. 58; Gamut, 1991, p. 33; Bennett, 2003, pp. 20–22; Gerlofs, 2009, p. 16).^{22,23} The truth of lines 3 and 4 in particular may seem counter-intuitive, but the reason for this outcome is that the *modus operandi* in truth-conditional logic

²¹This analysis is named after the binary material operator $\supset$, resembling a horseshoe (Copi, 1973, p. 15; Bennett, 2003, pp. 20–21). The symbol is derived from the letter C in Peano's work (see Sanford, 1989, p. 51), who used the letter in ' $b \supset a$ ' for ' b is a consequence of a '. He then introduced $\supset$ to reverse the notation, i.e., ' $b \supset a$ ' is the same as ' $a \supset b$ '. Whitehead and Russell (1910) transformed this symbol into $\supset$.

²²Both $\rightarrow$ and $\supset$ are used in the literature to denote a conditional operator. Although Bennett (2003, Chapter 1), in discussing Grice's (1975) treatment of indicative conditionals, reserves $\supset$ for a strictly truth-conditional operator (material implication) and $\rightarrow$ for an operator including a non-truth-conditional connection between p and q , most authors (see e.g., Gamut, 1991; Magnus, 2015) use $\rightarrow$ as the symbol for the truth-conditional operator. (See Rescher, 2007, p. 39 for an overview of modes of implication and corresponding symbols. For a recent introduction to the material analysis of conditionals, see MacFarlane, 2020, Chapter 4.) I will use $\rightarrow$ for 'conditional,' including non-truth-conditional meaning aspects, and $\supset$ for 'material conditional'.

²³For an interesting take on the commitment to ' $\neg(P \wedge \neg Q)$ ' of speakers using conditionals as promises and, especially, threats, as in 'if you don't eat the dinner, I won't buy you this toy,' i.e., whether or not the speaker in this case is permitted to perform $\neg q$ in a situation in which the hearer ate the dinner (p), see Sztencel and Clarke (2018) and Sztencel (2018, Chapter 5). Although, for reasons of space, we cannot discuss this issue in any detail here, Sztencel and Clarke's (2018, p. 463) experimental results show that ' $p \wedge \neg q$ ' is 'permitted for conditional threats,' which undermines the claim that the $\neg(p \wedge \neg q)$ constraint is definitional of the encoded semantics, or 'core meaning,' of conditionals.

is to assign truth-values to complex statements by testing for the *falsity* of the complex statement. This can be seen by applying Table 2.1 to Cicero’s earlier example, as adapted in (17) below.

(17) If it is day, the sun shines.

As ‘ $p \supset q$ ’ means that if p is true, then q must also be true, lines 1 and 2 in Table 2.1 show that the truth of both p and q guarantees the truth of ‘if p then q ,’ while the truth of p and the falsity of q combined are inconsistent. Applied to (17), knowing that it is day, one *must* conclude that the sun shines. If one knows it to be day, but the sun is not shining, (17) is false. Since lines 3 and 4 in Table 2.1 take p to be false, ‘if p then q ’ cannot be disproved and the whole statement is evaluated as true ($\top$).²⁴ Consequently, in cases in which p is false, the conditional does not provide any information about q , hence lines 3 and 4, when taken together, are indecisive on q . A conditional with a false antecedent would thus ‘not tell us anything about the actual truth value of the consequent [...], and it is unclear what the truth value of “If A then B ” would be’ (Magnus, 2015, p. 26).

In truth-conditional analyses, ‘meaning’ is defined in terms of the relation between language and possible worlds. For now, we will look at declarative sentences, as they are used to assert propositions.²⁵ Declarative sentences assert whether or not the proposition expressed is true or false.²⁶ ‘Synthetic sentences’ are those sentences that express propositions that are true or false depending on the possible world they are evaluated in, as opposed to ‘analytic sentences’ which are necessarily true or false, i.e., in all possible worlds. The meaning of a proposition is determined by the conditions a world must meet for that proposition to be true (see Carston, 2011, p. 280; Heim & Kratzer, 1998, p. 1; Boogaart & Reuneker, 2017).²⁷ Returning to conditionals, then, we can clarify the discussion at hand by saying that uttering a conditional is to perform an assertive speech act combining two clauses in which the belief in a state-of-affairs in the proposition presented in the consequent is dependent on the belief in a state-of-affairs in the proposition presented in the antecedent.²⁸ It is,

²⁴To address the problem of propositions being evaluated as *unknown*, rather than true or false, multi-valued logics have been proposed, such as the three-valued Łukasiewicz logic (Łukasiewicz, 1970; Seuren, 2010, Chapter 1; Saldanha, Hölldobler & Rocha, 2017), and trivalent semantics by de Finetti (1936, 1995) (see Lassiter, 2020). I will not discuss such logic systems further here.

²⁵To be clear on terms, for now, I will reserve the term ‘utterance’ for the expression of a sentence expressed in a specific context, and ‘sentence’ as a grammatical entity used to express a proposition.

²⁶In contrast to, for instance, imperative sentences, which do not assert a proposition, but issue a command and have a reversed direction of fit (cf. Searle, 1976, pp. 3–4).

²⁷What this referential meaning exactly is, is yet another matter. See e.g., Boogaart and Reuneker (2017, pp. 189–191), Lakoff (1987), Langacker (1991, pp. 1–2), Langacker (2008, p. 55).

²⁸Of course, there are other types of speech act next to assertives, such as the five main types defined by Searle (1976), namely directive, commissive, expressive, and declarative speech acts. For now, we will focus on conditionals with declarative consequents performing assertive speech acts, but see section 5.8 for other sentence types and types of speech acts.

however, not the case that ‘assertion’ here refers to the individual propositions p and q expressed in the antecedent and consequent, but to the conditional as a whole, i.e., the antecedent and consequent as combined in a conditional construction. For the appropriate uttering of a conditional, it is not so much the individual truth values of p and q , but their combination that counts. (This is far from uncontroversial, of course, and we will come back to this later in section 2.5 in more detail.) Let us revisit Magnus’s (2015, p. 26) remark, in which he says that a conditional with a false antecedent would thus ‘not tell us anything about the actual truth value of the consequent [...], and it is unclear what the truth value of “If A then B ” would be’. It is important to note here that $\top$ and $\perp$, in the logical evaluation of complex statements, are not the result of an evaluation in terms of contingency to the world referred to, as with atomic statements such as p and q , but in terms of validity. A true complex statement is a statement of which the combination of its parts (statements and operators) yields a true statement. Note furthermore that statements are evaluated in terms of truth ($\top$ or $\perp$), while arguments, built up from (simple or complex) statements, are evaluated in terms of validity. Copi (1973, pp. 4–5, 273) remarks that the term *validity* is reserved by ‘some logicians [...] to characterise statements which are *logically true*,’ but I will use the term here in Copi’s sense, namely for arguments only. Applied to Table 2.1, this means that p and q as atomic sentences are true or false in the sense of their contingency to a world, while ‘ $p \supset q$ ’ as a complex statement is *logically true* or false, as its truth is a compositional function of its parts, i.e., contingency on situations referred to is only indirect. As Cruse (2000, p. 29) argues, ‘the definition of material implication makes no reference to the meanings of the propositions, merely to a relation between their truth values’. This results in discrepancies between the meaning of conditionals in logic and in natural language, such as the conclusion that a conditional statement is true in any case in which proposition p expressed in the antecedent is false. I will discuss these problems next in section 2.3.3.

2.3.3 Paradoxes of material implication

The analysis of conditionals in terms of material implication results in discrepancies between what conditionals mean from a logical perspective, and how they are used in natural language. When Peirce (cited in Sanford, 1989, p. 50) discusses the aforementioned Philonian analysis of *if*, he remarks the following.

The Philonian view has been preferred by the greatest logicians. Its advantage is that it is perfectly intelligible and simple. Its disadvantage is that it produces results which seem offensive to common sense.
(Peirce, 1933, p. 279)

Peirce (1933) refers to a mismatch between the rules governing logic and the rules involved in natural language. While the first set of rules governs the evaluation of statements and arguments in terms of ‘well-formed formulae’ (*wff*’s;

Magnus, 2015, p. 30), the second refers to the cooperative communication in terms of what, in parallel, may provisionally be called ‘felicitous discourse’. As has been observed by many, natural language, in contrast to logic, requires more from a conditional statement than the logical operator $\supset$ and individual truth values (see e.g., Austin, 1970; Grice, 1975; Haiman, 1978, p. 564; Comrie, 1986; Kratzer, 1986; Bennett, 2003; Dancygier, 1998, p. 4; Bennett, 2004; Dancygier & Sweetser, 2005). This gives rise to differences between conditionals in natural and formal languages, called ‘the paradoxes of material implication’.²⁹ In the remainder of this section, I will discuss two main problems.

Strawson (1952, pp. 86–87) distinguishes two groups of theorems with respect to the truth-conditional analysis of natural language conditionals. He argues that the first group, reproduced in (18), is non-problematic.

(18) Theorems in which $\supset$ resembles ‘if’

- a. $((P \supset Q) \wedge P) \supset Q$
- b. $((P \supset Q) \wedge \neg Q) \supset \neg P$
- c. $(P \supset Q) \leftrightarrow (\neg Q \supset \neg P)$
- d. $((P \supset Q) \wedge (Q \supset R)) \supset (P \supset R)$

Given the conditional statement in (1), repeated below, and the truth of p ‘I catch the train,’ the conclusion following (18a) is that ‘I will come on time’ (cf. line 1 in Table 2.1).

- (1) If I catch the train, I will come on time.

Given the same conditional statement and the falsehood of q , the conclusion to be drawn is ‘I did not catch the train’ (cf. (18b) and line 4 in Table 2.1). The theorem in (18c) warrants the same conclusion, namely that from ‘if P , Q ’ one can infer ‘if not Q , not P ,’ i.e., ‘If I do not come on time, I will not have caught the train’. The theorem in (18d) comes down to a hypothetical syllogism, for which an extra argument is needed, as provided below (19).

- (19) If I catch the train, I will come on time. If so, I will join the party.

The extra argument will be proposition r . It follows from (18d) that, given ‘If I catch the train, I will come on time’ ($P \supset Q$) and ‘If I come on time, I will join the party’ ($Q \supset R$), one is entitled to conclude ‘If I catch the train, I will join the party’ ($P \supset R$). In these cases, the theorems in (18) show that the

²⁹The term *paradox* is meant here in terms of ‘shortcomings in the match between the formal analysis and the natural language data it might be thought to cover’ (von Fintel, 2011, p. 1519), not in the technical sense of an internal inconsistency of a logical system.

material conditional resembles natural language *if*.^{30,31} Before arguing that in these cases too a specific discrepancy arises, I will discuss the theorems that are presented as problematic by Strawson.

Strawson's theorems in (20) present problems for equating natural language *if* to the material conditional. It can be seen that (20a) and (20b) amount to the conclusion that, when p is false, the conditional statement is always true, whether or not q is true (cf. lines 3 and 4 in Table 2.1).

(20) Theorems in which $\supset$ does not resemble 'if'

- a. $\neg P \supset (P \supset Q)$
- b. $\neg P \supset (P \supset \neg Q)$
- c. $Q \supset (P \supset Q)$
- d. $Q \supset (\neg P \supset Q)$
- e. $\neg P \leftrightarrow ((P \supset Q) \wedge (P \supset \neg Q))$

Applied to the example in (1), this warrants the conclusion that in case 'If I catch the train' turns out false, the complete statement will be true. In other words, when p is false, q is irrelevant to the evaluation of the conditional as a whole, which is essentially restated in (20e). Note that this is what differs in the 'defective truth table' in Table 2.2, as mentioned earlier in this section, which leaves the evaluation of the conditional undecided in case of a false antecedent.

Table 2.2:
Defective truth table of 'If P then Q'

	P	Q	$P \supset Q$
1	$\top$	$\top$	$\top$
2	$\top$	$\perp$	$\perp$
3	$\perp$	$\top$	...
4	$\perp$	$\perp$	...

As can be seen in the literature on conditionals, this paradox is exemplified by showing that any conditional is true in case the proposition expressed in the antecedent is false. In other words, any proposition can follow a false proposition expressed in the antecedent without altering the truth value of the whole conditional, as in the example in (21) below.

³⁰(18b) and (18c) amount to *contraposition*, which has its own set of problematic cases (see e.g., Jackson, 1987). The theorem in (18d) suffers from 'strengthening the antecedent' (cf. Adams, 1966; Jackson, 1987; Cooper, 1978). These problems will not be discussed here.

³¹One could also argue that it is the other way around, i.e., that in these cases natural language *if* resembles the material conditional, depending on one's view on the origins or nature of logic. See again Kneale and Kneale's *The Development of Logic* for an elaborate discussion.

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- (21) If I propose marriage to Margaret Thatcher, she will leap for joy and urge me to accompany her to a mountain retreat in Peru. (Sanford, 1989, p. 54)

Taking the theorems in (20a) and (20b), or lines 3 and 4 in Table 2.1 together, they license the conclusion that (21) must be true as whole, irrespective of the truth or falsity of q , because p is false – ‘if p , then q ’ cannot be disproved with a false antecedent, rendering (21) logically true.³² In other words, q is irrelevant to the evaluation of conditionals with false antecedents. A similar result is obtained by evaluating the theorems in (20c) and (20d). From these theorems, it can be seen that the truth of p is irrelevant to the evaluation of the conditional as a whole in the case that q is known to be true (cf. lines 1 and 3 in Table 2.1). Applied to (1), this means that, when it is known that the speaker will come on time, the conditional as a whole is true, whether or not she caught the train.

These problems are summarised by Lewis (1912, p. 522) as ‘two somewhat startling theorems: (1) a false proposition implies any proposition, and (2) a true proposition is implied by any proposition’. The knowledge of the falsity of p or the truth of q renders any conditional statement logically true, which does not reflect the use of conditionals in natural language. The problem of a false antecedent necessarily resulting in the truth of the whole conditional is the first of two main problems. The second problem concerns the connection between p and q . This commonly mentioned problem in linguistic studies of conditionals concerns line 2 in Table 2.1, which warrants that all conditional statements in which p and q are (synthetically) true (i.e., in reference to a world), are logically true as a whole. In other words, the analysis is purely compositional, meaning that the truth values of the individual parts determine the truth value of the whole. This licenses not only non-problematic examples discussed above, such as those in (1) and (17), and examples such as the conditional in (22) below, but also examples as in (23).

- (22) If you touch me, I’ll scream. (Leech, 1971, p. 110)

- (23) If Paris is the capital of France, (then) two is an even number. (Sweetser, 1990, p. 113)

In (22), the truth value of the complex statement captures the semantics of the complex sentence, i.e., the speaker will have spoken the truth if he or she is touched and, consequently, screams. Both events are related through a volitional schema, i.e., the antecedent is presented by the speaker as a reason for screaming. This connection has no bearing to the truth-conditional evaluation of (22), however. In the material analysis, the evaluation of both (22) and (23) results in the value $\top$ in case both propositions are taken to be true. However, there is no clear way of interpreting two being an even number as a

³²Note here that Sanford intends this example to reflect the clear falsity of p , since he ‘will not propose marriage to Margaret Thatcher’.

consequence of Paris being the capital of France. On this point, the difference between conditionals in logic and in those used in natural discourse seems clear. As Sweetser (1990, p. 113) asks, ‘under what circumstances would the evenness of two be conditionally dependent on or related to Paris’ being the capital of France?’³³ These circumstances are present in (22) (i.e., the volitional schema), but not in (23). The problem introduced by line 1 in Table 2.1 is thus that any two propositions that are true render ‘ $p \rightarrow q$ ’ true, as it is truth-conditionally identical to ‘ $p \supset q$,’ while natural language users typically require a connection between both propositions. Although I will discuss these two problems connected to material implication separately in more detail, it must be noted that Strawson’s non-problematic theorems in (18) are not free from the problem caused by a lack of connection between the two propositions expressed in conditional form. In other words, any set of propositions, connected or unconnected, can be evaluated using Strawson’s theorems. The problem of false antecedents and that of connection are, however, distinct problems. For instance, the problem in (21) concerns the falsity of the antecedent only, as there is no lack of connection, because Sanford obviously presents marrying Margaret Thatcher and leaping for joy as connected.

2.3.4 Conclusion

The reason I discussed the truth-conditional analysis of the meaning of conditionals in this section in some detail is not only the historical and theoretical importance of material implication, but also the identification of two main discrepancies between the conditional in logic and in natural language. First, the knowledge of p being false, or q being true renders any conditional statement true, while this does not reflect the use of conditionals in natural language. In the next section, we will see that one would not use a conditional in such cases, i.e., in cases in which one knows that either p is false, or that q is true. Second, a connection between p and q is irrelevant to the truth values of the complex statement, licensing logically correct, but incoherent conditionals of the type in (23), which also does not reflect the use of conditionals in natural language.

It is important to note that from the discussion above one might draw the conclusion that a truth-conditional analysis cannot capture what conditionals are about and that it therefore should be abandoned altogether. This is indeed a perspective on conditionals taken by scholars from fields ranging from semantics and philosophy (see e.g., Edgington, 1986; Bennett, 2003, Chapter 3; Weirich, 2015, Chapters 4, 5) to functional and cognitive linguistics (see e.g., Akatsuka, 1986; Sweetser, 1990, Chapter 5). This is especially the case in many usage-oriented accounts. If it is mentioned at all, it is mostly quickly

³³Of course, there can always be devised a context in which such a consequential relation would hold, such as a game in which the front of a card reading ‘Paris is the capital of France’ has a backside which reads ‘two is an even number’. Note that this would actually confirm that q must be able to be at least construed as a consequence of p .

dismissed.³⁴ Some linguists use the specific focus of formal semantics as an argument against truth-conditional analyses of conditionals (see e.g., Edgington, 1986; Wierzbicka, 1997; Mayes, 1994, pp. 451–452; Sweetser, 1990, p. 113).³⁵ This is, in my view, not entirely deserved, as the scope of a truth-conditional analysis is different, as can be seen in, for instance, in von Fintel’s (2011) definition of truth-conditional semantics below.

The questions for the semanticist are two-fold: (i) what is the formal analysis of the different meanings that conditionals convey, and (ii) how are these meanings compositionally derived? (von Fintel, 2011, p. 1518)

Semantics in this sense is concerned with only a part of the meaning of natural language. Logical semantics forms ‘no more than a part of the theory of meaning’ (Gamut, 1991, p. 195).³⁶ With respect to conditionals, Stalnaker (1968, p. 110) argues that ‘there are further rules beyond those set down in the [truth-conditional] semantics, governing the use of conditional sentences. Such rules are the subject matter of a *pragmatics* of conditionals’. In this view, and even if one believes natural language conditionals may never express the material conditional, the material conditional is ‘simply a *definitional introduction* of this conditional,’ i.e., a starting point adequate for the further analysis of conditionals in terms of sentential logic (cf. Forbes, 1994, p. 49).

In this section, we reviewed a truth-conditional analysis of conditionals to arrive at a better understanding of their semantics. This enables us to determine the focus in investigating the differences between the logical operator $\supset$ and the grammatical conjunction *if* (and other conditional constructions): the truth-conditional status of the propositions expressed in the antecedent and consequent, and a connection between the antecedent and consequent. I will discuss these two issues in the next section in order to describe what Stalnaker described as ‘a *pragmatics* of conditionals’ and, of course, to evaluate whether this is indeed (primarily) a pragmatic matter.

³⁴Cruse (2000, p. 9) argues that ‘material implication is essentially of no interest to linguistic semantics [...]’, although he argues for strict implication, as entailment, in contrast to material implication, which does make reference to the (non truth-conditional) meaning of propositions.

³⁵For a recent overview of Edgington’s work on conditionals, and related discussions by other scholars, see Walters (2021).

³⁶Delimitation of *meaning* is heavily debated and not only a scope of analysis, but also a view on the nature of language. As may be expected, this dissertation is not the place to discuss this issue in extensive detail. See for discussion e.g., Stalnaker (1972, p. 138), Salmon (2005, p. 317), Ariel (2010). For specific discussion on this issue in relation to conditionals, see Lewis (1918, pp. 291–339) on ‘strict implication’, Ramsey (1950), Stalnaker (1968), Lewis (1973b) on ‘possible worlds’ and, for introduction to and discussion of these approaches, see Cantwell (2018), Adams (1975) on probability theory, and Anderson and Belnap (1975) on relevance logic. See also Gerlofs (2009, pp. 23–39) and von Fintel (2011) for overviews.

2.4 Non-truth-conditional meaning of conditionals

2.4.1 Introduction

In this section, I discuss the framework used for analysing conditionals and their non-truth-conditional meaning found in natural language. I will offer a brief introduction to Grice's model of (non-natural) meaning in section 2.4.2, before discussing conventional and non-conventional types of meaning in sections 2.4.3 and 2.4.4 respectively. In section 2.4.5, I will clarify how I use the term 'non-truth-conditional meaning' in this dissertation. In section 2.4.6, I will provide a detailed discussion of two types of conventional meaning in order to avoid the terminological confusion present in parts of the pragmatic literature. Next, in section 2.4.7, I will provide a brief conclusion, before moving on to the analysis of the status of proposition p expressed in the antecedent in section 2.5, and the connection between the antecedent and consequent in section 2.6.

2.4.2 Grice's model of meaning

Before discussing the two non-truth-conditional meaning aspects of conditionals in the following sections, I will try and clarify the use of the term 'non-truth-conditional meaning' as it is used in this dissertation. The starting point for this discussion is where we ended the previous section, namely that a strictly truth-conditional analysis of conditionals cannot describe why, in natural language, we do not use conditionals in situations in which we want to assert their propositions, and why we seem to need a connection between antecedent and consequent for the utterance of a conditional to be felicitous.

Modern pragmatics essentially started with Grice's 'Logic and Conversation' in 1957 (Grice, 1957, 1975, 1989), in which Grice developed his theory of implicatures to deal with aspects of meaning that could not readily be analysed in terms of truth-conditional logic, as introduced below.

It is a commonplace of philosophical logic that there are, or appear to be, divergences in meaning between, on the one hand, at least some of what I shall call the formal devices – $\sim$, $\wedge$, $\vee$, $\supset$, $(\forall x)$, $(\exists x)$, (ιx) , (when these are given a standard two-valued interpretation) – and, on the other, what are taken to be their analogues or counterparts in natural language – such expressions as *not*, *and*, *or*, *if*, *all*, *some* (or *at least one*), *the*.
(Grice, 1989, p. 22)

To account for these divergences, Grice (1989, p. 24) introduced the term 'implicature,' which refers to what is 'implied, suggested, meant' instead of 'what is said'.³⁷ According to Grice (1989, p. 87), 'what is said' is the proposition

³⁷Cohen (1971, p. 68) remarks that Grice already explained the concept of implicature in Grice and White (1961), but then he still called it 'implication,' which, as we have seen, denotes conditionals in logic, which does not help distinguishing between types of meaning.

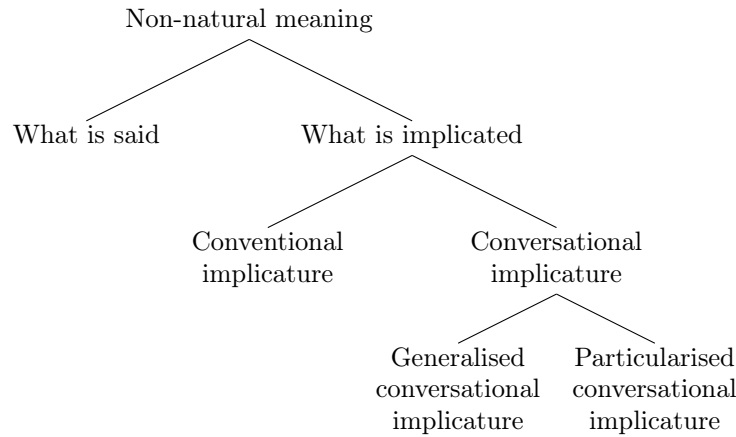
that is expressed by a sentence, and it is what a speaker can ultimately be held accountable for: ‘what is said’ (S) means p ‘in virtue of the particular meanings of the elements of S, their order, and their syntactical character’ (i.e., ‘Syntactic Correlation,’ see Bach, 2001, p. 15; for discussion of the concept of ‘what is said,’ see below, and Baptista, 2011). Next to this sentence meaning, a speaker may implicate additional meaning. Such ‘additional’ meaning is carried by implicatures, which come in two main types. The first type, conventional implicature, supplies non-truth-conditional meaning independent of its context. This means that, in Levinson’s (2000, p. 14) words, ‘what is coded by the linguistic system is the sum of what is said (roughly the truth-conditional content) and what is conventionally implicated’.³⁸ Grice, as we will see in the next section, unfortunately, offers only a brief discussion on this type of implicature. The second type, conversational implicature, is dependent on context, and is discussed in great detail by Grice (see section 2.4.4). Conversational implicatures can be quite individual and strongly context dependent, in which case they are called particularised conversational implicatures. In case they are more frequent and only weakly context dependent, they are called generalised conversational implicatures. Conversational implicatures have received more much attention than conventional implicatures in the field of pragmatics at large. Both types do not, by definition, contribute to truth-conditional meaning (i.e., ‘what is said,’ see e.g., Grice, 1989, p. 25; Blakemore, 2002, p. 47; Bach, 2001, p. 40; Birner, 2013, p. 99), but they do play an important role in analysing the ways in which meaning in conversation extends beyond its contribution to the truth-conditional contents of what was said.

Figure 2.1 below offers an overview of the standard view of Grice’s model of non-natural meaning.³⁹

³⁸Below, I will raise the issue to what extent conventional implicatures should be seen as the result of inferences, as that would place them outside what is strictly coded by the linguistic system.

³⁹I will not discuss ‘natural meaning’ here. For the difference between natural and non-natural meaning, see Grice (1957), and, for a brief explanation, Terkourafi (2009a, pp. 28–29), Terkourafi (2009b, p. 80).

Figure 2.1:
Grice's model of non-natural meaning



As we see here, ‘non-natural meaning’ includes both conventional and context-dependent aspects of meaning (or ‘language-dependent’ and ‘intentional’ or ‘speaker-dependent’ aspects of meaning; cf. Terkourafi, 2009a, pp. 80–81). Although this figure presents a clear picture of Grice’s model of non-natural meaning, and the distinction between conventional or sentence meaning (including both truth-conditional meaning or ‘what is said’ and the non-truth-conditional meaning contribution of conventional implicatures), and conversational or utterance meaning (including both particularised and generalised conversational implicatures) is used often to distinguish between semantics and pragmatics, it does obscure the fact that ‘meaning’ here refers to the meaning of either expressions/sentences (i.e., linguistic constructs), or utterances (i.e., contextualised usage events), but not to the meaning of individual words or phrases.⁴⁰ This difference is often neglected, but because it is of importance to the analysis of conditionals offered in the next section, I will provide a discussion of this issue to prevent terminological confusion in section 2.4.6. First, however, I will elaborate on the notions of conventional implicature, conversational implicature, and non-truth-conditional meaning in sections 2.4.3 to 2.4.5 respectively.

⁴⁰For discussions of the concept of ‘what is said’, see e.g., Levinson (1983, pp. 42, 96), Levinson (2000, pp. 14, 170), Potts (2007a, p. 666), Recanati (1993, Chapter 13). For discussion and the notion ‘structured proposition’ with respect to the work of Grice, see Bach (1994, pp. 142–143). On the notions of ‘implicature’ and minimal propositions, see Bach (2001).

2.4.3 Conventional implicature

As mentioned above, ‘what is said’ accounts for the truth-conditional meaning of an expression (for an elaborate discussion, see Baptista, 2011), whereas ‘what is implicated’ accounts for the non-truth-conditional meaning of an expression or utterance. Such implicatures come in two main types: conventional and conversational implicatures. The former type is reserved for meaning that is conventionally associated with a certain expression, but, as the name suggests, does not affect truth-conditions. Grice provides the example in (24) below.

(24) He is an Englishman; he is, therefore, brave. (Grice, 1989, p. 25)

The truth-conditions for *therefore* are exactly those of *and*, as in (25) and its logical counterpart $\wedge$, and even those of *but*, as in (26).

(25) He is an Englishman, and he is brave.

(26) He is an Englishman, but he is brave.

As *therefore* and *but* have the same truth-conditions as *and*, and from a purely truth-conditional perspective, they are indistinguishable from $\wedge$, as can be seen in Table 2.3 below.

Table 2.3:
Truth table of $\wedge$, and, but, and therefore

	P	Q	$P \wedge Q$	‘ P and Q ’	‘ P but Q ’	‘ P therefore Q ’
1	T	T	T	T	T	T
2	T	$\perp$	$\perp$	$\perp$	$\perp$	$\perp$
3	$\perp$	T	$\perp$	$\perp$	$\perp$	$\perp$
4	$\perp$	$\perp$	$\perp$	$\perp$	$\perp$	$\perp$

In contrast to what Table 2.3 seems to suggest, the meanings of *and*, *but*, and *therefore* can hardly be called identical in natural language. Grice (1989, p. 25) argues that by uttering (24) he would have committed himself, ‘by virtue of the meaning of my words, to its being the case that his being brave is a consequence of (follows from) his being an Englishman’. However, he continues, he has not *said* that his braveness follows from the man being an Englishman. He has ‘indicated, and so implicated’ it, but it is not part of what was (truth-conditionally) said. These aspects of meaning are conventionally tied to the words *therefore* and *but*, and thus not dependent on any specific context. Unfortunately, as Potts (2007a, pp. 665–666) remarks, Grice offers only one small paragraph on the subject of conventional implicatures before moving on to conversational implicatures, leaving much detail to be explained. It may therefore not come as a surprise that Grice’s notion of conventional implicature instilled

many debates and different analyses, or has been abandoned altogether in some theoretical frameworks.⁴¹ We will continue the discussion of conventional implicatures in more detail in section 2.4.6 below, but to be able to do so, we will first contrast conventional implicatures with conversational implicatures.

2.4.4 Conversational implicature

Next to conventional implicatures, the other type of implicature is the conversational implicature, which is non-truth-conditional as well, but context dependent, thus non-conventional by definition. If we look at *and* again, we can contrast the example in (25) with the example in (27) below.

- (27) She jumped on the horse and rode into the sunset. (Blakemore & Carston, 1999, p. 1)

This example licenses the implicature that the jumping occurred before riding into the sunset. This cannot be attributed to *and*, however, as in (25) no such implicature arises. The implicature is context-dependent to a certain degree, and can be derived on basis of the mutual expectation that the interlocutors are cooperative in their conversation, cf. Grice's 'Cooperative Principle' in (28).

(28) Cooperative Principle

Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged. (Grice, 1989, p. 26)

Furthermore, expecting the other interlocutor to adhere to the Cooperative Principle, the inference can be calculated from one or a combination of the four maxims and their sub-maxims adapted from Grice (1989) in (29) below.

(29) Grice's conversational maxims

1. Quantity
 - i. Make your contribution as informative as is required (for the current purposes of the exchange).
 - ii. Do not make your contribution more informative than is required.
2. Quality
 - i. Do not say what you believe to be false.

⁴¹Most notably, in Relevance Theory, conventional implicatures are not acknowledged. See for instance Carston (2006, pp. 653–654), who mentions, in a footnote, the following: 'I omit from this chapter any discussion of the Gricean notion of "conventional implicature," a category which simply does not arise within relevance theory and which is currently seen, across various pragmatic frameworks, to be in need of radical reworking'. Here, linguistic devices generating what are called conventional implicatures are analysed as elements 'encoding procedural constraints on the inferential processes involved in deriving conversational implicatures'.

- ii. Do not say that for which you lack adequate evidence.
- 3. Relation
 - i. Be relevant.
- 4. Manner
 - i. Avoid obscurity of expression.
 - ii. Avoid ambiguity.
 - iii. Be brief (avoid unnecessary prolixity).
 - iv. Be orderly. (Grice, 1989, pp. 26–27)

From (27) and the fourth sub-maxim of manner in (29) we can infer that the order in which the events are described would, under normal circumstances, match the order in which they occurred. A further distinction within the category of conversational implicatures made by Grice is that between generalised and particularised conversational implicatures, the former being less context dependent, or a default implicature, as in (27), the latter being more context dependent, or particular.

2.4.5 Non-truth-conditional meaning

The term ‘non-truth-conditional meaning’ will be used here in Grice’s sense, namely to refer to those aspects of meaning that do not contribute to truth-conditions. This meaning includes both conventional and non-conventional (i.e., conversational) implicatures.⁴² This does not mean, however, that the difference between conventional and conversational implicatures is of no importance in this study. In fact, they differ in important ways. First, conversational implicatures must be calculable using the maxims in (29), whereas conventional implicatures are tied to words or expressions and, therefore, do not need to be calculated (but see the discussion in section 2.4.6 below). Second, conversational implicatures are cancellable (or ‘defeasible’), meaning that an implicature *p* can be cancelled in specific circumstances by adding “‘but not *p*” or “‘I do not mean to imply that *p*” (Grice, 1989, p. 44). The conversational implicature of order in (27), for instance, can be cancelled by adding ‘but not in that order’, whereas the conventional implicature of contrast tied to *but* in (26) cannot. Adding ‘but I do not mean to say that Englishmen are generally not brave’ would make for an incoherent or even an infelicitous utterance. The other side of this characteristic is that conversational implicatures are reinforceable (cf.

⁴²I will not go into the related issue of ‘non-at-issue content’ here. ‘At-issue content’ (roughly) corresponds to truth-conditional content. Potts (2007b, p. 666) for instance identifies it with ‘descriptive meanings’ and ‘what is said’, and ‘non-at-issue content’ is then used to analyse expressive meaning contributions (see e.g., Potts, 2005; McCready, 2010, p. 2). ‘At-issueness’, however, does not coincide (completely) with dimensions like conventional and conversational meaning, and truth-conditional and non-truth-conditional meaning, and introduces yet another dimension to the semantics-pragmatics interface (see e.g., Horn, 2016).

Sadock, 1978, p. 294), as one can continue (27) by explicitly saying ‘and I mean in that order’ without being redundant, whereas saying ‘and I mean to say that Englishmen are generally not brave’ would result in redundancy. While there are other characteristics and tests of conversational implicatures,⁴³ the most used is cancellability and used in tandem with calculability, it should be possible to discern conversational from conventional implicatures.

I will use Grice’s framework as much as possible in this dissertation, because it is considered the basis for many subsequent theories of pragmatics. If needed, I will refer to what are known as the ‘Neo-Gricean frameworks’ by Horn (1984) and Levinson (1983, 2000), who continue in the line of Grice, and basically uphold the types of implicatures discussed above, but reduce the four Maxims in (29) to two and three principles respectively.⁴⁴ I will not use the ‘Post-Gricean’ framework of Relevance Theory (Sperber & Wilson, 1986), which reduces Grice’s four Maxims to one ‘Principle of Relevance’, mainly because it changes where to draw the line between truth-conditional and non-truth-conditional meaning in important ways.⁴⁵ Most prominently, Sperber and Wilson (1986, p. 182) introduce the term (pragmatic) ‘explicature’ (‘an explicitly communicated assumption’) to include inferred meaning (implicatures in Grice’s sense) into truth-conditional meaning (Sperber & Wilson, 1986, pp. 38, 182). This means that a (truth-evaluable) proposition is already enriched by pragmatic inference, i.e., pragmatic principles are needed before language users can determine what is explicitly communicated, resulting in what is called ‘explicature’. To a lesser degree, and upholding the basic Gricean distinctions between ‘what is said’ and ‘what is implicated’, this standpoint is also defended by Levinson (2000, pp. 166–167), who views these inferences as ‘intrusive implicatures’, also allowing for pragmatics to precede semantic evaluation of a proposition.⁴⁶

⁴³Most notably ‘non-detachability’, which suffers from excluding manner-based implicatures, and ‘indeterminacy’. See Grice (1989, Chapter 3) and Sadock (1978, p. 284).

⁴⁴For Horn (1984), there are two pragmatic principles: the Q-principle for Quantity and the R-principle for Relation. The Maxim of Quality is not represented in Horn’s principles, because it is preliminary to the working of the principles. Without it, ‘the entire conversational and implicatural apparatus collapses’ (Horn, 1984, p. 12). Like Horn, Levinson (2000) considers the Maxim of Quality to be preliminary to the working of the principles he proposes. Contrary to Horn’s reduction of Grice’s four maxims to two principles, Levinson (2000) argues for three principles: the Q-principle for Quantity, the I-principle for Informativeness, and the M-principle for Manner.

⁴⁵For the same reason, and for reasons of space, I will not discuss Elder and Jaszczolt’s (2016) framework of ‘Default Semantics’, and its application to (biscuit) conditionals as presented in detail by Elder (2019a), nor Sztencel’s (2018, pp. 75–76) analysis of conditionals in terms of ‘semantic holism’, which rejects a distinction between logical and inferential relations, and suggests that the ‘meaning/semantics of an expression is determined by its place in the network of beliefs constituting entire theories or even a cogniser’s entire belief system [...]’. For an introduction, see Chapter 4, and for an application to conditionals, see Chapters 5 and 6 in Sztencel (2018).

⁴⁶For elaborate overviews and discussions of pragmatics frameworks, which falls outside the scope of this dissertation, see a.o. Ariel (2010), Chapman (2011, Chapter 5), Carston (2002, Chapter 2), Levinson (2000, Chapter 3), Szabó (2005).

2.4.6 A note on conventional meaning and conventional implicature

Before returning to the topic of conditionals, I deem it necessary to try and offer some terminological clarity concerning the notions ‘conventional meaning’ and ‘conventional implicature’, because in a (large) part of the pragmatic literature, these terms are used either interchangeably, or ‘conventional meaning’ is left out of the picture altogether. Note, however, that this section is not merely an exercise in close-reading of Grice (1989), or an insistence on clear terminology for the sake of terminology. The difference between conventional meaning and conventional implicature will turn out to be of importance to the analysis of conditionals offered in the remainder of this dissertation.

In the previous sections, we distinguished between conventional implicatures and conversational implicatures, and this distinction is vital for understanding Grice’s model of meaning. As announced in the introduction to this section, however, this ‘standard picture’ of Grice’s model of (non-natural) meaning is often presented without a clear distinction between meanings on word and sentence level. This, in my view, introduces terminological problems when dealing with conventional implicatures. Therefore, we will discuss this distinction in detail in the remainder of this section.

To clarify the issue at hand, let us analyse Levinson’s criticism on Grice’s analysis of conventional implicatures below.

Grice provides just two examples: the word *but* has the same truth-conditional (or truth-functional) content as the word *and*, with an additional conventional implicature to the effect that there is some contrast between the conjuncts (Grice, 1961); the other example is the word *therefore* which Grice holds contributes nothing to the truth conditions of the expressions it occurs within (Grice, 1975: 44).
(Levinson, 1983, p. 127)

We see here that ‘contrast’ is described as a conventional implicature of *but*. For *therefore*, this conventional implicature would be ‘consequence’. Levinson (1979, p. 214) furthermore mentions the following.

I believe that at least in some of their uses, words like *however*, *moreover*, *anyway*, *well*, *still*, *furthermore*, *besides*, *although*, *okay*, *oh*, and phrases like *in fact*, *in a way*, *in any case*, *all in all*, *be that as it may*, will have to be treated as carrying conventional implicatures. In addition of course there are socially deictic elements like *sir*, *madam*, *mac* or *mate*, *your honor*, *professor*, and summons forms with socially deictic implication like *hey*, *excuse me*, and polite formulae like *how do you do*.
(Levinson, 1979, p. 214)

It is not entirely clear how ‘carrying conventional implicatures’ must be interpreted here, but in view of the above, I think it safe to say that ‘conventional implicatures’ here actually refers to the conventional meanings of the words and phrases summed up. Similarly, Birner (2013, pp. 66–68), in discussing her example reproduced in (30) below, mentions how *but* has ‘no effect on the truth of the utterance’.

- (30) Clover is a labrador retriever, but she’s very friendly. (Birner, 2013, p. 66)

She continues by arguing that the meaning aspect of contrast is ‘an implicature; since it is conventionally attached to the use of the word *but*, it is a conventional implicature’. While this is, to my knowledge, a very common interpretation of Grice’s notion of conventional implicature, perhaps even the dominant interpretation in the field of pragmatics, it does not in fact concur with Grice’s brief and, as mentioned above, perhaps somewhat obscure discussion of conventional implicatures, reproduced in full below.

In some cases the conventional meaning of the words used will determine what is implicated, besides helping to determine what is said. If I say (smugly), *He is an Englishman; he is, therefore, brave*, I have certainly committed myself, by virtue of the meaning of my words, to its being the case that his being brave is a consequence of (follows from) his being an Englishman. But while I have said that he is an Englishman, and said that he is brave, I do not want to say that I have SAID (in the favored sense) that it follows from his being an Englishman that he is brave, though I have certainly indicated, and so implicated, that this is so. I do not want to say that my utterance of this sentence would be, STRICTLY SPEAKING, false should the consequence in question fail to hold. [...] (Grice, 1989, pp. 44–45)

As can be read in the beginning of this passage, Grice distinguishes between conventional *meaning* and conventional *implicature*. It seems that ‘consequence’ is what Grice calls ‘the conventional meaning of the word[s]’ *therefore*, which, in turn, ‘will determine what is implicated’. The conventional implicature, then, is not ‘consequence’, as the authors referred to above suggest, and it is not tied to a single word, but rather to an expression built up from words with conventional meanings, arriving at the more ‘fleshed-out’ conventional implicature ‘being brave is a consequence of (follows from) his being an Englishman’. In other words, whereas the word *therefore* conventionally adds the general meaning aspect of ‘consequence’ to the expression it is part of, the conventional implicature ‘being brave is a consequence of his being an Englishman’ is much more specific and tied to the expression as a whole. This resembles Karttunen and Peters’s (1979a, p. 47) analysis, in which they explain how conventional implicatures (or, in their analysis, presuppositions) are tied to sentences. Karttunen and

Peters argue that a standard, declarative natural language sentence ϕ represents both ϕ^1 , and ϕ^p , which stand for the sentence's truth-conditions and its conventional implicatures respectively, of which the latter are thus licensed at sentence level, not at word level (see also Gamut, 1991, p. 188).⁴⁷

When we look at the pragmatic literature at large, it is clear that there are different ways of understanding the notion of conventional implicature, and in many cases, conventional meaning, as mentioned by Grice above, is not discussed at all. A perhaps remarkable observation is that Grice's brief passage on conventional implicature gets cited by a number of authors, but while it begins, as we saw above, by stating that 'in some cases, the conventional meaning of the words used will determine what is implicated, besides helping to determine what is said', hardly any author draws attention to the notion of conventional meaning. This is of importance, because for Grice, this meaning forms the basis for generating or licensing conventional implicatures. Although Potts (2005) is an exception by commenting on the excerpt explicitly, he does not clarify the issue. On the contrary, as we can see below, he argues that conventional implicatures are part of the conventional meaning of words.

The phrase 'the conventional meaning of the words' is the crux of this statement, since it locates CIs [Conventional Implicatures] in the grammar. The 'conventional' part of 'conventional implicature' stands in for 'not calculable from the conversational maxims and the cooperative principle'. This is initial (and compelling) motivation for a dividing line between the phenomena that pragmatic principles should cover (conversational implicatures) and those that they cannot (CIs, among others). (Potts, 2005, p. 9)

He continues by asking whether it is 'true that the phrase mentioned places conventional implicatures in the grammar?'. I would argue, based on the same 'crux of this statement', that 'the conventional meaning of the words' is part of the grammar, but conventional implicatures are not. Rather, they are a product of the grammatical rules and words of a language combined. While one may object that this is reading too much into this passage, Potts's book *The Logic of Conventional Implicatures* (2005) deals, as the title suggests, specifically with conventional implicatures, and early on, Potts lists a number of properties of conventional implicatures, of which the first is 'CIs are part of the conventional meaning of words' (Potts, 2005, pp. 11, 88). Another example of the terminological problems at hand can be found in Chierchia and McConnell-Ginet's

⁴⁷It must be noted, however, that later on, Grice (1989, p. 118) remains somewhat unclear on this issue by arguing that what is implicated 'may be either conventionally implicated (implicated by virtue of the meaning of *some word or phrase* [emphasis added] which he has used) or nonconventionally implicated (in which case the specification of the implicature falls outside the specification of the conventional meaning of the words used)'. I take this passage to be at least compatible with the distinction between conventional meaning and conventional implicature as made in this section.

discussion of the examples in (31) and (32) reproduced below, in which they argue that (32), but not (31) suggests ‘that the speaker perceives a contrast between going to the store and buying nothing’, while truth-conditionally (31) and (32) are identical.

(31) Jim went to the store and bought nothing. (Chierchia & McConnell-Ginet, 1990, p. 189)

(32) Jim went to the store but bought nothing. (Chierchia & McConnell-Ginet, 1990, p. 189)

They continue by arguing that ‘considerations of this sort led Grice to regard the contrastive character of *but* as a “conventional implicature,” an implication that is conventional in nature but not determinable by truth-conditional content as such’. However, such an explanation conflates word and sentence meaning. When one distinguishes between conventional meaning and conventional implicature, it must be the case that the conventional meaning of *but* includes ‘contrast’, but ‘a contrast between going to the store and buying nothing’ can only be a conventional implicature of the expression as a whole, with an important, but not exclusive contribution of *but*. Rather, the conventional meaning of *but* in unison with the other words in the sentence determines what is implicated. Blakemore (2002, p. 48) too seems to lump together conventional meaning and conventional implicature by arguing that ‘it seems that Grice would want to say that the speech act whose performance is signalled by *but* or *on the other hand* in an utterance such as [(33)] has the content in [(34)], and hence that this is the conventional implicature carried by *but*’.

(33) My brother-in-law lives on a peak in Darien; his great-aunt, on the other hand, was a nurse in World War I. (Blakemore, 2002, p. 48)

(34) There is a contrast between the assertion that the speaker’s brother-in-law lives on a peak in Darien and the assertion that his great-aunt was a nurse in World War I. (Blakemore, 2002, p. 48)

In fact, later in the discussion, Blakemore (2002, p. 72) mentions how ‘we have already seen how the phenomenon [Grice] called *conventional implicature* – expressions such as *but* and *therefore*, for example – made it difficult for Grice to maintain this definition’. Next, Ariel (2010) shows how various scholars distinguish between truth-conditional and non-truth-conditional conventional meaning, while ‘Grice’s distinction between semantic meaning and conventional implicature hardly figures in linguistic problem solvers’ analyses’ (for references, see Ariel, 2010, p. 14). Later on, however, Ariel seems to use the terms conventional meaning and conventional implicature interchangeably, when she says that the ‘contrast aspect of the interpretation of *but* is analyzed as a conventional implicature’ (see also Ariel, 2008, pp. 69, 295). In analysing the example in (35) below, she mentions how the notion of contrast for *and* is

a conversational implicature, as it varies depending on the context, whereas ‘it is a conventional implicature for *but*. Grice proposed a similar analysis for *therefore*’.

- (35) I do not know if they sold or advertised, but we did not sell anything, no apartment and (a) week ago suddenly people came in, bought... (Ariel, 2010, p. 127)

Keeping the terminology clear, however, we should say here that the conventional meanings of *and* and *but* are different, and in case of *but*, its conventional meaning together with the other words and their order in the expression license a conventional implicature, which is more specific than ‘contrast’, namely a contrast between ‘we didn’t sell...’ and ‘possibly they sold’. It is of course possible that this is what Ariel means, but by using the terms ‘conventional meaning’ and ‘conventional implicature’ somewhat loosely, we lose an important distinction. This can be seen clearly in the following passage.

So, the conventional implicatures associated with e.g., *moreover*, *anyway*, and *but* constitute **conventional** meanings which are not necessarily truth conditional. On the assumption that conventional meanings are semantic, these expressions contribute semantic meanings. Yet, these fail to impact the truth conditions of the propositions they occur in. They are semantic phenomena which pattern in a pragmatic manner. (Ariel, 2010, p. 64)

Here, the term ‘conventional meaning[s]’ seems to be used to refer to overall sentence meaning, while, in the same sentence, conventional implicatures are again directly connected to individual words. As Ariel (2010, p. 128) sums up, with respect to their context-independence, detachability, determinateness and non-cancellability, ‘conventional implicatures are rather like semantic meanings’. I agree with this conclusion to the extent that conventional meanings, such as ‘contrast’ for *but* and ‘consequence’ for *therefore*, are indeed (non-truth-conditional) semantic meanings, but the respective conventional implicatures are more specific, and while they do not depend on context, they are licensed not only by individual words and their conventional meanings, but by the combination of words in the expression or sentence it appears in. It is thus conventional within the system of ‘rules and words’ (or constructions) of a language, but not part of the semantic meaning of a single word.⁴⁸ I do not adhere to the view

⁴⁸Grice’s (1989, p. 25) discussion of an example in which someone has uttered *He is in the grip of a vice* suggests, although it is not mentioned explicitly, that conventional meaning is not limited to words or phrases, but can also be attached to larger constructions. He argues that, ‘given a knowledge of the English language, but no knowledge of the circumstances of the utterance, one would know something about what the speaker had said, on the assumption that he was speaking standard English, and speaking literally. One would know that he had said, about some particular male person or animal x, that at the time of the utterance (whatever that was), either (1) x was unable to rid himself of a certain kind of bad character trait or (2) some part of x’s person was caught in a certain kind of tool or instrument (approximate account, of course)’.

expressed by Ariel (2010, p. 164) that ‘conventional implicatures form part of the grammar, because their interpretation is encoded, no inferencing is needed in their generation’. This is, in Grice’s view I believe, true for conventional meaning, but again not for conventional implicatures, which are licensed by specific words in their syntactic ‘context’ and must thus be inferred.

The question then remains to which extent conventional implicatures are pragmatic when defined in terms of inferences.⁴⁹ No context is needed for conventional implicatures, but in order to ‘work them out’, it seems some level of inferencing is involved, as one needs to combine both the conventional meanings of the words and knowledge of the grammar of English, because conventional implicatures are tied to sentences or expressions i.e., ‘the elements of [the sentence], their order, and their syntactic character’ (Grice, 1989, p. 87; see also the notion of ‘Syntactic Correlation’ introduced by Bach, 1999, p. 15). This view is, again, contrary to the view endorsed by Ariel (2010, p. 128) and the view by Levinson (1983) discussed earlier, who argue that conventional implicatures reside on the code side of the ‘code/inference distinction’, because, as Ariel argues, by their conventional status, they do not have to be inferred, while remaining implicatures due to their non-truth-conditional contribution to overall meaning. Related to this is Potts’s (2007a, p. 668) warning against being ‘misled by “implicature” in the label “conventional implicature”’. CIs are not pragmatic meanings’. However, if conventional implicatures are licensed by the conventional meanings of the words used and the order they are presented in, i.e., they arise at sentence level, they can be said to be calculated, or one would have to stipulate the expression as a whole as one indivisible unit, which is also what Horn (2008, p. 48) suggests: ‘a Conventional Implicature of ϕ is an aspect of the meaning of ϕ that does not affect ϕ ’s truth conditions (i.e., does not affect what is said) but is part of the idiosyncratic lexical or constructional meaning of the expressions involved’ (i.e., ‘conventionally implicated material [...] constitutes part of the encoded meaning that is irrelevant to the truth conditions of the full sentence’; Horn, 2016, p. 1). With respect to the status of conventional implicatures, Horn (2008, p. 50) argues that it is semantic ‘insofar as it involves an aspect of the conventional meaning of a given expression rather than being computable from general principles of rational behavior or communicative competence, but it is pragmatic insofar as it involves considerations of appropriateness rather than truth of the sentence in which it appears’. Carston’s (1998, p. 24) remark on Grice’s analysis of words like *but* and *therefore*, shows how they act as ‘devices of conventional implicature, contributing to higher-level speech acts’. Such inferences are described in terms of ‘procedural encodings’ in the framework of Relevance Theory. Although the notion of conventional implicature has no place in this framework (see above), the explanation that linguistic elements such as the connectives *after all*, *so*,

⁴⁹The problem of drawing the semantics-pragmatics distinction can be seen in action here, as it depends on what dimension is chosen (implicit/explicit, literal/non-literal, direct/indirect, truth-conditional/non-truth-conditional, conventional/context-dependent; see e.g., Ariel, 2010, Chapter 2; Bach, 2001, pp. 21–22).

and *but* ‘indicate to the hearer what type of inference process he should perform in deriving the cognitive (contextual) effects of the propositions explicitly communicated by the utterance’ is comparable to (although not identical with) the difference between conventional meaning (the meaning of words) and conventional implicatures (or ‘cognitive (contextual) effects of the propositions’).⁵⁰

Some scholars are more explicit about the distinction between conventional meaning and conventional implicature. Gamut (1991, p. 215) for instance, argues that the contrast meaning of *but* is irrelevant to the truth of the proposition expressed, ‘so we have here a non-truth-conditional aspect of conventional meaning. The corresponding implicature, that the speaker believes there is some opposition between the two conjuncts conjoined by *but*, is a conventional implicature’.⁵¹ Recanati (1993, p. 233), in painting what he calls ‘the Gricean picture’, mentions that ‘the meaning of the sentence also determines other, non-truth-conditional aspects of utterance meaning, like those responsible for the difference between “and” and “but”. Grice calls them “conventional implicatures”’. In what follows, he contrasts conventional implicatures with conversational implicatures by arguing that the former are ‘conventionally determined by the meaning of the sentence’, whereas the latter are ‘part of what the utterance communicates’. Gazdar (1979, p. 38), in discussing the examples reproduced in (36) and (37), argues that ‘on the not implausible assumption that *but* carries a conventional implicature, examples [(36)] and [(37)] would have the same truth conditions and differ only in that [(37)] conventionally implicates a proposition involving some sort of contrast, unexpectedness, or the like’.

(36) Mary got pregnant and John was pleased. (Gazdar, 1979, p. 38)

(37) Mary got pregnant but John was pleased. (Gazdar, 1979, p. 38)

Although it seems Gazdar here conflates conventional meaning and conventional implicature, he continues by saying that the implicature (of contrast) ‘arises solely because of the particular (non-truth-conditional) properties of the word *but* and cannot be given some higher-order explanation in terms of conversational rules’, which means that it is indeed the conventional meaning of *but* that contributes to *licensing* a conventional implicature, but it does not embody it. As Gazdar describes it, ‘the dictionary entry for *but* would have to have some pragmatic component that would specify its *implicature potential* [emphasis added]’. Perhaps more explicitly, Bach (1999, p. 327) distinguishes between conventional meaning and conventional implicature as well. In arguing against the notion of conventional implicature, he discusses how the common

⁵⁰See also Ariel (2010, p. 69), who argues that ‘conventional implicatures are considered pragmatic for Grice (e.g., the contrast associated with *but*), because they are nontruth conditional, regardless of their conventionality. But they are (linguistic) semantic for Relevance theoreticians, because they constitute coded meanings, their nontruth conditionality considered irrelevant’.

⁵¹Note however that ‘some opposition’ here would still refer to a general meaning, which is contrary to the view endorsed here.

view holds that the difference between his examples in (38) and (39), as reproduced below, ‘depends essentially on the conventional meaning of the word “but”’.

(38) Shaq is huge but he is agile. (Bach, 1999, p. 327)

(39) Shaq is huge and he is agile. (Bach, 1999, p. 327)

In Bach’s discussion, the contrast meaning of *but* is not a conventional implicature, but ‘generates’ one. In turn, Bach (1999, p. 331) defines conventional implicatures as follows.

A proposition is a conventional implicature of an utterance just in case (a) the speaker (speaking seriously) is committed to the truth of the proposition, (b) which proposition that is depends upon the (or a) conventional meaning of some particular linguistic device in the utterance, but (c) the falsity of that proposition is compatible with the truth of the utterance. (Bach, 1999, p. 331)

We see here how conventional implicatures are defined in terms of propositions that result from utterances. While I distinguish between sentences or expressions and utterances, the point here is that combinations of words (sentences, utterances) generate conventional implicatures, not words in isolation. Words are, of course, important, but must be seen as devices ‘to generate conventional implicatures’. Bach (1999, p. 333) calls these ACIDs (‘alleged conventional implicature devices’), and he provides examples such as the adverbs *already*, *also*, *barely*, *either*, *only*, and *scarcely*, implicative verbs such as *bother*, *condescend*, *fail*, and *manage*, and subordinating conjunctions such as *although*, *despite*, and *even though*. This view is compatible with Zufferey, Moeschler and Reboul’s (2019, p. 90) remark, who, in discussing the passage from Grice cited on page 45, argue that ‘discourse connectives such as *therefore*, *because* and *but* trigger conventional implicatures because it is the meaning of connectives that leads to the derivation of the implicature’. For instance, in the expression in their example reproduced in (40), *even* plays an important role in triggering the conventional implicatures in (41) and (42), but these implicatures are ultimately implicatures of the sentence in (40), not merely of the adverb *even*.

(40) Even Bill likes Mary. (Zufferey, Moeschler & Reboul, 2019, p. 91)

(41) Other people besides Bill like Mary. (Zufferey, Moeschler & Reboul, 2019, p. 91)

(42) Of the people under consideration, Bill is the least likely to like Mary. (Zufferey, Moeschler & Reboul, 2019, p. 91)

Again, conventional meaning at word level licenses conventional implicatures at sentence or expression level (see also Sadock, 1978).

As conventionalisation of implicatures plays an important role in language change (see e.g., Traugott, 1999; Bach, 1998), the diachronic literature may help clarify some issues at hand. Schmid (2020, pp. 278–279) distinguishes between conventional meaning and conventional implicature in discussing the example in (43).

- (43) Professor Jones was there. As you know, he talks a lot and so the meeting lasted six hours. (Schmid, 2020, p. 278)

Schmid argues that the conventional implicature ‘Professor Jones was there. So the meeting lasted six hours’ ‘hinges upon the word *so*, which bridges the gap filled by the proposition *he talks a lot* in example [(43)]. The potential of *so* to act as such as a bridge derives from highly specific pragmatic associations connected to this particular form’. In turn, Schmid describes such conventional implicatures as ‘highly specific routinized pragmatic associations connected to specific linguistic forms’, which, although not as explicitly as may have been the case, seems to reflect the difference between (non-truth-conditional) conventional meaning and conventional implicatures. In a common view on language change, particularised conversational implicatures, if licensed frequently, become generalised conversational implicatures, and, in the end, may become conventional implicatures, as they become so entrenched that using a certain form invariably licenses the implicature at stake (see Traugott & König, 1991, Chapter 3). Levinson (1979, p. 213) argues as follows: ‘In some limited domains one seems to be able to find a series of stages in the linguistic change: e.g., from particularized to generalized conversational implicature, then to conventional implicature, in the case of some conventionally encoded honorifics in Asian languages’. Although Levinson (1979, p. 216) later on asks (retorically), ‘What could be more natural than to call the end product of a process of conventionalization of conversational implicatures, conventional implicatures?’, it remains to be seen how, in this view, the difference between word and sentence meaning can be maintained, as change from particularised to generalised conversational implicatures occurs at the same (sentence) level, but this cannot be said for the ‘next step’, as, in Levinson’s view, and given his examples, conventional implicatures occur at word level. As this issue goes beyond the scope of this dissertation, I will not pursue it further here, apart from remarking that I would argue that the meaning aspect developed out of a conversational implicature would not (gradually) ‘turn into’ a conventional implicature, but instead become the conventional meaning of the form, especially in case of the examples central in most, if not all discussions on conventional implicatures, which are mostly words like *but* and *therefore*, and sometimes small phrases like *in fact* and *all in all*.

The question may very well have risen by now why such a detailed discussion is of any importance to the analysis of conditionals. The preliminary answer to this question is that the conditional conjunction *if* has a conventional, truth-conditional meaning similar to $\rightarrow$. In the following sections, we will see it also has the conventional, non-truth-conditional meaning aspects of what I

will call ‘unassertiveness’ and of ‘connectedness’. In other words, *if* in natural language is a conjunction that (invariably) carries the conventional meaning that its conjuncts p and q are not asserted (but suggested, echoed, questioned, et cetera), and that the conjuncts are in some way connected (as cause and effect, argument and conclusion, et cetera). These are conventional meanings (not conventional implicatures), in the same way ‘contrast’ and ‘consequence’ are conventional meanings of *but* and *therefore* respectively. This is, however, as we will see in what follows, where a comparison to the stock examples *but* and *therefore* ends, because the notions of unassertiveness and connectedness are more abstract than those of contrast and consequence. Before going into detail on unassertiveness and connectedness in the next sections, however, I will briefly summarise the discussion on non-truth-conditional meaning below.

2.4.7 Conclusion

In this section, I discussed how the term ‘non-truth-conditional meaning’ is used in this study. It should come as no surprise that we will use this term to approach two main discrepancies between the conditional in logic and in natural language we have discussed in the previous section: the knowledge of p being false, or q being true rendering any conditional statement true, and the irrelevance of a connection between p and q in the analysis of conditionals as material implication.

As far as non-natural meaning goes, words have conventional meanings. These meanings may contribute to the truth-conditional meaning of the expression they are used in, the non-truth-conditional meaning, or both. In case of *therefore*, for instance, which was discussed above and is one of the stock examples in the pragmatic literature on the subject, its truth-conditional meaning is $\wedge$, whereas its non-truth-conditional meaning is ‘contrast.’ When combined with other words, and as a result forming, in this case, a compound sentence, such as ‘He is an Englishman; he is, *therefore* brave’, the sentence, including but not limited to *therefore*, licenses a specific conventional implicature, here ‘his being brave is a consequence of his being an Englishman’ (cf. Grice, 1989, pp. 44–45). Whereas conventional meanings are thus tied to words, conventional implicatures are tied to sentences (or expressions). As we will see in the following sections, the two meaning aspects of conditionals that are central in this dissertation, namely unassertiveness and connectedness, will be analysed as conventional meanings, not as conventional implicatures. They may, however, give rise to conventional implicatures, although we will see this is probable for only one specific type of conditional.

The goal of this discussion was provide terminological clarity. I use the term ‘non-truth-conditional meaning’ to refer to those parts of meaning that are not the result of logical operators and the individual proposition(s) they operate on. Rather, the evaluation of what counts as non-truth-conditional meaning requires additional information, such as information that is conventionally attached to a word but not to its ‘logical pendant’, information conveyed by the

order of the words in a sentence, or information attached to the use of an expression in a certain context (i.e., the utterance). While this is an attempt at a clear description of ‘non-truth-conditional meaning’, matters are, of course, more complex. As Dancygier and Sweetser (2005, p. 41) argue, ‘not only is the boundary between semantics and pragmatics a fuzzy one, but all added implicatures of linguistic usage (whether more or less conventional) are initially cued by the most conventional aspects of meaning, the ones we most comfortably label “semantic”’ (for similar views, see e.g., Wierzbicka, 1988, pp. 1–20; Langacker, 2008, p. 40). While I will try to analyse the non-truth-conditional meaning of conditionals as those aspects of meaning which cannot be captured in the propositions they present, in terms of logical operators, this must be seen in light of being clear on terms, not in order to strictly hang on to a sharp distinction between semantics and pragmatics. This is in line with a recent call by Leclercq (2020, pp. 227–231) for ‘more terminological precision’ concerning the notions of semantics and pragmatics in the framework of construction grammar by distinguishing between ‘conventional and non-conventional aspects of meaning’ and ‘truth-conditional and non-truth-conditional aspects of meaning’. We will explicitly come back to this at the end of this chapter in discussing the specified research questions in this dissertation. For now, the distinction between truth-conditional and non-truth-conditional meaning must be seen foremost as a clear starting point for further analysis.

2.5 Unassertiveness of conditionals

2.5.1 Introduction

In this section, I focus on the first problem discussed in section 2.3. In short, the problem is that a false proposition p presented in the antecedent renders any conditional true, regardless of the truth of proposition q presented in the consequent. I will address this issue by arguing that the problem does not occur in natural language. This may seem like a blunt statement, but I will use this section to argue that language users would not use a conditional in situations in which they could assert p . I will thus argue for the unassertiveness of conditionals, instead of their alleged *uncertainty*, as in Strawson’s claim that, by using a conditional, the speaker’s utterance ‘carries the implication’ of uncertainty about or disbelief in p and q (Strawson, 1952, p. 88; see also Grice, 1989, p. 9).⁵²

⁵²For similar views in different frameworks, and with varying views on semantics and pragmatics, (e.g., Comrie, 1986, pp. 79, 89; Sweetser, 1990, p. 141; Dancygier, 1998, p. 72; Huddleston & Pullum, 2002, p. 741; Gabrielatos, 2019). see also section 5.5 on modality.

2.5.2 Uncertainty, hypotheticality and unassertiveness

In most pragmatic accounts, the hypotheticality or, in Levinson's (2000, p. 110) terms, 'epistemic uncertainty' expressed by using a conditional is considered a conversational implicature. This analysis is based on contrasting the use of conditional *if* with the use of a factive conjunction like *since*. In other words, the implicature is derived as a clausal implicature as defined by Levinson (1983) (based on Gazdar, 1979, pp. 60–61) in (44) below.

(44) Clausal implicature

If S asserts some complex expression *p* which (i) contains an embedded sentence *q*, and (ii) *p* neither entails nor presupposes *q* and (iii) there's an alternative expression *r* of roughly equal brevity which contains *q* such that *r* does entail or presuppose *q*; then, by asserting *p* rather than *r*, *S* implicates that he doesn't know whether *q* is true or false, i.e., he implicates $Pq \ \& \ P \sim q$.⁵³ (Levinson, 1983, p. 136)

This means that a speaker violates Grice's Maxim of Quantity, and more specifically, its first sub-maxim ('Make your contribution as informative as is required'), by using a conditional ('complex expression *p*') in a situation in which she actually holds a belief about (the truth value of) either of these propositions, because a conditional does not presuppose or entail the embedded propositions. Gazdar presents the following argument.

IF one utters a compound or complex sentence having a constituent which is not itself entailed or pre-supposed by the matrix sentence and whose negation is likewise neither entailed nor pre-supposed, THEN one would be in breach of the maxim of quantity if one knew that sentence to be true or false, but was not known to so know, since one could have been more informative by producing a complex sentence having the constituent concerned, or its negation, as an entailment or a presupposition. It follows that, *ceteris paribus*, the utterance of such a complex sentence implicates that both the constituent sentence and its negation are compatible with what the speaker knows. (Gazdar, 1979, pp. 60–61)

A speaker could and thus should have been more informative by using a complex expression ('alternative expression' *r*) or its negation that does entail or presuppose the truth value of the embedded proposition. If there is an alternative to using a conditional that is of 'roughly equal brevity' (cf. Grice's *maxim of Manner*; see also Gazdar, 1979, p. 61; Levinson, 1983, p. 135) that indeed presupposes the embedded propositions, the speaker would have been more informative in using that expression. If she did not, the addressee is entitled to infer that the speaker does not know whether or not the embedded propositions

⁵³Here, 'P' stands for 'any declarative sentence expressing the proposition *p*' (Levinson, 1983, p. 123). In this notation, $\sim$ stands for negation ($\neg$).

are true (or, in Gazdar's (1979, p. 61) words, both the embedded propositions and their negation are 'compatible with what the speaker knows'), as in (45) below.

- (45) If the cat returns before dinner, we don't have to look for it tonight.
 $\text{Qn}_1 + >$ 'The cat may or may not return.'⁵⁴

Clausal implicatures work like Horn scales (cf. Horn, 1972, 1984).⁵⁵ Such a scale of expressions is organised by informativity, such as $\langle \textit{all}, \textit{most}, \textit{many}, \textit{some}, \textit{few} \rangle$ and $\langle \textit{and}, \textit{or} \rangle$. In these scales, the higher items are more informative and entail the lower items. Although lower items on a scale, such as *most*, are truth-conditionally compatible with higher items such as *all*, when using *most* the speaker provides grounds for the inference that she was not in a position to use *all*, as this would amount to a breach of the maxim of Quantity. For instance, saying you have 'most of the money' is compatible with saying you have 'all of the money', but as the latter is more informative, using *most* generates the implicature that *all* does not apply (i.e., one who says 'I spent most of the money' did not, technically speaking, tell something untrue when it turns out she spent 'all of the money'). The same effect can be seen by contrasting (45) with (46) below.

- (46) Since the cat returns before dinner, we don't have to look for it tonight.
 $\text{Qn}_1 + >$ '~~The cat may or may not return.~~'

Here 'since p , q ' entails both p and q , whereas 'if p , q ' in (45) does not. Hence, the implicature of not knowing the truth value of p and, in effect, that of q , is licensed through the first sub-maxim of Quantity in (45),⁵⁶ but not in (46). It is thus an inference 'from the lack of informational richness to the speaker's inability to provide it' (Levinson, 2000, p. 116). Huddleston and Pullum (2002, p. 741) provide the same explanation in terms of informational strength (see section 3.2.9), in the sense that *if* p , q is weaker than p and q . Using a non-factive conjunction in situations where one knows p to be true or false, would be considered 'conversationally inappropriate' (cf. Forbes, 1994, p. 84).

Let us return to the problem at hand: any false p or true q renders ' $p \rightarrow q$ ' true. While Levinson (2000, p. 110) calls the inference discussed above an implicature of 'epistemic uncertainty', I will argue for the term 'unassertiveness' to tackle the problems associated with the theorems as listed by Strawson (1952). The clausal implicature defined above predicts that, given the truth or falsehood of either p or q , a cooperative language user (i.e., a language user following the Cooperative Principle) would not use a conditional, because using a conditional implicates p being either true or false, and q being either

⁵⁴ $\text{Qn}_1 + >$ here denotes 'implicates through the first sub-maxim of the maxim of Quantity'. Symbols for implicatures are based on the symbols used in Levinson (2000, pp. xi–xii) and Huang (2017, p. 13).

⁵⁵ For an application to conditionals, see also Huang (2009) and Levinson (2000, pp. 19–20).

⁵⁶ Or in Levinson's (2000, p. 36) account, the first Q-heuristic: 'What you do not say is not the case'.

true or false $((P \vee \neg P) \wedge (Q \vee \neg Q))$. This shows why the theorems in (20c) and (20d) repeated below are problematic in the material analysis of natural language conditionals, but not in actual conversation.⁵⁷

(20c) $Q \supset (P \supset Q)$

(20d) $Q \supset (\neg P \supset Q)$

While I argue above that natural language conditionals conforming to the theorems in 2.5.2 should not occur without additional inferences, in cooperative communication, remarkably, examples of such uses can be found, when one accepts ‘pragmatic’ or ‘speech-act conditionals’ as conditionals (see also section 2.2). In Sweetser’s example in (47) below, for instance, or in Austin’s famous example in (48), the antecedent relates to the consequence on the pragmatic or discourse level.

(47) If I may say so, that’s a crazy idea. (Sweetser, 1990, p. 118)

(48) There are biscuits on the sideboard if you want them. (Austin, 1970, p. 212)

In these examples, the consequent is used as a speech act irrespective of the truth value of p . Following the second sub-maxim of Quantity in (29) (‘do not make your contribution more informative than is required’), a speaker uttering either (47) or (48) could also only have uttered the consequent. However, the antecedent ‘merely’ contextualises the speech act performed by uttering the consequent and serves as a remark in the interest of politeness. In other words, the truth value of q seems independent of the truth value of p and, especially in (48), q seems to be asserted irrespective of p . This seems to be the only use of a conditional for which the theorems above do not pose problems. These examples do not pose problems for the pragmatic account presented above either, as p is still not asserted, as this would defeat its use as a politeness strategy.

Now, one could ask why we need to distinguish between unassertiveness, uncertainty and hypotheticality. The reason for this is that the unassertiveness of conditionals in natural language does not seem to be context dependent, which would be expected if we were to treat it as a conversational implicature, even a strongly generalised one, which is calculable as explained above. The unassertiveness of conditionals, however, cannot be a conversational implicature, as the scale on which the implicature would be based, is itself based on the conventional, albeit non-truth-conditional, meaning of *if*. Without the unassertiveness tied to the form of a conditional, there would be nothing to suggest that *if* is less informative than *since*. A speaker chooses the conditional form not because she is necessarily uncertain on the truth of proposition p , but because she cannot or does not want to commit herself to p . This suggests unassertiveness to be a conventional meaning of conditionals (see section 2.4.6 above on the terms

⁵⁷Note that this does not confound analysis and use, as the argument here is that the problematic theorems do not correspond to any actual conversational situation.

‘conventional meaning’ and ‘conventional implicature’), and I will argue that it is, although such an analysis may seem to run into problems quickly. Of those problems, the first problem is the use of conditionals in contexts in which p is known to be true. The second problem is that some conditionals are said to be ‘counterfactual’, i.e., to express the falsity of propositions p and q . As it turns out, these problems can be overcome and I will use them to develop the notion of unassertiveness as a conventional meaning aspect of conditionals in more detail. I will start by addressing the first problem in the next section.

2.5.3 Unassertiveness and givenness

The first problem at hand is the use of a conditional in contexts in which the truth of p is given. In line with the previous section, we should be able to answer the question why a language user would opt for the less informative conditional when a factive conjunction can be used.

Bennett (2003, p. 4) starts out his study of conditionals by defining a conditional as an ‘item expressible in a sentence of the form “If [sentence A], then [sentence C]”, the effect of the whole being to apply a binary operator to propositions expressed by those two contained sentences’ (see the material analysis discussed in section 2.3). He argues that this definition helps capture ‘obviously genuine conditionals’, while a ‘deeper account can emerge from the analysis (or analyses) that we eventually come up with’, a practical approach similar to the aim of section 2.2. He explicitly excludes the example in (49) below (adapted from Akatsuka, 1985 by Bennett).⁵⁸

- (49) If you have applied, I’m going to apply too. (Bennett, 2003, p. 5)

The fact that the truth of p is contextually given, as can be seen in Akatsuka’s original example below in (50).

- (50) A: I’m going to the Winter LSA.
B: If you are going, I’m going, too. (Akatsuka, 1985, p. 635)

In Stalnaker’s (1968) account, the ‘givenness’ of p as in (50) above would be ‘merely’ a pragmatic component of the concept of conditionals, leaving in tact the possible worlds theory of conditionals in which belief conditions are transferred into truth values. Although the frameworks differ, this comes close to Dancygier’s (1998, p. 19) remark that ‘the presence of *if* requires an interpretation under which the assumption in its scope does not count as an act of assertion’. This may seem to conflict with the example in (50), but it does not. If the antecedent of B’s conditional would merely repeat the assertion made by A, B would violate the second maxim of Quantity, or one of the preparatory felicity conditions of assertions, i.e., that speaker and hearer do not both know that the hearer knows the truth of p (cf. Searle, 1969, p. 65). Rather, the

⁵⁸Bennett does not provide a page number and the exact example was not found in Akatsuka (1985). This example most closely resembles the one provided by Bennett.

antecedent does not count as an assertion, and the repetition of A's utterance in the form of an antecedent should be analysed not in terms of violating the maxim of Quantity, but as obeying the maxim of Relation, as the antecedent here serves to provide the grounds for the conclusion in the consequent (but see section 2.6). The example in (50) may then be an example to show that not all conditionals are used to express uncertainty, but it is not a counterexample to the unassertive conventional meaning of conditionals with respect to the individual propositions (see the notion of *unassertability* in Horn, 1989, p. 378; see also Dancygier, 1998, pp. 19, 103, 121; Rieger, 2015). I argue here that unassertiveness, and not uncertainty or hypotheticality, is a non-truth-conditional, yet conventional part of the meaning of conditionals. Levinson, however, argues that there are situations in which the unassertiveness of conditionals is cancelled, and he opts for a conversational approach. According to Levinson (2000, pp. 11, 109), the 'epistemic noncommittedness' of conditionals is a generalised conversational implicature, i.e., a '*default* inference [emphasis added]', and conversational implicatures are to be defeasible. He provides the example in (51) below.

- (51) If Chuck has got a scholarship, he'll give up medicine. (Levinson, 1983, p. 142)

Levinson (1983, p. 142) argues that to utter (51) is 'to implicate that one does not have any reason to think that Chuck has actually already got a scholarship or to think that he will definitely give up medicine'. However, given the right context, this implicature can be cancelled, as we can see in (52).

- (52) A: I've just heard that Chuck has got a scholarship.
 B: Oh dear. If Chuck has got a scholarship, he'll give up medicine.
 (Levinson, 1983, p. 142)

Levinson provides this example to show that the inference from B's use of a conditional in (52) to uncertainty about the antecedent is an implicature. Given this context, Levinson argues the 'the clausal implicatures [to] evaporate,' and he concludes that it cannot be a non-defeasible aspect of the meaning of conditionals. Levinson (1983) argues for 'hypothetical implications associated with the use of *if ... then*', while Levinson (2000) argues that 'these implicatures capture the inference of epistemic noncommittedness associated with the conditional [...]'. Hypotheticality and non-committedness or *unassertiveness*, however, are different notions, as we will see shortly. Huddleston and Pullum (2002) too argue for a conversational implicature. They give the example of (53) below, which can be uttered in a context in which it has just been established that 'she bought it at such-and-such a price'.

- (53) If she bought it at that price, she got a bargain. (Huddleston & Pullum, 2002, p. 741)

Huddleston and Pullum (2002, pp. 741–742) argue that 'my not knowing whether *P* is true or false is an implicature, not an entailment' because one can use a conditional in contexts where '*P* has just been asserted or established'

without contradiction. In a case such as (53), a conditional is used to explain the inference expressed in the consequent as being drawn from the antecedent. To disentangle this issue, we turn to Akatsuka (1986), who argues, albeit in other terms, that it is not needed to deem the unassertability of conditionals an implicature when the difference between knowledge and (newly learned) information is taken into consideration:

It is impossible for anyone to enter other people's minds and directly experience their feelings, emotions or beliefs. What is registered in their mind now is only indirectly accessible to us as 'information' through observations of external evidence, including linguistic communication. (Akatsuka, 1986, pp. 340–341)

Akatsuka argues that the difference between 'unsharable' knowledge and information reflects why conditionals can be used even when p is (contextually) given. If one regards a proposition to be true, but the proposition concerns newly learned information rather than knowledge coming from direct observation, it can be used in the antecedent of a conditional.⁵⁹ Akatsuka provides the following examples.

- (54) Son (looking out of the window):
 It's raining, Mommy
 Mother: If it's raining (as you say), let's not go to the park. (Akatsuka, 1986, p. 341)
- (55) Son (looking out of the window and noticing the rain):
 * If it's raining, let's not go to the park!⁶⁰ (Akatsuka, 1986, p. 341)

The contrast between (54) and (55) shows that contextually given information, and not knowledge gathered from direct experience, can be used as the antecedent of a conditional. As Dancygier (1998, p. 187) argues: 'the assumption brought up in the protasis may simply be observable in the immediate environment; it may have been communicated by another participant [...]'. If the unassertiveness were a (generalised) conversational implicature and not part of the meaning of a conditional, the example in (55) would have to be felicitous. If, however, the unassertiveness of conditionals *is* part of the (conventional, non-truth-conditional) meaning of conditionals, it would conflict with the direct observation that results in knowledge, as it indeed does in (55). The same goes for Huddleston and Pullum's example; the person uttering (53) cannot have just witnessed someone buying the product, but has to have learnt this information indirectly. In other words, *if* construes a situation as not directly jointly

⁵⁹See also Goebel (2017, p. 382) for an similar analysis of biscuit conditionals in terms of knowledge and common ground, and the experiments by Krzyżanowska, Collins and Hahn (2020) on 'source reliability' in learning from testimonies in the form of indicative conditionals, as in *If Bill has malaria, then he will make a good recovery*. (Krzyżanowska, Collins & Hahn, 2020, p. 987; see also Hartmann & Hahn, 2020).

⁶⁰Please note that the * judgment is Akatsuka's.

observable in the communicative situation. This shows that it is not necessary, as Levinson (2000) argues, that claiming that ‘hypothetical implications were built into the semantics of the conditional’ would amount to rendering *if* ambiguous.⁶¹ We do not want to claim hypotheticality, but unassertiveness as part of the ‘semantics of the conditional’. A contextually given *p* can be hypothetical, but it does not have to be in order to be used as the antecedent of a conditional.⁶² Furthermore, Athanasiadou and Dirven (1996, 1997a) show that hypotheticality is a prototypical feature of a certain type of conditionals (see section 3.3.9 for detailed discussion), but not of all conditionals. In their example, adapted in (56) below, for instance, the relation between antecedent and consequent is co-occurring and the antecedent is, in their terms, ‘factual’.

- (56) If there is a drought like this year, the eggs remain dormant.
(Athanasiadou & Dirven, 1996, p. 62)

A perhaps clearer example is the ‘general hypothetical’ in (57) below.

- (57) If ice is left in the sun, it melts. (Strawson, 1952, p. 88)

Although Strawson (1952, pp. 88–89) calls this a ‘general hypothetical’, he uses the term ‘hypothetical’ for ‘conditional’ in the sense that the antecedent ‘would be a good ground or reason for accepting the consequent’. The point here is that the situation expressed in the antecedent is general and not ‘uncertain’ or ‘hypothetical’. It is, however, unasserted, as the speaker did not commit herself to any specific occurrence of ice being left in the sun. Like with ‘particular conditionals’ (as opposed to the ‘general conditionals’ above), there may be hypotheticality or uncertainty involved, but the unassertiveness of the conditionals remains constant.

While I agree with Levinson (1983, 2000) that ‘epistemic uncertainty’ may be a generalised conversational implicature and thus defeasible, I argue here that *unassertiveness* is part of the non-truth-conditional, conventional meaning of conditionals. By using a conditional, a speaker does not assert any of the individual propositions. Rather, the unassertiveness of conditionals is part of their *conventional meaning*, i.e., the non-truth-conditional part of linguistically coded meaning (see Levinson, 2000, pp. 14, 166). Applied to the examples in (54) and (55) previously discussed, we can now see why the latter, analysed in (59) below, is infelicitous: the direct observation of the son is incompatible with the conventional meaning, which is non-cancellable, in contrast to a conversational implicature.

⁶¹This view has remained unchanged in Levinson (2000).

⁶²It may be said however that the acceptance of *p* is hypothetical – see ‘as you say’ in (54).

- (58) Son (looking out of the window):
 It's raining, Mommy
 Mother: If it's raining (as you say), let's not go to the park.
 $\approx p$ is not asserted.
 $+>$ 'It may or may not be raining.'⁶³
- (59) Son (looking out of the window and noticing the rain):
 * If it's raining, let's not go to the park!
 # $\approx p$ is not asserted.
 # $\approx$ 'It may or may not be raining.'

What we may seem to lose in this approach is the scalar analysis in terms of *if* being part of the Horn-scale $\langle \textit{since}, \textit{if} \rangle$, because conventional meaning is, by definition, non-calculable. Note however, how the conventional meaning ($\approx$) of unassertiveness in turn licenses the implicature ($+>$) of uncertainty.⁶⁴ However, as I argued before, we can view the scale as being based on the unassertiveness of conditionals, from which further implicatures of uncertainty or disbelief may result. Note here that I consider unassertiveness an aspect of conventional meaning, not a conventional implicature or presupposition. The difference between conventional meaning and conventional implicatures was discussed in detail in the previous section. The notions of conventional implicature and presupposition are closely related, but the exact differences are hotly debated. While this discussion falls beyond the scope of this dissertation, I would like to remark that I analyse unassertiveness in terms of conventional, non-truth-conditional meaning, because such meaning, by definition, has no bearing on truth conditions, whereas this is different for presuppositions, as in their failing, they either prevent the proposition expressed by the sentence containing the presupposition from having a truth value (cf. Russell, 1905; Strawson, 1952, p. 178), or render the proposition false (cf. Frege, 1948).⁶⁵ In contrast, a conventional implicature (per Grice's definition) does not have an effect on truth values.⁶⁶ I will briefly come back to this issue in the analysis of unassertiveness and counterfactuality in section 2.5.4.⁶⁷

⁶³As is the case with conversational implicatures, this implicature too is indeterminate (Grice, 1989, pp. 39–40), and could also be phrased as 'I am uncertain about it raining,' or 'I do not know whether it rains'.

⁶⁴Although Grice (1989, p. 39) himself already suggests that 'it may not be impossible for what starts life, so to speak, as a conversational implicature to become conventionalised, to suppose that this is so in a given case would require special justification' (see also Grice, 1989, pp. 24–25, 43), we do not need to resort to such explanations.

⁶⁵For overview and discussion of the larger debate on presupposition and presupposition failure, see Beaver (1997), Geurts (1999, Chapter 1), Beaver and Geurts (2014), Birner (2013, pp. 147–148).

⁶⁶See Grice (1989, pp. 25–26, 43), Potts (2005, Chapter 3), and Kapsner (2020, p. 14).

⁶⁷For a more elaborate account on conventional implicatures in general, see Potts (2005, Chapters 2, 3).

To tackle one more problem with the analysis of unassertiveness as conventional meaning, we will look at rhetorical conditionals (Quirk et al., 1985, cf.) (see section 3.3.4), as in (60), which may be thought of as a counterexample to the conventional status of unassertiveness.

- (60) If that is Princess Anne, I'm a Dutchman. (Huddleston & Pullum, 2002, p. 742)

However, here too there is no assertion of proposition p and if there is an assertion, it is not by means of the antecedent. In line with Huddleston and Pullum's view, we see here that the clear falsehood of q gives rise to the implicature that p is false too. While, as Dancygier (1998, p. 19) argues, the reasons for not asserting may differ per conditional, 'the role of *if* as a signal of non-assertive meanings remains constant' (see also Dummett, 1973, pp. 328–330; Horn, 1989, pp. 377–379; cited by Dancygier, 1998, p. 19), even in rhetorical conditionals.

The conventional meaning of unassertiveness of conditionals licenses a (conversational) scalar implicature concerning the stance of the speaker towards p . Applied to the earlier examples in this section, we see that this analysis can accommodate for contexts in which there is no prior knowledge of p , as (61), as well as for contexts in which there is, as in (62).

- (61) A: I've just heard that Chuck has got a scholarship.
 B: If Chuck has got a scholarship, he'll give up medicine.
 $\hat{=}$ p is not asserted.
 Qn₁+> 'I have reasons for believing Chuck has got a scholarship.'

- (62) If the cat returns before dinner, we don't have to look for it tonight.
 $\hat{=}$ p is not asserted.
 Qn₁+> 'The cat may or may not return.'

Here we see the constancy of the unassertiveness, and the dependency on context of the uncertainty implicature. This is compatible with the fact that conditionals are grouped together with other 'nonassertive contexts', such as questions and comparative clauses (see e.g., Quirk et al., 1985, p. 784) licensing negative polarity items (see van der Wouden, 1994, p. 132; Hoeksema, 2012, p. 17).⁶⁸

The unassertive character of conditionals has also been described in terms of their 'non-veridicality' meaning, in Giannakidou (1998, p. 131) terms, that conditionals express 'weakened commitment' towards proposition p expressed in the antecedent. For a more recent account, see Liu (2019b), who discusses the non-veridicality of conditionals in terms of the following commitment scale.

- (63) More committed <BECAUSE p , IF p >Less committed.⁶⁹ (Liu, 2019b, p. 3)

⁶⁸This view is also corroborated by extensive corpus studies, such as Gabrielatos (2010, 2021).

⁶⁹Here, *because* is comparable to *since* in Levinson's account discussed above.

Although Liu does not relate this scale to Gazdar's (1979) clausal implicatures discussed above, they seem compatible, and they seem to express, in basic terms, the same idea, namely that the antecedent of a conditional is not used to assert p or express full commitment towards p .⁷⁰

In conclusion, the choice of using a conditional conjunction rather than a factive conjunction may be due to an expression of uncertainty, indirect knowledge (see section 2.5.3), hypotheticality, contrast to expectations (see section 2.5.4), disbelief or some other stance towards p . Whereas these more specific stances towards p are conversationally derived from the fact *that* a conditional was uttered (i.e., why did the speaker use a conditional), unassertiveness remains constant and is tied to *what* was uttered (i.e., the speaker did not make an assertion of p and q).⁷¹ Before drawing conclusions on this issue, however, we have to address another problem that was encountered in section 2.3.3, namely those conditionals which involve antecedents that present a proposition p as counterfactual.

2.5.4 Unassertiveness and counterfactuality

The second problem with unassertiveness as conventional meaning we identified in section 2.5.2 was the use of a conditional to express the falsity of p in subjunctive or 'counterfactual' conditionals, as in the example below.

(64) If the rain would have stopped, we would have been dry.

As a working definition of counterfactual conditionals, I follow Ippolito (2013, pp. 1–2) in taking counterfactuals to be subjunctive conditionals in which the temporal morphology 'is not interpreted as locating the eventuality described in the antecedent clause in time', but to signal an 'irrealis flavour', i.e., 'a proposition that the speaker does not judge to be very likely' or false.⁷² Note however that a characterisation of subjunctive conditionals in terms of counterfactuality essentially discusses a morphological concept in semantic terms. Indeed, the terminology concerning counterfactuals is, as von Stechow (2011, p. 1517) calls it, 'linguistically inept', as it conflates morphological marking (tense, aspect) with mood (indicative, subjunctive). The term 'subjunctive conditional' is widely used to refer to counterfactuals, especially when contrasted with indicative

⁷⁰See also the recent experiments by Liu, Rotter and Giannakidou (2021), who show that *falls* 'if/in case'-conditionals reduce speaker commitment about p in comparison to *wenn* 'if'-conditionals and V1-conditionals.

⁷¹See also Sørensen (2012, p. 825) on the difference between lying with conventional implicatures and misleading with conversational implicatures.

⁷²Interestingly, counterfactuals dealing with 'alternative histories' (e.g., 'What if Germany had won the First World War?') are heavily debated among historians. Carr (1986, p. 91), for instance, argues that counterfactuals play 'a parlour game with the might-have-beens of history' and have nothing to do with history. They are consequently rejected as serious attempts at historical research. In discussing 'historical counterfactuals' Nolan (2013) however, provides several reasons why such 'alternative histories' may prove useful, such as reasoning about causation, and assessing responsibility for actions.

conditionals. In this section, and in line with the usual practice, when using the term ‘subjunctive’, I refer to a type of conditional distinguished in the literature from another type, namely indicative conditionals. In short, in past tense indicative conditionals, tense is used in a temporal sense to refer to the past, whereas in counterfactuals, the past tense is used in a modal sense to distance the speaker from the truth of p . Because of this, the use of tense in counterfactual conditionals is also called ‘fake tense’ in a number of accounts, marking ‘hypotheticality, unexpectedness, or distance from reality’ (see Iatridou, 2000; Schulz, 2014; Mackay, 2015).⁷³ In discussing verb tense in chapter 5 (see section 5.4), I will come back to this point to avoid terminological confusion. In that section, I will not use the term ‘subjunctive’ to refer to a type of conditional, and neither will I use the term to refer to a mood, as Dutch uses tense rather than mood to indicate counterfactuality.

In counterfactuals, p is taken to be false, and we can see in the relevant theorems from (20) repeated below that in this case, q can take both $\top$ and $\perp$ without rendering the conditional as a whole false.⁷⁴

$$(20a) \neg P \supset (P \supset Q)$$

$$(20b) \neg P \supset (P \supset \neg Q)$$

We already saw this in the truth table of ‘ $P \supset Q$ ’ (see Table 2.1 on page 29), and we noted that in natural language, we would tend to be indecisive on the truth of the conditional as a whole (cf. the ‘defective truth table’ in Table 2.2 on page 33). As can be seen in the examples provided by Adams below, the indicative conditional in (65) implicates that either p nor $\neg p$ is true, whereas its counterpart in (66) seems to express disbelief in or falsity of the antecedent (i.e., $\neg p$), rendering the conventional meaning of unassertiveness questionable.⁷⁵

- (65) If Oswald didn’t kill Kennedy, someone else did. (Adams, 1970, p. 90)
 $\approx p$ is not asserted.
 $\text{Qn}_1 + >$ ‘Oswald may or may not have killed Kennedy.’

- (66) If Oswald hadn’t killed Kennedy, someone else would have. (Adams, 1970, p. 90)
 ...

⁷³Note that the basic meaning of tense can be seen as either time-based, or including time and other dimensions (such as realis-irrealis). For overview and discussion, see Boogaart and Janssen (2007).

⁷⁴The theorem in (20e) is not repeated here, because it is a restatement of (20a) and (20b) combined.

⁷⁵The minimal pair in (65)-(66) is now widely known as the *Oswald/Kennedy minimal pair* (see e.g., McDermott, 1999, p. 294; Edgington, 2008, p. 6; von Stechow, 2012, p. 466). However, Adams’s (1970, p. 70) original examples were ‘If Oswald hadn’t shot Kennedy in Dallas, then no one else would have’ and ‘If Oswald didn’t shoot Kennedy in Dallas, then no one else did’ (see also Ippolito, 2013, p. 141).

The question then is whether the conventional meaning of *if* holds too for (66), and which implicature(s) it licenses. As may be expected from the previous section, I will argue that the conventional meaning stays in tact, and that it is the conversational implicature that differs between (65) and (66), i.e., counterfactuality is not a conventional part of the meaning of subjunctive conditionals (see also Dancygier & Sweetser, 2005, p. 71). Treating this generalised conversational implicature as conventional would be either incompatible with indicative conditionals as discussed before, because being unassertive on p and asserting falsity of p are incompatible, or it would suggest indicative and subjunctive conditionals to be different constructions.⁷⁶

According to von Stechow (2012, p. 469), and contrary to what lines 3 and 4 of Table 2.1 suggest, the falsity of the antecedent in (66) leads to the acceptance of the consequent, as it ‘amounts to saying that there were facts in the actual world that would have led to Kennedy’s assassination one way or the other’. In case p is false, the truth table gives no prediction about q – the truth value of q is undetermined and $\neg p$ is compatible with both lines 3 and 4 of Table 2.1 – while (66) seems to license the truth of q . As von Stechow (2011, p. 1522) remarks, for indicative and subjunctive conditionals ‘it is very commonly held that quite different approaches are appropriate’. This means that subjunctive conditionals generally receive another analysis than indicative conditionals (Karttunen, 1971, see e.g., Kempson, 1975; Ippolito, 2013; Williamson, 2020, especially Chapter 10; for a recent overview and discussion, see Edgington, 2020). This choice is motivated by the difference in temporal morphology (see the difference between (65) and (66) above). In other words, the difference in form between indicative and subjunctive conditionals licenses a different approach.⁷⁷ The evaluation of both types of conditionals need not be different, however.

Stalnaker (1975) argues for a truth-conditional semantics that covers both indicative and subjunctive conditionals. Indicative conditionals present antecedents that are within the ‘context set’, or the set of possible worlds which are compatible with the current conversation. Conversely, subjunctive conditionals are used when the speaker does not want to signal this compatibility, but when the speaker wants to signal compatibility with ‘the nearest world’ which

⁷⁶As it is not necessary for the matter of unassertiveness under current discussion, we will return to the subject of indicative and subjunctive conditionals in sections 5.4 and 5.5, and briefly on the topic of their status as different constructions in section 6.5.

⁷⁷This leads to another problem, namely that there are counterfactuals which are not subjunctive. The problem in this case is that the conditional has the indicative mood, but functions as a counterfactual, because one of the propositions is ‘patently absurd’ (Quirk et al., 1985, p. 1094). This falsity is carried over to the other proposition, as in their example in (a) below. I will argue for a unified pragmatic analysis, I will not discuss this matter further, apart from suggesting that this ‘carrying over’ may be analysed as a conversational implicature.

(a) If they’re Irish, I’m the Pope. (Since I’m obviously not the pope, they’re certainly not Irish.)

is presupposed to differ precisely on the matter of what is expressed in the antecedent (cf. Horn, 2000, p. 321). In this sense, (66) would mean that, apart from Oswald killing Kennedy, there were circumstances that would have led to Kennedy's assassination. A similar analysis can be found in mental spaces theory. Fauconnier (1994, p. 109) argues that 'counterfactuality is a case of forced incompatibility between spaces'. Conditionals are analysed as 'space builders' which, in the case of counterfactuals, open a cognitive structure by means of tense, as 'directly contradicting a reality that is known and cannot be changed' (Dancygier & Sweetser, 2005, p. 76).⁷⁸ The incompatibility with the 'nearest world' or the 'base [reality] space' is derived from the temporal morphology in the 'contrary to fact' antecedent, resulting in a notion of counterfactuality that seems to conflict with the aforementioned theorems, as there is no 'uncertainty' or 'unassertiveness' involved in expressing $\neg p$.

The supposed falsity of p in subjunctives is, however, not as clear as might seem to be the case. A subjunctive conditional may be interpreted as counterfactual, but it does not have to be, as is illustrated by the example below.⁷⁹

- (67) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show. (Anderson, 1951, p. 37)

In supposing a doctor investigating Jones' death utters (67), Anderson (1951, p. 37) argues the 'doctor's statement would probably be taken as lending support to the view that Jones took arsenic – it would certainly not be held to imply that Jones did not take arsenic'. From this, he concludes that the falsity of the antecedent cannot be inferred from a 'true subjunctive conditional in the past (or any) tense'. As Arregui (2007, p. 225) argues, in such examples we 'reason "as detectives": we work our way backwards from the known consequence (in the consequent), to the cause (in the antecedent)'.⁸⁰ Huddleston and Pullum (2002, p. 749) too argue that 'the strategy here, then, is to reconstruct what happened by working back from consequences to their causes'. Contrary to indicative conditionals, which mark compatibility with the worlds selected, subjunctive marking places the antecedent further away from the set of

⁷⁸This is not to say that mental spaces are similar to possible worlds. Possible worlds are state descriptions including all the conditions on which the truth value of a proposition depends (Löbner, 2002, p. 237), whereas mental spaces are a cognitive structure that map onto other cognitive structures. In Lakoff and Sweetser's words (see Fauconnier, 1994, p. ix), possible worlds are 'objectivist models, models of the actual world [...] not models of the human mind, but models of the world as it is assumed to be or might be'. For further discussion on possible worlds and mental models, such as mental spaces, see Johnson-Laird (1986, pp. 63–64).

⁷⁹See also Tellings (2016) on the use of subjunctive conditionals in discourse and insights into the requirements for both the licensing and cancellation of their counterfactual implicatures.

⁸⁰Remark that this explanation is only applicable to subjunctives with a true consequence. Subjunctives with false consequents project their falsity onto the antecedent, because in a true conditional, a false consequent cannot have a true antecedent (see the truth table, lines 3 and 4).

readily compatible worlds in order to create epistemic distance (see Langacker, 1978, and for a recent overview and discussion, see von Prince, 2019), without necessarily licensing a *contrary-to-fact* or counterfactual interpretation. In the current analysis of counterfactuality as a conversational implicature, instead of a conventional implicature, this poses no fundamental problems, although the conversational implicature of counterfactuality may be said to be strongly generalised and not easily cancellable. Cancellability can be observed in other non-counterfactual subjunctives too, such as in the example by Comrie below.

- (68) If the butler had done it, we would have found just the clues that we did in fact find. (Comrie, 1986, p. 90)

Here, the characterisation ‘reasoning as detectives’ is, even in a non-figurative way, of direct use to the current analysis. Suppose a detective utters (68). One can think of a context in which the detective has, until now, not suspected the butler. She is then confronted with the clues spoken of in the consequent. The detective presents the antecedent as contrary not to the truth or to her belief, but contrary to her expectations. This can also be seen in (69), which Karttunen and Peters use to argue that it ‘would be incorrect to postulate a general rule that a subjunctive conditional sentence presupposes that its antecedent clause is false’.

- (69) If Mary were allergic to penicillin, she would have exactly the symptoms she is showing. (Karttunen & Peters, 1979a, pp. 5–6)

As mentioned in the previous section, we need to look into some detail into the notion of presupposition to follow Karttunen and Peters’s argument. Although Stalnaker (2002, p. 712) argues that there is no *general accepted* definition of *presupposition* – there are only ‘standard paradigm examples (“the king of France is wise” presupposes that France has a unique king, “John does not regret voting for Nader” presupposes that John voted for Nader [...])’ and ‘some rough criteria. For example, if sentence S presupposes that ϕ , then the negation of S also presupposes that ϕ ’ – I will address the notion of presupposition here, because it is important for the argument that subjunctive conditionals do not form a problem for the unassertiveness of conditionals.⁸¹ Presuppositions are mostly seen as those propositions that must be true in order for a sentence to be able to receive a truth value (see e.g., Stalnaker, 1974). In some pragmatic accounts, presuppositions are analysed in terms of common ground, i.e., those propositions that are taken for granted by the participants of the conversation,

⁸¹This means that I will not go into detail into the different ways of analysing presuppositions. The notion is heavily debated (see e.g., Kempson (1975) and Karttunen (2016), Geurts (2017) for recent overviews and discussion), not in the least because ‘the’ phenomenon of presupposition is argued to be highly heterogeneous. See Kapsner (2020) for an analysis of presuppositions of conditionals.

or, in Stalnaker's (2002, p. 704) terms, 'the mutually recognized shared information in a situation in which an act of trying to communicate takes place'.⁸² A more technical definition of common ground given is the following:

It is common ground that ϕ in a group if all members accept (for the purpose of the conversation) that ϕ and all believe that all accept that ϕ and all believe that all believe that all accept that ϕ etc.
(Stalnaker, 2002, p. 716)

In this sense, a subjunctive conditional would, if one believes it to be counterfactual by nature, accommodate a presupposition of counterfactuality, i.e., it would facilitate the process of adding the falsity of the proposition antecedent to the common ground, in much the same way as with classic examples like 'the King of France is bald' (see Russell, 1905, p. 483). In the same vein, after the subjunctive conditional is uttered, the counterfactual status of the antecedent is added to the common ground. I will follow Karttunen and Peters (1979a) in arguing against a presuppositional analysis of counterfactuals. Karttunen and Peters argue that the counterfactual inference in (69) is a particularised conversational implicature, as they are 'highly context dependent' (an assessment I will challenge shortly below), by showing that they can be cancelled, as in their example in (70).

- (70) If Mary were allergic to penicillin, she would have exactly the symptoms she is showing. But we know that she is not allergic to penicillin.
(Karttunen & Peters, 1979a, p. 8)

As can be seen in this example, the counterfactual reading may be cancelled by the contents of the consequent and thus it cannot be a precondition (i.e., a presupposition) for the truth value of the antecedent. In the more general notion of common ground, it may be the case that in the majority of situations subjunctive conditionals are counterfactual, but this, in itself, does not make it part of the semantics of the subjunctive. As Huddleston and Pullum (2002, p. 749) argue (see also section 3.2.9), counterfactuality in conditionals is an implicature. A subjunctive conditional in which the 'contrary to fact' implicature is cancelled is 'not common but nevertheless clearly established' and therefore they argue *counterfactual* to be the wrong term for remote (or subjunctive) conditionals. As we will see in later chapters (especially in section 5.4), we will see that the 'contrary to fact' implicature is the default for subjunctive conditionals, and cases in which this implicature is cancelled, as in (70), are highly infrequent. Therefore, the implicature should be considered not 'highly context dependent' (i.e., a particularised conversational implicature, as suggested by Karttunen and Peters, 1979a), but a generalised conversational implicature.

⁸²See Stalnaker's footnote for the attribution of the term *common ground* to Grice: 'I believe that the expression "common ground", as a term for the presumed background information shared by participants in a conversation has its origin in Paul Grice's William James lectures. He did not define or explain the term in the published text, but described certain propositions as having "common ground status". See Grice (1989, pp. 65, 274).

According to Mauck and Portner (2006, p. 1333) the implicature of the falsity of p carries over to q in the consequent as a result not of logical necessity, but of the Gricean maxims of Relation and Quantity. The antecedents of subjunctive conditionals as (67) to (68) do not presuppose falsity, but implicate it through epistemic distancing, because *if* is the ‘scalar runner-up’ to its assertive (factive) pendant *since* (see previous sections). If the antecedent of (67) is taken to *presuppose* the falsity of p (‘Jones has taken arsenic’), it should not be cancellable easily – which was already shown to be false by Karttunen and Peters. If it was not cancellable but part of the meaning of a subjunctive conditional, it should be possible to substitute *if* for *since* and result in the same behaviour. As can be seen in (71) below, this is not the case.

- (71) # Since Jones has not taken arsenic, he {would have shown/shows} just exactly those symptoms which he does in fact show.

The utterance in (67) may be seen as expressing a chain of inference backwards from symptoms to a non-expected, but apparent cause. While the antecedent is presented as something unlikely or unexpected, the consequent expresses a proposition that is incompatible with falsity of the antecedent, but compatible with the unassertiveness of what is expressed in the antecedent. This chain of inference is not possible in (71), as the antecedent asserts rather than implicates $\neg p$. This shows that the problematic theorems in (20a) and (20b) do not adequately describe uses of *if* in natural language. In case a speaker wishes to assert $\neg p$, no conditional will be used, as it would conflict with the conventional meaning of unassertiveness of conditionals.

To make matters clear, I consider counterfactuality to be a generalised conversational implicature of subjunctive conditionals, as contrasted with indicative conditionals which lack this implicature, as can be seen by contrasting (45) (repeated below) with (72).

- (45) If the cat returns before dinner, we don’t have to look for it tonight.
 $\approx p$ is not asserted.
 Qn₁+> ‘The cat may or may not return.’
- (72) If the cat would have returned before dinner, we wouldn’t have had to look for it.
 $\approx p$ is not asserted.
 M+> ‘It is contrary to expectation that the cat has returned.’

In the latter example, the modal *will* and verb tense and are used as a linguistic clues for ‘epistemic distancing’ (Langacker, 2008, p. 302), and because it concerns the past, marked by the past perfective, it licenses a ‘counterfactual to the past’ implicature. This epistemic distancing can also be seen in (73), which, however, does not concern the past and, as a result, remains epistemically distanced, but does not license a true counterfactual implicature.

- (73) If the cat would return before dinner, we wouldn't have to look for it tonight.
 $\hat{\approx} p$ is not asserted.
 $M_{\langle + \rangle}$ It is contrary to expectation that the cat will return.'

Although we can explain this through Grice's maxim of Manner, Levinson's 'Principle of Manner' in (74) below is better suited, as it explicitly includes markedness.

(74) Levinson's M-Principle

1. Speaker's maxim
 Indicate an abnormal, nonstereotypical situation by using marked expressions that contrast with those you would use to describe the corresponding normal, stereotypical situation.
2. Recipient's corollary
 What is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations [...]. (Levinson, 2000, p. 136)

The relation to Grice's maxim of Manner in (29) is that marked forms in Levinson's principle above include those forms which are 'more morphologically complex and less lexicalized, more prolix or periphrastic, less frequent or usual, and less neutral in register' than 'unmarked forms'. The 'layer of additional past' (see also the notion of 'fake tense' in the discussion above) is needed in subjunctives, as modern English has no subjunctive mood (i.e., no 'inflectional expression' that corresponds to modality as a conceptual domain cf. Bybee, Perkins and Pagliuca, 1994, p. 181). Such formal markedness licenses 'additional meaning or connotation absent from the corresponding unmarked forms'. In Haiman's (1985, p. 147) terms, 'morphological markedness corresponds to semantic markedness'. Applied to conditionals, past tense in subjunctives implicates epistemic distance or disbelief, rather than asserting falsity. Dancygier and Sweetser (2005, p. 76) argue along the same lines: 'The main function of the verb forms used in so-called counterfactual sentences is marking distance: temporal, epistemic, or both'.

Compatible with the general unassertiveness of conditionals, subjunctive marking in conditionals implicates, but does not assert disbelief. Counterfactuality as implicature is thus compatible with unassertiveness as a non-truth-conditional meaning aspect. As with indicatives, *if* in subjunctive conditionals invites the addressee to consider the situation in the antecedent and its consequence, without asserting either p or $\neg p$. The contrary-to-fact meaning of a subjunctive conditional is a generalised conversational implicature and while this means it is a default implicature, it is still cancellable. Recent experimental results by Espino, Byrne and Johnson-Laird (2020) corroborate this view. Their results show how subjunctive conditionals, as in (75) below, receive what they call a 'prefactual interpretation', leaving open the truth of p in the antecedent.

- (75) If he were injured tomorrow, which he can be, then he would take some leave. (Espino, Byrne & Johnson-Laird, 2020, p. 1275)

The first prefactual paraphrase available is one of possibility: ‘it is possible, and remains so, that he is injured tomorrow, and in that case, it is certain that he takes some leave’. When context licenses a counterfactual implicature, the preferred interpretation of their participants shifted to the paraphrase ‘it was once possible, but does not remain so, that he was injured’. Another recent experimental study by Skovgaard-Olsen and Collins (2021) shows that the implicated falsity of the antecedent of subjunctive conditionals is ‘as cancellable as scalar implicatures’, which are uncontroversial cases of conversational implicature. Such experiments notwithstanding, counterfactuals, like conditionals, remain a much debated phenomenon, and in this section, I aimed only at reconciling counterfactuals with the unassertiveness of conditionals.⁸³

2.5.5 Conclusion

From the discussions in sections 2.5.3 and 2.5.4 above, I conclude that the unassertiveness of conditionals renders one part of the paradoxes identified irrelevant. In conversation, speakers do not use conditionals to assert *p*, although they can use conditionals in situations in which *p* is contextually given, or, on the opposite, believed to be false. The unassertiveness of conditionals itself, however, cannot be a conversational implicature, as the scale on which the implicature of uncertainty, or hypotheticality would be based, is based itself on the conventional, albeit non-truth-conditional, meaning of *if*. Without this unassertiveness, there would be nothing to suggest that *if* is less informative than *since*.

A speaker uses a conditional not because she is necessarily uncertain on the truth value of proposition *p*, but because she cannot or does not want to assert *p*.⁸⁴ This may be due to uncertainty, but a conditional can also be used for the expression of indirect knowledge, hypotheticality, contrast to expectations, disbelief or another stance towards *p*. These specific stances are conversational implicatures, albeit, especially in the case of subjunctive conditionals, strongly generalised conversational implicatures. Whereas these more specific stances towards *p* are conversationally derived from the fact *that* a conditional was uttered (i.e., why did the speaker use a conditional), unassertiveness, i.e., the inability to assert the individual propositions of a conditional, remains constant and is tied to *what* was uttered (i.e., the speaker did not make an assertion of *p* and *q*). I will consider unassertiveness a conventional meaning aspect of

⁸³For an introduction to the semantics of counterfactuals, see Egge and Cozic (2016), for a recent overview of analyses of counterfactuals, see Arregui (2020). See also Kempson (1975, pp. 218–221) and especially Ippolito (2003, pp. 176–178) for Gricean analyses of counterfactuals.

⁸⁴For another, recent analysis of conditionals in terms of unassertability, see Kapsner (2020). Note, however, that this analysis has different assumptions and posits different analyses in terms of presuppositions for indicatives and subjunctives.

conditionals, because by using a conditional, the speaker signals that she does not commit to the assertion of p , while having reasons to express p in connection to q . This ‘connectedness’ relates to the second set of problems identified in section 2.3.3, and it is what we will turn to next.

2.6 Connectedness in conditionals

2.6.1 Introduction

The second set of problems identified in section 2.3.3 arose from the lack of connection between propositions p and q in truth-conditional analyses of conditionals. Often, this problem is viewed with respect to line 1 in the truth table for conditionals (see Table 2.1 on page 29), as in Sweetser’s example below, but the problem is not limited to this line. Without a connection between the antecedent and consequent, any combination of propositions except a true p and a false q renders the conditional true as a whole. This means that an incoherent example like (23) repeated below is valid despite its incoherence.

- (23) If Paris is the capital of France, (then) two is an even number. (Sweetser, 1990, p. 113)

The aim of this section is to provide a clarification of the concepts of ‘connectedness’ and ‘connection’. First, I will discuss the general concept of connectedness in conditionals in section 2.6.2, after which, in section 2.6.3, I will review analyses which consider the connection a conversational, thus cancellable implicature. Then, in section 2.6.4, I argue for another view, in which connectedness is part of the conventional meaning of conditionals. In section 2.6.5, I discuss the related phenomenon of ‘conditional perfection’, after which, in 2.6.6, I will present an intermediate conclusion on this issue, before moving on to the final formulation of research questions in section 2.7, the conclusion to this chapter in section 2.8.

2.6.2 Connection between antecedent and consequent

In contrast to logical and philosophical accounts of conditionals, linguistic studies of the connection between p and q have been concerned mostly with what kinds or types of connections may be expressed by using a conditional, and less with its actual semantic or pragmatic status. Many accounts assume or posit the existence of a connection between antecedent and consequent, without arguing what it is exactly, and, if not semantic, how it is licensed. For example, Athanasiadou and Dirven (1996, p. 611) mention that conditionals express ‘a relationship between a first event and a second event’, but the notion ‘relationship’ is not elaborated. Sweetser (1990, pp. 113–114) is more explicit in stating that natural language conditionals assume ‘a *connection* between the truth of the antecedent and the truth of the consequent’, but she does not explain what licenses such a connection. Declerck and Reed (2001, p. 46) argue

for a ‘link between P and Q ’ and suggest types of links (see next chapter), but offer no definition. The same can be seen in Saeed’s (2011) discussion of the clausal implicature we discussed in section 2.5. In discussing (76) below, Saeed argues that the speaker, ‘by excluding the stronger, implicates: “Maybe he’s here; maybe not; *therefore* [emphasis added] maybe he can play; maybe not”’.

- (76) If he’s here, he can play. (Saeed, 2011, p. 472)

The use of *therefore* is not motivated, however, although it refers to the notion of connection under discussion.

If, for the moment, we accept that conditionals express a connection between antecedent and consequent, the type of connection in natural language conditionals may vary. A relatively early and clear set of examples is provided by Noordman, adapted in (77) and (78) below.

- (77) If John is ill, he is not going to his work. (Noordman, 1979, p. 85)

- (78) If John is not going to his work, he is ill. (Noordman, 1979, p. 85)

It is clear that the conditional in (77) expresses that John’s possible illness would cause him to stay home from work, whereas in (78), the assumption that John is not going to his work functions as an argument for the conclusion that he is ill. Therefore, it may be said that the specific connection is contextually determined and pragmatic in nature. Many accounts of conditionals therefore phrase the connection between the antecedent and consequent more generally in terms of ‘sufficiency’, ‘contingency’ or ‘enablement’, because the connection depends on information beyond individual propositions, such as grammatical form, world knowledge and context. Consequently, logicians and linguists such as Strawson (1952), Stalnaker (1968), Grice (1989), Geis and Zwicky (1971) and Lewis (1976) have treated the connection between antecedent and consequent as ‘a problem of pragmatics rather than grammar’ (cf. Akatsuka, 1986, p. 335; see also references therein; see Kment, 2020 for a recent overview and discussion of causality in counterfactuals).

The opposing view is that the connection is a part of the semantics of conditionals. Mauri and van der Auwera (2012, p. 395) argue, following van der Auwera (1986) and Sweetser (1990), that ‘*if* is not translatable into truth tables, but rather encodes non-truth-conditional relations such as causal and consequential ones’. They argue that an example such as (79) below, ‘semantically encodes that the president’s resignation is the cause for the vice president to assume the presidency’.

- (79) If the President resigns, the Vice President shall immediately assume the presidency. (Mauri & van der Auwera, 2012, p. 395)

This view is based on van der Auwera’s (1986) ‘sufficiency hypothesis’, in which the antecedent of a conditional presents a sufficient condition for the consequent. Mauri and van der Auwera (2012) argue that there are two types of

analysis of the connection: the truth-conditional analysis in which the connection is not part of the semantics of conditionals, and the non-truth-conditional analysis in which the connection is part of the semantics of conditionals.

I will opt for an account similar to Akatsuka's (1986, p. 335), who argues that the connection is 'an integral part of the "if p , q " construction's linguistic meaning'. She continues by saying that 'each conditional sentence shares an abstract, grammatical meaning similar to 'correlation/correspondence between p and q '. The 'specific nature' of the connection in this view is contextually determined. Akatsuka however, opposes her view with those of the aforementioned scholars who frame the connection as 'a problem of pragmatics rather than grammar', which I do not endorse, as there seems to be a middle ground. I will work out the details of this middle ground in the same terms as the unassertiveness of conditionals discussed in the previous section, and I will argue that a general connection is part of the conventional non-truth-conditional meaning of conditionals, and not a defeasible implicature. Connecting clauses is, after all, the conventional meaning of any conjunction (see e.g., Sanders & Sweetser, 2009; Pander Maat & Sanders, 2006, p. 248).

2.6.3 Connectedness as defeasible non-truth-conditional meaning

As we saw throughout this chapter, the delimitation of semantics and pragmatics is a much debated topic for many linguistic phenomena (for an overview, see, Ariel, 2010), and conditionals are by no means an exception. The previous section raised the question of the status of the connection between antecedents and consequents. We will start by discussing 'connectedness' as a defeasible part of the meaning of conditionals, which is a view defended by, amongst others, Grice.

Grice (1989, pp. 62, 77) considers what he calls the 'Indirectness Condition' a non-conventional (i.e., conversational) implicature.⁸⁵ The indirectness condition follows from the non-commutivity of $\supset$, a conventional meaning of 'if', as follows. A speaker uses a conditional form not only when 'the truth-table requirements are satisfied but also some strong connection holds' (Grice, 1989, p. 77). The reason for this specific implicature is, according to Grice, that *if* in propositional logic is the only non-commutative operator, as can be seen in the replacement rules in (80) below (see Magnus, 2015, pp. 119–120, 159).

(80) Replacement rules of commutativity

- a. $(P \wedge Q) \leftrightarrow (Q \wedge P)$
- b. $(P \vee Q) \leftrightarrow (Q \vee P)$
- c. $(P \leftrightarrow Q) \leftrightarrow (Q \leftrightarrow P)$

⁸⁵The term 'Indirectness Condition' was chosen 'presumably because it indicates the existence of indirect evidence of a non-truth-functional nature for accepting an ordinary conditional' (Chakraborty, 1997, p. 550).

These replacement rules include all but one of the binary operators, namely the conditional operator $\supset$, because ' $p \supset q$ ' is not equivalent to ' $q \supset p$ '. This can be seen when an invalid replacement rule is applied to an ordinary conditional like the example in (81) below.

(81) If it rains, the road is wet. $\nleftrightarrow$ If the road is wet, it rains.

For Grice (1989, pp. 77–78), this is an indication of the existence of a special function for conditionals in natural language, namely to present a 'strong connection between antecedent and consequent'. This implicature concerns the 'presentation of cases in which a passage of thought, or inferential passage, is envisaged from antecedent to consequent' (Grice, 1989, p. 77). This, then, can be used to explain the inconsistencies in theorems (20c) and (20d), because by uttering 'if p , then q ', one could have been briefer and more informative by asserting q . There must, therefore, be a reason for the weaker claim (see previous section) and the uttering of not only the consequent, but also the antecedent. Furthermore, it explains why in both sets of Strawson's theorems, valid but incoherent evaluations can be obtained with respect to natural language conditionals. The use of a conditional implicates, on basis of its non-commutivity, a (strong) connection between p and q (see Grice, 1989, p. 78).

For Grice, the connection is a conversational implicature. Before going into the cancellability of this connection, we will go beyond Grice's own analysis and see how we can account for this implicature in terms of calculability.⁸⁶ Of all logical connectives, Grice (1989, p. 72) argues, "if" seems to be the only one which is non-commutative; the order of the clauses of a conditional is not, from the semantic point of view, a matter of indifference'. Following the fourth sub-maxim of Manner ('be orderly') (see the maxims on page 42), a speaker may be expected to present the clauses of a conditional in the order in which the situations expressed occurred or will occur. In line with Levinson's 'Principle of Informativeness', this can be related to iconicity, because an unmarked expression is most informative by assuming its stereotypical meaning. The stronger inference drawn from 'if p , q ' is that, by stereotypical iconic presentation, p precedes q . Add to this the maxim of Relation ('be relevant') and one can make an inference from the temporal relation between antecedent and consequent to a causal connection, which, although in dialectic terms it amounts to the fallacy 'post hoc ergo propter hoc' ('This *after* that, thus this *because of* that'), is recognised as the conventionalisation of an implicature for various connectives (Hopper & Traugott, 2003, pp. 80–82; Mauri & van der Auwera, 2012, p. 380). This can be demonstrated for the connectives *since*, *after* and the conjunction *and* in the examples in (82) to (83), which may be interpreted in both a temporal and a causal fashion.

(82) Since Susan left him, John has been very miserable. (Hopper & Traugott, 2003, p. 81)

⁸⁶To my knowledge, Grice does not offer such an explanation and, as we will see below, it is not entirely clear whether or not this analysis is in line with Grice's ideas on the scope of the conversational maxims.

- (83) After we read your novel we felt greatly inspired. (Hopper & Traugott, 2003, p. 81)
- (84) He gave up semantics and felt much happier. (Blakemore & Carston, 1999, p. 1)

As Hopper and Traugott (2003) explain for (83), the implicature ‘strengthens informativeness because it enriches the relation between *after we read your novel* and the rest of the utterance, thus providing an interpretation of why the speaker thought it was relevant to include these temporal facts’. As can be seen in (84), this implicature is not only licensed by temporal connectives, but also by *and* (Grice, 1989, p. 28; Blakemore & Carston, 1999, p. 6). Unlike temporal connectives, but comparable to conditionals, however, the conjunction in (84) needs two inferences: one from the iconic order to temporal relation through the maxim of Manner, and a second from this temporal relation to causality through the maxim of Relation, as implemented in (85) and (86) below.

- (85) He gave up semantics and felt much happier.
M₄+> ‘Giving up semantics preceded feeling much happier.’
R+> ‘Giving up semantics caused feeling much happier.’
- (86) If it rains, the road is wet.
M₄+> ‘Rain precedes the road getting wet.’
R+> ‘Rain causes the road to get wet.’

It is, however, not clear whether or not this explanation is in line with Grice’s own view on the application of the maxim of Relation, as the maxim is not only described in scarce detail, it is also unclear whether or not it applies only to whole speech acts, or also to parts of speech acts.⁸⁷ With respect to conditionals, Skovgaard-Olsen, Singmann and Klauer (2016, p. 29) remark that the maxim of Relation ‘applies to the level of whole speech acts, whereas when we talk about relevance in relation to conditionals, we are dealing with an internal relation between the antecedent and the consequent in one sentence’. Douven (2017b, p. 1542) argues along the same lines and argues that it does not follow from the maxim of Relation that so-called ‘missing-link’ conditionals, in which there is no connection between *p* and *q*, appear odd. As I will argue for the conventional (thus not calculable) status of the connectedness in conditionals in the next section, I will not take up this point any further. We will continue,

⁸⁷On the maxim of Relation, Grice merely remarks the following.

Though the maxim itself is terse, its formulation conceals a number of problems that exercise me a good deal: questions about what different kinds and focuses of relevance there may be, how these shift in the course of a talk exchange, how to allow for the fact that subjects of conversation are legitimately changed, and so on. I find the treatment of such questions exceedingly difficult, and I hope to revert to them in later work. (Grice, 1989, p. 27)

however, by looking at examples in which the connection between antecedent and consequent is apparently lacking or cancelled, which would provide arguments for the analysis above and the conversational status of the implicature.

As remarked before, for Grice, the connection between antecedents and consequents of conditionals is a conversational, thus defeasible implicature, because it is not always present. He provides the example below, in which the connection is, presumably, absent.

- (87) If he was surprised, he didn't show it. (Grice, 1989, p. 62)

Grice argues that in cases such as (87), the connection is absent, although he concedes that this is a 'special case', which should be 'satisfactorily explained', as the connection in Grice's view is a generalised conversational, thus default implicature. I do not agree on the absence of a connection in this example, however. In the case of the example in (87), the conditional is concessive. If we combine the unassertiveness conventionally implicated by the use of *if* with the background knowledge that being surprised under normal circumstances causes an expression of surprise, the speaker then uses the connection between surprise and expression to cast doubt on proposition *p* expressed in the antecedent, which she could not have done were there no connection between being surprised and showing it. This view is in line with the analysis Cohen (1971, p. 62) provides. If we would accept Grice's example in (87) to be a counterexample to the hypothesis that conditionals in natural language always express some kind of connection, and we would accept the 'Conversationalist Hypothesis' that *if* is purely truth-conditional without any conventional implicatures attached, we would have to accept (88), because material implication deems a conditional true in case the consequent is true, irrespective of the truth-value of proposition *p* in the antecedent.

- (88) # If he was not surprised, he didn't show surprise [judgement added].
(Cohen, 1971, p. 62)

Grice provides another example to show that the connection between *p* and *q* is a conversational implicature, adapted in (89) below.

- (89) ? If you put that bit of sugar in water, it will dissolve, though so far as I know there can be no way of knowing in advance that this will happen [judgement added]. (Grice, 1989, p. 60)

Grice's argument here is that the cancellation here 'has the effect of labelling the initial statement as a pure guess or prophecy'. However, I do not think (89) makes a felicitous utterance, because by uttering a conditional, the speaker commits herself to the connection (which is also apparent by the absence of a modal verb like *may* here). This is in line with an example by Lassiter (in press), who argues that cancelling the connection (or 'relevance effect') between the antecedent and consequent 'leads to a sense of bizarreness'.

- (90) # If Mary left the party early, Bill was unhappy – though these things have nothing to do with each other [judgement added]. (Lassiter, in press, p. 4)

In much the same vein as the analysis of unassertiveness in the previous section, the connectedness in a conditional can be exemplified as follows. In the example in (91) below, the conditional conventionally expresses connectedness between the antecedent and consequent, which is then contextually specified into a more specific conversational implicature, which conflicts with the denial of connectedness in (90) (i.e., with ‘though these things have nothing to do with each other’).

- (91) If Mary left the party early, Bill was unhappy.
 $\approx$ p is not asserted.
 $\approx$ p and q are connected.
 $+>$ ‘Mary leaving early causes Bill to feel unhappy.’

However, as this could be seen as just ‘rephrasing’ an intuition in terms of the supposed non-cancellability of the connection implicature, let us look at another example Grice provides, including his rationale, reproduced below.

There are now some very artificial bridge conventions. My system contains a bid of five no trumps, which is announced to one’s opponents on inquiry as meaning “If I have a red king, I also have a black king”. It seems clear to me that this conditional is unobjectionable and intelligible, carries no implicature of the Indirectness Condition, and is in fact truth-functional. (Grice, 1989, p. 60)

Grice (1989) argues here that this is an example in which *if* is equivalent to $\supset$ without any implicature of connection between p and q . However, within the specific rules set up in the game, the conditional provides the players with an argument from which to infer that I have a black king in case I indeed do have a red king. So whereas the connection here is not one of clear causality, there still is an inferential link between antecedent and consequent, in the sense that, within this specific context, the knowledge of a player having a red king enables one to conclude that he or she must also have a black king.

Stalnaker’s (1968, p. 100) perspective too is illustrative in this matter, as he argues that the connection between p and q is not necessary in natural language. Consequently, it should not have a place in a semantic theory of conditionals.⁸⁸ To show that the connection between p and q is not a necessary feature of conditionals, Stalnaker uses the example of a (hypothetical) survey.

⁸⁸It is somewhat strange that Haiman (1978, p. 578) cites Stalnaker (1975, p. 167) as criticising the material-implication analysis as follows: ‘it leaves out the idea of CONNECTION which is implicit in an if-then statement’, while, both in recent re-issues and in the original 1968 version of the paper, Stalnaker (1968, p. 100) argues as follows: ‘The material implication analysis fails, critics have said, because it leaves out the idea of *connection* which is implicit in an if-then statement’. He then continues by arguing that, if this ‘were accepted, then we would face the task of clarifying the idea of “connection,” but there are counterexamples even

He sets out to answer the question ‘How does one evaluate a conditional statement?’ and presents the reader with ‘a true-false political opinion survey’ in which the statement under evaluation is the following.

- (92) If the Chinese enter the Vietnam conflict, the United States will use nuclear weapons. (Stalnaker, 1968, p. 101)

In order to evaluate this statement, the following scenario is described.

Consider the following case: you firmly believe that the use of nuclear weapons by the United States in this war is inevitable because of the arrogance of power, the bellicosity of our president, rising pressure from congressional hawks, or other *domestic* causes. You have no opinion about future Chinese actions, but you do not think they will make much of a difference one way or another to nuclear escalation. (Stalnaker, 1968, p. 101)

Stalnaker, following Ramsey (1950, p. 248), argues that the conditional is evaluated along the following lines.

Add the antecedent (hypothetically) to your stock of knowledge (or beliefs); and then consider whether or not the consequent is true. Your belief about the conditional should be the same as your hypothetical belief, under this condition, about the consequent. (Stalnaker, 1968, p. 101)

Stalnaker’s answer to the question of the evaluation of the conditional in the scenario provided is then: ‘Clearly, you believe the opinion survey statement to be true even though you believe the antecedent and consequent to be logically and causally independent of each other’. In other words, in the ‘stock of knowledge’ of the survey participant, proposition q (‘The United States will use nuclear weapons.’) is true. This knowledge (or belief) does not change by adding proposition p (‘The Chinese (will) enter the Vietnam conflict.’) and thus the conditional as a whole is true. Even if one accepts the conclusion derived from this analysis, namely that p is irrelevant in case q is known or believed to be true, the example chosen by Stalnaker may obscure the discussion, as it forces the participant to choose between evaluating the conditional as either true or false, while it may be hypothesised that the participant in the survey may ‘simply’ find the conditional irrelevant in case she is convinced of the truth

with this notion left as obscure as it is’ (see e.g., Stalnaker, 2019, p. 153). Stalnaker (1968, p. 101) concludes that the “connection” is ‘sometimes relevant and sometimes not’, i.e., it is not necessary, because ‘if you believe that a causal or logical connection exists, then you will add the consequent to your stock of beliefs along with the antecedent [...]’, but ‘if you already believe the consequent (and if you also believe it to be causally independent of the antecedent), then it will remain a part of your stock of beliefs when you add the antecedent’. This means that Stalnaker does not reject the truth-conditional analysis of conditionals in the way Haiman suggests, and that he considers the connection between antecedent and consequent a pragmatic, rather than a semantic (i.e., propositional) matter.

of q . In the following section, I analyse Stalnaker's example in different terms and I will argue for the conventional status of connectedness. Note, however, that, as we have seen in this section that connections can be indirect (see also 3.3.7 for a discussion of concessive conditionals) and are, sometimes, highly context-specific, we need an account of 'connectedness' that is not limited to specific types of connection.

2.6.4 Connectedness as conventional non-truth-conditional meaning

For Grice (1989, p. 62), a speaker using a conditional 'standardly [...] implicates that there is non-truth-conditional evidence when he says that $p \supset q$ '. Grice's argument that the non-commutivity of the conditional operator $\rightarrow$ is an indication of the existence of a special function for conditionals in natural language points, I think, towards its conventional status, although Grice is not clear on this, as he focuses mostly on the conversational status of the connections themselves. We have already seen the problems with cancelling connections in the reanalysis of Grice's own examples of conditionals in which he argued the connection to be lacking, and it becomes apparent too when we place Stalnaker's conditional in (92) discussed in the previous section in a more natural conversational context, as in (93) below.

- (93) A: I really believe that the use of nuclear weapons by the United States in this war is inevitable.
 B: Well, if the Chinese enter the Vietnam conflict, the United States will use nuclear weapons.
- a. # A: Yes, that's true.
 b. A: No, they will use nuclear weapons in any case.

A's first utterance in (93) is similar to the evaluation in Stalnaker's scenario. B responds by uttering the conditional under evaluation. A's evaluation in (93a) is incoherent, as what seems to be confirmed is not p or q , but the connection between p and q expressed by B, which, in Stalnaker's analysis, is deemed irrelevant by A's original expression of the belief that the use of nuclear weapons is 'inevitable'. This inevitability is not part of the common ground – or shared belief of A and B – as B believes q to be dependent on p .⁸⁹ Insightful in this matter is Horn's (1989, pp. 377–379) discussion on metalinguistic negation, in which he gives the following example based on Nietzsche's 'notorious conditional' and argues that it is certainly possible to deny (94) ('It is not the case that if God is dead, everything is permitted.') while not committing to (95).⁹⁰

⁸⁹This characterisation reminds us of presuppositions, which can be understood in terms of background knowledge that is cancellable only using metalinguistic negation. See also section 2.5.4.

⁹⁰Although Nietzsche is believed not to have read Dostoevsky's (1879–1880) *The Brothers Karamazov* (Kaufmann, 2013, p. 318), the novel includes the phrase 'If there is not God, everything is permissible'.

(94) If God is dead, everything is permitted.

(95) God is dead and something is forbidden.

The point made by Horn (1989, p. 378) is that negating a conditional does not amount to negating the material conditional, which would license (95), as can be seen in Table 2.4, in which only line 2 results in $\top$ for ' $\neg P \supset Q$ '.

Table 2.4:
Truth table of $P \supset Q$ and $\neg(P \supset Q)$

	P	Q	$P \supset Q$	$\neg(P \supset Q)$
1	$\top$	$\top$	$\top$	$\perp$
2	$\top$	$\perp$	$\perp$	$\top$
3	$\perp$	$\top$	$\top$	$\perp$
4	$\perp$	$\perp$	$\top$	$\perp$

Rather than negating the material conditional, the negation of a conditional expresses an 'unwillingness to assert that proposition [the negation of material implication]'. As in Stalnaker's example, the negation seems to target precisely the connection between p and q . Horn provides several examples, but does not analyse them in terms of this connection. Rather, he uses the examples to argue negation being applicable to both truth and assertability. However, when we look at the examples Horn adapts from Grice (1989, p. 81) and Dummett (1973, pp. 328–330), and Horn's (1989, p. 378) explanation below, it seems to be the case the connection between p and q is negated.

(96) It is not the case that if X is given penicillin, he will get better. (Horn, 1989, p. 378)

(97) It is not the case that if X is given penicillin he will get better; it might very well have no effect on him at all. (Horn, 1989, p. 378)

(98) X: If it rains, the match will be cancelled.

Y: That's not so. (or, I don't think that's the case.) (Horn, 1989, p. 378)

According to Horn, Y's contribution in (98) is 'not actually a negation of X's content (presumably a material conditional, although Dummett fails to make this explicit); rather, we can paraphrase Y as having conveyed [(99)] or [(100)]'.

(99) If it rains, the match won't necessarily be cancelled. (Horn, 1989, p. 379)

(100) It may [epistemic] happen that it rains and yet the match is not cancelled. (Horn, 1989, p. 379)

Horn (1989, p. 378) concludes that negation outside the scope of a conditional amounts to refusing the assertion 'if p , (then) q ' rather than to a '(descriptive) negation of a conditional whose truth value is determined in accordance with the material equivalence' as presented in (101) below.

$$(101) \neg(p \rightarrow q) \leftrightarrow (p \wedge \neg q)$$

Given Horn's (1989) focus on negation in *A Natural History of Negation*, this characterisation is suiting, but focusing on conditionals, Grice's original explanation below – within his discussion of conditionals – is more insightful.

Sometimes a denial of a conditional has the effect of a refusal to assert the conditional in question, characteristically because the denier does not think that there are adequate non-truth-conditional grounds for such an assertion. In such a case, he denies, in effect, what the thesis represents as an implicature of the utterance of the unnegated conditional. For example, to say 'It is not the case that if X is given penicillin, he will get better' might be a way of suggesting that the drug might have no effect on X at all. (Grice, 1989, p. 81)

Two notions are essential here. First, the term 'non-truth-conditional grounds' is used to refer to the connection between p and q in natural language conditionals (see Grice, 1989, p. 62). Second, Grice explains (96) to be a denial of 'what the thesis represents as an implicature of the unnegated conditional', which must be interpreted here as the same non-truth-conditional connection mentioned before. This is in line with Grice's final remark above, namely that it might be a way of suggesting 'that the drug might have no effect on X at all', i.e., the suggestion that no connection holds between taking the drug and getting better. Negating a conditional thus amounts to denying its conventional meaning of connectedness.

Coming back to the question whether or not a speaker can cancel the alleged implicature of connectedness without appearing incoherent or infelicitous, we can see, in line with the example by Lassiter (in press) in (90) above, that cancellation of the implicature of connection in Stalnaker's example leads to infelicity, as in (102) below.

- (102) # If the Chinese enter the Vietnam conflict, the United States will use nuclear weapons, and/although there is no connection between the actions of the Chinese and the United States.

The problematic nature of cancellation of connectedness is consistent with recent experimental work by psychologists, which shows that participants rate cancellation as contradictory significantly more in examples like (102) than cancellation of strongly generalised scalar implicatures, as in 'Some of our guests are in the garden. In fact, they all are' (Skovgaard-Olsen et al., 2019, p. 46).

All of the above points to connectedness being more than 'just' a (generalised) conversational implicature. There have been several analyses that 'a conditional is true [if and only if] there is a valid argument with the conditional's antecedent plus, possibly, contextually indicated background assumptions as its premises and the conditional's consequent as its conclusion' (Douven, 2016, p. 36; see also Kneale & Kneale, 1962, Chapter 3). In recent so-called 'inferentialist' approaches, it has been argued that a conditional is

only true when the consequent follows, through inferential steps (either deductive, inductive or abductive), from the antecedent, in combination with background knowledge, while the consequent cannot follow solely from that background knowledge.^{91,92} Furthermore, the antecedent has to be compatible with the background knowledge involved (see Douven, 2016, p. 38 and references therein; see also Krzyżanowska, Wenmackers and Douven, 2014; for recent overviews and discussion, see Skovgaard-Olsen, 2020 and Douven, Elqayam and Krzyżanowska, 2021). In the same inferentialist paradigm, Krzyżanowska, Wenmackers and Douven (2013) and Krzyżanowska, Collins and Hahn (2017, 2020) present experimental results that show how the acceptability of conditionals decreases when a connection is not present (for another recent experimental study, see also Sebben & Ullrich, 2021). Although Krzyżanowska, Collins and Hahn (2017) discuss their results explicitly as an argument against ‘a Gricean account’ of connectedness, they do not distinguish between different types of implicatures. I interpret ‘Gricean’ here as Grice’s ‘Conversationalist Hypothesis’ as discussed by Cohen (1971), which seems in line with Krzyżanowska (2019), who argues that the connection between antecedents and consequents fails all tests for conversational implicatures, which in turn is corroborated by experimental results by Skovgaard-Olsen et al. (2019), who show that participants judge cancelling the connection contradictory. In another experiment, Grusdt and Franke (2021) show how the choice to use a conditional to describe a situation is influenced by manipulating ‘relevant causal beliefs’.

Other recent approaches to conditionals have argued to include the notion of ‘causality’ into a more formal semantics of conditionals. Schulz (2011) and Santorio (2019) for instance both argue for a causal notion of entailment.⁹³ While it goes too far to include such a logic in this discussion, I will discuss the main proposal below, starting with the appropriateness condition in (103) below.

$$(103) \text{ ‘If } A, \text{ then } C\text{’ is appropriate only if } P(C|A) - P(C|\neg A) = \Delta P_A^C >> 0$$

Here, the ‘appropriateness’ of conditionals is defined in terms by the probability of the consequent. If this probability does not increase given the antecedent, a conditional is inappropriate (for a detailed discussion of causality and conditional probability in conditionals, see also van Rooij & Schulz, 2019; for

⁹¹For another framework, ‘Hypothetical Inferential Theory’ (HIT), which combines insights from both semantic and psychological analyses of conditionals, see Douven et al. (2018, p. 54). The approach adds to the ‘the principle of relevant inference’, i.e., an inferential relation between antecedents and consequents of conditionals, a second principle, ‘the principle of bounded inference’, which states that the strength of the relation ‘need only be strong enough, in the sense of being subjectively supported’, i.e., the relation may be a heuristic, a pragmatic cue or an inference to the best explanation.

⁹²See also Crupi and Iacona (2021, pp. 220–221) for an account of ‘evidential conditionals’ in which ‘the evidential support from a $[p]$ to b $[q]$ amounts to the degree of incompatibility between a $[p]$ and $\neg b$ $[\neg q]$ ’.

⁹³For a recent application of Douven’s ‘missing link’ analysis of predictive conditionals to other types, such as concessive conditionals and biscuit conditionals, see van Rooij and Schulz (2020).

an overview of research on the relation between natural language conditionals, causality, and probability judgements, see Over, 2017; Over & Cruz, 2021). This is different from Stalnaker's proposal, which says that a conditional is true in case the antecedent is *not incompatible* with the consequent (see previous section).⁹⁴ The definition in (103) effectively means that the 'appropriateness' of conditionals is defined in terms of the difference in probability of the consequent given the antecedent and the negation of the antecedent, i.e., the antecedent stands in a conditional relation to the consequent only if 'manipulating A will change C in a systematic way' (Schulz, 2011, p. 14). Conditionality, in this sense, is defined in terms of manipulation and control (for another account in which weak and strong relevance are formally operationalised, see Dietz, Hölldobler & Pereira, 2015). Tellings (2020) too argues for conditional dependency between antecedents and consequents of conditionals in his analysis of the use of conditionals as answers to questions, as in (104) below.

- (104) A: Do you want coffee or tea?
 B: If it is freshly made, I would like coffee. (Tellings, 2020, p. 26)

Here, we see a question concerning the consequent (i.e., ' q ?'), and an answer in the form of a conditional (i.e., 'if p , q '), in which 'learning about the conditional dependency between p and q is relevant for A in the process of resolving her decision problem " $?q$," because the answer enables A to answer the question in terms of p instead of q by means of their dependency.

As in the linguistic literature on the subject at hand, the philosophical literature on conditionals also debates about the status of the connection between p and q in natural language conditionals. Jackson (1998, Chapters 1-4) argues in favour of the so-called 'Supplemented Equivalence Theory' (see also Jackson, 2006, pp. 221–222) in which the truth-conditional analysis of conditionals as material implication is accepted and supplemented with a conventional implicature of connection, in the same vein as I argued in this section, although I argue here for connectedness as conventional meaning instead of a conventional implicature. Jackson (1987) argues that 'there is a convention governing the assertion of $(A \rightarrow B)$ to the effect that it should only be asserted when it would be right to infer B on learning A'. In an earlier account too, Jackson (1979, p. 587) explicitly compares the connection between p and q to other well-known conventional implicatures, such as those connected to *but* as discussed in section 2.4. He argues that 'what is signalled by the assertion of $(P \rightarrow Q)$ amounts to $Pr(Q/P)$ being high. This is sufficient for $Pr(P \supset Q)$ ', in which the probability of q depends, at least partially, on p , comparable to the probability-based appropriateness account summarised in (103) above. Bennett (2003, Chapter 3), however, provides a number of arguments against treating connectedness as conventional implicature. For instance, words with a conventional meaning licensing a conventional implicature, such as the stock examples *but* and

⁹⁴Note here that this does not mean it necessarily runs counter to Ramsey's proposal, as what some call 'the Ramsey test', is, at least according to Bennett (2003, p. 28), not exactly what 'capture[s] the spirit of Ramsey's remark'.

therefore discussed in section 2.4.3, can be deleted and replaced by a full stop without affecting the truth conditions (Bennett, 2003, pp. 40–41), which cannot be said for *if*. Another objection is that Jackson (1979, p. 93), according to Bennett (2003, pp. 41–42) is unclear by using terms like *tone*, as in ‘the words that are responsible for conventional implicatures, that carry tone’. Bennett’s arguments mainly concern the nature of and terminology around conventional implicatures and their contribution to an utterance. I will not repeat the rest here, as they fall outside the scope of this dissertation, and furthermore, I think it is impossible to offer an account here that settles this debate. As Levinson (2000, p. 198) repeatedly argues, and this discussion shows again, the difference between what is said, and what is implicated ‘is in large part a matter of how the analyst phrases the inferences’. I will therefore take the discussion provided above, including the apparent non-defeasibility of the connectedness and the recent experimental results supporting this view, as arguments for treating the connectedness in conditionals as something stronger than a conversational implicature, namely a non-truth-conditional, conventional (i.e., non-defeasible) part of the meaning of conditional conjunctions in natural language.

How, then, are the more specific connections inferred? As we saw in section 2.6.3, in case connectedness is considered a conversational implicature, it can be calculated using the maxims of Manner and Relation. In this section, however, I argued for connectedness as part of the conventional meaning of conditionals, presenting antecedents and consequents as connected. Conventional meaning is, by nature, not calculable. I argued the *type* of connection, however, to be not conventionally attached to *if*, but conversationally implicated. Several kinds of connection can be expressed using a conditional, and while a full discussion of the types discerned in the literature follows in the next chapter, I will briefly provide examples in the remainder of this section to clarify what is meant by ‘filling in the details of connectedness’ mentioned in the discussion so far.

Comrie (1986, p. 96) argues that conditionals in natural language combine ‘material implication with the *relevance of a causal relation* [emphasis added] from the protasis to the apodosis’. In (105) repeated below, for instance, the connection was presented as being *consequential*, but this cannot be said for Dancygier and Mioduszevska’s example in (106), also repeated below, in which, as was discussed in the previous section, *q* is not presented as a consequence of *p*, but as a conclusion based on *p*.

- (105) If I catch the train, I will come on time. (Dancygier & Mioduszevska, 1984, p. 122)
- (106) If he passed the exam, he must have studied hard. (Dancygier & Mioduszevska, 1984, p. 122)

Clear examples of different types of conditional connections are offered in Sweetser’s (1990, pp. 114–119) tripartite classification, as presented below (see section 3.3.7 for a detailed discussion).

- (107) If Mary goes, John will go.

(108) If she's divorced, (then) she's been married.

(109) There are biscuits on the sideboard if you want them.

In all three cases, *p* and *q* are interpreted not in isolation, but in connection to each other by means of the conventional meaning of connectedness expressed by *if*. The most basic connection in Sweetser's account that of *causality* in (107) and it holds in the 'content domain'; i.e., the 'going' of Mary causes or enables that of John. This connection can also be seen in (105). In (108) the connection is *inferential* and, therefore, less direct, as the antecedent presents an argument for the conclusion drawn in the consequent. This connection is similar to the one in (106). As we can already see, this type of connection lends itself for the expression of epistemic necessity using *must* as in (106), but in (108) we see such a modal marking is not necessary for this connection to be implicated. Finally, in (109) the relation is *pragmatic* and even more indirect, as the antecedent 'merely' expresses a relevance condition for the speech act in the consequent. Sweetser (1990, pp. 141–142) argues the *inferential* and *pragmatic* connections in (108) and (109) to have been pragmatically extended from the causal connection as exemplified in (107). As we will see, there are several accounts which define other types of connections, and, evenly importantly, do so on different grounds. The question we will end with here, however, is on basis of what the exact implicature is inferred. Before addressing this question, and properly formulating the research questions in section 2.8, we will discuss one last issue related to the connectedness in conditionals in the next section, namely the phenomenon of 'conditional perfection'.

2.6.5 Conditional perfection

One argument in favour of the connectedness in conditionals is the phenomenon of 'conditional perfection' (cf. Geis & Zwicky, 1971; Horn, 1972; Gazdar, 1979; van der Auwera, 1997), which takes ' $p \rightarrow q$ ' to conversationally implicate ' $\neg p \rightarrow \neg q$ ', an inference known as the formal fallacy of 'denying the antecedent' (see a.o. Copi, 1973; Gamut, 1991). This means that for the examples discussed before, such as Stalnaker's example on page 81, a 'regular conditional' ('If the Chinese enter the Vietnam conflict, the United States will use nuclear weapons') is 'strengthened' into a biconditional ('Only if the Chinese enter the Vietnam conflict, the United States will use nuclear weapons'). Or, as Sweetser (1990, p. 123) puts it, 'we may, under appropriate conditions, reason from apodosis to protasis, as well as from protasis to apodosis'. We have already seen that it is this interpretation that is denied when negating a conditional. With respect to the denial of 'If the Chinese enter the Vietnam conflict, the United States will use nuclear weapons', this would amount to denying an exclusive relation between the Chinese entering the Vietnam conflict and the United States using nuclear weapons. Sweetser (1990, p. 114) too takes *p* in the antecedent of an example like (110), Mary's going, as not only a sufficient, but also a necessary condition for John's going.

(110) If Mary goes, John will go. ($p \rightarrow q$)

(111) If Mary does not go, John will not go either. ($\neg p \rightarrow \neg q$)

While the truth table does not predict John's going ($q \vee \neg q$) on the basis of Mary not going ($\neg p$), the implicature licensed by conditional perfection does, by selecting lines 1 and 4 in the truth table and denying the logically valid argument in line 3. This can be seen even more clearly in the classic examples from Geis and Zwicky (1971) in (112) and (113) below.

(112) If John leans out of that window any further, he'll fall. (Geis & Zwicky, 1971, p. 562)

(113) If you mow the lawn, I'll give you five dollars. (Geis & Zwicky, 1971, p. 562)

With respect to the discussed paradoxes of material implication, conditional perfection affects Lewis's (1912, p. 522) 'startling theorems', namely that 'a false proposition implies any proposition' and 'true proposition is implied by any proposition', because the invited inference 'denies' line 3 of the truth table, strengthening conditionality ('*if*, $p \rightarrow q$) into biconditionality or equivalency (*iff*, $p \leftrightarrow q$).

Sweetser (1990, p. 115), following Comrie (1986), argues that the 'if and only if' reading is not part of the semantics of *if*, but a conversational implicature 'which easily follows from the sufficient-conditionality use of *if*'.⁹⁵ The question then is whether or not the truth conditions are affected. Intuitively, this seems to be the case, as conditional perfection indeed excludes line 3 from the truth table of conditionals (a true p and a false q) from the evaluation of a conditional. Knowing that line 2 (a false p and a true q) is the only line that renders a conditional false, the only lines that remain are 1 (a true p and a true q) and 4 (a false p and a false q). However, as with other conversational implicatures, this implicature is context specific and can be cancelled. So in (113), the Relation implicature licenses a causal interpretation and this, in turn, licenses conditional perfection, as the speaker may be *assumed*, on basis of the maxim of Quantity, to have expressed all necessary and sufficient conditions for the consequent in the specific context of the utterance. As this assumption is based on the Cooperative Principle and one of the conversational maxims, however, the implicature can be cancelled, and does not always arise, or is not licensed with the same strength, which can be seen in the example in (114), adapted from (86) above.

(114) If it rains, the road is wet.⁹⁶

$\hat{\approx}$ p is not asserted.

+> 'It may or may not be raining.'

⁹⁵Although it is not mentioned by Sweetser or Comrie, this view is corroborated by earlier experimental evidence, as presented by Noordman (1979, pp. 65–87).

⁹⁶For the purpose of clarity, the conventional meaning ($\hat{\approx}$) and implicature of unassertiveness (+>) are also explicitly represented in this example.

$\approx$ p and q are connected.
 $M_4 + >$ ‘Rain precedes the road getting wet.’
 $R + >$ ‘Rain causes the road to get wet.’
 $+ >$ ‘Only rain causes the road to get wet.’

If one accepts that this example licenses conditional perfection too, it can be cancelled much more easily than in the case of (113), for instance by continuing the utterance with ‘but people with garden hoses can get it wet too’. By contrasting (113) with (114), we can see the strength of the implicature depends on the contents of the utterance, i.e. as ‘mowing the lawn’ and ‘receiving five dollars’ are connected in (113) as an inducement or promise (see e.g., Fillenbaum, 1986; Ohm and Thompson, 2004; Haigh et al., 2011, and section 1.1), the implicature of conditional perfection appears stronger than in (114), in which the connection is one of more general consequence. Another view on this issue is that conditional perfection is not cancellable and ‘intrudes’ on truth conditions. In ‘intrusive constructions’ (Levinson, 2000, p. 198) the truth conditions of a sentence make ‘reference to the pragmatic properties of its constituent clauses’ (Gazdar, 1979, p. 168; for examples and analysis, see also Wilson, 1975, p. 151). I will view conditional perfection as a conversational implicature in the classic (i.e., ‘non-intrusive’) sense, because it can be cancelled. Note, however, that the conventional meaning of connectedness is not, and cannot be cancelled. If we take (114), for instance, and we explicitly cancel the ‘if and only if’ implicature as we have done above (‘but people with garden hoses can get it wet too’), the necessity of rain is denied, while it still counts as a sufficient cause of roads getting wet. The connectedness of the conditional is thus maintained.

2.6.6 Conclusion

In this section, we analysed the connectedness in p and q in ‘if p , q ’ as part of the conventional meaning of conditionals in order to explain the inconsistencies in theorems (20c) and (20d) on page 33, which suggest that the truth of p is irrelevant in case q is known to be true. If this were the case, one could have been briefer and more informative by asserting q instead of uttering ‘if p , then q ’. A speaker using a conditional thus, in accordance with Grice, must have reasons to do so and the reason is to express that ‘some strong connection’ holds between p and q . Unlike Grice, I argued that the connectedness in conditionals cannot be cancelled, and it is considered part of the conventional meaning of conditionals.

A speaker uses a conditional not, or not only to express a material conditional, which amounts to a compositional evaluation of a conditional based on the individual truth values of p and q , but to present two situations in connection. This connectedness may be of causal nature, but can also be of another kind. Whereas these more specific connections between p and q are conversationally derived from the fact *that* p and q were expressed using a conditional, the contents of p and q , the grammatical properties of the conditional and the

utterance in context, the connectedness itself remains constant. Although we have discussed this latter specification in terms of a conversational implicature, the characterisation of their licensing in terms of contents, grammatical properties and context leaves open many questions. We will discuss this issue in great detail in the next chapter.

2.7 Research questions

Before summarising the insights gathered in this chapter, let us take the discussion so far to narrow down the question formulated at the beginning of this chapter: how are conditionals used in natural language? In the introduction in section 2.1, I already remarked that one cannot expect such a general and, as we have seen, heavily debated question to be answered in full. However, starting from the material analysis of conditionals and identifying two main discrepancies between ‘if p , (then) q ’ ($\rightarrow$) and $\supset$, and fleshing out two conventional, non-truth-conditional aspects of meaning to deal with these discrepancies now enables us to determine a more specific research direction.

Analysing both unassertiveness and connectedness as conventional, non-truth-conditional meaning aspects of conditionals means that these aspects are treated here as tied to conditional form(s), and that they have no effect on truth conditional meaning. Although this raises several questions about truth-conditional analyses of conditionals, in view of the current study, the two questions in (115) are of particular interest and will guide the rest of this dissertation.

(115) Main research questions

- a. What specific implicatures are licensed through the unassertiveness of and connectedness in conditionals?
- b. To what extent do the grammatical features of conditional *if* constructions determine the more specific implicatures?

With respect to (115a), we want to know which specific implicatures are licensed through the unassertiveness and connectedness argued for in this chapter. Implicatures related to unassertiveness are concepts described in the literature such as uncertainty, hypotheticality and counterfactuality. Implicatures related to connectedness are, for instance, causal, epistemic, co-occurrence and speech-act connections between p and q . As we have seen already, the more specific implicatures are, contrary to unassertiveness and connectedness, context-dependent. However, as we will see in the next chapters, the grammatical properties of conditional constructions may also affect these implicatures. Therefore, with respect to (115b), and as mentioned several times throughout this chapter, we should analyse not only the conditional conjunction *if*, but the construction as a whole: the conjunction and the properties of the two clauses it connects. From the perspective of construction grammar, we do not only want to know

which ‘meanings’ (including implicatures) can be expressed by using a conditional, but we also want to investigate those meanings with respect to formal characteristics, or, the grammar of conditionals. Instead of arguing that *if* has either a very general (‘vague’) meaning that is further specified by the utterance in context (i.e., the monosemy view), or arguing that *if* has different meanings (i.e., the polysemy view), I will approach the questions above by testing to what extent the more specific interpretations of unassertiveness (cf. (115a)) and connectedness (cf. (115b)) are indeed conversational implicatures, and to what degree they are actually generalised, i.e., triggered by differences in grammatical forms in a network of conditional *if*-constructions.

2.8 Conclusion

In this chapter, after introducing the concept of conditionals in section 2.1, we identified a number of characteristics of conditionals in natural language in section 2.2. Next, we compared the use of conditionals in natural language with their truth-conditional analysis in terms of material implication in section 2.3. This yielded two main discrepancies, or, in other words, two clear aspects in which $\supset$ differs from $\rightarrow$ (i.e., in which the logical operator $\supset$ differs from the linguistic conjunction *if*). After discussing the notion of non-truth-conditional meaning in section 2.4, we analysed the discrepancies mentioned before and identified the main non-truth-conditional aspects of the meaning of conditionals in natural language. By doing so, I hope to have provided the needed terminological clarity concerning the notions ‘semantics’ and ‘pragmatics’ with respect to the analysis of conditional constructions. As argued for by Cappelle (2017) ‘there is an urgent need for some more theoretical reflection about what kind of pragmatic information should and should not be included in constructions and how, if at all, pragmatics differs from semantics’. Leclercq (2020, p. 226) encourages scholars working within the framework of construction grammar to discuss in more explicit terms the notions of semantics and pragmatics, instead of using broad terms like ‘meaning’, in order to ‘increase its internal coherence and to enhance its overall intelligibility for the wider linguistic community’. He proposes to use two dimensions to do so: first a distinction between semantics and pragmatics can be made by separating ‘encoded meanings’ from ‘contextually inferred meanings’ respectively, and second, by separating ‘truth-conditional content’ from non-truth-conditional content’. In this chapter, I hope to have shown that while these approaches draw the line between semantics and pragmatics differently, they do offer analytic clarity when used explicitly, as the identification of two non-truth-conditional meaning aspect in this chapter shows.

The first non-truth-conditional meaning aspect of conditionals, discussed in section 2.5, is their unassertiveness, that is, they cannot be used to assert p or q . Concepts frequently used in the literature on conditionals, such as uncertainty and counterfactuality, are more specific implicatures triggered by the unassert-

iveness of conditional utterances in context. The second non-truth-conditional aspect of conditionals, discussed in section 2.6, is that they present p and q as connected (i.e., ‘connectedness’). As with uncertainty or counterfactuality as conversational implicatures derived in part from the conventional meaning of unassertiveness of conditionals, connectedness is conventionally expressed by using a conditional conjunction, and further specified in context by a conversational implicature of, for instance, causality or epistemic inference. In search of clear terminology, I will explicitly phrase what was discussed in this chapter as follows. First, the conventional, truth-conditional content of conditionals is $\rightarrow$. Second, the conventional, non-truth-conditional meaning of conditionals includes their unassertiveness and connectedness. Third, the non-conventional (i.e., contextual), non-truth-conditional meaning of conditionals includes the specifications of unassertiveness and connectedness.⁹⁷

In section 2.7, I took the general question we started out with in this chapter and broke it down into two more specific research questions. In line with the above, these research questions suggest analysing the meaning and the form of conditionals in unison, taking seriously the point made by Dancygier (1998, p. 5), namely that the meaning of conditionals ‘is determined by a number of form-meaning correlations which are construction-specific’ and that in an analysis of conditional constructions, we need to investigate how ‘its lexical and structural features are mapped onto aspects of interpretation [...]’. By explicitly discussing conditionals in terms of their truth-conditional and non-truth-conditional meaning, and in terms of their conventional and non-conventional (i.e., contextual) meaning, we can now proceed, in the next chapter, to discuss which types of conditionals are distinguished in the literature, and how these types relate to the non-truth-conditional meaning aspects discussed in detail in this chapter. Evenly importantly for the further analysis presented in the dissertation, I will inventory which grammatical features are suggested to be related to different types of conditionals, in order to test to what extent the more specific implicatures of unassertiveness and connectedness are generalised or even conventionalised.

⁹⁷Note that by using the term ‘includes’ for the conventional, non-truth-conditional content, and the non-conventional, non-truth-conditional content of conditionals I would like to make clear that I do not suggest to have given an exhaustive description of the meaning of conditionals. Note furthermore that, as I argued for in section 2.4, I do not use the concept of explicatures from Relevance Theory in this dissertation, which would amount to non-conventional, truth-conditional content.

CHAPTER 3

Classifications of conditionals

3.1 Introduction

In the previous chapter, I argued for the unassertiveness of and connectedness in conditionals. Although both notions were characterised as conventional, non-truth-conditional meanings, I argued their specification, i.e., the more specific types of unassertiveness and connectedness, to be conversational implicatures. In this chapter, I will provide an overview of the literature that classifies conditionals in relation to these two implicatures.

The aim of this chapter is to provide the necessary preliminaries for answering the two research questions in discussed in section 2.7. With respect to the first question, namely what specific implicatures are licensed through the unassertiveness of and the connectedness in conditionals, this chapter provides an overview of classifications of conditionals based on the specifications of unassertiveness, and of connections between antecedents and consequents of conditionals. With respect to the second question, namely to what extent the grammatical form of conditionals determine the specific implicatures they license, the overview aims to serve as an inventory of grammatical features related to different types of conditionals in the literature. In relation to consequent chapters, these features will serve as input for the main corpus study, which aims to answer the question to what extent the non-truth-conditional meaning aspects of conditionals are tied to the grammatical features of conditionals in Dutch, and to what extent these can be viewed as pairings of form and meaning, i.e., as constructions in the sense of construction grammar (see previous chapters, and chapter 6).

Starting with implicatures connected to unassertiveness in section 3.2, I will review classifications of conditionals geared towards what we have characterised as epistemic stances in section 2.5. In section 3.3, I will discuss classifications based on the connectedness in conditionals, i.e., those accounts which distinguish types on the basis of connections between antecedents and consequents of conditionals. In both sections, attention is given to the grammatical features discussed in those accounts, as they form the ingredients for the remainder of this study, in which these features will serve as variables for several cluster analyses, which test combinations of features on their status as grammatical constructions (see chapter 6). Before moving on to the data collection and preparation in chapter 4, I will offer preliminary conclusions in section 3.4.

3.2 Types of unassertiveness

3.2.1 Introduction

In this section, I discuss classifications that are based on the more specific implicatures resulting from the unassertiveness of conditionals. Before doing so, I deem it necessary to remark that the accounts discussed here do not start from unassertiveness as characterised in the previous chapter, and they do not all discuss the meaning aspects they distinguish in terms of implicatures. Instead, unassertiveness is a non-truth-conditional meaning aspect of conditionals used here to group accounts that provide insights to the more specific implicatures arising from this meaning aspect.

The aim of this section is to provide an overview of both the types of stances towards the propositions expressed by using a conditional, and to identify which grammatical features are suggested to be related to these stances. In sections 3.2.2 to 3.2.10 I will systematically discuss these accounts, before summarising the findings in section 3.2.11, and moving on to classifications of the different types of connections in section 3.3.

3.2.2 Present, past and future conditions

Goodwin (1879, pp. 88–102) classifies Greek conditionals in terms of *time*, resulting in two types: *present and past conditions* on the one hand, and *future conditions* on the other (see also Smyth, 1920, pp. 516–537).

Present and past conditions can be divided into conditions that imply either no degree of fulfilment, as in (1), and those that imply its non-fulfilment, as in (2). The former sub-type has the indicative mood in the antecedent and (commonly) also in the consequent of Greek conditionals. This type is described by Smyth (1920, p. 516) as stating ‘a supposition with no implication as to its reality or probability’.

- (1) If he is doing this, it is well.

(Goodwin, 1879, p. 90)

- (2) If he had done this, it would have been well. (Goodwin, 1879, p. 90)

Two more sub-types are defined; those with a particular supposition, referring to one or more definite acts, as in (3), and those with a general supposition, referring ‘indefinitely to any act or acts [...] which may be supposed to occur or to have occurred at any time’ (Goodwin, 1879, pp. 88–89), as in (4).

- (3) If he was able to do this, he did it. (Goodwin, 1879, p. 89)

- (4) If he is (ever) able to do this, he (always) does it. (Goodwin, 1879, p. 89)

Goodwin (1879, pp. 91–92) shows how general conditionals are expressed using present tense or past tense in both clauses, as in his examples in (5) and (6).

- (5) If any one (ever) drinks of this, he dies. (Goodwin, 1879, p. 91)

- (6) If any one (ever) drank of this, he died. (Goodwin, 1879, p. 91)

This distinction between particular and general conditionals resembles the difference between regular *predictive* conditionals and *generic conditionals* (cf. Dancygier and Sweetser, 2005; see section 3.3.7) and between *hypothetical* and *course-of-events conditionals* (cf. Athanasiadou and Dirven, 1996; see section 3.3.9).

Future conditions are divided into future conditions with ‘more vivid form’, with an antecedent in subjunctive or future indicative mood and a consequent in any future mood, as in (7), and future conditions with ‘less vivid form’, which have the optative mood (expressing wish or hope) in both the antecedent and consequent, as in (8), although English has no morphological optative mood, as opposed to Greek, which is the focus in Goodwin’s (1879) account.

- (7) If I (shall) receive anything, I will give it to you. (Goodwin, 1879, p. 102)

- (8) If he should go, he would see all. (Goodwin, 1879, p. 105)

Smyth (1920, p. 523) argues the first type is used when ‘the speaker clearly desires to be graphic, impressive, emphatic, and to anticipate a future result with the distinctness of the present’, while the second type may express the same probability or possibility, but with less ‘temperament’.

With respect to exhaustiveness, Goodwin mentions that the verb patterns of antecedents and consequents discussed include most, but not all conditionals found. What follows is a set of mixed constructions that have non-identical tenses in the antecedent and consequent and which cannot be placed into the classification discussed. Smyth (1920, pp. 517, 527–537) mentions the same: ‘There are many possible combinations of present and past conditions with different forms of the protasis and apodosis’. For instance, when the indicative is used in the antecedent, the optative mood may be used in the consequent, as in (9), or when subjunctive or future indicative mood in the antecedent is combined with the optative mood in the consequent, as in (10).¹

¹Again, remember, as mentioned above, that the moods in Goodwin’s Greek examples cannot be directly translated into English.

(9) If this is so, he would not justly be punished. (Goodwin, 1879, p. 105)

(10) If I should do this, it would be well. (Goodwin, 1879, p. 105)

Criticism on Goodwin's classification has focused on the use of *time* as main parameter, the difference between particular and general and the implications of the parameter of *fulfilment*. Elliott (1981, p. 18) elaborates that the verb form underspecifies time, for which context is needed and therefore is interpretational (as we will see in section 3.3.7, this criticism also applies to Dancygier's main parameter of *backshift*). Elliott (1981, p. 15) also argues that the distinction between *general* and *particular* conditions is sometimes difficult to establish, as exemplified in his examples in (11) and (12).

(11) ... but if (whenever) we walk in the light... we have (in such cases) fellowship. (Elliott, 1981, p. 15)

(12) Lord, if you are willing you are able to cleanse me. (Elliott, 1981, p. 15)

Elliott (1981, p. 15) argues that (11) 'states a general situation that is presently true for all believers', whereas (12) is 'considered a particular one'. It is this 'interpretative [...] nature' that is seen as problematic in Goodwin's classification.

With respect to grammatical features influencing the stance towards the propositions of the conditional, this classification is built around time reference as expressed by verb tense, not only in distinguishing between conditionals with and without implication of fulfilment, as in 'future conditions', but also as a characteristic of particular and general conditionals.

3.2.3 Logical, anticipatory, ideal and unreal conditionals

Gildersleeve (1882) classifies conditionals in the odes of Greek lyric poet Pindar (c. 518-438 BC). As he uses manifest moods and tenses in Greek to determine types of conditionals, and these features are not directly translatable into determinate features in English (or Dutch), the examples in this section are taken from the King James Version of the New Testament, following references provided by Robertson (1919) and Elliott (1981).

Gildersleeve (1882) distinguishes four main types of conditionals: *logical*, *anticipatory*, *ideal* and *unreal conditionals*. *Determined-fulfilled conditions*, as in (13), are called *logical conditions*, which are used to reason from a premise to a conclusion: the proposition in the antecedent is accepted as true and, therefore, the proposition in the consequent must also be accepted.

(13) And they asked him, and said unto him, Why baptizest thou then, if thou be not that Christ, nor Elias, neither that prophet? (John 1:25)

Gildersleeve (1882, pp. 435, 445) notes that this type is Pindar's 'favourite condition in argument' and is the predominant type of condition in Pindar's odes. It can be both *particular* and *general* and according to Gildersleeve, the

only assertion made is the connection between ‘two members of the sentence’, but none of the individual members (i.e., the antecedent and consequent) is asserted, which is in line with the analysis presented in sections 2.5 and 2.6. Gildersleeve (1882, p. 438) mentions that, in his corpus of Pindar texts, ‘logical conditions far outnumber, indeed almost double, all the others put together’.

Determined conditions can be either *fulfilled*, as in (13) above, or *unfulfilled*, as in (14) below.

- (14) Now when the Pharisee which had bidden him saw it, he spake within himself, saying, This man, if he were a prophet, would have known who and what manner of woman this is that toucheth him: for she is a sinner. (Luke 7:39)

This determined-unfulfilled type is called *unreal* and presents the antecedent as ‘contrary to fact’ (Gildersleeve, 1882, p. 437).

Undetermined conditionals can either have a prospect of determination, expressing a probability, as in (15), or a remote prospect of determination, expressing a possibility (‘less likelihood of determination’, cf. Robertson, 1919, p. 1020), as in (16).

- (15) Jesus answered, Are there not twelve hours in the day? If any man walk in the day, he stumbleth not, because he seeth the light of this world. (undetermined with prospect of determination) (John 11:9)
- (16) And who is he that will harm you, if ye be followers of that which is good? But and if ye suffer for righteousness’ sake, happy are ye: and be not afraid of their terror, neither be troubled. (undetermined with remote prospect of determination²) (1 Peter 3: 13-14)

The undetermined-prospective condition in (15) is called *anticipatory* and expresses the antecedent as expected to become true (a probability), while the undetermined-remotely prospective condition in (16) is called *ideal* and is ‘a fusion of the true optative and the potential optative’ (Robertson, 1919, p. 1020). It expresses wishes that are not asserted as being contrary to fact, but are less likely to be fulfilled than anticipatory conditions.

Gildersleeve (1882, p. 435) opts for a further distinction of types into *particular* and *general* conditions: ‘the logical condition, like every other form of the conditional sentence, is particular or generic according to the character of the apodosis’, as we also saw in Goodwin’s account in the previous section.³ When the antecedent has present-verb tense, as in (17), it has ‘a double meaning’, pointing either to a definite or indefinite subject.

- (17) He gets angry if I leave the house.

²Gildersleeve’s classification is based on Pindar’s poetry, which is in ancient Greek, while Robertson’s and Elliott’s accounts focus on the New Testament in Koine Greek, which does not have a special form for this fourth type of condition. This is also true for English. See Elliott (1981, p. 24) Robertson (1919, p. 1020).

³See also Dancygier and Sweetser’s (2005, p. 95) ‘generic conditionals’ in section 3.3.7.

Here, both the particular reading ‘If I leave the house now, he gets angry’ and the generic reading ‘Every time I leave the house, he gets angry’ are available.

To sum up, Gildersleeve (1882) divides conditionals into those expressing *determined* and *undetermined* conditions, which are expressed using different verb forms. As his classification concerns classic Greek, the verb forms cannot be directly applied to present-day English or Dutch, but we can clearly see a parallel to the importance of verb tense in most classifications in this section.

3.2.4 Implicative and non-implicative conditionals

Whereas *fulfilment* is a secondary parameter in both Goodwin’s and Gildersleeve’s accounts, it is the primary parameter in Sonnenschein’s (1892) account. He distinguishes conditionals that imply no degree of fulfilment, as in (18), from those that imply a degree of non-fulfilment, as in (19).

(18) If he is doing this, he’s sinning. (Sonnenschein, 1892, p. 192)

(19) If he were doing this, he would be sinning. (Sonnenschein, 1892, p. 192)

As can be seen, this distinction coincides with the indicative-subjunctive distinction discussed in section 2.5.4. Both types of conditionals are further divided into *present time*, as in (18) and (19), *past time*, as in (20) and (21), and *future time*, as in (22) and (23).

(20) If he was doing this, he was wrong. (Sonnenschein, 1892, p. 192)

(21) If he had done this, he would have sinned. (Sonnenschein, 1892, p. 193)

(22) If he does this/shall do this, he will be wrong. (Sonnenschein, 1892, p. 192)

(23) If he were to do this, he would sin. (Sonnenschein, 1892, p. 193)

Sonnenschein (1892, pp. 192–193) also distinguishes ‘general conditions’ from particular conditions in the class of non-implying conditionals, which express ‘an habitual action or a general truth’ and occur both in present and past tense, as in his examples in (24) and (25) respectively.⁴

(24) If anyone steals, he is punished/will be punished. (Sonnenschein, 1892, p. 193)

(25) If anyone stole, he was punished. (Sonnenschein, 1892, p. 193)

The main parameter of *fulfilment* has received considerable criticism. Chambers (1895, p. 294) objects to this parameter, because, according to him, it provides an imbalance in (pedagogical) grammars: ‘conditions implying non-fulfilment are relatively rare in the language and should not be the basis of

⁴See Gazzo Castañeda and Knauff (2021) for a recent experimental study showing that people accept conclusions from particular (‘specific’) conditionals more strongly than those from generic (‘unspecific’) conditionals.

classification'. As such, he argues, it leaves a large and heterogeneous group of conditionals that do not imply fulfilment. Although the distinction between implicative and non-implicative conditionals is defended by Donovan (1895) in his review of Sonnenschein's grammar, the way of operationalising this distinction is criticised. Sonnenschein (1892, p. 191) argues conditionals with implication to have a consequent in Greek marked by means of the adverb *áv*, which is 'expressed in English by a "should" or "would" (or equivalent subjunctive)', and the antecedent by subjunctive *were*, which, instead of 'denoting what *was*, have come to denote what *is not*'. Donovan (1895, p. 64) argues that conditionals should be classified 'according to the universal canon of fulfilment or non-fulfilment [of the condition]' and not according to the occurrence of 'would be' or 'would have been'. Chambers (1895) also objects to the terminology used and the non-objective way of classifying it provides, as fulfilment is context-dependent in some cases.

As Sonnenschein's grammar is of educational nature, his focus on form is understandable, and for present purposes it illustrates a choice between a latent characteristic (implication) and a manifest characteristic (occurrence of *would*). Sonnenschein (1892) chooses to use occurrence of *should* or *would* to discriminate between *indicative* and *subjunctive* conditionals, and accordingly he makes the distinction between conditionals with and without implication, whereas Donovan (1895, p. 63) favours to explain the latent characteristic itself, as he argues that 'to convey a grammatical [the presence or absence of *what would be*] notion applicable to all languages and of very wide extension, is bound to be misleading'. This brief overview of Sonnenschein's grammar reinforces the importance of verb tense and modal auxiliaries as grammatical features that are related to licensing implicatures of hypotheticality and counterfactuality.

3.2.5 Real, unreal, potential and future conditionals

Kaegi (1905, pp. 143–146) distinguishes four types of conditionals: those expressing *conditioned reality*, as in (26), *unreality*, as in (27), *potentiality*, as in (28) and *single future or repeated occurrence*, as in (29).

(26) If you wish, you can. (Kaegi, 1905, p. 144)

(27) If you wished, you could (but you do not wish). (Kaegi, 1905, p. 144)

(28) If you should wish (=Suppose you were to wish), you would be able. (Kaegi, 1905, p. 145)

(29) If you wish, you will be able. (Kaegi, 1905, p. 145)

The *conditioned reality* type in (26) presents a conclusion 'as real, if the condition be real, but implies nothing as to the latter' (Kaegi, 1905, p. 144), through the means of the indicative (simple present or simple past) in both clauses. In (27), both the antecedent and consequent are presented as 'unreal or contrary to fact', either referring to present time using simple past, as in (27), to a past time using past perfect tense, as in (30), or in mixed form.

- (30) If you had wished, you could have (but you did not wish). (Kaegi, 1905, p. 144)

In the type in (28), both the antecedent and consequent are presented as ‘purely imaginable’, i.e., suppositions, only conceivable situations. According to Kaegi (1905, p. 145), this type is expressed by means of using the optative mood (see section 3.2.2), which in English is expressed by *should* and *would*. Finally, the fourth type of conditional, in (29), presents the condition as ‘objectively possible, or even as anticipated under certain circumstances’ and the conclusion as ‘positively certain’ (Kaegi, 1905, p. 145). The antecedent can either refer to a single future occurrence, as in (29), or implicate repeated occurrence in the present, as in (31), or in the past, as in (32).

- (31) If (=whenever) you wish, you (always) can. (Kaegi, 1905, p. 145)
- (32) If (=as often as) you (had) wished, you (always) could. (Kaegi, 1905, p. 146)

As we have seen in the accounts previously discussed, it takes context to determine between these two uses.

In Kaegi’s account, mood, reflected by verb tense and modals in English, is used to distinguish between four types of conditionals. We see the basic distinction between neutral and distanced conditionals, a class of mere supposition, and the type which can refer to either a single future occurrence indicated by the modal verb *will* in the consequent, or repeated occurrence without this modal. The importance of tense and modality as features influencing the specific implicature based on unassertiveness is thus again reinforced by this account.

3.2.6 Open and closed conditionals

Funk’s (1985) ‘semantic typology of conditionals’ focuses on direct conditionals and dismisses indirect conditionals (or “non-effectual” [and “non-consequential”] conditional sentences), as was seen also in the formal accounts discussed in sections 2.2, and he remarks that these uses are ‘more or less restricted to the simplest (i.e., unmarked) pattern of conditional sentences’. Funk (1985, p. 372) argues that the difference between *neutral* and *unreal conditionals* (i.e., indicative and subjunctive conditionals) ‘clearly dominates the whole scene of conditionals’ and he criticises combining the parameters *reality* and *time reference* to determine conditional types, which would lead to *real past*, *real non-past*, *unreal past* and *unreal non-past* conditionals, as in (33) to (36) respectively, because time reference is marked morphologically, but ‘bears no peculiar significance to conditionals beyond the temporal relation it establishes’ (Funk, 1985, p. 381).

- (33) If she has changed her mind, he must be/will be/is happy. (Funk, 1985, p. 374)

- (34) If she is in time/if she changes her mind, he will be happy. (Funk, 1985, p. 374)
- (35) If she had been in time/if she had changed her mind, he would be/have been happy. (Funk, 1985, p. 374)
- (36) If she was/were in time/if she changed her mind, he would be happy. (Funk, 1985, p. 374)

Funk's argument to include a third parameter is that neither (*would*) modals nor tense are stable indicators of reality or time (see the discussions in the previous sections). Based on Haiman's (1974, p. 359) observations, he suggests the additional parameter of *posteriority*, which determines whether a conditional is 'closed' or 'open' (see also Nieuwint's *now* and *not-now conditionals* discussed in section 3.3.6). In *closed conditions*, the situation expressed in the antecedent precedes the speech event ('non-posterior') and is manifested and verifiable, as in (33) and (35). This type entails that the situation in the antecedent took place before the moment of speaking. The condition can either be neutral, i.e., 'without implication', as in (33) and (37)-(38) below, or *hypothetical* or *marked*, as in (35) and (39)-(40), i.e., with a 'contrary to fact' implication.

- (37) If you used proper grammar, she understood. (Funk, 1985, p. 381)
- (38) If you really love me, you will not talk that way. (Funk, 1985, p. 380)
- (39) If you had used proper grammar, she would have understood. (Funk, 1985, p. 381)
- (40) If you really loved me, you would not talk that way. (Funk, 1985, p. 380)

Open conditions on the other hand do not precede the speech event and are neither manifested, nor verifiable, as in (34) and (36). Because situations posterior to the moment of speaking are, per definition, open, in the sense of being non-manifested and (thus) non-verifiable, anteriority does not play a role. Within open conditionals too, *neutral* and *hypothetical (marked)* conditionals are distinguished, as exemplified in (41) and (42) respectively.

- (41) If she is in time, he will be happy. (Funk, 1985, p. 373)
- (42) If she was/were in time, he would be happy. (Funk, 1985, p. 373)

Note that (36) and (42) should be understood in a non-counterfactual sense, i.e., the event of being in time in (42) is posterior to the moment of speaking and the speaker expresses epistemic distance, not counterfactuality, towards the fulfilment of the condition.

According to Funk, what we have called the unassertiveness of conditionals in the previous chapter, can be paraphrased as 'if it happens that' for open conditionals, and as 'if it is true that' for closed conditionals (Funk, 1985,

p. 377), and he concludes that English grammar does not mark this distinction. For instance, the antecedent of (41) may refer to the moment of speaking ('if it is true that she is here') or to some time in the future ('if it happens that she is here'). Thus, in the closed type, the situations expressed in the antecedent (such as using proper grammar in (39) or loving someone in (40)) are presented as having taken place or still taking place at the moment of speaking (i.e., non-posterior), while in the open conditionals in (41) and (42) the situation in the antecedent is presented as taking place after speaking. In (37) and (38), the epistemic stance is neutral, because the use of proper grammar has taken place in (37), but the speaker is agnostic about the situation, i.e., it is manifested, but not verified. In (38), the loving holds (or does not hold) at the moment of speaking and is not fully manifested, and not verified. In (39) and (40), the epistemic stance is non-neutral, i.e., distant. For (39) the using of proper grammar has taken place, and while the speaker is agnostic about the situation (i.e., the situation is manifested, but not verified), she expresses negative belief. In (40) the loving takes places during the moment of speaking and is not fully manifested and not verified, but the speaker expresses negative belief towards *p* expressed in the antecedent.

With respect to features, Funk's (1985) account is explicit, albeit not particularly useful for the current purposes. Funk (1985, p. 381) argues that the *+/- real* distinction is unmarked in English conditionals and although the *+/- anterior* distinction is marked by tense, it 'bears no peculiar significance to conditionals beyond the temporal relation it establishes'. The *+/- posterior* distinction, on the other hand, indicates whether a conditional is *closed* or *open*, but is unmarked. Funk (1985) argues for the *semantic* categories of *open* and *closed* conditionals on basis of time.⁵ *Open* or *future conditionals*, of which the conditions are still subject to manifestation, and *non-future conditionals*, of which the conditions are manifested. As this is an unmarked, semantic distinction, it does not clearly select a feature to be added or reinforced in this overview, although Funk's (1985) disagreement with the *neutral-unreal* distinction does, as he himself discusses at length, shows the impact on the implicatures licensed by tense and modality.⁶

⁵Funk (1985, p. 381) argues as follows for this *semantic* typology: 'In the more precise terms of its (negative) truth-commitment, however, the semantic nature of a hypothetical conditional depends on the existence in time (not in fact) of the conditioning event (content of the protasis). In other words, it depends on what has been described above as the category of "manifestation" – a distinct property of propositional structures that enter into the conditional frame. These and some other considerations, [...] in my opinion, fully justify the acceptance of such a semantic category – even in the System of English, where it is not represented by an overt morphosyntactic distinction'.

⁶Funk (1985, pp. 367, 378) also mentions conditionals with imperative consequents as deviations from 'regular' conditionals by adding the meaning of the imperative, and he notes the ambiguity between specific and generic conditionals we have already seen in the previous sections.

3.2.7 Factual, future and imaginative conditionals

Celce-Murcia and Larsen-Freeman (1999) include a chapter on conditionals in their book aimed at second-language acquisition of English, because they note that ‘conditionals sentences ranked fifth’ on a survey of the most serious teaching problems by ESL teachers (see also e.g., Jacobsen, 2015; Dolgova Jacobsen, 2016; see Schwarz & Smitherberg, 2020, on *if* + *would have* in English as a Foreign Language textbooks as compared to corpus data; and see Burton, 2021, for a discussion and an expansion of the common ELT categorisation of conditionals to include, the ‘less central’ types of conditionals, such as the ‘speech-act’ or ‘biscuit’ conditionals discussed previously in section 2.2).⁷ This makes their account relevant, as it is aimed specifically at the form of conditionals and its relation to different uses. Celce-Murcia and Larsen-Freeman provide a classification of conditionals (partly based on results of Hwang, 1979), which distinguishes ‘three different kinds of semantic relationships’, namely *factual*, *future* and *imaginative* conditionals.

Although Celce-Murcia and Larsen-Freeman do not actually define *factual conditionals*, their further division and the examples show that they express a neutral stance towards the truth of *p*, whereas *future* and *imaginative conditionals* express a stance that departs from the present and the real respectively. Although *factual* does suggest a type of conditional implicating the truth of its propositions (as in the determined-fulfilled conditionals in Gildersleeve’s classification), this is not how the term is used by Celce-Murcia and Larsen-Freeman (1999). Rather, generic factual conditionals express a relationship that is ‘true and unchanging’ (i.e., not time-dependent), as in (43), by means most frequently of the simple present tense in both clauses, whereas in *habitual factual conditionals* this ‘physical law’ like relation is substituted for habitual behaviour, as in (44), which is reflected in tense, as this sub-type can refer to past habits by the simple past in both clauses. Both types express a relation that can be expressed by *when(ever)*.

(43) If you boil water, it vaporizes. (Celce-Murcia & Larsen-Freeman, 1999, p. 548)

(44) If I wash the dishes, Sally dries them. (Celce-Murcia & Larsen-Freeman, 1999, p. 549)

(45) If Nancy said, “Jump!” Bob jumped. (Celce-Murcia & Larsen-Freeman, 1999, p. 549)

The main difference here lies in volition. The generic type in (43) is law-like, whereas the habitual type in (44) involves a volitional habit. According to Celce-Murcia and Larsen-Freeman (1999, p. 341), habituals can express present or past habits while remaining ‘timeless’, hence the possibility of a simple

⁷ *ESL* stands for ‘English as a Second Language’, *ELT* stands for ‘English Language Teaching’.

past in (45). Next to generics and habituais Celce-Murcia and Larsen-Freeman distinguish *implicit* and *explicit inference factuais*. Implicit inference factuais express an inference about a specific (i.e., time-bound) relationship, as in (46).

- (46) If it's Tuesday, it's Sam's birthday. (Celce-Murcia & Larsen-Freeman, 1999, p. 549)

As with *generics* and *habituais*, implicit inference factuais 'tend to maintain the same tense, [grammatical] aspect or the same modal in both clauses', but they are not limited to the simple tenses mentioned. This is not the case with *explicit* inference factuais, which have a 'less strict parallelism of tense, aspect or modal in both clauses' and are explicitly marked for inferential processes, typically by modals such as *or should* or *must*, as in (47).

- (47) If someone's at the door, it must be Peter. (Celce-Murcia & Larsen-Freeman, 1999, p. 549)

Contrary to generic and habitual factual conditionals, inference factuais cannot be paraphrased using *when* or *whenever*.

Future conditionals express 'future plans or contingencies', as in (48).

- (48) If it rains, I'll stay home. (Celce-Murcia & Larsen-Freeman, 1999, p. 550)

Mostly, the simple present is used in the antecedent and 'some explicit indication of future time (e.g., *will* or *be going to*' in the consequent, as in (48)). Celce-Murcia and Larsen-Freeman (1999, p. 550) call conditionals with the modal verb *will* in the consequent *strong conditions*, whereas modals like *may* or *should* result in *weakened conditions*, as in their example in (49), and cases in which the condition itself, i.e., the antecedent, is 'weakened', as in (50).

- (49) If you finish your vegetables, I *may* buy you an icecream. (Celce-Murcia & Larsen-Freeman, 1999, p. 550)
- (50) If it {should/happens to/should happen to} rain, I'll stay home. (Celce-Murcia & Larsen-Freeman, 1999, p. 550)

The reason for including such cases is that learners of English will 'regularly be encountering the "weakened" versions' of conditionals, not just those using *will* (Celce-Murcia & Larsen-Freeman, 1999, p. 550).

As with Dancygier's (1998) use of backshift to distinguish between predictive and non-predictive conditionals (see section 3.3.7), and parallel to Funk's remarks in the previous section, Celce-Murcia and Larsen-Freeman's distinction between factual and future conditionals is underspecified by linguistic form. For instance, in (48), two interpretations are valid. If it is undetermined whether or not it rains at the present moment, (48) is not a future conditional. Rather, it would be a factual conditional, as exemplified in (51).

- (51) A: Do you want to come over to have a coffee?
B: If it rains, I'll stay home. (Let me have a look outside.)

When, however, the verb *rains* is backshifted, the conditional becomes a future conditional, as in (52).

- (52) A: What are you going to do tomorrow?
 B: If it rains, I'll stay home. (So let's wait for the weather forecast.)

This again points to the importance of treating specifications of the conventional meaning of unassertiveness as *conversational* implicatures, as the context must, to some degree, be involved in the analysis.

The last type of conditional is the *imaginative conditional*, which is further divided into *hypothetical* and *counterfactual* conditionals, each with a time-distinction (present-future and present-past respectively). Hypothetical conditionals 'express unlikely yet possible events or states', as in (53), by means of the simple past. In such conditionals, the 'negative quality' of the antecedent can be weakened too, as in (54).

- (53) If Joe had the time, he would go to Mexico. (Celce-Murcia & Larsen-Freeman, 1999, p. 551)
 (54) If Joe {should have/happened to have/should happen to have} time, he would go to Mexico. (Celce-Murcia & Larsen-Freeman, 1999, p. 551)

This is not possible in counterfactual conditionals, which, according to Celce-Murcia and Larsen-Freeman (1999, p. 551), express 'impossible events or states' in the antecedent by means of the past perfect tense, as in their example in (55) below.

- (55) If my grandfather had still been alive in 1996, he would experience a very different world. (Celce-Murcia & Larsen-Freeman, 1999, p. 551)

A further difference between *hypotheticals* and *counterfactuals* is that the former can refer to present and future situations, as in (53) and (56) respectively, while the latter can refer to present and past situations, as in (55) and (57) respectively.

- (56) If Joe were to have time, he would go to Mexico. (Celce-Murcia and Larsen-Freeman, 1999, p. 551)
 (57) If my grandfather had still been alive in 1996, he would have been 100 years old. (Celce-Murcia & Larsen-Freeman, 1999, p. 551)

In line with what we have discussed at length in section 2.5.4, Celce-Murcia and Larsen-Freeman (1999, p. 551) remark that 'the problem with imaginative conditionals arises in the tense used', as the the past tense, as in (53), 'refers to the present time', and the past perfect tense, as in (55), 'refers to past time'. Although in their schematic summary, all *imaginative conditionals* receive the modal *would* in the consequent (and 'would have' in case of past counterfactuals), and all their examples of this type indeed feature *would* in the consequent, in their discussion no mention of this is made.

Celce-Murcia and Larsen-Freeman's (1999, p. 556) comparison of the classification with Hwang's (1979) data shows factuais to be 'by far the most frequent type': 19.2% in spoken data and 16.5% in written data, followed by future conditionals (13.5% and 18.6% respectively) and present imaginative conditionals (18.8% and 16.0%). For classifying purposes, little to no definitions or criteria of the main types are supplied, making it hard to explain what exactly constitutes the difference between, for instance, implicit inference and future conditionals. Furthermore, there is no (explicit) principled argument to define three classes, i.e., future and imaginative conditionals could also have been sub-types of non-factual conditionals, which would make factuality the main parameter for classification. This is, however, not the aim of Celce-Murcia and Larsen-Freeman (1999), and the main benefit of this account for second-language acquisition is that learners of English are provided with clear grammatical descriptions of when to use which tense and modal marking, which, again, reinforce the importance of these features for licensing of the more specific implicatures of unassertiveness of conditionals.

3.2.8 Factual and theoretical conditionals

Next to the distinction of *case-specifying* and *non-case-specifying conditionals*, which will be discussed in section 3.3.11, Declerck and Reed (2001, p. 50) offer another account, which is based on possible-world theory and distinguishes *factual* from *theoretical conditionals*.

Factual-P conditionals carry an implicature of the truth of *p* in the real world, which is 'not very common' according to Declerck and Reed (2001, p. 67). Declerck and Reed's 'factual conditionals' are different from 'factual conditionals' in Celce-Murcia and Larsen-Freeman's account. In the latter account, they are neutral, while in Declerck and Reed's account they carry an implicature of truth. Four sub-types are distinguished: *past repetitive habits*, *performative P*, *factuality indirectly following from counterfactuality* and *non-case specifying factual-P*, as exemplified in (58) to (61) respectively.

- (58) If I had a problem, I always went to my grandmother. (Declerck & Reed, 2001, p. 67)
- (59) ["May I invite you for a drink?"] – Excuse me, please, if I decline. [I have some urgent business to attend to.] (Declerck & Reed, 2001, p. 68)
- (60) If she had been honest, she would have told us about it. (Declerck & Reed, 2001, p. 69)
- (61) I enjoyed the party, even if I did get red wine all over my new sweater. (Declerck & Reed, 2001, p. 71)

In (58), a recurring pattern based on 'a number of past instances (actualizations)' is expressed, which, according to Declerck and Reed (2001, p. 67), are 'taken for granted in interpretation', as we saw for the habitual conditionals

in the previous sections, and as we will see also in Athanasiadou and Dirven's account discussed in section 3.3.9.⁸ In (59) the antecedent is performative and the actualisation of the proposition in the antecedent is not *asserted*, but *performed*: the uttering of 'if I decline' amounts to the actual declination of the offer made. In (60), presenting the antecedent using a past perfect implies the contrary to be fact, i.e., 'she was not honest', which, for Declerck and Reed, make this type 'factual'. Counterfactual 'ad absurdum' conditionals also fall into this class, which is in agreement with Quirk et al.'s (1985, p. 1094) remark that this type resembles open or neutral conditionals, they seem to be assertive, as can be seen in the famous 'dracula conditional' in (62)

- (62) If Confucius was born in Texas, I'm Dracula. (Smullyan, 1978, p. 101; cited by Akatsuka, 1991, p. 25)

In this type, not the form of the antecedent, but the falsehood of the consequent licenses the inference that *p* must be false as well, as with *q* being false, *p* could not be true according to the truth table of material implication (see Table 2.1 in section 2.3). In (61), the concessive clause implies factuality, but no further analysis is given by Declerck and Reed in light of their *factual* type.

These four types of 'factual-P conditionals' are used as an argument to disprove Dancygier and Sweetser's (1997, p. 114) claim that *if* marks 'non-assertion of the *if*-clause', for which I also argued in section 2.5. However, while Declerck and Reed take care of distinguishing between characteristics of antecedents and consequents, I argue again that none of the examples provided of this category actually assert *p*. Rather, they express the relation between *p* and *q* and they may implicate that this relation has occurred at least once. This implicature, however, can be cancelled, as is the case with other conditionals in each of the examples provided.

- (63) If I had a problem, I went to my grandmother, but I never had a problem.

Although (63) does not amount to a very natural discourse, this is mainly due to the universal quantification of *always*. Declerck and Reed (2001, p. 68) argue that 'in this type of conditional it seems that just before each actualisation of *Q*, there has been an affirmative answer to a question version of *P*', here 'Did you go to your grandmother?'. To clarify matters, I find it useful to compare this to Goodwin's (1879) notion of 'implying fulfilment' (see section 3.2), which is compatible both with the implication of occurrence in the examples above and the unassertiveness of conditionals. Indeed, even Declerck and Reed's own characterisation of actualisation as '*taken for granted* [emphasis added] in interpretation' would fit more with an act of implicating, than with an act of asserting. An insightful case is the point Gabrielatos (2010, p. 184) makes. He discusses the following example to preliminarily distinguish between factual and non-factual conditionals.

⁸Note here that the connectedness of the antecedent and consequent is conventionally expressed, and further specified as one of co-occurrence. The unassertiveness of conditionals thus still holds, as it concerns the individual propositions in the antecedent and consequent.

- (64) (context: the speaker sees the milkman at the door)
 * If the milkman is here, give him his money. (Declerck & Reed, 2001, p. 2)

According to Declerck and Reed, the inferential link between the antecedent and the consequent is unacceptable, because the presupposition licensed by the antecedent is overridden by the context, i.e., seeing the milkman. The ‘rejection [...] seems justified only if the speaker seriously presents it as an inference’, according to Gabrielatos (2010, p. 184), but becomes unwarranted when ‘we consider that the speaker’s actual knowledge, or reality for that matter, may well be irrelevant in this case; what matters is the notion that the speaker wants to communicate’. Gabrielatos (2010) continues by constructing a context in which the presence of the milkman at the door is a fact; the speaker has seen the milkman and utters (64) in a humorous way to ‘bring the postman’s arrival to the hearer’s attention, and at the same time instruct him/her to pay the milkman’. The example in (64) would then be acceptable without being inferential, but being more of a speech-act conditional (cf. Gabrielatos, 2010, p. 184). However, here the difference between knowledge and information becomes relevant again (cf. Akatsuka, 1986, see section 2.5). When the speaker sees the milkman at the door, the speaker has direct knowledge of the situation. Presenting that knowledge by means of the antecedent of a conditional conflicts with its unassertiveness and violates the maxim of Quantity (cf. Grice, 1989), because the speaker has evidence for a stronger claim than she makes. When the situation has the status of information, rather than knowledge, as in Declerck and Reed’s (2001, p. 2) example in (65), the evidence is indirect and not stronger than the implication of the antecedent.

- (65) [“Mummy, the milkman’s here.”] – “If the milkman is here, give him his money.”

In (64) the antecedent is factual (i.e., known), while in (65) it is assumed. The former is incompatible with a conditional, while the latter is not, leaving intact both the unassertiveness and the ‘factualness’ of the conditional (see also 2.5). In (63) too, the factuality of the antecedents is implicated, but in this instance, by other means, namely that of recurrence. As such a conditional is presumably based on multiple co-occurrences of the events expressed, one may infer that these events have taken place at least once, but this is, indeed, an implicature, not an assertion.

Theoretical-P conditionals ‘refer to situations that only exist in the mind of the speaker’ (Declerck & Reed, 2001, p. 50) and are either neutral or non-neutral, which comes down to whether or not a relation between the possible world (i.e., theoretical) and the actual world is expressed. Neutral theoretical-*P* conditionals do not imply any relation between the theoretical and actual world. They are non-specifically referential, universal or habitual, as in (66) to (68) respectively.

- (66) If a woman has a history of cancer in her family, she should have herself checked at least once a year. (Declerck & Reed, 2001, p. 73)
- (67) If water boils, it changes into steam. (Declerck & Reed, 2001, p. 74)
- (68) If I go into town, I take the bus. (Declerck & Reed, 2001, p. 75)

In case of universal or habitual conditionals, the consequent usually features simple present or past tense or modal *will* or *would* ‘expressing characteristic behaviour’ (Declerck & Reed, 2001, p. 75). Other sub-types are *set-identifying conditionals* (metalinguistic conditionals in the accounts by Dancygier & Sweetser, 2005, p. 126, and Athanasiadou & Dirven, 1997a; see next section) ‘*if you say so*’ conditionals, *anchoring-P conditionals* (anchoring the Q-clause to the current discourse) and *imaginary conditionals*, as in (69) to (72) respectively.

- (69) Children are orphans if their parents are dead. (Declerck & Reed, 2001, p. 76)
- (70) [“He’s charming when you get to know him.”] – “If you say so.” (Declerck & Reed, 2001, p. 78)
- (71) If he noticed Brand, he didn’t comment. (Declerck & Reed, 2001, p. 78)
- (72) In your place I wouldn’t react if he wrote me a threatening letter. [...] (Declerck & Reed, 2001, p. 80)

Set-identifying conditionals have antecedents with noun phrases referring to ‘a set or mass without specifying the boundaries of the set or mass’ (Declerck, 1988, p. 153; Declerck & Reed, 2001, p. 75). Imaginary conditionals, as in (72), are ‘not formally distinguishable from counterfactual conditionals’ (Declerck & Reed, 2001, p. 80), meaning that they share the same tense pattern.

Contrary to neutral conditionals, according to Declerck and Reed, *non-neutral theoretical-P* conditionals implicate a degree of fulfilment, and as such they carry an implication about the extent to which the theoretical would is likely to resemble the real world. The implication can be that the ‘P-world’ is closed, meaning that *p* is accepted to be true (not known, as in factials), as in (73), where the antecedent is echoic. Several sub-types are distinguished, most notably *inferentials*, which are, contrary to Dancygier and Sweetser’s (2005) framework we will discuss in section 3.3.7, strictly ‘truth-inferential’, as in (74). In this type, the antecedent or the consequent (or both) is frequently marked for epistemic modality by auxiliaries (*must*, *might*) or adverbs like *probably* and *possibly* (cf. Declerck & Reed, 2001, p. 88).

- (73) [“I didn’t do it.” – “I believe you.”] But if you didn’t do it, it must have been Fred.” (Declerck & Reed, 2001, p. 81)
- (74) [“This one was painted by Renoir.”] – “If this is a Renoir, it must be worth a fortune!” (Declerck & Reed, 2001, p. 85)

Another type is the *open-P conditional*, of which the speaker is not sure whether or not the situation in the antecedent turns out to correspond to the actual world, as in (75) below. Declerck and Reed (2001, pp. 91–92) argue that the antecedent is repetitive in the discourse surrounding the conditional, making it a topic which licenses a prediction.

- (75) If the train is late, we will miss our connection in London. (Declerck & Reed, 2001, p. 91)

The position of this type in the typology is somewhat ambiguous, because, especially with future reference, open-*P* conditionals would much more likely be labelled ‘neutral’. Declerck and Reed (2001, pp. 91–93) do, albeit indirectly, comment on this problem: ‘an open-*P* conditional about the future implies that the speaker does more than just make a guess (supposition): she also assumes that the course of events selected is a real possibility’. It remains unclear how to interpret this comment with respect to the typology, as, for instance, the aforementioned ‘non-specific reference type’ of neutral-*P* conditionals would also seem to fall into this characterisation. In open-*P* conditionals, antecedents often refer to the future and imply that *p* is more than a guess.

Tentative P-conditionals carry the implicature that *p* is unlikely, as in (76), and *counterfactuals*, which in Declerck and Reed’s (2001, pp. 54, 99) classification are the only true *irrealis conditionals*, indicate that *p* ‘might correspond with the actual world, but that this possibility is considered as rather unlikely’, as in (77).

- (76) If he did/were to do that, he would be in real trouble. (Declerck & Reed, 2001, p. 93)

- (77) If he had not tampered with the machine, it would not have broken down. (Declerck & Reed, 2001, p. 99)

Counteridenticals-P conditionals and *interrogative Q conditionals* are distinguished as sub-types, as in (78) and (79) respectively.

- (78) If I were you, I wouldn’t do it. (Declerck & Reed, 2001, p. 102)

- (79) If Oswald didn’t kill Kennedy, who did? (Declerck & Reed, 2001, p. 103)

In tentative conditionals, the speaker uses backshift (simple past, past perfect) to express she deems it unlikely that *p* is the case (Declerck and Reed, 2001, p. 93; see also ‘future less vivid conditionals’ in Iatridou, 2000, p. 234). This epistemic distancing can also be used to express tentativeness of a different type, such as modesty, tact, or politeness (Declerck & Reed, 2001, p. 95). Because of the unlikely-implicature, the antecedent cannot refer to the past, which would shift from tentativeness to counterfactuality. In counterfactuals, the antecedent is assumed to be contrary to fact. While Declerck and Reed (2001, p. 99) argue the counterfactuality of *p* to be a presupposition, I will treat it as treat it as a (strong yet defeasible) conversational implicature, as argued for in section 2.5.4.

As already mentioned at the beginning of this section, Declerck and Reed (2001) remark that *factual-P conditionals* are not very common, whereas *theoretical-P conditionals* are much more common and have numerous sub-types, which reflect previously discussed accounts, most notably the distinction between *neutral-P* and *non-neutral-P* conditionals, which resemble the difference between Sonnenschein's (1892) *implicative* and *non-implicative* conditionals. This distinction was also found in the accounts of Goodwin (1879) and Gildersleeve (1882). These different implicatures of unassertiveness (see previous chapter), in Declerck and Reed's classification of conditionals termed *factual* and *theoretical conditionals*, are linked to modal marking and to tense patterns, which again are highlighted as relevant features for researching the relation between grammatical form and the implicatures of conditionals.⁹

3.2.9 Open and remote conditionals

Huddleston and Pullum (2002, pp. 738–766) distinguish between *open conditionals*, as in (80), and *remote conditionals*, as in (81).

(80) If Ed is here he can come too. (Huddleston & Pullum, 2002, p. 739)

(81) If Ed was/were here he could come too. (Huddleston & Pullum, 2002, p. 739)

The main parameter used to distinguish (80) from (81) is 'satisfaction of the condition', i.e., whether or not the statement in the antecedent is presented as being true. The *open-remote* distinction thus does not coincide with for instance Funk's (1985) *open-closed* distinction. Funk's example of a hypothetical open conditional, repeated below as (82), would be a remote conditional in Huddleston and Pullum's (2002) account.

(82) If she was/were in time, he would be happy. (Funk, 1985, p. 373)

Furthermore, Huddleston and Pullum (2002, p. 738) argue against using *time* as main parameter (see e.g., Goodwin's classification in section 3.2.2), because 'the time sphere does have some limited bearing on the interpretation, but the basic meaning [present, past and future] is the same in all three cases'. Huddleston and Pullum (2002, p. 739) consider the *open conditional* to be the default conditional and, as in Sonnenschein's classification, the criterion for a conditional to be *remote* is having a modal auxiliary in the consequent (usually *would*, *should*, *could*, or *might*) and a modal past tense or 'irrealis *were*' in the antecedent.¹⁰ As discussed above (see the discussion of Sonnenschein's classification at the end of section 3.2.3), this makes the criterion objective

⁹For an elaborate discussion of tense patterns in all the different sub-types of conditionals discussed, see Declerck and Reed (2001, Chapter 5).

¹⁰As we will see below, in Huddleston and Pullum's account too, the past tense may be ambiguous between expressing remoteness (i.e., *epistemic distance* and past time or *temporal distance*).

on the one hand, as the class of remote conditionals is defined on the basis of a manifest characteristic, while on the other hand this might make it less applicable to other languages. Consequently, they argue against the general or universal term *counterfactuals*.

According to Huddleston and Pullum (2002, p. 739), *open conditionals* exclude the combination of a true antecedent and a false consequent. In this sense, they are material conditionals (see section 2.3). Furthermore, they remark, open conditionals license the implicature that the situation in the consequent is a consequence of the situation in the antecedent, which we discussed in detail in terms of connectedness in section 2.6, and that negation of *p* implies the negation of *q*, i.e., conditional perfection (see section 2.6.5). As we have already discussed, this implicature can be cancelled, and Huddleston and Pullum provide an example, adapted in (83) below, showing this to be the case.

- (83) If it's fine this week-end I'm going to the beach, and in fact I'll probably go even if it's wet. (Huddleston & Pullum, 2002, p. 741)

Huddleston and Pullum (2002) argue for a 'consequence implicature' between antecedent and consequent, which can be causal, as in (84) or inferential, as in (85).

- (84) If it rains tomorrow it *will/may* make things very difficult for us. [future]
(Huddleston & Pullum, 2002, p. 744)
- (85) If he is not at work he *will/may* be watching the cricket. [present]
(Huddleston & Pullum, 2002, p. 744)

According to Huddleston and Pullum (2002, pp. 740–743) the causal relationship occurs 'very often' and can also apply to non-present tense, as in (87), in which case it seems to trigger a 'multiple situations' reading, as in (87) and (88), which coincides with the general-particular distinction by Gildersleeve (1882) discussed in section 3.2.3.¹¹

- (86) If the key is not in my pocket, I have left it in the door. (Huddleston & Pullum, 2002, p. 740)
- (87) If they touched the wire they (invariably) got an electric shock. (Huddleston & Pullum, 2002, p. 739)
- (88) She cycled to work if she got up early enough. (Huddleston & Pullum, 2002, p. 743)

In an inferential relationship, as in (86), the truth of *q* follows from *p*, as in Gildersleeve's (1882) 'ideal condition' (see also Johnson-Laird's 'completely determinate' conditionals, which will be discussed in section 3.3.5). Huddleston

¹¹See also Dancygier and Sweetser's 'generic-predictive conditionals' and Athanasiadou and Dirven's 'course-of-event conditionals' in sections 3.3.7 and 3.3.9 respectively.

and Pullum (2002, p. 740) treat the consequence implicature explicitly as an implicature rather than an entailment, providing examples like (89) that clearly do not express a relation of consequence between antecedent and consequent.

- (89) If our house was spacious, the place next door was immense.¹²
(Huddleston & Pullum, 2002, p. 740)

Although I agree with Huddleston and Pullum's (2002, p. 740) assessment that there is no direct consequential relation expressed in (89), I believe some kind of inferential relation is at play here, and this example shows again the importance of positing the connectedness in conditionals in more general terms. Taking into consideration that the example in (89) is a case of what we will discuss as a 'metatextual conditional' (cf. Dancygier & Sweetser, 2005) in section 3.3.7, the consequent must be related to the antecedent on the metalinguistic level of the utterance, rendering (89) into (90).

- (90) If the word *spacious* is suitable for our house, the word *immense* is suitable for the place next door.

Characteristic for this use of open conditionals is the ascription of a scalar property to entities in the antecedent and consequent, and in this view, there still is a clear connection between antecedent and consequent, i.e., the description of our house as *spacious* enables the description of the place next door as *immense*.

The last type of open conditional is the speech-act conditional, discussed by Huddleston and Pullum (2002, p. 740) as featuring a 'relevance protasis' in which '*q* is true independently of whether *p* is true', as in the example in (91).

- (91) If you need some help, Helen is willing to lend a hand. (Huddleston & Pullum, 2002, p. 740)

Moving on to *remote conditionals*, Huddleston and Pullum (2002) argue that they express a condition that is satisfied in 'a world which is potentially different from the actual world', as can be seen in the difference between the open conditional in (92) and the remote conditional in (93).

- (92) If he tells her she will be furious. (open) (Huddleston & Pullum, 2002, p. 748)
(93) If he told her she would be furious. (remote) (Huddleston & Pullum, 2002, p. 748)

There is 'an implication of non-fulfilment', comparable to Quirk et al.'s (1985) *hypothetical conditionals*. Like open conditionals, remote conditionals implicate exclusion of cases in which *p* is true and *q* is false and they license the

¹²As was the case with Quirk et al.'s (1985) second type of rhetorical conditional, this scalar type of relation between antecedent and consequent does not seem to appear in Dutch conditionals, although including the adverb *al*, as in 'Als ons huis *al* groot was, het huis ernaast was immens', does improve the translation of (89), especially in a V1-conditional with accentuated *ons*, as in 'Was ons huis *al* groot, het huis ernaast was immens'.

consequence implicature (p causes q) and conditional perfection. Remoteness is implicated, as in Huddleston and Pullum's (2002, p. 749) example in (94), as it can be cancelled (see section 2.5 for a more detailed discussion).

- (94) I don't know whether he broke it or not, but I doubt it; if he had done he would probably have told her about it. (Huddleston & Pullum, 2002, p. 749)

Remote conditionals license implicatures concerning the degree of likelihood or actuality of the situation in the antecedent. The past tense verb in remote conditionals express 'modal remoteness, not past time'. Antecedents of remote conditionals in this account must contain past tense (or 'irrealis *were*'), whereas the consequent must have a modal auxiliary like *would*, *should*, *could* or *might*. As discussed in the previous sections, there is no formal distinction coinciding with the unlikely-counterfactual distinction. Huddleston and Pullum (2002, p. 754) show the ambiguity between expressing remoteness and past time by past tense, as in (95) below (see also Funk, 1985).

- (95) If we weren't home by ten o'clock the landlady would lock us out. (Huddleston & Pullum, 2002, p. 754)

This example has two clear but different possible interpretations: it can be both an iterative open conditional (whenever we weren't home by ten o'clock) and a remote, future-oriented conditional (if we weren't home by ten o'clock tonight).

Huddleston and Pullum (2002) offer a classification of conditionals in English based on *fulfilment*, i.e., *open conditionals* which do not implicate a degree of fulfilment of the condition and *remote conditionals*, which implicate a degree of non-fulfilment. As in the accounts previously discussed, the degree of fulfilment is reflected in *verb tense* and *modal marking*. Epistemic modals are, according to Huddleston and Pullum (2002, p. 744), not frequently used in conditional antecedents, while they are highly frequent in conditional consequents to implicate degree of fulfilment, irrespective of the time expressed.

3.2.10 Conditionals, hypotheticals and counterfactuals

Wierzbicka (1997, p. 52) discusses existing definitions of conditionals (see also section 2.2) and proposes to consider the prototypical conditional conjunction *if* as a 'conceptual primitive', i.e., a concept that cannot be defined in terms of more basic concepts, such as hypotheticality, knowledge or inference: 'instead, we must conclude that the IF-relation is fundamental, irreducible to anything else' (Wierzbicka, 1997, p. 19). She continues by distinguishing not types of conditionals, but types of *if*-sentences: *counterfactuals*, *hypotheticals* and *conditionals*.

The *counterfactual* type of *if*-sentence is discussed by Wierzbicka (1997, pp. 28–30) in terms of Barwise's (1986, p. 22) characterisation of a counterfactual statement being a statement that 'presupposes that the antecedent is false'

(see section 2.5 for arguments against counterfactuality as presupposition). In counterfactuals, the antecedent is marked by *had* and a past participle in the antecedent, and *would* in the consequent, as in (96).

- (96) If X had happened, Y would have happened. (Wierzbicka, 1997, p. 50)

Next to this ‘affirmative’ type, Wierzbicka distinguishes a second, negative type, as in (97).

- (97) If X hadn’t happened, Y would not have happened. (Wierzbicka, 1997, p. 26)

It might be questioned why this licenses two sub-types of counterfactuals, as negative counterfactuals merely include negation, but Wierzbicka makes a point of this by arguing that English does not, as Comrie (1986, p. 887) argues, ‘lack counterfactual conditionals’.¹³ While, according to Comrie, the examples in (98) and (99) may be interpreted as non-counterfactual in case context overrides the counterfactual implicature, Wierzbicka (1997, pp. 29–30) found no native English speakers ‘who wouldn’t regard sentences such as [(98) or (99)] as counterfactual’.

- (98) If the butler had done it, we would have found just these clues. (Comrie, 1986, p. 90)
- (99) But if the footman had done it, we would have found exactly the same clues. So we really can’t tell which one of them did it. (Wierzbicka, 1997, p. 28)

Although Wierzbicka argues that (98) and (99) also elicit varying response of native speakers, (100) and (101) were consistently rejected by her informants.

- (100) * If they hadn’t found that water, they would have died; so let’s hope they found it. (Wierzbicka, 1997, p. 30)
- (101) * If they hadn’t found that water, they would have died; and it’s unlikely that they found it. (Wierzbicka, 1997, p. 30)

Consequently, Wierzbicka (1997, p. 31) argues the ‘negative counterfactual’ to be a truly counterfactual construction and she hypothesises that the ‘negative’ element (i.e., epistemic distance) encoded by the past perfect tense is the ‘hard core’ of counterfactuals across linguistic and cultural contexts. This view, is, as one might imagine, incompatible with the analysis presented in section 2.5, in which counterfactuality was analysed as a conversational implicature. So (98) can be followed by (99) without being resulting in infelicitous discourse, as Comrie would have it. Although I agree with Wierzbicka (1997, p. 28) that the ‘normal reading’ may be counterfactual, a view she attributes to Davies (1979, p. 158), who indeed argues that ‘when used in isolation, even in circumstances

¹³We will come back to this point in section 3.3.9.

where common knowledge cannot be assumed, [counterfactuals] usually have a contrary to fact meaning', I uphold that this is *usually*, but not *necessarily* the case. Davies argues as follows.

If I say, as a conversation opener, "If it hadn't rained the match would have been played", you would understand me to mean that it had rained, and that the match hadn't been played. It is generally the "open" sense which requires a disambiguating context to make it clear.
(Davies, 1979, p. 158)

This suggests, as was discussed before in section 2.5.4, that counterfactuality is an implicature, as it can be cancelled. It may very well be a strongly generalised implicature which, as Davies mentions above, requires specific cancellation contexts (i.e., 'the "open" sense which requires a disambiguating context to make it clear'), but nevertheless, it can be cancelled. Therefore I suggest here that the judgements of Wierzbicka's informants are, at least partly, the result of the specifics of the examples, such as present time reference, and the continuations in (100) and (101), because a continuation as in (102) seems less problematic.

- (102) If they hadn't found that water, they would have died, which was exactly what happened.

Again, I do not wish to claim here that the cancellation of counterfactuality such as in (102) is a frequent phenomenon, but this can be said of many generalised implicatures. Rather than hypothesising about frequencies and perhaps non-occurrence, we will take up this point later on in discussing the results of the corpus study in chapters 5 and 6.

Continuing with *hypotheticals*, Wierzbicka (1997, p. 48) characterise this type as an '*if-would* construction which does not include a pluperfect *had* and which refers to the future' (i.e., *if* without *had* or *were* in the antecedent and *would* in the consequent), as in (103) and (104).

- (103) If this (X) happened, something else (Y) would happen. (Wierzbicka, 1997, p. 48)
- (104) If he married X, I would disinherit him. (Wierzbicka, 1997, p. 48)
- (105) If this (X) happens, something else (Y) will happen. (Wierzbicka, 1997, p. 48)

As I discussed before, Wierzbicka (1997, p. 35) argues against Comrie's (1986, pp. 88–89) 'hypotheticality continuum' and argues that it is unclear how certainty that something happened on one end and certainty that something did not happen can be ends on this continuum. Instead, she argues that open conditionals, hypotheticals and counterfactuals constitute different constructions with distinct, non-truth-conditional meanings. According to Wierzbicka (1997, p. 48), the difference between the hypothetical in (104), the conditional in (105), and the counterfactual in (97) is what we analysed before as the more specific

implicature arising from the unassertiveness of conditionals, namely that the hypothetical version is a combination of an *if*-sentence (‘of “real possibility”’) and ‘a kind of hedge or “disclaimer of thought”: “I don’t say I think this will happen”’. As the difference between this ‘hedge’ and that of a counterfactual (‘I don’t say I think this has happened’) is a qualitative difference, Wierzbicka (1997, p. 49) denies hypotheticality as a continuum. Rather, she argues that the three types represent ‘strictly matchable universals: the conditionals of “real possibility” and the imaginary, non-real, “impossible” “counterfactuals”. With this, Wierzbicka’s account seems to reflect the same kind of tripartite structure as argued for by earlier grammarians, as was be discussed in previous sections in terms of, for instance, real, potential and unreal conditionals (cf. Kaegi, 1905; see section 3.2.5).

The *conditional* type of *if*-sentence is defined on a negative formal characteristic, i.e., the lack of *had* and a past participle in the antecedent and the lack of *would* in the consequent, as in (105) above. In this type, there is no marking of epistemic distance. Where hypotheticals combine real possibility with the hedge ‘I don’t say I think this will happen’ counterfactuals with ‘I say I don’t think this happened’, conditionals ‘only’ express possibility. In terms of Wierzbicka (1997, p. 51), it lacks ‘the disclaimer “I don’t say: I think: this will happen”’. According to Wierzbicka (1997, pp. 52–53), the difference between conditionals and counterfactuals is that the former allow imagining things that can happen, whereas the latter allow imagining things we think cannot happen. Hypotheticals, in contrast, are less of a ‘universal feature of human language and human thought’, but ‘situated half-way between the conditionals of real possibility and counterfactuals’.¹⁴

In Wierzbicka’s account, we have seen again the importance of tense and modality. Counterfactuals have a past perfect in the antecedent and *would have* in the consequent, and a further subdivision is made into affirmative and negative counterfactuals based on negation in the antecedent, which adds to our inventory the feature *negation*. Hypotheticals in Wierzbicka’s account have a simple past in the antecedent and *would* in the consequent. Conditionals, finally, are then those *if*-clauses without any of the aforementioned patterns of tense and modality.

3.2.11 Conclusion

The accounts discussed in this section distinguish different types of conditionals, foremost with respect to the degree of fulfilment of the antecedent. In most accounts, neutral conditionals are distinguished from conditionals that

¹⁴This phrasing presents conditionals, hypotheticals and counterfactuals on a continuum. Wierzbicka criticised Comrie’s account for presenting hypotheticality as a continuum, but this must be seen explicitly in light of the proposed ends in Comrie’s (Comrie, 1986, pp. 88–89) continuum: ‘a factual sentence would represent the lowest degree of hypotheticality, while a counterfactual clause would represent the highest degree’, whereas the lowest degree in Wierzbicka’s account would, I believe, not be factuality, but possibility.

implicate a degree of epistemic distance towards p in the antecedent, presenting the situation referred to as, for instance, ‘ideal’ or ‘unreal’ (cf. Gildersleeve, 1882), ‘potential’ or ‘futures’ (cf. Kaegi, 1905), ‘open’ or ‘closed’ (‘remote’) (cf. Funk, 1985; Huddleston & Pullum, 2002), or even ‘factual’ and ‘theoretical’ (cf. Declerck & Reed, 2001). In light of the previous chapter, we are now able to understand these degrees of fulfilment as conversational implicatures licensed, in part, by the unassertiveness of conditionals.

Analysing the implicatures licensed by the unassertiveness of conditionals as conversational implicatures, i.e., context-dependent and cancellable aspects of the non-truth-conditional meaning of conditionals, does not mean the more specific implicatures are wholly context dependent. We have seen that the literature discusses them in close relation to a number of grammatical aspects of the clauses connected by the conjunction *if* in a conditional construction. These grammatical aspects will serve as features in the corpus study, as they embody the form-side of potential form-meaning pairings or constructions, consequently providing the input for the cluster analyses in the following chapters, which will test combinations of features (i.e., ‘clusters’) for their status as constructions. All classifications in this section state the importance of *verb tense* to express epistemic distance towards p in the antecedent, and the ambiguity between expression of temporal and epistemic distance provides an argument for a probabilistic approach to the implicatures of conditionals. Related to verb tense is modal marking, most notably of the epistemic kind, with *will* marking single-future occurrence, *would* marking epistemic distance, and verbs like *must* marking inferential processes. With respect to subjunctive conditionals, negation was proposed most strongly by Wierzbicka (1997) as being related to counterfactual interpretation, suggesting this is a feature to be included in the analysis too.

In conclusion, we have seen that most accounts of conditionals dealing with implicatures of unassertiveness distinguish between two major types, namely those conditionals that do not implicate a stance towards the truth of p , and those that do, almost invariably in the negative sense, i.e., implications of low likelihood, improbability or as contrasting with expectations. Before systematically investigating the related grammatical features of verb tense, modal marking and negation, we will discuss accounts dealing with the second type of implicatures argued for in the previous chapter, namely those licensed by the connectedness of conditionals.

3.3 Types of connection

3.3.1 Introduction

As discussed in chapter 2, the material analysis of conditionals deals with conditionals in terms of truth conditions exclusively. In natural language, the use of a conditional conventionally expresses unassertiveness and connected-

ness, and from these conventional meanings, language users derive inferences, among which a more specific connection between antecedent and consequent. We analysed this more specific connection as a conversational implicature in section 2.6, and in the current section, I will discuss classifications of these connections.

The aim of this section is to provide an overview of specific implicatures licensed by the connectedness in conditionals. As in the previous section, I focus on both the specific implicatures, or types of connection, and on the grammatical features that are suggested to play a role in licensing these implicatures, because they form the input for the corpus-based, bottom-up approach to conditional constructions introduced in the next chapter. In sections 3.3.3 to 3.3.11 I will discuss classifications of conditional connections. In section 3.3.12 I briefly summarise the findings, after which I will move on to drawing the conclusions of this chapter in section 3.4. Before doing so, however, a remark concerning so-called ‘biscuit conditionals’ is in order, which is the topic of the next section.

3.3.2 A note on ‘biscuit conditionals’

The accounts discussed in the following sections include a type of conditional that was largely absent from the classifications discussed so far. Austin provides the example in (106), which led to the term ‘biscuit conditional’.¹⁵

- (106) There are biscuits on the sideboard if you want them. (Austin, 1970, p. 212)

Austin (1970, p. 213), in discussing *if* and *can*, remarks that while (106) can be expanded into (107), ‘*if* is still the *if* of doubt or hesitation, not the *if* of condition’.¹⁶

- (107) There are biscuits on the sideboard which you can (or may) take if you want them.

Geach (1976) discusses ‘hypotheticals’ and equates them with ‘sentences joined together with an “if”’. He then excludes cases like (108) and (109) as ‘odd cases’.

- (108) I paid you back that fiver, if you remember. (Geach, 1976, p. 89)
(109) There’s whisky in the decanter if you want a drink. (Geach, 1976, p. 89)

The exclusion of such conditionals is understandable from the focus on hypotheticals in a study of reasoning, or, for that matter, in the truth-conditional analysis of conditionals, as their antecedents do not introduce conditions or hypothetical situations in the classical sense.

¹⁵Austin (1970, p. 213) credits the example ‘I paid you back yesterday, if you remember.’ to P.T. Geach.

¹⁶By this, Austin (1970, p. 210) means that the effect of the *if*-clause in (106) is not the same as in ‘I can squeeze through if I am thin enough’, which *does* imply that ‘If I cannot squeeze through I am not thin enough’, and of course does *not* imply that ‘I can squeeze through’. Instead, it is comparable to ‘I can if I choose’, which, according to Austin, ‘is precisely different’ from the aforementioned implications.

In the following sections, it can be seen that the type explicitly excluded by Austin as not being ‘conditional’ finds its way in many (more recent) classifications. As we saw in section 2.2, cases such as (108) and (109) are usually omitted in formal-semantic analyses, because they ‘do not state in any sense conditions under which the consequent is true, rather they seem to somehow operate on a higher speech act level’ (cf. von Stechow, 2011, p. 1517). As already discussed in the aforementioned section, in this study I do consider these cases conditionals. The argument for doing so, is the starting point discussed in chapter 2. In that chapter, we analysed conditionals not in terms of only the truth conditions of the individual propositions p and q and their logical combination using the connective $\supset$, but the meaning expressed beyond their truth-conditional meaning, i.e., non-truth-conditional aspects of meaning expressed by using conditional constructions. As discussed, from a constructional point of view, the fact that examples such as (106) share constructional properties with ‘more central cases’ of conditionals enables analysing ‘biscuit conditionals’ and other pragmatic conditionals (cf. Sanford, 1989, p. 5) in relation to what are mostly considered those central cases, instead of disqualifying them *a priori* on what seem to be largely intuitive grounds.

Although much more can be said about biscuit conditionals, and several analyses have indeed been proposed (see references provided in section 2.2), it is not needed to do so here, as we will encounter various more pragmatic types of connections between antecedents and consequents of conditionals in the following sections. With the remark above in place, therefore, we are ready to discuss the first account specifically aimed at types of connections in conditionals.

3.3.3 Telling, decision, performance and knowledge connections

Davies (1979, p. 146) distinguishes four types of connections, which result from a more general framework of semantic analysis of grammatical constructions. The types do not result from lower-level (grammatical, semantic) features, but from the theoretical framework of ‘secondary roles’, namely ‘teller’, ‘knower’, ‘decider’ and ‘performer’.¹⁷ The main types of conditionals are *telling*, *decision*, *performance* and *knowledge* conditionals correspondingly, as in the examples in (110) to (113) respectively.

(110) If you like watching tennis, Wimbledon’s being televised this afternoon.
(Davies, 1979, p. 146)

(111) If John comes, phone Mary. (Davies, 1979, p. 148)

(112) If the weather’s wet, the roads will be treacherous. (Davies, 1979, p. 152)

¹⁷Primary roles being speaker and addressee.

- (113) If he's a local man, he must know about the old mine workings. (Davies, 1979, p. 162)

As can be seen, the first type is similar to the biscuit conditional discussed in the previous section. The antecedent provides the 'reason for the full telling (saying) of the main clause' (Davies, 1979, p. 146). The antecedent in the second type in (111) introduces a condition for the decision in the main clause. The performance conditional in (112) presents the antecedent as the cause of the effect in the consequent.¹⁸ The final type, in (113), is, according to Davies (1979, p. 162), the only type of conditional that 'realise[s] truth functional relations between propositions, and a deductive conclusion in its main clause'. In other words, the antecedent presents an argument which serves as the basis for the conclusion in the consequent.

Telling conditionals are sub-divided into *open* and *closed telling* conditionals, as in (114) and (110) (repeated below) respectively. In both cases, the antecedent provides the reason for uttering the consequent. The difference between the sub-types is that (110) presents the antecedent as knowledge accepted by the speaker – she knows the addressee likes watching tennis, while the antecedent in (114) the antecedent presents a lack of knowledge on the speakers part – she does not know whether the addressee has a want for biscuits.

- (114) There are biscuits on the sideboard if you want them. (Davies, 1979, p. 146)

- (110) If you like watching tennis, Wimbledon's being televised this afternoon.

In general, telling conditionals present a 'chain of thought' on the level of discourse to motivate the uttering of the consequent.

In decision conditionals, the consequent presents a decision contingent on the antecedent. The antecedent can, but does not have to present another decision. This feature divides this type into single and double decision conditionals, as in (115) and (116) respectively.

- (115) If John comes, phone Mary. (Davies, 1979, p. 148)

- (116) If you'll just take this bag, I'll pay the taxi. (Davies, 1979, p. 148)

The antecedents of double decision conditionals contain a 'decision modal' and this type is used mostly for making polite requests. According to Davies (1979, p. 151), decision conditionals do not present forms of argument and do not present a conclusion in the consequent, as the antecedent and consequent are not presented as affecting each other. Apart from this distinction, Davies (1979, p. 148) divides decision conditionals 'according to the value of *if* which they realise'. This 'value of *if*' is either temporal (i.e., *when(ever)*), as in (115), question- or query-like, as in (116), or refers to 'accepted knowledge' (i.e., *as* or *since*), as in (117).

¹⁸Davies (1979, p. 152) remarks that the terms *cause* and *effect* are used here 'as they are used in ordinary language, rather than as philosophically defined concepts'.

- (117) If John plays tennis, let's ask him to make up a doubles. (Davies, 1979, p. 148)

What distinguishes telling and decision conditionals from performance and knowledge conditionals (see below) in terms of grammatical features, is that the former types 'may have a modal verb in the dependent clause' (such as *will*, *can* and *must*) and 'may have a non-declarative main clause' (Davies, 1979, p. 149). Note, however, that modal verbs in the antecedent are not a necessary feature.

Performance conditionals present the antecedent as the cause of the effect presented in the consequent. Three sub-types are distinguished. First, the *open prediction* conditional, in which the antecedent presents a situation as one that the speaker is agnostic of, and the consequent is the effect of the occurrence of that situation, as in (118). Second, the *induction* type, in which the antecedent is closed, i.e., the knowledge is accepted and from that knowledge, a conclusion is drawn, as in (119). Note, however, that that no formal features which may distinguish between the 'open' and 'closed' nature of the antecedent are discussed by Davies. Third, there is the *counterfactual conditional*, of which Davies argues that it does not necessarily express a situation as 'contrary to fact', but rather as distanced (see section 2.5.4), as in (120).¹⁹

- (118) If the weather's wet, the roads will be treacherous. (Davies, 1979, p. 152)
- (119) If this plane has flown a thousand times without an accident, it won't crash now. (Davies, 1979, p. 157)
- (120) If the Germans had invaded England in 1940, they would have won the war. (Davies, 1979, p. 157)

As can be seen in the examples, in most cases of performance conditionals, the consequent features a form of the modal verb *will* or *may*.

Knowledge conditionals are, according to Davies (1979, p. 162), 'the only type of English conditional which does realise truth functional relations between propositions, and a deductive conclusion in its main clause'. They can either be *independent knowledge* conditionals, as in (121), or *non-independent knowledge* conditionals, as in (113), repeated below.

- (121) If whales are warmblooded then whales are mammals. (Davies, 1979, p. 162)
- (113) If he's a local man, he must know about the old mine workings. (Davies, 1979, p. 162)

The feature that distinguishes the two sub-types is the presence of a modal verb in the consequent. Only in the type in (121), including the modal verb (*must*) in the consequent that highlights the reasoning process, the antecedent

¹⁹Davies (1979, p. 157) remarks that non-counterfactual subjunctive conditionals 'occur frequently in learned argument and in detective fiction'.

is presented as closed. A last type of knowledge conditionals is, as is the case in other classifications, presented as ‘a somewhat peripheral group’ of conditionals (Davies, 1979, p. 167) in which common knowledge is expressed in the consequent to indicate either the truth or falsity of the antecedent, as in the examples below.

(122) She’s fifty if she’s a day. (Davies, 1979, p. 167)

(123) If that’s really gold I’m a Dutchman. (Davies, 1979, p. 167)

In (122), modus ponens (‘If p , then q . p , therefore q .’) is used to derive the truth of the antecedent on basis of the obvious truth of the consequent (‘she’s (at least) a day old’). In (123), by modus tollens (‘If p , then q . Not q , therefore not p .’), the falsity of q is used to express that p is also false.

Davies’ classification has not been widely used after publication. This may have to do with the way in which Davies attributes her semantics to ‘literal meaning’ (Davies, 1979, Chapter 2). Davies argues, as Huddleston (1981, p. 121) notes, ‘that there is a correspondence in the area of mood between literal meaning and surface grammar – that one specification of literal mood meaning will attach to one specification of surface grammar’. Huddleston argues that Davies does not appropriately distinguish between the meaning of forms and situational factors. He provides the following example.

[Davies] says that a sentence like *It may be raining* expresses the assumption that ‘neither you nor I know [whether it is] (but someone else perhaps does)’ [...]. But such assumptions are not attributable to the meaning of *may*. If a student asks whether there is a question on modality in an examination I have set, and I reply *There may be*, I am not implying that I don’t know [...]. (Huddleston, 1981, p. 122)

I agree with Huddleston (1981) that it is problematic that Davies (1979) assigns literal meaning to context-less sentences, i.e., to form only, while, as Huddleston’s example above shows, context may distinguish between multiple meanings of utterances. This can be seen in Davies’ own examples too. For instance, the knowledge status of the antecedent distinguishes between sub-types of performance conditionals, but is highly context dependent. Although Davies’ framework has not been used much after publication, the characterisation of some types of conditionals can be found in subsequent classifications, such as the main difference between telling conditionals, performance conditionals and knowledge conditionals, which find their counterparts in, for instance, the respective speech-act, predictive and epistemic conditionals in Dancygier and Sweetser’s (2005) classification (see section 3.3.7).

With respect to grammatical features of importance to the connection implicatures, from this classification, we see the importance of modal marking in the antecedent and, to a larger extent, the consequent for determining types of connections between antecedents and consequents. We will see this repeated in various classifications discussed in the following sections.

3.3.4 Direct, indirect and rhetorical conditionals

Quirk et al. (1985) propose two main types of conditionals based on the connection between antecedent and consequent, namely those expressing *direct*, and those expressing *indirect* conditions, largely coinciding with Austin's aforementioned distinction between conditional and non-conditional *if*.

The direct type expresses the contingency of the consequent on the fulfilment of the condition in the antecedent, as in (124) and (125) below.

(124) If you put the baby down, she'll scream. (Quirk et al., 1985, p. 1088)

(125) If he changed his opinions, he'd be a more likeable person. (Quirk et al., 1985, p. 1088)

In the more peripheral indirect type of conditionals, the antecedent presents a situation that is not directly related to the situation in the consequent, as in (126).

(126) She's far too considerate, if I may say so. (Quirk et al., 1985, p. 1089)

The condition in this type is taken to be dependent on the speech act in the consequent, i.e., the assertion 'she's far too considerate'. The speaker here uses an *if*-clause as a hedge 'on the force of the speech act' in the consequent, amounting to a politeness strategy by asking for permission (see Brown & Levinson, 1987, p. 272), but she can also address the correct understanding of an utterance, as in (127).

(127) She and I are just good friends, if you understand me. (Quirk et al., 1985, p. 1089)

The last type is the *rhetorical conditional*, in which one of the propositions is 'patently absurd' – comparable to Davies' (1979) examples in (122) and (123) above. In a likewise fashion, the falsity of *q* is carried over to *p*, as in the example in (128) below.

(128) If they're Irish, I'm the Pope. (Since I'm obviously not the pope, they're certainly not Irish.) (Quirk et al., 1985, p. 1094)

Conditionals expressing direct conditions are divided into *open conditions* and *hypothetical conditions*, a distinction based on the feature of 'backshift', which indicates that the time marked by the verb form precedes the time referred to. Backshift can be used to express epistemic distance, as discussed in section 2.5 (see, among others, Leech, 1971, pp. 99–105; Dancygier, 1998, p. 37), resulting in, in Quirk et al.'s (1985) terms, a 'hypothetical conditional'. The distinction does not have an effect on the type of relation between the antecedent and consequent, but rather on the expressed belief in fulfilment of the condition in the antecedent, reminiscent of the accounts discussed in section 3.2. Open conditions are 'neutral', meaning that they do not express an

epistemic stance towards the fulfilment of the condition, as in (129), while hypothetical conditions do express epistemic stance towards what is expressed, as in (130) to (132) (examples adapted from Quirk et al., 1985, p. 1091).

- (129) If Colin is in London, he is undoubtedly staying at the Hilton. (Quirk et al., 1985, p. 1091)
- (130) If he changed his opinions, he'd be a more likeable person. (Quirk et al., 1985, p. 1091)
- (131) They would be here with us if they had the time. (Quirk et al., 1985, p. 1091)
- (132) If you had listened to me, you wouldn't have made so many mistakes. (Quirk et al., 1985, p. 1091)

Future conditions express that the condition will likely not be fulfilled, as in (130), *present conditions* express that the condition is not fulfilled, as in (131), and *past conditions* express that the condition was not fulfilled, as in (132). Tense marks the antecedent for these modalities, which are carried over to the main clause. The tense used in the consequents of (130) to (132) marks the speaker's belief: for future reference this is said to be 'contrary to expectation', for present reference 'contrary to assumption' and for past reference 'contrary to fact' (or *counterfactual*; Quirk et al., 1985, p. 1092). Although this classification is widely used and highly acclaimed (see e.g., Aarts, 1988), Quirk et al.'s (1985, p. 1092) statement that hypothetical conditionals with past time reference 'conveys the speaker's belief that the condition [...] was not fulfilled' has attracted criticism. Huddleston (1988, p. 353) argues that 'this view is widespread among grammarians, though philosophers have often pointed out that it is erroneous'. This ties in with the discussion in section 2.5.4 on the difference between subjunctive conditionals and counterfactuals. Whereas Quirk et al. (1985, p. 1092) argue that past hypothetical conditionals, as in (132), express a condition that is contrary to fact, it would have been more precise to speak of *implicating* instead of *conveying*. Huddleston (1988, p. 353) also argues that Quirk et al. ignore 'the use of the past perfect with present time reference', as in (133).

- (133) If your father had been alive today, he would have disowned you. (Huddleston, 1988, p. 353)

Indirect conditionals are classified as open conditions, 'that are dependent on an implicit speech act of the utterance (Quirk et al., 1985, p. 1095).²⁰ They are introduced mainly by *if*, but also by 'in case', 'assuming (that)', 'in the event (that)', and 'supposing (that)'. Four sub-types are distinguished. In the first sub-type, the antecedent expresses a request for permission for the speech

²⁰Open conditions are neutral conditions, i.e., those antecedents that leave 'unresolved the question of the fulfilment or nonfulfilment of the condition' (Quirk et al., 1985, p. 1091).

act in the consequent, making it a suitable device for politeness strategies, as in (134). The antecedent in the second sub-type expresses a metalinguistic comment on the wording of the consequent, as in (135). In the third sub-type, the antecedent addresses ‘extralinguistic uncertainty’ on the part of the speaker or hearer about what is expressed in the main clause, as in (136) (also called ‘non-committal conditionals’, cf. Puente-Castelo, 2021, p. 192). The last sub-type has an antecedent in which is expressed on what condition the indirect speech act in the consequent is uttered, such as the request in (137) and the offer in (138).

- (134) If I may be quite frank with you, I don’t approve of any concessions to ignorance. (Quirk et al., 1985, p. 1095)
- (135) His style is florid, if that’s the right word. [...] (Quirk et al., 1985, p. 1096)
- (136) Chomsky’s views cannot be reconciled with Piaget’s, if I understand both correctly. (Quirk et al., 1985, p. 1096)
- (137) If you’re going my way, I need a lift back. (Quirk et al. 1985: 1096) (Quirk et al., 1985, p. 1096)
- (138) If you want to borrow a shoe brush, there’s one in the bathroom. (Quirk et al., 1985, p. 1096)

There seems to be much similarity between the first (permission) and last sub-type. The description ‘the conditional clause expresses the condition under which the speaker makes the utterance’ (Quirk et al., 1985, p. 1096) seems somewhat general in such a detailed account of indirect conditionals. The difference between the first and the last sub-type is that the first sub-type addresses a felicity condition contingent on the illocutionary force of the main clause (the act of approving in (134)), while the last sub-type addresses a felicity condition contingent on the propositional contents of the main clause (‘there’s one in the bathroom’ in (138)). Gabrielatos (2010, p. 246) argues that Quirk et al.’s (1985, p. 1095) remark that the speech act expressed in the consequent is necessarily implicit is incorrect, as he encounters examples like (139) in his corpus.

- (139) ‘I would like to have your permission to extend my stay, Mr Connon’
‘Do I have a choice?’ asked Connon. ‘If I do, which I doubt where Jenny’s concerned, then I unhesitatingly offer you my hospitality for as long as you care to accept it.’ [GUD 1335] (Gabrielatos, 2010, p. 246)

Gabrielatos redefines Quirk et al.’s (1985) indirect conditionals, based on Funk’s (1985, p. 368; see section 3.2.6), as conditionals in which the uttering of the consequent (‘or aspects of it’) is contingent on the antecedent. He distinguishes two sub-types, *relevance* and *comment* conditionals, as in (140) and (141) respectively.

- (140) It was never like this, and my father was an Old Bastard if you must know. [EDJ 2007] (Gabrielatos, 2010, p. 25)
- (141) Which are the sectors where you feel, if you had a new settlement, er there would be potential er problems if that's the right word, for the implementation of your regeneration policies in Leeds. [J9S 15] (Gabrielatos, 2010, p. 252)

The difference between the two is that the antecedent of relevance conditionals comments on the *contents* of the consequent, while comment conditionals are metalinguistic in nature and comment on the *form* of the consequent. The reason for Gabrielatos' (2010, p. 246) rejection of the general label of 'speech-act conditional' (cf. Sweetser, 1990) is that 'every utterance is a potential speech act [...], that is, every utterance can be intended, or contextually interpreted, as a speech act'. However, as is made clear by Dancygier (1998, p. 103) in a discussion of Horn (1985, 1989), the label 'speech-act conditionals' or 'biscuit conditional', as discussed in section 3.3.2, refers to conditionals in which the consequent is constituted by a speech act other than the assertive type (see also section 5.8). For direct conditionals, it is the truth of the proposition in the assertive speech act in the consequent that is contingent on that of the antecedent, while for other types, this is not the case. While the argument that every utterance is a potential speech act holds, I hold the label 'speech-act conditional' here to reflect that the relation between the antecedent and consequent resides on the utterance or speech-act level, not on the propositional level.

The final category is the rhetorical conditional, which appears to present an open, direct condition, but makes 'a strong assertion' either by projecting the absurd level of falsity of proposition *q* in the consequent onto proposition *p* in the antecedent, in turn rendering it false, as in (128) above or (142) below, or by projecting the apparent truth of *p* onto *q*, showing it to be true, as in (143), mostly in situations where scalarity is involved (see also Davies' examples of knowledge conditionals in the previous section).

- (142) If you believe that, you'll believe anything. ('You certainly can't believe that.') (Quirk et al., 1985, p. 1095)
- (143) The package weighed ten pounds if it weighted an ounce. (The package certainly weighted ten pounds.) (Quirk et al., 1985, p. 1095)

Quirk et al. (1985, p. 1094) argue that, while they share the appearance of conditionals expressing an open condition, rhetorical conditionals are (strongly) assertive, a characteristic opposed to the non-assertiveness of open conditions.

The simplicity of Quirk et al.'s (1985) distinction into direct and indirect conditions is not only grammatically plausible, but Gabrielatos' (2010, pp. 155–158) results show that the distinction also holds up in a corpus study of written English. He argues that this is mainly because of the respective syntactic differences between the consequent as an adjunct in *direct*, and the consequent

as a disjunct in indirect conditionals. This supports the corpus-based approach introduced in the next chapter to investigate the relation between grammatical features and implicatures of conditionals. Therefore, from this classification, we take *sentence type*, for the distinction between direct and indirect conditionals, *verb tense*, and *modal marking*, for the distinction between open and closed conditionals as relevant features.²¹

3.3.5 Complete, partial and non-determinate conditionals

In reaction to logic-oriented accounts (see section 2.3), Johnson-Laird (1986) aims at developing a psychologically plausible theory of conditionals. He argues that ‘we can make sense of certain conditionals only by bearing in mind that they are invariably taken to mean that some sort of relation is intended to hold between antecedent and consequent’ (Johnson-Laird, 1986, p. 67). Johnson-Laird’s account is the result of a number of psychological studies into people’s reasoning with conditionals. Its foundation is, therefore, mainly empirical. Johnson-Laird (1986, p. 73) found that people normally do not use (formal) rules of inference, but use the information in the antecedent enriched by existing beliefs and context to interpret the conditional and search for counterexamples. A connection is needed for a theory of mental models (for an introduction to mental models, see Johnson-Laird, 2012), in which a conditional allows for a deduction about a finite domain in the two steps presented in (144) below.

- (144) Step 1. Construct a mental model based on the superficial linguistic representation of the antecedent and on those beliefs triggered during this process.
 Step 2. Interpret the consequent in the context of the model and general knowledge. (Johnson-Laird, 1986, p. 65)

As step 1 in (144) shows, the mental model of a conditional constructed by a language user is determined by the antecedent. The notion of ‘finite domain’ is important with respect to the notion of ‘possible worlds’ as used by Stalnaker (1968) (see also section 2.5). Johnson-Laird (1982, p. 31; 1986, p. 63) argues that the infinity of the set of possible worlds makes the theory less psychologically plausible, as ‘it cannot fit directly into an individual’s mind’. A mental model is more restricted to the content and context of the utterance under evaluation.

The nature of the connection between antecedent and consequent can be temporal-conditional, as in (145), in which case the consequent of a conditional can refer to an event that occurred before, during or after the event in the antecedent. The nature can also be causal (see also Miller & Johnson-Laird, 1976), as in (146), logical, as in (147) or deontic, as in (148).

²¹The distinction between *open* and *closed* conditionals, based on tense and modal marking, however, does not show to be a discriminating feature in Gabrielatos’ quantitative corpus study. This point will be taken up further in chapter 6.

- (145) If it is hot now, then it {was hot yesterday/is hot now/will be hot tomorrow}. (Johnson-Laird, 1986, p. 67)
- (146) If the match had been struck, it would have lit. (Johnson-Laird, 1986, p. 68)
- (147) If a woman has a husband, then she is married. (Johnson-Laird, 1986, p. 73)
- (148) If you take the cake, I'll smack you. (Johnson-Laird, 1986, p. 64)

Although these different types of connections between antecedent and consequent are of importance to the mental model, they are not described in further detail. Rather, Johnson-Laird determines the main categories by the degree of determination in which the antecedent determines the situation in the consequent.

Johnson-Laird (1986, pp. 69–71) distinguishes between antecedents that completely determine the consequent, as in (149), those that partially determine the consequent, as in (150) and those that do not determine the consequent, but 'stipulate[s] the relevance of the information conveyed by the consequent', as in (151).

- (149) If someone is in a room, there is a room that is not empty. (Johnson-Laird, 1986, p. 70)
- (150) If the accused was on a train when the murder occurred, then he (sic [JL]) must be innocent. (Johnson-Laird, 1986, p. 71)
- (151) If you've run out of petrol, there's a garage down the road. (Johnson-Laird, 1986, p. 69)

As can be seen, the last type, in (151), is comparable to Quirk et al.'s (1985) indirect conditional as discussed in the previous section, in which the antecedent is not a condition for the consequent directly, but a condition on the speech act made in the consequent. The complete and partial types are comparable to Quirk et al.'s (1985) direct conditions, although the two types do not coincide with further sub-types by Quirk et al. (1985). According to Johnson-Laird (1986), the partial-type exemplified in (150) is the most frequent, and most problematic category. The problematic nature of this type is due to the fact that the antecedent provides only part of the state of affairs in which the consequent must be evaluated, i.e., one has to 'enrich' the antecedent in (150) (by a connecting premise or topos, see e.g., Ducrot, 1996) to arrive at a mental model that completely predicts the consequent, as in (152).

- (152) If the accused was on a train when the murder occurred, and a person cannot be in two places at once, and there are no cinemas on trains, and ..., then the accused is innocent. (Johnson-Laird, 1986, p. 71)

Because conditionals can be either of these three types, corresponding to three mental models, Johnson-Laird (1986, p. 72) argues that there ‘is no guarantee of the validity of many everyday inferences’, explaining why people generally perform poorly on formal reasoning tasks with conditionals (see e.g., Wason, 1968). Furthermore, as Johnson-Laird argues that the partial type in (150) is most frequent, many conditionals in language use are require background knowledge and context to be evaluated.

As Johnson-Laird’s (1986) account is psychological in nature, no grammatical features are described in relation to the types discussed. Furthermore, it remains somewhat unclear whether and how the two parameters (nature and degree) interact. For instance, it seems that in cases in which the antecedent does not determine the consequent (comparable to Quirk et al.’s indirect conditions) the connection cannot be described in terms of a temporal, causal, logical nature, but seems restricted to a connection on the speech-act level. Although no grammatical features can be distilled from this classification, we can see modal marking in the consequents of the examples provided playing a role comparable to its role in the previously discussed classifications. I therefore believe this brief discussion of Johnson-Laird’s (1986) account is relevant for the current purpose, as it is an alternative to the strictly logical analysis of conditionals discussed in section 2.3.2 and highlights the importance of not only contextual factors such as world knowledge beyond the propositions expressed in antecedents and consequents of conditionals, but also of the connection between these two clauses in everyday use of conditionals.

3.3.6 Now and not-now conditionals

Nieuwint (1992) discusses the distinction between indicative conditionals (i.e., *real, open conditionals*), as in (153), and subjunctive conditionals (i.e., *hypothetical, unreal conditionals*), as in (154).

(153) If Hitler invades England Germany will win the war. (Nieuwint, 1992, p. 5)

(154) If Hitler had invaded England Germany would have won the war. (Nieuwint, 1992, p. 5)

Nieuwint’s main point of departure is the problem already discussed in section 2.5.4, namely that the term *counterfactual* should be avoided, because what is traditionally labelled as such does, according to Nieuwint (1992, p. 177), ‘not itself make any claim about matters in the real world’. Instead, a conditional as in (154) makes a claim about an imaginary world (i.e., a possible world in terms of Stalnaker, 1968) which bears no necessary relation to the real world. Nieuwint’s (1992, pp. 175–176) main parameter is *time* manifested in *tense*, separating ‘conditionals whose meaning is “now”’ (in the sense of ‘non-past’) from ‘conditionals whose meaning is “not-now”’, in the sense of either ‘past’, or

“‘imaginary’ [...] whose fulfilment is ‘closed’ with respect to ‘now’”.²² Although the main parameter does not distinguish between different connections between antecedent and consequent, the reason for discussing this account here is that the sub-types distinguished by Nieuwint are in fact based on the connection.

The domain of *now conditionals* is the real world and they are capable of ‘materializing in the non-past real world of the present or the future’ (Nieuwint, 1992, p. 175). In this category, a further division is made on basis of the connection between the antecedent and the consequent. This connection can be either *free* or *unfree*. *Free conditionals* are ‘stochastic’ if they have no direct causal or logical relation and can be either specific and uncertain, as in (155), or generic, as in (156).

(155) If the hotel is full we’ll go to a campsite. (Nieuwint, 1992, p. 180)

(156) If the hotel is full we always go to a campsite. (Nieuwint, 1992, p. 180)

If a *now conditional* is not *free*, it is *unfree* and bound to either causality, in which case the antecedent causes the consequent, as in (157) and (158), or to logic, in which case the antecedent implies the consequent, as in (159). The type of *unfree now conditionals* is, according to Nieuwint (1992, p. 180), the only type that can be judged true or false.

(157) If you drop that vase it will break. (Nieuwint, 1992, p. 180)

(158) If you heat ice it will melt. (Nieuwint, 1992, p. 180)

(159) If you’re a bachelor you’re unmarried. (Nieuwint, 1992, p. 180)

As can be seen, the differences between (155) and (156) on one hand and (157) and (158) on the other correspond to the difference between a specific and a generic reading. In the case of a specific claim, the fulfilment of the antecedent must be uncertain at the time of speaking (Nieuwint, 1992, p. 175), which is not the case for generic claims (but see the discussion in section 2.5.3).

Contrary to *now conditionals*, the domain of *not-now conditionals* is either the past or the imaginary (Nieuwint, 1992, p. 176), a distinction we have discussed at length in section 3.2. In the former, its fulfilment is open in the (real) past and in the latter it is open in the imaginary. Not-now conditionals situated in the past of the real world can be either reported speech with a backshifted verb in the antecedent, as in (160), or concern a past event in the antecedent. In the latter case, it can, again, be free, as in (161) and (162) or unfree, as in (163) and (164), each with its respective specific and generic sub-types.

(160) He said that if the hotel was full they’d go to a campsite. (Nieuwint, 1992, p. 180)

(161) If I did that, I (will have) apologized. (Nieuwint, 1992, p. 180)

²²These types are comparable to Funk’s (1985) *open* and *closed* conditions discussed in section 3.2.6.

(162) If she played the Schubert as an encore she left out the repeats. (Nieuwint, 1992, p. 180)

(163) If he told you that, he was lying. (Nieuwint, 1992, p. 180)

(164) If it rained the streets got wet. (Nieuwint, 1992, p. 180)

These *not-now conditionals* all concern the real world and as such are still indicative conditionals. *Not-now conditionals* can either be used as an invitation for an interlocutor to take on the imaginary perspective (i.e., in which the imaginary world is real) or an invitation to ‘apply contraposition’, which shows that the indicative version of the antecedent is untenable (in the real world), to speculate about the present or future (Nieuwint, 1992, pp. 178–179). For *imaginative conditionals*, the same distinction between free and unfree conditionals holds. *Free imaginative conditionals* can only make specific claims, as in (165), and no generic claims, as seen in (166), while *unfree imaginative conditionals* can express both, as in Nieuwint’s examples in (167) and (168) respectively.

(165) If that were water, it would freeze at 0° C. (Nieuwint, 1992, p. 178)

(166) * If something were water, it would freeze at 0° C. (Nieuwint, 1992, p. 178)

(167) If you dropped that vase, it would break. (Nieuwint, 1992, p. 180)

(168) If you were invisible, no one would be able to see you. (Nieuwint, 1992, p. 180)

As Nieuwint (1992, pp. 154–155) makes explicit, verb tense is an important feature of conditionals. He argues that the use of *if* and a simple past or past perfect tense in a ‘present tense context’ licenses the listener to ‘automatically assume that a switch to an imaginary [...] world is being made by the speaker, whereas this is not the case in a “past context”’. In case of a specific prediction in the consequent, a modal auxiliary and an infinitive is used in the consequent, whereas a simple present or past is used in case of a non-specific (i.e., generic, habitual) prediction. While Nieuwint explicitly mentions the problems connected to using the term ‘counterfactual’, his class of *imaginary conditionals*, marked by tense and modal auxiliaries, leaves the problem somewhat unresolved, as imaginary conditionals are not connected to the real world, and thus could be in accordance with it, but do not have to. As discussed before, modal marking by tense can be ambiguous. With respect to implicatures of connectedness, Nieuwint’s distinction between *free* and *unfree conditionals* resembles Johnson-Laird’s distinction between complete and partially determined conditionals discussed in section 3.3.5, and the distinction between *specific* and *generic conditionals* is reminiscent of a number of accounts discussed in section 3.2, as is the distinction between *causal* and *logical connections*. Except for the occurrence of the modal auxiliary *will* in antecedents (see Nieuwint, 1992, Chapter 3), and the role of *will* and *would* in consequents in distinguishing

(to some degree) between causal and logical connections between antecedents and consequents of *now* and *not-now conditionals*, with respect to the current purpose, this account mainly reinforces the importance of modal marking by tense and auxiliaries in conditionals with respect to the connection between antecedents and consequents.

3.3.7 Content, epistemic and speech-act conditionals

Sweetser (1990) and Dancygier (1998) have both offered a classification of connections between antecedents and consequents of conditionals. Dancygier and Sweetser (2005) offer a unified approach in terms of ‘Mental Spaces Theory’ (cf. Fauconnier, 1994; see also section 2.5.4). I will focus on their most recent approach here mainly, but I will briefly comment on differences with respect to their earlier accounts.

Dancygier and Mioduszevska (1984, pp. 121–125) argue for two main types of conditionals: *consequential* and *non-consequential* conditionals, as in (169) and (170)–(171) respectively.

- (169) If I catch the train, I will come on time. (Dancygier & Mioduszevska, 1984, p. 122)
- (170) If Susie is listening at the door, she is breathing quietly. (Dancygier & Mioduszevska, 1984, p. 122)
- (171) If she called yesterday, I was out. (Dancygier & Mioduszevska, 1984, p. 125)

In consequential conditionals, the situation expressed in the antecedent causes that in the consequent, while in the non-consequential conditional in (170) the situation in the antecedent is an argument for the conclusion expressed in the consequent. Non-consequential conditionals can also express more pragmatic connections, as in (171). For Sweetser (1990), the relation between antecedent and consequent in all the examples above is one of causality, even in what Dancygier and Mioduszevska (1984) call ‘non-consequential’. The approaches are not incompatible, however, as Sweetser (1990, p. 127) extends causality into different domains. Conditionality for Sweetser is best captured in von Wright’s (1973) idea of ‘a possible causal intervention’, in which the antecedent introduces a hypothetical world which differs in only one respect from the real world and this difference is caused by the possible intervention, as in the mental models of Johnson-Laird discussed in section 3.3.5. Sweetser (1990, pp. 113–114) argues that the type of connection is pragmatically inferred, while van der Auwera’s (1986) ‘Sufficient Conditionality Thesis’ (a term used by Sweetser, whereas it is called the ‘Sufficiency Hypothesis’ by van der Auwera, 1986, p. 200), in which the antecedent is interpreted as a sufficient condition for the ‘realisation’ of the consequent, is constant, akin the approach argued for in chapter 2, albeit in different terms. Sweetser (1990, pp. 113–119) classifies

conditionals in three main domains. The connection *if* introduces is either a *content sequence*, as in (169), an *epistemic sequence*, as in (170) or a *speech-act sequence*, as in (171) above. Sweetser also discusses antecedents that express metalinguistic comments, as in (172).

- (172) OK, I'll have a *tomahto*, if that's how you pronounce it. (Sweetser, 1990, p. 140)

From a diachronic perspective, Sweetser (1990, p. 141) argues that 'the kind of causal priority which is evidently important in our interpretation of natural language conditional sentences has its roots in the content world'. The more specific implicatures of connectedness are thus, in Sweetser's view, directly causal, or have been pragmatically extended from this type into the domains of reasoning and speech acts.

In Dancygier's (1998) classification, Sweetser's (1990) non-content domains function as sub-types of *non-predictive conditionals*. Dancygier (1998) criticises earlier accounts, such as those discussed in section 3.3.4, in which *open* or *neutral conditionals* are distinguished from *hypothetical* or *remote conditionals* as main types. She argues that this main distinction does not clearly separate temporal reference from epistemic modality, both expressed by means of verb forms in English. For instance, Dudman's example in (173) (cited in Dancygier, 1998, p. 36) would be classified as *open* (i.e., direct and neutral) in Quirk et al.'s (1985) classification, while contextual assumptions about deceased people mark the impossibility, or at least the high improbability, of the situation.

- (173) If Grannie attends the rally, it will [...] be as a ghost. (Dudman, 1984, p. 153)

Mainly because of the ambiguous role of tense in indicating time or epistemic distance, as discussed in previous sections already, Dancygier (1998, pp. 37–38) proposes the main parameter *backshift*, which refers to 'every case of language use such that the time marked in the verb phrase is earlier than the time actually referred to'. Backshift by means of verb tense in *predictive conditionals* must then be interpreted in epistemic terms (cf. the discussions in section 3.2), in contrast to tense in *non-predictive conditionals*, which express an indirect connection between antecedent and consequent. Outside the predictive and non-predictive distinction, Dancygier (1998, pp. 46, 63) places 'generic constructions' of the type in her example in (174), which is used to express general statements and 'seem[s] to share some features of both of the classes'.

- (174) If I drink too much milk, I get a rash. (Dancygier, 1998, p. 63)

It shares with predictive conditionals its construal of the consequent as the result of the antecedent, as both introduce assumptions used in prediction. In this type, *if* can be paraphrased as *when* or *whenever* (see Dancygier, 1998, p. 64). What generic conditionals share with non-predictive conditionals is that the use of verb forms is similar as their use outside conditionals – mainly indicative

of time, and less similar to their use within predictive conditionals. The link to predictive conditionals seems to prevail, however, because in Dancygier and Sweetser (2005, p. 95) this type is classified as a predictive conditional.

Within the main type of predictive conditionals, Dancygier (1998) distinguishes between two sub-types of backshift, namely *if-backshift*, in which only the antecedent is affected, as in (175), and *hypothetical backshift*, in which the whole conditional is affected, as in (176) and (177).

- (175) If it rains, the match will be cancelled. (Dancygier, 1998, p. 26)
- (176) If it rained, the match would be cancelled. (Dancygier, 1998, p. 26)
- (177) If it had rained, the match would have been cancelled. (Dancygier, 1998, p. 26)

This distinction reflects the distinction between *open* and *closed* conditionals discussed earlier (see section 3.2). Backshift in (176) creates what could be called a ‘counterfactual to the present’ meaning, whereas in (177), it creates a ‘counterfactual to the past’ meaning. This backshift is, however, not directly observable, and I find it important to discuss this problem in somewhat more detail here, because Dancygier’s account depends partly on this distinction. The *if*-clause in (175) has a present-tense verb and can be interpreted as uncertainty (‘Does it rain now?’), prediction (‘Will it rain in the future?’) or generic (‘Whenever it rains [...]’). Modal and temporal interpretation of verb tense are hard to distinguish and require context, or, as Dancygier (1998, p. 43) mentions, ‘in the absence of time adverbials the context often remains as the sole source of information’. Although backshift is presented as criterion for the characteristic of ‘predictivity’, it is itself a latent feature indirectly distinguishing between temporal reference and epistemic distance. The distinction between *latent* and *manifest characteristics* (cf. Lazarsfeld, 1966, p. 162) is important for the bottom-up approach introduced in the next chapter, because latent characteristics are not directly perceivable through observation and their parameters must be derived through manifest observations (cf. Sandri, 1969, p. 102). Lazarsfeld argues latent characteristics to have only a probabilistic relation to the underlying characteristics, which makes annotation in corpora indirect as well. The degree of backshift correlates with the epistemic distance marked by the speaker towards what is expressed, from no or weak distancing in (175) to strong distancing in (177).

Most common in predictive conditionals is the use of *will* in the consequent to refer to a future situation (i.e., a prediction), but it can also signal ‘epistemic or habitual prediction’. Dancygier (1998, p. 45) follows Joos (1964) in describing (non-hypothetical) *will* as ‘a kind of commitment on the part of speaker that she has sufficient grounds for saying what she does and takes a kind of responsibility for the statement made’. Predictive conditionals frequently have a sentence-initial antecedent (see section 5.2 for a discussion concerning this claim) and they usually invoke alternative scenario’s through conditional perfection (cf.

Geis & Zwicky, 1971; see also the discussion in section 2.6), through which, Dancygier (1998, p. 43) and Dancygier and Sweetser (2005, p. 32) argue, the antecedent opens up an ‘extension space’ in which its consequent holds and an ‘alternative space’ in which the consequent of its negation holds. It is mostly in these cases that the resumptive element *then* is used to refer to the ‘unique space set up’ opened up by the antecedent (Dancygier & Sweetser, 1997, p. 131), whereas it cannot be felicitously used in conditionals with generic reference, such as concessive conditionals (see below).²³ With respect to these alternative scenario’s, Dancygier and Sweetser (1997) and Dancygier and Sweetser (2005) consider concessive conditionals, as in (178), to be ‘predictions without specific alternatives’.

- (178) Even if he commits a crime, they will vote for him. (Dancygier & Sweetser, 2005, p. 157)

Following Kay (1990), Dancygier and Sweetser treat *even* as a scalar operator and they analyse (178) by arguing that ‘the most extreme case of the range of alternative values [...] for *P* is still not extreme enough to set up an alternative scenario to *Q*’. Therefore, concessive conditionals do not invoke an alternative scenario, but cancel the standard predictions connected to *P* in (178). This scalar relation can be further explained in terms of Ducrot’s (1996) topoi: background assumptions that are scalar in nature and to which concessives introduce an exception (cf. Reunecker and Boogaart, 2013, p. 295; see also Lycan, 2001, p. 122).

For Sweetser (1990, p. 116), conditionals in the epistemic domain are one step further from real-world causality and express causality in reasoning processes; the (hypothetical) knowledge of the truth of the antecedent is a sufficient condition for drawing the conclusion in the consequent, as in (179).

- (179) If she’s divorced, (then) she has been married. (Sweetser, 1990, p. 116)

Dancygier (1998, p. 83) argues that in such non-predictive conditionals there is no backshift, as verb tense indicates time and not modality. According to Dancygier and Sweetser (2005, p. 117), the function of the antecedent of an epistemic conditional is ‘simply to give background to the addressee, by invoking the relevant parts of the cognitive context which brought about this conclusion’. Sweetser (Sweetser, 1990, p. 126; cf. Haiman, 1978) classifies antecedents of epistemic conditionals as topics: ‘they are givens, but only relative to the apodosis’. In relation to the discussion in the previous chapter (see section 2.5), the question is why given information is presented as an unasserted antecedent. Sweetser argues that this is because the speaker’s epistemic state

²³Note that van Belle and Canegem-Ardijns (2007, p. 829) argue against the claim that ‘predictive conditionals almost inevitably get a *q* if and only if *p* interpretation’. They also argue that *conditional perfection* is too broad a notion and that there are three types of conditional perfection, namely ‘only if *p*, *q*’, ‘only if not *p*, not *q*’, and ‘if not *p*, then not *q*’. As this discussion goes beyond the scope of this overview, I refer here to van Belle and Canegem-Ardijns (2007) and Declerck and Reed (2001, pp. 429–430).

is not directly available to the hearer (see also Dancygier & Sweetser, 2005, pp. 117, 121). This connects to Akatsuka's (1985, p. 632) distinction between newly-learned information and knowledge, as discussed in section 2.5. This type is accompanied by a high frequency of modals like *must* and of resumptive *then* to signal reasoning processes, but, as with other non-predictive conditionals, they typically do not involve alternative scenarios. As we saw in section 2.6, Noordman (1979, p. 85) argues that the example in (77) (repeated for convenience below) expresses 'that John's being ill is a condition or eventually a cause for not going to his work', while (78) expresses 'that one may infer John's illness from John's not going to his work'.²⁴

(77) If John is ill, he is not going to his work. (Noordman, 1979, p. 85)

(78) If John is not going to his work, he is ill. (Noordman, 1979, p. 85)

Noordman (1979, p. 86) explains the difference as follows: 'if the condition [...] is mentioned after the conjunction [as in (77)], the sentence expresses a condition-consequence relation' and 'if the condition is mentioned in the other clause [as in (78)], the sentence expresses an inference relation'. This adheres closely to Sweetser's (1990, p. 123) characterisation of epistemic conditionals as reversed causality, and to Dancygier and Mioduszevska's (1984, p. 123) 'shifted' order of the 'p and q sequence'.

Speech-act conditionals are one more step away from real-world causality in predictive conditionals. The illocutionary force of the speech act in the consequent takes effect conditionally and as such, the antecedents of speech-act conditionals express factors which influence, enable or cause the 'performance of the speech act' (Sweetser, 1990, pp. 118, 142; see also Knott, 2001, pp. 138–139), as in the example in (171) and in Austin's example (106) from section 3.3.2 repeated below.

(106) There are biscuits on the sideboard if you want them.

Here, the maxim of Relation is invoked, because only in the case of the hearer being hungry the offering of biscuits is relevant. In other words, 'if you want them' introduces a sufficient condition not for the content of the consequent ('there are biscuits on the sideboard'), but for the act of making an offer.²⁵ When the antecedent of a speech-act conditional involves given information, the speech act often is an act of politeness (cf. Sweetser, 1990, p. 131), an indirect strategy in the sense that addressing a felicity condition before making a question, command or request saves the negative face of the hearer, as

²⁴Neither Sweetser (1990), Dancygier (1998) nor Dancygier and Sweetser (2005) relate their distinction between content and epistemic conditionals to this earlier psycho-linguistic work by Noordman (1979, p. 65), who demonstrates a processing difference between 'sentences expressing a condition-consequence relation and sentences expressing an inference relation'.

²⁵See section 2.6.3 for a discussion on whether or not maxims actually apply to parts of utterances (Douven, 2017b, p. 1542).

we already discussed in terms of politeness Brown and Levinson's politeness theory briefly in section 3.3.4 on Quirk et al.'s (1985) *indirect conditionals*. Interestingly, this relation can also be introduced by *when*, as in (180).²⁶

- (180) When amber lights flashing, prepare to stop. (Dancygier & Sweetser, 2005, p. 116)

The relationship between conditionals and speech acts has been discussed in detail by van der Auwera (1986, pp. 198–199). He distinguishes speech act *about* conditionals from conditional speech acts, as in his examples in (181) and (182) respectively.

- (181) If you inherit, will you invest?
Yes, if I inherit, I will invest. (van der Auwera, 1986, p. 198)
- (182) If you saw John, did you talk to him?
Yes, (I saw him and) I talked to him. (van der Auwera, 1986, p. 198)

The difference between (181) and (182) can be seen in the responses they elicit; in (181) the addressee will normally affirm or deny the whole conditional, while in (182), the speech act of asking a question is 'dependent on the condition that the protasis is true' (van der Auwera, 1986, p. 199) and consequently, *yes* confirms only the antecedent, not the whole conditional. Several authors (e.g., Lauerbach, 1979; Heringer, 1972; van Dijk, 1979; cited by van der Auwera, 1986, p. 199) have analysed speech-act conditionals in a Gricean fashion: 'the protasis is a comment on a conversational or politeness maxim and functions as a politeness or opting out device'. This use must be distinguished from speech acts about conditionals. Sweetser's (1990) speech-act domain would coincide with what van der Auwera (1986) calls speech-act conditionals, while 'speech acts about conditionals' as in (181) would 'simply' be conditionals in the content domain.²⁷

Dancygier and Sweetser (2005) discuss a fourth type of connection, licensing so-called 'metalinguistic conditionals', as exemplified in (183) and (184).

- (183) "That's what we're in business to do, get this cocksucker nailed, if you'll excuse my Greek." (Dancygier & Sweetser, 2005, p. 128)
- (184) John managed to solve the problem, if that was at all difficult. (Sweetser, 1990, p. 140)

²⁶It is surprising, as van Belle and Canegem-Ardijns (2007, p. 830) note, that Dancygier and Sweetser argue that speech-act conditionals generally do not take distanced verb forms. Although (a) below would amount to Dancygier and Sweetser's (2005) 'specialized constructions' because of the mixed tense pattern in the antecedent and consequent, van Belle and Canegem-Ardijns (2007, p. 830) provide counter-examples like (a).

(a) I'll help you with the dishes, if that would be alright with you.

²⁷For a more detailed discussion, see van der Auwera (1986, p. 199) on so-called *non-commentative conditional speech acts*.

These conditionals are different from speech-act conditionals in that they relate to the speech act as a linguistic performance, but they do not relate to the force of the speech act itself. Put differently, the antecedent of a metalinguistic conditional comments on a part of the consequent, while the antecedent of a speech-act conditional comments on the complete consequent. The relationship between antecedent and consequent in metalinguistic conditionals is therefore more specific than in speech-act conditionals: it is about the choice of linguistic form in the consequent.²⁸ In (183), the antecedent comments on the use of the word *cocksucker*, while in (184) the antecedent comments on the presupposition of difficulty licensed by *managed*.²⁹ Another difference is that antecedents of metalinguistic conditionals do not seem able to occur in sentence-initial position, because they refer to the apodosis anaphorically (Dancygier, 1998, p. 106). This, in effect, results in sentence-medial or sentence-final position, as was corroborated by Reuneker (2017b) on basis of corpus data.³⁰

The last type of conditional distinguished by Dancygier (1998, p. 108) and Dancygier and Sweetser (2005, p. 132) maps a metaphor from the antecedent onto the consequent, as in (185).

- (185) If the beautiful Golden Gate is the thoroughbred of bridges, the Bay Bridge is the workhorse. (Dancygier & Sweetser, 2005, p. 132)

Here the metaphor ‘the Golden Gate is a horse’ is extended to another object: the Bay Bridge. If one accepts the metaphor used in the antecedent, it follows that another object in the same domain may be characterised in terms of the same metaphor (‘one submapping is conditional on the other’, cf. Sweetser, 1996, p. 223).³¹ The question remains whether or not the meta-metaphorical type of conditional is a type in itself. As it concerns an inferential transfer between domains in metaphors, it shares characteristics with both metalinguistic conditionals (commenting on linguistic choices) and epistemic conditionals (reasoning from a premise to a conclusion). Dancygier and Sweetser (2005, pp. 135–136) argue that this type behaves most similarly to epistemic conditionals, because the relation between the antecedent as premise and the consequent as conclusion does not structurally differ from that in epistemic

²⁸For a recent analysis of ‘if you like’ as both a (metalinguistic) hedge targeted at the form of the consequent, and as a hedge targeted at the content of the consequent, see Elder (2019b).

²⁹See also Athanasiadou and Dirven’s (1997a) detailed classification of metalinguistic conditionals.

³⁰It would be expected that metalinguistic conditionals cannot be used predictively (see e.g., Dancygier, 1992; Dancygier, 1998). However, see Dancygier and Sweetser (2005, p. 127).

³¹For specifics on this type, see Sweetser (1996, p. 221), who distinguishes between three sub-types of meta-metaphorical conditionals.

conditionals. Consequently, I argue that meta-metaphorical conditionals can be explained by the general characteristics of epistemic conditionals, applied to metaphors (see also Sweetser, 1996, p. 231).³²

In conclusion, Dancygier and Sweetser (2005) argue for causality in all conditionals, which may be situated however in different (content, epistemic, speech-act and metalinguistic) domains. This is a stronger claim than the analysis presented section 2.6, in which I argued for a general conventional meaning of connectedness in conditionals, of which causality is a possible, and perhaps frequent, but not the only more specific implicature to be derived. This depends, however, on whether one views an inferential connection between an antecedent and a consequent (i.e., an epistemic conditional) as extended from (content) causality. With respect to grammatical features and connections, Dancygier (1998) argues that more traditional approaches to classifying conditionals as open and hypothetical conditionals have proven problematic, because verb tense does not unambiguously mark temporal reference and epistemic modality. She introduces *backshift* as the main parameter by which predictive conditionals are epistemically marked, while non-predictive conditionals are not. However, as backshift can only be indirectly observed in verb tense, this classification, even given Dancygier's criticism above, points towards verb tense as an important feature of conditionals again, together with modal auxiliaries. Backshift is 'observable' only through tense and context (i.e., tenses such as simple past or past perfect do not unequivocally indicate backshift), and it will not be included as such in the corpus study that follows. Dancygier and Sweetser's account does add the grammatical features *clause order* as Dancygier and Sweetser argue that predictive conditionals usually have iconic order supporting the (direct) causal connection between antecedent and consequent, which is in line with the analysis presented in section 2.6.3 based on the non-commutivity of $\supset$. Finally, the use of the resumptive element *then* also may have an effect on the implicatures of connectedness, as it refers back to the antecedent 'and locates the event or state described in the apodosis in that mental space', signalling compatibility with a biconditional ('if and only if') implicature (cf. Dancygier & Sweetser, 1997, p. 116; see also Iatridou, 1991). Resumptive *then* will therefore be included as a feature in the corpus study.

3.3.8 Polarity, source of coherence and segment order in conditionals

In the framework of the Cognitive approach to Coherence Relations (*CCR*; cf. Sanders, Spooren and Noordman, 1992) coherence relations are considered to be cognitive entities, i.e., in understanding discourse, language users need to infer coherence relations between segments (see e.g., Hobbs, 1979; Sanders,

³²Dancygier and Sweetser (2005, p. 136) argue for yet another type of conditional, the meta-spatial conditional. I will not discuss this type here, as it is, as they argue themselves, a left-over category, in which *spatial* refers to the general idea of mental spaces, not geographical space. See Dancygier and Sweetser (2005, pp. 136–138) for examples and discussion.

Spooren & Noordman, 1992; Kehler et al., 2008; Hoek, 2018), as they do not engage in the exchange of isolated segments (phrases, clauses, utterances). Consequently, they combine segments in order to construct a cognitive representation in which these segments form a coherent whole. As Schilperoord and Verhagen (1998, p. 141) remark, ‘the notion *coherence structure* refers to connectedness of discourse that sets it apart from random sets of sentences’, and as such its relevance to the current inventory of implicatures from connectedness can be seen.

Sanders, Spooren and Noordman (1992, pp. 2–3) make clear that discourse coherency is different from cohesion, in which ‘the connectivity of the discourse is primarily tied to the explicit marking of semantic relations’. As I mentioned in section 2.2, one characteristic of conditionals is that they consist of two ‘parts’ (clauses mostly), which are connected by a conjunction or presented using another construction. However, as we discussed extensively in the previous chapter, the exact nature of the connection between these parts is often not explicitly marked as such and it was analysed in terms of a conversational implicature. The consequent is, in some way, ‘conceptually dependent’ on the antecedent and in order to arrive at a coherent conceptualisation, they have to be related by the language user (cf. Schilperoord & Verhagen, 1998, p. 150).³³ Within the CCR framework, conditional relations between segments have a *causal* basic operation (as opposed to *additive relations*), because ‘there is an implication relation between the two arguments ($P \rightarrow Q$)’ (Hoek, 2018, p. 44) meaning that one segment influences the other, in contrast to additive relations, which only express ‘ $P \wedge Q$ ’. As Sanders, Spooren and Noordman (1992, p. 7) argue, ‘it appears that whether the causal basic operation holds does not depend solely on the truth value of the antecedent and the consequent, but also on the link between the antecedent and the consequent’. This relates very closely to conversational implicatures of specific connections we are after in this part of the chapter.

The types of conditionals distinguished in the Cognitive approach to Coherence Relations are based on combinations of the remaining ‘CCR primitives’, namely *polarity*, *source of coherence* and *order of the segments*, which results in *positive objective conditionals*, *positive subjective conditionals*, *negative objective conditionals* and *negative subjective conditionals*, all of which can have a *basic* or *non-basic* order of the antecedent and consequent. A conditional can either have positive or negative polarity, as in the examples in (186) and (187) respectively, in which it is implicated that the situation expressed in the antecedent either causes or enables the situation expressed in the consequent, as in (186), or it is implicated that the antecedent prevents the situation expressed in the consequent, as in (187).

(186) If it rains, Jill will bring an umbrella. (Hoek, 2018, p. 59)

³³ Although Schilperoord and Verhagen (1998) study restrictive relative clauses, this ‘conceptual dependency’ seems suitable for other phenomena too.

- (187) Unless the skies have cleared, we are bringing an umbrella.³⁴ (Hoek, 2018, p. 60)

Next, positive and negative conditionals can either have a semantic (objective) or a pragmatic (subjective) ‘source of coherence’, as in (186)-(187) and (188) respectively.

- (188) If Jill brought an umbrella, it must be raining. (Hoek, 2018, p. 59)

Objective conditionals are comparable to Dancygier and Sweetser’s (2005) *content conditionals*, as they relate the antecedent and consequent according to the world they refer to, e.g., as cause and effect, whereas subjective conditionals are comparable to epistemic and speech-act conditionals, because they relate the antecedent and consequent with respect to the reasoning of the speaker. The coherence relation is further specified for the order of antecedent and consequent. The alternative of the basic-order conditional in (188) for instance would be the conditional in (189) below.

- (189) It must be raining, if Jill brought an umbrella.

Next to the original ‘CCR primitives’ *polarity*, *basic operation*, *source of coherence* and *order of the segments*, several other distinctions have been proposed, such as *temporality* (Evers-Vermeul, Hoek & Scholman, 2017), *volitionality* (Stukker, Sanders & Verhagen, 2008) and, recently, *disjunction* (Hoek, Evers-Vermeul & Sanders, 2019).³⁵

The reason that I discuss this approach (only) briefly at this point, is that, although it does not offer a detailed classification of conditional connections as such (which is not its main objective), it does point towards features related to the specific connections between antecedents and consequents of conditionals. As ‘source of coherence’ coincides with the specific connection itself and is directly based on the work by Dancygier and Sweetser discussed in the previous section, this is not a ‘feature’ to be considered. Polarity, however is, and points towards negation in clauses of conditionals, as is clause order, which was also mentioned in relation to iconicity in predictive conditionals by Dancygier and Sweetser (2005) discussed in the previous section.³⁶

3.3.9 Hypothetical, course-of-event and pragmatic conditionals

Athanasiadou and Dirven (1996) and Athanasiadou and Dirven (1997a, p. 62) regard conditionals as utterances in which there is ‘mutual dependency between the two propositions in the subclause and in the main clause’, and although they remark that this dependency is ‘the common factor of all conditionals –

³⁴See Daalder (1994) for the Dutch conditional conjunction *tenzij* ‘unless’.

³⁵See Hoek (2018) for a recent overview.

³⁶See section 5.9 in the next chapter for a more detailed discussion of this feature and the differences between polarity and negation.

and consequently also the main factor of conditionality', no further analysis of how this dependency, comparable to the connectedness argued for in chapter 2, comes about is offered. Rather, as was discussed already in section 2.6, they postulate it and continue by distinguishing between three types of conditionals: *course-of-event*, *hypothetical* and *pragmatic conditionals*.

The classification is based on the distribution of conditionals in several corpora. The corpus-based approach is argued for by showing that 'any conceptual category has many more structural realisations than an approach solely based on introspection can guarantee, and corpus-based examples will provide the whole range of structural possibilities' (Athanasiadou & Dirven, 1997a, p. 23). According to Athanasiadou and Dirven (1997a, p. 61) hypotheticality is not a prototypical feature of all conditionals, as is assumed in many accounts of conditionality, but the prototypical feature of one specific, albeit highly frequent type of conditionals, namely the type in which the connection is causal in nature. This causality is not, as Comrie (1986) argues, common to all conditionals, but it forms a scale on which hypothetical conditionals are at the high end (strong causal dependency), and pragmatic conditionals at the low end (low causal dependency). With respect to the analysis in the previous chapter, this hypotheticality is only one of the possible implicatures from unassertiveness. In other words, all conditionals are unassertive, but not all need to be considered hypothetical, which is reflected in Athanasiadou and Dirven's account.

Hypothetical conditionals operate in what Athanasiadou and Dirven (1997a, p. 62) call a 'non-actual frame'. This type of conditional expresses two different events, which stand in a consecutive relation and are hypothetical, while the hypothetical character is not involved in the relation between the two situations expressed. The likelihood of hypothetical conditionals is positioned by Athanasiadou and Dirven (1997a, p. 73) on their scale of likelihood from 'potentially real' without the use of epistemic markers ('unmarked hypothetical conditionals'), as in (190) below, to 'less likely', as in (191), and, finally, 'unreal', as in (192), by means means of tense and modal verbs ('marked hypothetical conditionals').

(190) If I go bald, I will shoot myself. (Athanasiadou & Dirven, 1997a, p. 73)

(191) If I should go bald, I would shoot myself. (Athanasiadou & Dirven, 1997a, p. 73)

(192) If I had gone bald, I would have shot myself. (Athanasiadou & Dirven, 1997a, p. 73)

The nature of the connection between antecedent and consequent in hypothetical conditionals can be brought out by paraphrasing the utterances using *because* (Athanasiadou & Dirven, 1997a, pp. 65–67), as in (193)–(194).

(193) If there is no water in your radiator, your engine will overheat immediately. (Athanasiadou & Dirven, 1997a, p. 65)

- (194) The engine will overheat *because* there is no water in the radiator.
(Athanasiadou & Dirven, 1997a, p. 67)

However, not all hypothetical conditionals involve a causal connection, as can be seen in (195) below.

- (195) If the allowance is more favourable to a widow than the retirement pension, she will be paid that allowance. (Athanasiadou & Dirven, 1997a, p. 66)

Whereas there is a ‘strong *causal*’ connection in (193), this is not the case for the second sub-type of hypothetical conditionals distinguished by Athanasiadou and Dirven, the *condition* in (195), which is the only sub-type that can be paraphrased with ‘on condition that’.

- (196) ? The engine will overheat on condition that there is no water in the radiator.
(197) The widow will be paid the allowance on condition that it is more favourable.
(Athanasiadou & Dirven, 1997a, p. 66)

Athanasiadou and Dirven (1997a, p. 68) further remark that this sub-type only expresses desirable outcomes, i.e., you cannot ‘punish somebody *on condition that* he does something wrong’ (italics added), which is in line with Daalder’s (2006; 2009) observation that the Dutch conditional conjunction *mits* ‘on condition that’ can only be used for desirable outcomes. The third sub-type is *supposition*, as in (190) repeated below.

- (190) If I go bald, I will shoot myself. (Athanasiadou & Dirven, 1997a, p. 73)

Here the consequent expresses a reaction to a ‘supposed state of affairs’ (Athanasiadou & Dirven, 1997a, p. 66). The connection of dependency is still present, but, according to Athanasiadou and Dirven, there is no cause or condition involved, merely a possible ‘resultative action’ in case *p* becomes true.

The second main type of connection is that in *course-of-event conditionals*, which express a relation of co-occurrence between two situations. Athanasiadou and Dirven argue that the speaker commits herself to the ‘actual, frequent or general realisation of the two situations’, which is not the case for hypothetical conditionals. In contrast to hypothetical conditionals, course-of-event conditionals have as the ‘most typical characteristic [...] the absence of modals’, which is explained by Athanasiadou and Dirven (1996, p. 617) as conditionals being used to ‘talk about a world of reality, experienced and described usually by someone with expert knowledge’. When modals appear in this type of conditional, Athanasiadou and Dirven (1996, p. 620) suggest *can* and *may* are the most likely candidates, as they ‘evoke the sense of coming a bit closer to known reality’. Furthermore, in contrast to hypothetical conditionals which refer to specific situations, course-of-event conditionals typically refer to ‘general time

in the present or past' or a combination of both (cf. Athanasiadou & Dirven, 1996, pp. 616–617). This is also reflected in the frequent use of the simple present, as in (198), and present perfect, as in (199), which 'in English is the form *par excellence* to combine past time and present time'. Specific adverbs like *normally*, *always* and *sometimes* can be used to express 'generality and reality', as in (200).

- (198) If there is a drought at this time, as happens so often in central Australia, the fertilised egg in the uterus still remains dormant. (Athanasiadou & Dirven, 1996, p. 611)
- (199) If there has been rain and there is a good pasture, then the egg now restarts its development. (Athanasiadou & Dirven, 1996, p. 616)
- (200) If the tonsils are remove , the adenoids are sometimes cut out too. (Athanasiadou & Dirven, 1996, p. 619)

In course-of-event conditionals two events co-occur, of which one is dependent on the other (Athanasiadou & Dirven, 1997a, pp. 62, 70), but there is a relation of co-occurrence, not necessarily causality. This type of conditional can be characterised as expressing a 'whenever' relation. Athanasiadou and Dirven (1997a) argue that Comrie's (1986, p. 88) generalisation that all conditionals are hypothetical in nature is too broad, because his argument that 'greater hypotheticality means lower probability and lower hypotheticality means greater probability' is problematic for course-of-event conditionals. While, as in hypothetical conditionals, both events referred to in the respective clauses are unasserted (see section 2.5), in course-of-event conditionals 'there is a suggestion of a real occurrence of the two events' in the sense that whenever the first situation occurs, the second also occurs'. Course-of-event conditionals are not as prototypical as hypothetical conditionals are, because, although they are high in frequency, they have a lower dependency between clauses and they do not mark epistemic attitudes towards the situations expressed.³⁷

In the third type of conditional, the *pragmatic conditional*, the antecedent expresses a 'metapragmatic signal' which marks the relevancy of consequent, as in (201).

- (201) If you are thirsty, there's beer in the fridge. (Athanasiadou & Dirven, 1997a, p. 61)

In (201), the antecedent addresses one of the felicity conditions for the offer in the consequent (the preparatory condition of the addressee being thirsty). Athanasiadou and Dirven argue that this type of conditional is the least prototypical, as it is less frequent than the other types, has the lowest level interdependency between clauses, and although it can appear marked and has

³⁷Athanasiadou and Dirven (2000) further divide this type into three sub-types, namely the referential course-of-event conditionals discussed above, inferential course-of-event conditionals, and instructive course-of-event conditionals. For reasons of space, I will not discuss these types further here. See Athanasiadou and Dirven (2000) for details.

sub-types, it has no internal prototypicality range, and does not express epistemic attitudes towards the situations expressed. Athanasiadou and Dirven (2000, pp. 3, 5) define pragmatic conditionals as a super-ordinate category which distinguishes itself from hypotheticals and course-of-event conditionals because they are “speaker-oriented” or “hearer-oriented” and thus are apt to serve the interpersonal function of language’. This type must be distinguished from Sweetser’s (1990) speech-act conditionals, discussed in section 3.3.7, which denote the narrower category of speech acts. For Athanasiadou and Dirven (2000, p. 13) this category comprises conditionals that signal ‘the relationship between the sign and the user’. The category of pragmatic conditionals is further divided into *logical* and *conversational conditionals*, the former resembling Dancygier and Sweetser’s epistemic conditionals discussed in section 3.3.7, the latter resembling the speech-act conditionals from the same section. Logical pragmatic conditionals involve analytic reasoning processes, in which, with respect to form, the antecedent ‘can only be preposed to the consequent’. The link between the antecedent and the consequent in this subcategory can be either identifying, as in (202), or inferential, as in (203).

(202) If there’s one species to be put out to pasture it’s Presidents.
(Athanasiadou & Dirven, 2000, p. 7)

(203) If she’s divorced, then she’s been married before. (Athanasiadou & Dirven, 2000, p. 7)

In identifying conditionals, the antecedent offers a description identifying the subject of the consequent. However, Athanasiadou and Dirven (2000) argue that the communicative function of this sub-type is not to reveal someone’s identity, but, more rhetorically, to emphasise the important features of a category to be identified.

Inferencing conditionals emphasise the inferential nature of the utterance. According to Athanasiadou and Dirven (2000, p. 12) resumptive *then* and modal verbs are frequently used to emphasise the act of reasoning. This type of pragmatic conditional is, as might be expected, frequently marked for epistemic modality by modal auxiliaries like *may* and *must*, modal adverbs like *surely*, and phrases like ‘it seems likely that’, and ‘it follows that’. Finally, conversational pragmatic conditionals are divided into *discourse conditionals* and *meta-communicative conditionals*, comparable to Dancygier and Sweetser’s distinction between *speech-act* and *metalinguistic conditionals* respectively. Discourse conditionals, like those in (204) and (205) (adapted from Athanasiadou & Dirven, 2000, p. 14; Austin, 1970, pp. 210, 212), involve speech acts or aspects of the discourse ‘such as metalinguistic references’, in which the antecedent ‘tends to be postposed’.

(204) If you’re hungry, there’s food in the fridge. (Athanasiadou & Dirven, 2000, p. 14)

(205) There are biscuits on the sideboard if you want them. (Athanasiadou & Dirven, 2000, p. 15; adapted from Austin, 1970, p. 212)

In this category, the antecedent links the consequent to ‘some or other, usually hearer-oriented, pragmatic factor in the conversation’ (Athanasiadou & Dirven, 2000, p. 13). Characteristics of this category are that resumptive *then* is not used, there are no hypothetical verb forms or changes of tense (but see the discussion on distanced speech-act conditionals in section 3.3.7), no explicit use of performatives (but see Gabrielatos’ remark in section 3.3.4), a variety of speech acts, and a preferred clause order of sentence-initial antecedents. As an indication of the low level of dependency between antecedent and consequent, Athanasiadou and Dirven (2000, p. 15) remark that this type of conditional can be paraphrased as two independent sentences, as in their example in (206), although I note here that question-answer pairs have been linked historically to conditionals before (Cuyper, 2008, p. 294; Traugott, 1985, p. 100; Leuschner & van den Nest, 2015; for a discussion of verb-first conditionals in (fictive) questions, see Pascual, 2014; Leuschner, 2016), and such paraphrases are by no means impossible for other types distinguished by Athanasiadou and Dirven either.

- (206) There are biscuits on the sideboard. You want some? (Athanasiadou & Dirven, 2000, p. 15)

Comrie (1986) groups together all non-directly causal conditional conditionals, while Sweetser (1990) separates what are called logical and conversational by Athanasiadou and Dirven (2000). Athanasiadou and Dirven (2000, p. 3) adopt Comrie’s perspective by proposing the super-ordinate category of pragmatic conditionals, because the types both express a dependency relation between antecedent and consequent that is non-causal, i.e., logical or conversational. Where the antecedents of discourse conditionals contextualise the speech act performed in the consequent and are ‘hearer-oriented’, meta-communicative conditionals point out ‘some aspects of the global communicative act’ and are more ‘speaker-oriented’.³⁸

It is clear that Athanasiadou and Dirven’s classification differs from the accounts discussed in the previous sections. With respect to features, Athanasiadou and Dirven position hypothetical conditionals on their scale of likelihood from ‘potentially real’, to ‘unreal’ as they are marked by means of verb tense and modal verbs, which we have seen in the other classifications as well. Course-of-event conditionals are not marked for hypotheticality and frequently have simple (present or past) tense in both clauses without overt marking of likelihood, although modals like *can* and *may* are suggested to be viable in this type of conditionals, especially in what they call ‘instructive conditionals’. This means that not only occurrence of modals is of importance to the type of connection implicated, but also the type of modality (see section 5.5). Within the category of pragmatic conditionals, logical (identifying, inferencing) conditionals are linked to high frequencies of sentence-initial

³⁸See Athanasiadou and Dirven (2000, pp. 18–20) for the sub-types of meta-pragmatic, metalinguistic, and restrictive pragmatic conditionals, which, for reasons of space and relevance, are omitted here.

antecedents and the use of *then* to explicitly mark the inference chain from argument to conclusion, possibly in combination with modal auxiliaries like *must*. Conversational pragmatic conditionals on the other hand frequently feature sentence-final antecedents, cannot, according to Athanasiadou and Dirven be used with *then*, and, at large, and have present tense in both clauses, whereas this is less restricted in logical pragmatic conditionals. This classification thus reinforces the importance of the previously mentioned features of verb tense, clause order, resumptive *then*, and marking and type of modality.

3.3.10 Event and premise conditionals

Haegeman (2003) analyses conditionals from a syntactic perspective (in a ‘broadly generative framework’) and argues for two types of conditionals in terms of embedding, namely *event conditionals*, in which the conditional clause affects the event expressed in the main clause and is inserted inside the matrix domain, while in *premise conditionals*, the conditional clause is attached outside the matrix domain. The distinction between *event* and *premise conditionals* is, as can be seen in her examples in (207)–(208), not comparable to the direct-indirect distinction by, among others, Quirk et al. (1985) (see section 3.2), but to the content-epistemic distinction by Dancygier and Sweetser (2005) discussed in section 3.3.7.³⁹

(207) If it rains we will all get terribly wet and miserable. (Haegeman, 2003, p. 317)

(208) If [as you say] it is going to rain this afternoon, why don’t we just stay at home and watch a video? (Haegeman, 2003, p. 317)

In the event conditional in (207), the antecedent is related to the event structure, while in the premise conditional in (208), the antecedent is related to the discourse structure. According to Haegeman (2003, p. 320) antecedents of event conditionals express a cause that leads to the effect expressed in the consequent. In premise conditionals, on the other hand, the antecedent ‘makes manifest’ a context for the consequent. Haegeman (2003, p. 318) argues that these types not only differ in their interpretation, but also in terms (‘internal and external’) syntax.

Syntactic properties related to event conditionals but not premise conditionals are that the time reference of the conditional clause is determined by the time reference in the matrix clause (‘*will* deletion’ cf. Jespersen, 1940; Palmer, 1974). In premise conditionals, future time is expressed independently in the antecedent, as in (209) below.

(209) If I’m no longer going to be arrested for possessing cannabis for my own consumption (Cannabis laws eased in drugs policy shake-up, October 24), shouldn’t I be able to grow my own? [...] (Haegeman, 2003, p. 321)

³⁹For clarification, the event-premise distinction thus also does not resemble Quirk et al.’s distinction between conditional adjuncts and disjuncts respectively.

Antecedents of event conditionals can appear in the scope of the adverbial adjuncts in the matrix clause, as in (210), while this is not possible for premise conditionals, as in (211).

- (210) John *sometimes* works best if there is a lot of pressure. (Haegeman, 2003, p. 321)

- (211) If John lives in Rome, he *probably* never uses his bike. (Haegeman, 2003, p. 322)

In (210), *probably* scopes over the antecedent, but this is not the case in (211). Whereas (210) may be paraphrased as ‘It is sometimes the case that John works best if there is a lot of pressure’ (note that this wide-scope reading of (210) is less likely with a sentence-initial antecedent), (211) cannot be paraphrased as ‘It is probably the case that if John lives in Rome, he never uses his bike’. In the same vein, focus markers, such as *only* in (212), can scope over antecedents of event conditionals, but not over antecedents of premise conditionals, as can be seen in (213).

- (212) John will only finish the book if there is a lot of PRESSURE on him. (‘only if’) (Haegeman, 2003, p. 322)

- (213) John will only finish the BOOK, if there is already such a lot of pressure on him. (i.e., ‘he won’t finish anything else’) (Haegeman, 2003, p. 323)

Pronouns in antecedents of event conditionals can be in the scope of a quantifier in the consequent, as in (214), in which *he* is bound to *no one*, while pronouns in antecedents of premise conditionals are not, as can be seen in (215), in which *he* is not bound by *no one*.

- (214) *No one* will answer the phone if *he* thinks it’s his supervisor. (Haegeman, 2003, p. 323)

- (215) Why does *no one* answer the phone, if *he* probably thinks it’s *his* supervisor? (Haegeman, 2003, p. 323)

Furthermore, event conditionals can be clefted, while premise conditionals cannot, as can be seen in the examples below.

- (216) It is (only) if he takes more exercise that John will get fitter. (Haegeman, 2003, p. 323)

- (217) * It is only if there is already such a lot of pressure on him now, that John will finish the book. (Haegeman, 2003, p. 323)

With respect to the integration of the antecedent in the domain of the consequent (their ‘external syntax’), VP substitution is possible in event conditionals but not in premise conditionals, as can be seen in (218) and (219).

- (218) If his paper is accepted, John will go to the conference and so will Mary.
- (219) If his children aren't in the garden, John will already have left home, and so will Mary.

The ellipsis in the consequent of (218) ('so will Mary') allows for a so-called 'sloppy identity' reading of *his*, meaning that *his* in (218) may 'be interpreted as either 'Mary will go to the conference if *John's paper* is accepted' or 'Mary will go to the conference if *her paper* is accepted'. This is not possible in the premise conditional in (219), which cannot be interpreted as 'If his children aren't in the garden, John will already have left home and if her children aren't in the garden, Mary will already have left home'. In other words, a sloppy interpretation is not available and *his* in this premise conditional can only refer to John's children (see Haegeman, 2012, p. 171).

As this discussion shows, Haegeman (2003) does not intend to offer a full classification of conditional connections, but focuses on the syntactic differences between what she calls *event* and *premise conditionals*, coinciding with the aforementioned *content* or *predictive* conditionals and all kinds of *non-predictive conditionals*. The reason I discuss this account to some detail here is that Haegeman (2003) points towards a number of grammatical features that may help determine the connection between the antecedent and consequent. First, there is the difference in time-reference between the two types. Time-reference of the antecedent is determined by the consequent in event conditionals, whereas it is not in other types of conditionals, so antecedents of event conditionals typically do not feature *will* while referring to future scenarios. The future reading of the antecedent is carried over from the consequent. This points, again, to verb tense and modal auxiliaries as relevant features. Scoping of adverbial adjuncts and pronouns in consequents over antecedents in event conditionals, but not in premise conditionals is not a feature directly observable in large corpus data, and it will not be used further. Haegeman (2003) does point towards another feature, namely *focus markers*, such as *only* and *even*, which scope over antecedents in predictive conditionals only. As such focus markers (or *focus particles*, see section 5.10) may be helpful in distinguishing between types of conditional connections, they will be added as a feature of interest.

3.3.11 Case-specifying and rhetorical conditionals

Next to the possible-worlds account by Declerck and Reed discussed in section 3.2.8, which focused mainly on implicatures of unassertiveness, Declerck and Reed (2001, p. 47) offer a 'typology of case-specifying *P*-clauses', which takes as main parameter *case-specification*, resulting in a distinction between *case-specifying* and *rhetorical* or *non-case-specifying conditionals*.

In *case-specifying-P conditionals*, the antecedent specifies in which cases q is valid. These conditionals come in various sub-types: *actualising*, *inferential* and *purely case-specifying conditionals*, as in the examples in (220) to (222) respectively.

- (220) If the enemy attacks, we will defend ourselves. (Declerck & Reed, 2001, p. 278)
- (221) If it wasn't Greene who wrote Bruno's Dream, it was/must have been Murdoch. (Declerck & Reed, 2001, p. 284)
- (222) (hospital regulation) If you're wearing your own nightie, wear a short-sleeved one. (Declerck & Reed, 2001, p. 304)

Actualizing-P conditionals as in (220) express a condition for the actualisation of q . This type coincides with the strongest type of direct conditionals, i.e., predictive conditionals in Dancygier and Sweetser's account (see section 3.3.7) and the causal sub-type of hypothetical conditionals in Athanasiadou and Dirven's account (see section 3.3.9). Other types of *actualizing-P conditionals* are *preclusive* (p prevents q), *actualization-licensing* (i.e., van der Auwera's *enablement*, see section 3.3.7), *non-preclusive conditionals* (concessive preclusion), and *in case-conditionals*, as in (223) to (226) respectively.

- (223) If it freezes, the contest will not be cancelled. (Declerck & Reed, 2001, p. 278)
- (224) I could open the door if I had the key. (Declerck & Reed, 2001, p. 280)
- (225) Even if it rains, we'll go to the seaside. (Declerck & Reed, 2001, p. 281)
- (226) I always carried an umbrella in case it rained (but it never did). (Declerck & Reed, 2001, p. 282)
- (227) I'll drop in and see you at 10 tonight, if you will be alone. (Declerck & Reed, 2001, p. 283)

In (223), the antecedent triggers the 'non-actualisation' of q . Here, the question rises whether this is not 'just' an *actualising-P conditional* with negation, as there seem to be no meaning that cannot be attributed compositionally to these two phenomena. However, it does point towards negation as an important feature. The *actualisation-licensing conditional* in (224) resembles what Sweetser (1990) and van der Auwera (1986) call *enablement* rather than causation, i.e., p does not cause q , but enables it. In *non-preclusive-P conditionals*, as in (225), q actualises in spite of p , i.e., this is a concessive conditional, which, in this case, is marked by the focus particle *even*. In (226), the anticipated possibility of the actualisation of p triggers q , rather than the actualisation of p itself. Finally, in (227), the sentence-final antecedent adds an "a posteriori" condition' (cf. Declerck & Reed, 2001, p. 283) to the consequent, and can only occur in sentence-final position.

The *inferential* sub-type of *case-specifying conditionals* implicates a connection of reasoning from antecedent to consequent. Declerck and Reed (2001, p. 285) argue that this type *presupposes* the truth of *p*, but I will use the term *implicate* for reasons discussed in section 2.5. In *direct inferentials*, as in (221) above, the inference goes directly from the antecedent, expressing the premise, to consequent, expressing the conclusion, and *p* forms a necessary and sufficient condition for *q*. This type is comparable to Johnson-Laird's *completely-determinate conditionals* (see section 3.3.5, see also the 'ideal type' discussed by Gildersleeve (1882; see section 3.2.3)). This type is often used with epistemic modals such as *must*, as was also observed by, amongst others, Dancygier (1998) (see section 3.3.7). In *inferential bridges*, as in (228) below, there is a 'missing step' (Declerck & Reed, 2001, p. 290) in the inference from *p* to *q*.

- (228) If today's Tuesday, you need your hat. (Declerck & Reed, 2001, p. 290)

Contrary to *direct inferentials*, *p* is neither a necessary, nor a sufficient condition for *q*, i.e., other conditions than the one expressed are involved (see also Johnson-Laird's *partially determinate conditionals* in section 3.3.5). In *non-standard direct inferentials* *p* is neither necessary nor sufficient for concluding *q* and this can be highlighted by the use of the focus particles, such as *especially* in (229), which, according to Declerck and Reed (2001, p. 433), 'block[s] the necessity implicature'.

- (229) An amateur video poses fewer problems, especially if it is done in addition to professional photographs. (Declerck & Reed, 2001, p. 294)

In *indirect inferentials*, the inference goes from *q* to *p*, instead of from *p* to *q*, as in (230), a well-known example of Dutchman-conditionals (or *Dracula, rhetorical, ad absurdum conditionals*; see sections 3.2.8 and 3.3.4, and see Verbrugge and Smessaert, 2010, pp. 342–344 for a detailed analysis).

- (230) If he passed his exam, I'm a Dutchman. (Declerck & Reed, 2001, p. 296; adapted from Strawson, 1952, p. 89)

Despite the Dutchman, Dracula and Pope examples in the literature, Declerck and Reed (2001, p. 301) remark that indirect inferentials need not be *ad absurdum* conditionals, but can also be licensed by the 'counterfactual verb form of the Q-clause', as in their example in (231).

- (231) If my mother-in-law was coming tomorrow, I would be busy cleaning the house from top to bottom. (Declerck & Reed, 2001, p. 301)

The same operation is at work here. The consequent may not be absurd, but is implicated to be false. From the falsehood of *q*, the falsehood of *p* is inferred.

Purely case-specifying conditionals 'just specify[...] the case(s) in which (or the circumstances under which) the Q-situation actualises, or the cases in which Q is true' (Declerck & Reed, 2001, p. 304). According to Declerck and Reed, *if* in these cases can be substituted with *when*, as in (232) below.

- (232) {When/If} you come to think of it, there's a lot of truth in what he says.
(Declerck & Reed, 2001, p. 304)

This type is limited with respect to the use of *then* (Declerck & Reed, 2001, p. 306), as can be seen in (233).

- (233) {If/When} you travel to Calcutta, (*then) there is an awful lot of poverty.
(Declerck & Reed, 2001, p. 306)

Within the category of *purely case-specifying conditionals*, there are cases in which the antecedent specifies the circumstances under which the *q* actualises. In (234), the antecedent specifies in which cases *q* is true, or the antecedent identifies a set, as in (235).

- (234) Supplemental vitamins are helpful if there is a dietary deficiency [...].
(Declerck & Reed, 2001, p. 305)

- (235) A car is little use if its brakes won't work. (Declerck & Reed, 2001, p. 309)

The *set-identifying* type of case-specifying-P conditional in (235) specifies the relevant cases through the restriction of a set referred to in the consequent, i.e., restricting the set of 'cars that are of little use' to those with dysfunctional brakes. This type seems to be related to the implicit conditional construction Audring (2016) illustrates with the example adapted in (236) below, which also have a set-identifying function, albeit much more specific.

- (236) The only good Indian is a dead Indian. (Audring, 2016, p. 16)

In this type of conditional, *if* can be replaced with 'atemporal or restrictive *when*' (see for references Declerck & Reed, 2001, p. 310). It usually features a sentence-final *if*-clause and has to be 'unbounded', meaning that the reference in the antecedent cannot be specific. Declerck and Reed (2001, p. 312) also point towards (lexical) aspect (which we will discuss in chapter 5) as a factor of influence on the connection between antecedents and consequents, as *set-identifying conditionals* mostly feature antecedents which express states (i.e., 'habitual characteristics') and they have an 'unbounded' noun phrase in the antecedent referring to a noun phrase in the consequent.

Conditionals that are not case-specifying are *rhetorical conditionals*, which are described by Declerck and Reed (2001, p. 319) as conditionals that feature 'a particular rhetorical function of the *P*-clause or *Q*-clause'. Contrary to what the notion of the *rhetorical conditional* amounts to in most other accounts discussed, in Declerck and Reed's account it is an umbrella term comprising multiple sub-types of non-case-specifying conditionals (see Declerck & Reed, 2001, p. 363). The first sub-type is the *utterance conditional*, which specifies the cases in which the uttering of the consequent is meaningful, as in (237) and (238) below. The example in (237) is a clear case of what is generally understood to be a pragmatic or speech-act conditional, in which the antecedent addresses

a felicity condition of the speech act performed by means of the consequent. In (238) the antecedent concerns the object of evaluation in the consequent (for numerous subtypes, see Declerck & Reed, 2001, pp. 321–330).

- (237) If you're hungry, there's a pie in the fridge. [...] (Declerck & Reed, 2001, p. 321)
- (238) [...] If this is the famous Mona Lisa, it's not half as good as everybody says. [...] (Declerck & Reed, 2001, p. 329)

In *comparing conditionals*, the antecedent merely introduces the ground for its comparison to the consequent, as in the similarity-based comparison in (239), or the gradation-expressing comparison in (240).

- (239) If your sister is clever, so is mine. (Declerck & Reed, 2001, p. 330)
- (240) If you think Pete's children are badly behaved, you should see Diana's twins. (Declerck & Reed, 2001, p. 333)

This subtype has sentence-initial antecedents mainly. In contrast, consequents of *commenting-q conditionals* have to be in sentence-final position, because the antecedent expresses a comment on the contents of the consequent or the conditions for uttering it (cf. Declerck & Reed, 2001, pp. 340, 353), as in the 'downtoning' example in (241), or the *metalinguistic* example in (242).

- (241) There will only be two or three people there, if any at all. (Declerck & Reed, 2001, p. 340)
- (242) He is a true yuppie, if that word is still used. (Declerck & Reed, 2001, p. 353)

The last type of rhetorical conditionals is the *pseudo-implicative conditional*, which mimics direct inferentials, as in (243), by licensing the addressee to infer from the truth of the protasis the truth of the apodosis, here 'I may spit on the floor'.

- (243) If you spit on the floor in your own house, you may do it here. [...] (Declerck & Reed, 2001, p. 358)

However, Declerck and Reed argue this to be a 'pseudo-implicative conditional', because the inferential chain is used in combination with irony by presenting a proposition *p* that is clearly false. In this sense, this type also resembles rhetorical conditionals, by using the falsity of one proposition to implicate the falsity of the other. Finally, in *pleonastic conditionals* the consequent is a repetition of the protasis, as in (244).

- (244) "I can't reach him. He must have switched off his mobile phone." – "Well, if you can't reach him, you can't reach him. Try again tomorrow." (Declerck & Reed, 2001, p. 359)

In most cases, the consequent is echoic. According to Declerck and Reed (2001, p. 360), this type is used to ‘convey the message that the speaker accepts what she considers as an inescapable fact’. For Dutch, this type has been noticed by Renkema (2016) as one form of expression of what he calls the ‘basta function’, i.e., an expression to end (a part of) a conversation, as can be seen in his example in (245).⁴⁰

- (245) Als de colleges in het Engels moeten worden gegeven, moeten ze in het Engels worden gegeven. (Renkema, 2016)
If the classes must be taught in English, they must be taught in English.

In this section, I discussed the second detailed account of conditionals by Declerck and Reed. As Mauck and Portner (2006, p. 1330) remark, their work is of high interest because of its empirical nature and the large number of examples. The benefit of their analysis can clearly be seen in level of detail in, for instance, the diverse set of non-case-specifying conditionals, as the sub-types characterise a heterogeneous collection of conditionals that occur in natural language, but are hard to categorise in more top-down classifications. The downside of this is that the various types are not logically and/or explicitly linked to each other, resulting in a typology that is exhaustive, but does not lend itself easily to generalisations – one of the major benefits of classifications (see Dancygier, 2003, p. 322; see also Croft, 2001, pp. 31–32 on ‘splitting’ and ‘lumping’ approaches to categorisation, and see chapter 6.) Declerck and Reed’s account does provide a number of features relevant to this study. While most types of conditionals have simple present in both clauses, and tense is used to express epistemic distance, other features are more clearly linked to (sub) types of conditionals, such as *relevance conditionals*, which cannot feature *then* (Declerck & Reed, 2001, p. 364),⁴¹ negation in *preclusive-P conditionals* (Declerck & Reed, 2001, pp. 279–280), the use of focus particles, such as *even* in *non-preclusive-P conditionals* (Declerck & Reed, 2001, pp. 280–281), and the sentence-final position of antecedents in *restrictive postscript-P-conditionals* (Declerck & Reed, 2001, p. 283). *Inferential conditionals* are frequently marked by epistemic modal verbs, and *purely case-specifying conditionals* are limited with respect to the use of *then* (Declerck & Reed, 2001, p. 306), as are several sub-types of rhetorical conditionals Declerck and Reed (2001, p. 364). Most *rhetorical conditionals* have simple present in both clauses, pointing towards verb tense as a feature of influence on implicatures of connectedness. In *commenting-Q conditionals*, clause order is restricted to sentence-final antecedents, as their consequents comment on the topic expressed in the antecedent (Declerck & Reed, 2001, pp. 329–330). *Comparing conditionals*, on the other hand, mainly have sentence-initial antecedents. A feature not yet seen in the accounts discussed in this chapter is aspect, which, according to

⁴⁰What is unclear, is why this type is termed ‘pleonastic’ by Declerck and Reed. In line with Renkema’s observations, I think it more fitting to speak of tautological than of pleonastic.

⁴¹For exceptions, see Declerck and Reed (2001, p. 322).

Declerck and Reed (2001, p. 312), is related to the connection between antecedents and consequents in *set-identifying conditionals*, which mostly feature antecedents that express states. Declerck and Reed (2001, p. 365) also observe that relevance conditionals in Dutch and German do not feature inversion of subject and finite verb in the consequent, in contrast to conditionals with a more direct connection between antecedent and consequent (i.e., Declerck and Reed's *case-specifying conditionals*). As this is highly relevant for this study, I will discuss this feature in greater detail in chapter 5 in terms of syntactic integration patterns.

3.3.12 Conclusion

The accounts discussed in this section all distinguish types of conditionals based on different connections between antecedents and consequents. What we saw in this section in general is that the difference between *direct* (performance, content, hypothetical) and *indirect* (decision, telling, speech-act, free, pragmatic, rhetorical) conditionals is present in each of the classifications, albeit phrased and analysed in different terms. In most (not all) accounts, direct conditionals are sub-divided into *causal* and *inferential* (epistemic, knowledge, logic) conditionals. *Indirect conditionals* are subdivided into several pragmatic categories (most often having to do with different politeness strategies), such as *decision*, *politeness*, *uncertainty* and *metalinguistic conditionals*.

The goal of this section was not only to inventory which specific implicatures of the connectedness in conditionals are distinguished in the literature, but also, in line with section 3.2, to gather the grammatical features to which the implicatures are related in the respective accounts, in order to test to what extent certain uses of conditionals in Dutch have separate constructional status. First, reminiscent of the accounts in 3.2, we have seen non-present verb tense and modal verbs as means of licensing implicatures of epistemic distance, which are less common in indirect conditionals. Epistemic use of the modal verb *must* is linked to *epistemic* or *inferential conditionals* in several accounts, and, as with non-present tense, indirect conditionals are linked to the absence of such modal marking. Next, we saw mention of syntactic integration and especially the role of resumptive *then* in licensing bi-conditional implicatures and in distinguishing between predictive and epistemic or inferential conditionals. Clause order is related to the direct-indirect distinction mostly, in the sense that direct conditionals, especially those involving causality, favour iconic clause order. Also related to this distinction is the sentence type of the consequent, because consequents that are not declarative appear often in indirect conditionals, such as conditional questions. Then, a number of accounts discussed in this section address focus particles, because adverbs like *even* and *only* affect the relation between antecedents and consequents. *Negation* is another feature mentioned, but as we will see in the next chapter, most literature focuses on negation of conditionals, not *in* conditionals. Nevertheless, it plays an important role in terms of *polarity*. Aspect also plays a role, mainly in distinguishing so-called

set-identifying conditionals. Finally, although it is not mentioned as such in the accounts discussed, it is noticeable that most examples of indirect conditionals feature first- and second-person subjects, which is, given the function of these conditionals, not surprising, but may point to another feature influencing how conditionals are interpreted as a whole. Therefore, it is added to the corpus study as a potentially relevant feature.

Although this summary only provides a very rough sketch of this section, we have seen that most accounts of conditionals dealing with implicatures of connectedness distinguish between direct and indirect conditionals, and suggest several grammatical features to be associated with those types and their subtypes. Before setting up the corpus study and systematically investigating these features in Dutch, I will offer a conclusion to this chapter in the next section.

3.4 Conclusion

The first aim of this chapter was to explore which types of conditionals are distinguished in the literature with respect to the two meaning aspects of conditionals argued for in chapter 2. In that chapter, I argued for the unassertiveness and connectedness of conditionals (see sections 2.5 and 2.6 respectively), which both are non-truth-conditional meanings of conditionals, licensing, together with grammatical features and context, further conversational implicatures to specify the type of unassertiveness and connectedness. Speaking very broadly, we have seen implicatures of unassertiveness of the neutral and non-neutral kind (e.g., implicatures of factuality, uncertainty, counterfactuality), and implicatures of connectedness of the direct and indirect kind (e.g., implicatures of causality, reasoning, speech-act relations).

The second aim of this chapter was to inventory the grammatical features that may license the conversational implicatures mentioned above. Implicatures of unassertiveness seem related most strongly to verb tense and the use of modal auxiliaries and adverbs (i.e., modal marking), although there is ample debate on the ambiguity of tense as referring to either a temporal or a modal dimension. Implicatures of connectedness seem to have a weaker link to specific features, although we have seen the influence of verb tense and modal marking, complemented by the features clause order, syntactic integration, negation, sentence type, (lexical) aspect, and the use of focus particles, such as *even* and *only*. One important note on the issue of grammatical features and their relation to implicatures is language specificity. Most classifications discussed in this chapter concern English conditionals, and it is not given that these features are related to types of unassertiveness and types of connections in the same way. Therefore, I will discuss this issue explicitly in the next chapter (see section 4.4), and in the final discussion in chapter 7.

Before moving on, I would like to emphasise here that I consider the specific types of unassertiveness and connectedness to be *conversational* implicatures. This means that it is not expected that any of the grammatical features men-

tioned fully determine these implicatures. Even the most promising predictor in English conditionals, the occurrence of *will* in the consequent, can occur in several types, as we have seen throughout this chapter. One could argue that *will* may express something else in different conditionals, but the point is that one cannot easily device a rule by which the different categories can be neatly distinguished. Therefore, I do not agree with Dancygier and Sweetser (2005, pp. 23–24) who argue against a more statistical approach to conditional constructions on the basis of linguistic features. While I do agree with them that careful examination of conditional constructions in their contexts is important for analysis, the fact that no necessary and sufficient criteria can be formulated for the implicatures under discussion asks for a more probabilistic approach.

In the previous chapter, we analysed conditionals in terms of unassertiveness and connectedness, and in this chapter, we looked at the more specific implicatures that are distinguished in the literature. I also inventoried to which grammatical features of conditionals these implicatures are linked in the literature. The next step is to test to what extent these features can be systematically linked to types of conditionals, i.e., to specific implicatures of unassertiveness and connectedness. In other words, we want to test to what extent different types of conditionals form a network of constructions (form-meaning pairings), taking seriously for instance Dancygier's (1998, pp. 14, 184–185) remarks on *if* being a conjunction as part of a larger construction, rather than the sole element responsible for all conditional meaning. To do so, all features will be discussed in isolation in chapter 5, and in combination in chapter 6, but before doing so, in chapter 4, I will present the necessary data selection, annotation and analysis.

CHAPTER 4

Data selection and methodology

4.1 Introduction

In chapter 2, I argued for two conventional meanings of conditionals, namely their unassertiveness and its connectedness. I also argued the specification of these two meanings of conditionals into, for instance, uncertainty about p expressed in the antecedent, and a causal connection between p and q , to be conversational implicatures. In chapter 3, I reviewed existing classifications of types of conditionals, and from these accounts, linguistic features related to further implicatures of unassertiveness and connectedness were inventoried. In this chapter, I present the setup of the corpus study intended to address the relation between the aforementioned implicatures and grammatical features of conditionals.

The main aim of this chapter is to present the necessary preliminaries concerning the corpus study, so that detailed analyses can be provided in the next two chapters. We will discuss why a corpus study is an appropriate and promising methodology for the research questions presented in section 2.7. Although we have answered the first question in part, namely what specific implicatures are licensed through the conventional meanings of unassertiveness and the connectedness in conditionals, this was done solely based on existing and mostly theoretically motivated accounts. As the second research question specifically addresses the influence of grammatical features on these implicatures, it may seem the most direct and suiting approach to annotate (a selection of) types from these accounts in a corpus of natural language, together with the suggested grammatical features, and then assessing the predictive power of those

features for the types in each classification (see section 4.3). Such an approach, however, makes an important preliminary assumption: types (and features) must be reliably annotated for the analysis to succeed. Suggestions in the literature, however, indicate this is not self-evidently the case. Before any further steps were taken, therefore, an experiment was carried out to assess the reliability of applying the classifications of conditionals to actual language usage data. After reporting on this experiment, this chapter will lay the foundations for a corpus-based approach to the implicatures discussed in chapter 2. This paves the way for attempting to answer the second question, which concerns the extent to which the grammar conditional constructions licenses specific implicatures. Addressing methodological details will, of course, not address these questions directly, but it will guide the reader through some important preliminaries before the results in the next chapters can be presented and evaluated.

In section 4.2, I will present the results of an experiment in which the reliability of classification of conditionals in corpus data was evaluated. Then, in section 4.3, I will present arguments for a corpus-based study of conditionals in light of the framework of construction grammar, I motivate the current corpus-based approach, and I will discuss the focus on conditionals in a specific language (Dutch). In section 4.4, the data collection and the measures taken to arrive at a representative and balanced corpus of conditionals are presented. Next, in section 4.5, I will discuss the annotation of features and its reliability. In section 4.6, I will introduce the statistical procedures for the quantitative analyses applied to the data, of which the results will be reported in the next chapters. Finally, in section 4.7, I will draw a brief conclusion, before moving on to the next chapter, in which the distributions of the grammatical features of conditionals will be presented and discussed extensively.

4.2 Reliability of classification

4.2.1 Introduction

In various corpus studies on conditionals, existing top-down (deductive) classifications have been criticised for being too detached from actual language use (see e.g., Carter-Thomas & Rowley-Jolivet, 2008), or for being too dependent on contextual interpretation (see e.g., Ferguson, 2001). This criticism has led to several smaller-scale bottom-up (inductive) classifications, which better suit the data under investigation, but prohibit more general conclusions and replication. Claims such as the one by Dancygier and Sweetser (2005, p. 137) in which they remark that frequencies of different types of conditionals ‘vary radically depending on the subject matter and the speaker’s or author’s goals’ can only be tested properly if there is a reliable way of identifying such types in different datasets. On a related note, Verhagen (forthcoming) remarks that scholars analysing texts in detail, ‘over and over again feel a need to define the categories anew, draw the boundaries somewhat differently than predecessors,

add other categories or distinguish subcategories [...].’ Whereas this passage may be read as a warning against the temptation of devising yet another classification of, in this case, conditionals, it also warns against the risks of applying theoretically motivated categories to language data, or applying categories constructed based on one data set onto another data set. This may indeed result in new categories and shifting boundaries, because such a deductive approach projects predefined categories onto the data (this issue is discussed extensively in the literature on framing analysis; see e.g., van Gorp, 2007, p. 72; Dirikx & Gelders, 2010, p. 733).

The aim of this section is to address the reliability of annotation of types of conditionals in natural language corpora as a preliminary for further steps in this study. In this section, therefore, I discuss an experiment reported on by Reuneker (2017a) in which the reliability of applying three classifications discussed in the previous chapter was critically assessed. Next to presenting the experiment and its results, I will discuss the implications not only for this study, but also for future research involving the classification of natural-language data.¹

In section 4.2.2, I will discuss the evaluation of inter-annotator reliability, focusing on corpus studies of conditionals and related topics. Next, in section 4.2.3, I will present the data and method used in the experiment, and in section 4.2.4, the results be presented. In section 4.2.5 I will draw conclusions, before moving on to the corpus setup for the subsequent steps in this study.

4.2.2 Evaluating reliability

As a number of authors note, the application of classifications to natural (language) data is not only a time-consuming and challenging, but also an important measure of its validity (see e.g., Artstein & Poesio, 2008, p. 557; Bolognesi, Pilgram & van den Heerik, 2017, pp. 1985, 1988).² As a preliminary test for further data analysis in this study, Reuneker (2017a) therefore subjected the classifications by Quirk et al. (1985), Dancygier and Sweetser (2005), and Athanasiadou and Dirven (1997a) to an experiment on annotation reliability.³

Although Athanasiadou and Dirven present their classification in terms of prototype theory, as does Dancygier (1998), they ultimately classify each conditional sentence as one type. Sweetser (1990, pp. 124–125) explicitly mentions

¹Next to the question concerning the reliability of classifications, the study by Reuneker (2017a) serves as a methodological case study for comparing reliability measures between different classifications by introducing ways of in-depth comparison based on combinatorial agreement-distributions. These issues will largely be ignored here due to restrictions of space.

²See also Levshina and Degand (2017, p. 146), who propose to deal with the ‘high cost of manual annotation of discourse connectives’ by using automatic annotation of lower-level (‘semantic and syntactic’) features for pre-annotation of coherence relations, after which these annotation should be verified and corrected by manual analysis.

³For details on these classifications, see sections 3.3.4, 3.3.7 and 3.3.9 respectively. For reasons of space, the overviews of these classifications will not be repeated here.

the problem of ambiguity for her analysis of conditionals in the content, epistemic and speech-act domain (see section 3.3.7): ‘A given example may be ambiguous between interpretations in two different domains, [...], but no one interpretation of an *if-then* sentence [...] simultaneously expresses conditionality in more than one domain’. This shows that the authors implicitly strive for mutually exclusive types, contrary to prototype categories, which can have ‘fuzzy boundaries’ (cf. Taylor, 2003, p. 51). In the previous chapters, we also saw numerous examples of ambiguity between, for instance, specific and general conditionals, past tense marking temporal or epistemic distance and problems alike. This means that, in annotation, in such cases a choice must be made, because the form of an utterance does not fully determine the intended meaning.

As we saw in chapter 3, various classifications of the same phenomenon are offered in the literature. Although the terminology differs, in a number of cases, these classifications classify conditionals in a highly similar way. Comparing the classifications reveals, however, that there is no one-to-one relation between the types and sub-types in the various accounts. Whereas the example in (1) would be consistently classified as an indirect, pragmatic or speech-act conditional in the classifications by Quirk et al., Dancygier and Sweetser, and Athanasiadou and Dirven respectively, an example such as in (2) would not.

(1) So: if you’re interested and you don’t have any plans yet, the Dutch Philharmonic Orchestra plays Tchaikovsky tonight.

(2) If that’s art, then I’m an artist too!

Quirk et al. (1985, p. 1094) distinguish a rhetorical type of conditional for the example in (2), whereas Athanasiadou and Dirven (1997a) would classify this example as a subtype of pragmatic conditionals. As Quirk et al. (1985) place rhetorical conditionals outside their direct-indirect distinction, and pragmatic conditionals would fall inside the indirect class, this amounts to an inconsistency between classifications. Dancygier and Sweetser (2005) do not analyse rhetorical conditionals as a separate type, but the example satisfies the criteria of epistemic conditionals, because the falsity of the antecedent licenses the conclusion in the consequent, albeit indirect through the projection of falsity from the consequent. Epistemic conditionals are a sub-type of non-predictive conditionals, however, while they are direct conditionals in Quirk et al.’s (1985, p. 1091) account and a subtype of either course-of-event or pragmatic conditionals in Athanasiadou and Dirven’s account. Such discrepancies between classifications are, in themselves, not problematic. As long as classifications are viewed as artificial constructs rather than reflections of natural systems (Sandri, 1969, pp. 86–87), different perspectives and organisations can co-exist. Although this view shifts the question from ‘Which classification is right?’ to ‘Which classification is able to explain the data best and most efficiently?’, preliminary to both questions, however, is the question of reliability: ‘To what extent are raters able to apply classifications consistently to real data?’.

Spooren and Degand (2010, p. 242) remark that ‘there is presently no tradition in the field of corpus-based discourse studies to report agreement measures’, which may, in part, be due to low agreement scores reported in studies that do (see also Mulken & Schellens, 2012, p. 43; Neuendorf, 2017, chapter 6). While recent research on, for instance, coherence relations does show an increasing number of studies explicitly addressing the question of inter-annotator agreement (see e.g., Rehbein, Scholman & Demberg, 2016; Bolognesi, Pilgram & van den Heerik, 2017; Prasad et al., 2017; Levshina & Degand, 2017; Hoek, 2018; Hoek, Evers-Vermeul & Sanders, 2019), Spooren and Degand’s remark clearly applies to the literature on conditionals. In discussing their corpus annotation, Renmans and van Belle (2003, p. 152) remark that ‘obviously, there are still no reliable, let alone objective ways to identify the underlying semantico-pragmatic reading of a certain conditional sentence, the classification was to a large extent based on personal interpretation and accordingly, could have been subject to human error’. Most studies are not as explicit on this issue, however. Athanasiadou and Dirven, for instance, provide frequencies of attested types, but do not mention how these results were obtained and whether or not the annotations were evaluated in terms of reliability. Dancygier and Sweetser use examples from corpora, but no frequencies, nor reliability measures are provided. Reliability is, however, a prerequisite for the demonstration of validity of a classification scheme, i.e., showing ‘that the coding scheme captures the “truth” of the phenomenon being studied’ (Artstein & Poesio, 2008, p. 557). Low reliability scores signal a problem, as they indicate that ‘the theoretical categories cannot be applied with any confidence’ (Spooren, 2004), and that types in classifications are ‘vague, in the sense that categorisations are non-replicable, and consequently unfit as a basis for theory building’ (Spooren & Degand, 2010, p. 242).

Contrary to its relative absence from the literature on conditionals, the issue of reliability is of major importance to the study of conditionals, as the assignment of specific uses to classes of conditionals is, inevitably, based (at least partly) on interpretation. Add to this the observations by Miltsakaki et al. (2004) and (Prasad et al., 2008; see also Hoek, Evers-Vermeul and Sanders, 2019, p. 19) that the annotation of coherence relations marked by explicit connectives results in higher agreement scores than the annotation of implicit relations, and it is clear that the notion of reliability is vital for the study of conditionals in corpora, as it allows for the assessment of the extent to which classification results are ‘independent of the measuring event, instrument or person’ (Kaplan & Goldsen, 1965, p. 83). This is especially relevant for the annotation of types of conditionals in this study, as they are analysed in terms of conversational implicatures (see chapter 2), and as such, they are non-conventional and not or only partly marked for the type of unassertiveness and connectedness. Reliability is understood in this study as the combination of stability (do rater’s judgments remain constant over time?) and replicability (can judgments be reproduced among raters?). As such, it differs from measures of validity, which represent the ‘the extent to which [both] raters classify sub-

jects into their true category’ (Gwet, 2014, p. 314). In the experiment reported on by Reuneker (2017a), both stability and reliability were investigated. We will turn to the data and method briefly in section 4.2.3 below, before moving on to the results and their implications in section 4.2.4.

4.2.3 Data and method

To measure the reliability of applying the aforementioned classifications to natural-language data, an experiment was conducted in which a group of trained students (henceforth: *raters*) classified a set of conditionals from the CONDIV corpus of written Dutch (Deygers et al., 2000) and the CGN corpus of spoken Dutch (Oostdijk, 2000). The experiment followed a within-participants design to control for effects of individual differences in linguistic knowledge and understanding of the materials. The raters were 27 native speakers of Dutch, and students of Linguistics at Leiden University (22 female, 5 male) with an average age of 22.7 years ($sd=5.1$). The raters participated for course credit in a course on corpus linguistics and classification of conditionals. For each classification, the original article or chapter was distributed as part of the course materials. Raters were asked to read the text and classify a set of conditionals accordingly prior to the class in which the classification was discussed. Both the examples provided by the authors and real usage data were used as training material. Examples and counter-examples of types were discussed collectively. A week before the experiment, raters were presented with an overview of the classifications, including criteria for each type (see Appendix E), in order to enable them to evaluate their understanding of the source texts and familiarise themselves with the instructions for the experiment.

The items were Dutch conditional sentences and consisted of 3 practice items to familiarise raters with the task, 14 items from the written corpus, 9 items from the spoken corpus, 8 control items, which were variations on examples from the literature, and 2 test-retest items (for these materials, see Appendix E). All items included one sentence preceding and one sentence following the conditional sentence. The conditional sentence itself was presented in bold. Each rater annotated 33 items according to the three classifications mentioned above. In order to control for memory and practice effects, the order of classifications applied was counterbalanced using a latin-square design. Within each block, the conditionals were presented in random order. Per item, raters chose a type, indicated their confidence on a 5-point Likert-scale, and optionally included a comment. In total, each rater classified 102 sentences.

4.2.4 Results

The first step was to select those raters who were able to correctly apply the classifications. To do so, eight control items were randomly presented in each of the three trials. These control items were based on the aforementioned criteria and the examples provided by the authors of the classifications, and could be

called ‘idealised examples’. No authentic examples by the respective authors were included to avoid memory effects. As the goal of the experiment was to measure the reliability of existing classifications when applied to natural-language data, it was found necessary to control for confounding factors related to participant’s individual abilities. In short, the control items allowed for the qualification of only those raters who were able to correctly classify idealised examples. For the selection procedure described here, a gold standard was available, because the items were specifically designed to belong to specific classes of the classifications. Therefore, not reliability, but validity was calculated for each participant (i.e., how well a rater’s classification judgments confirm to actual values; also called *accuracy*). Validity was calculated by dividing the number of true positives (correct answers) by the total number of classifications made. The results are presented in Table 4.1 below.

Table 4.1:

Validity for control items per classification (before selection, N=27)

Classification	Validity	
	<i>mean</i>	<i>sd</i>
Quirk et al. (1985)	0.84	0.12
Athanasiadou and Dirven (1997a)	0.81	0.17
Dancygier and Sweetser (2005)	0.68	0.16

Instead of using an arbitrary cut-off point or often criticised guidelines for agreement scores such as those offered by Landis and Koch (1977), negative deviation from the mean validity was used. If a rater’s accuracy score was more than one standard deviation lower than the mean (a *z*-score of -1 or less), this was taken to signal an inability to classify idealised examples and, thus, an inadequate understanding of the task. Nine raters were excluded from further analysis. As can be seen in table 4.2, this resulted in higher accuracies and lower deviations.

Table 4.2:

Validity for control items per classification (after selection, N=18)

Classification	Validity	
	<i>mean</i>	<i>sd</i>
Quirk et al.	0.89	0.06
Athanasiadou and Dirven	0.83	0.15
Dancygier and Sweetser	0.75	0.13

Both Table 4.1 and Table 4.2 suggest a difference in validity of ratings between Quirk et al.'s and Athanasiadou and Dirven's classification on the one hand, and Dancygier and Sweetser's classifications on the other. A repeated-measures ANOVA ($F(2,36)=7.58$, $p=0.0018$) confirmed that classification as a factor had a significant effect on accuracy within each participant. A post-hoc test using Bonferroni correction showed that the validity of Dancygier and Sweetser's classification (0.75) differed significantly ($p<0.001$) from those by Quirk et al. (0.89) and Athanasiadou and Dirven (0.83). This shows that participants had more difficulty classifying idealised examples of conditionals when using Dancygier and Sweetser's classification than when using those of Quirk et al. and Athanasiadou and Dirven.

In contrast to the measurement of validity, no gold standard was available for the corpus data, i.e., actual language data do not come with a 'correct label'. Therefore, agreement coefficients in the form of Krippendorff's Alpha (Krippendorff, 2004; Hayes & Krippendorff, 2007) were calculated. Results are presented in table 4.3 below. Note that scores are provided for agreement on the level of main types, and on the level of sub-types, and only for the 18 raters selected in the previous procedure.

Table 4.3:
Agreement for control and corpus items

Classification	Control		Corpus	
	main type	sub-type	main type	sub-type
Quirk et al.	0.87	0.69	0.53	0.41
Athanasiadou and Dirven	0.59	0.45	0.31	0.29
Dancygier and Sweetser	0.55	0.56	0.32	0.28

Note. Agreement scores for both main types and sub-types are reported in terms of Krippendorff's Alpha.

What this table shows, is that the agreement between the 18 raters on corpus items is consistently lower than their agreement on control items.⁴ This shows that judgements were indeed more reliable for idealised examples than for real,

⁴The small and reversed difference between main level and sub-level control items for Dancygier and Sweetser's classification can be explained by the small difference between the occurrence of four categories in the results for main types, and only five categories in the results for sub-types. The reason that this account is not brought down to two categories (i.e., predictive or content and non-predictive) is that studies using Dancygier and Sweetser's classification distinguish mainly between content, epistemic, speech-act and meta-linguistic conditionals, not between predictive and non-predictive conditionals. Further note that Krippendorff's Alpha corrects for the number of categories (see also section 4.5).

attested conditionals.⁵ The agreement on control items ranges between 0.55 and 0.87 and is higher than the agreement on corpus items, which ranges from 0.31 to 0.53. Both on control items and on corpus items, Quirk et al.'s classification results in substantially higher agreement scores than Athanasiadou and Dirven's and Dancygier and Sweetser's. Although these latter two scores are low already, the corpus scores are lower still. What can also be seen, is that, when sub-types are taken into account, the reliability decreases, which is consistent with other observations in the literature (see e.g., Spooren & Degand, 2010; Bolognesi, Pilgram & van den Heerik, 2017, pp. 1993–1994). In the results presented and discussed below, only main types are taken into account.

To allow for a more detailed analysis, a distribution of agreement coefficients was calculated. For all combinations of raters, Krippendorff's Alpha was calculated, resulting in 153 coefficients per classification. A repeated-measures ANOVA showed that the independent variable *classification* had a significant effect on the dependent variable *agreement* ($F(2,453)=37.43$, $p<0.001$). A post-hoc test using Bonferroni correction confirms what Table 4.3 already suggests, namely that the significant difference lies between Quirk et al. (1985) on the one hand and Athanasiadou and Dirven (1997a) and Dancygier and Sweetser (2005) on the other. In other words, raters were more reliable in their application of Quirk et al.'s classification, than in their application of the other two classifications.

Whereas inter-rater reliability is concerned with the agreement between different raters, intra-rater reliability is concerned with the 'self-reproducibility' (Gwet, 2014, p. 200) or 'stability' of classifications, which is also called 'test-retest reliability'. Krippendorff (2004, p. 215) argues that intra-rater reliability is a far weaker measurement of reliability than inter-rater reliability, because it only measures the degree to which classification results can be replicated by one rater, instead of by different raters. However, as, for instance, Verhagen and Mos (2016, p. 336) argue, the processing of linguistic material of an individual may vary between moments, which calls for the measurement of 'individual variation and its underlying dynamics' (see also Dąbrowska, 2014). For a full inquiry into the stability of the application of classifications to natural-language conditionals, the calculation of intra-rater reliability should be based on the same rationale as that of inter-rater reliability, i.e., classifying one item several times into the same class may reflect consistency, but can also be the result of chance (see e.g., Gwet, 2008). As this study's main focus is on inter-rater reliability, the number of test re-test items and the number of iterations was limited to keep the task manageable for raters. Consequently, only percentages of intra-rater agreement per classification could be calculated.⁶ For each classi-

⁵Note the difference between Table 4.1 and Table 4.2, and Table 4.3. In tables 4.1 and 4.2, validity scores are presented, in which no correction for chance agreement is performed, while in Table 4.3, this correction is applied, which results in lower scores due to the distribution of categories and answers.

⁶Keeping in mind the earlier remarks on the use of percentages (see above), these figures must be interpreted with caution.

fication, one item from the spoken corpus and one from the written corpus was adapted to function as a test-retest pair. To rule out possible confounding variables, care was taken to apply changes only on the lexical-semantic level of the utterance, while keeping their syntactic structures constant (see the materials in Appendix E). The results are presented in table 4.4 below. The percentages suggest that rater's judgments are stable, and the fact that the intra-rater reliability scores are high suggests that the low inter-rater agreement scores are not the result of random assignment of conditionals to types.

Table 4.4:
Intra-rater reliability on corpus items

Classification	Agreement
Quirk et al.	91.7
Athanasiadou and Dirven	77.8
Dancygier and Sweetser	91.7

Note. Agreement scores are reported in terms of raw agreement (i.e., percentages).

In addition to the annotation of types of conditionals, raters also reported their confidence in the type chosen on a 5-point Likert-scale (1=very uncertain; 5=very certain). There proved to be a correlation between inter-rater agreement and confidence (*Pearson's* $r(16)=0.73$, $p<0.05$), meaning that items that reached low agreement (closer to 0.0 agreement) were found harder to classify by raters (closer to 1 on the confidence scale). This suggests that raters were aware that certain items were harder to classify than others.

While the data presented so far allow for a straight-forward comparison of agreement scores, they do not provide a detailed picture of agreement on item level (i.e., per conditional), because the agreement scores compress a multitude of ratings into a single figure. These results, therefore, cannot be used directly for more detailed analyses, such as an analysis of variance or within-item agreement. Consequently, two different steps were taken. First, a pair-wise combinatorial distribution of Krippendorff's Alpha coefficients was generated. This is, however, not a trivial task, as agreement coefficients are normally calculated over the distribution of items and raters, not over the distribution of ratings per item. Therefore, the average agreement per item (O'Connell & Dobson, 1984; Schouten, 1982) was calculated.⁷ The results are presented in Appendix E, and show that the majority of corpus items score in the range of a 'slight' (<0.20) to 'fair' (0.21-0.40) level of agreement (cf. Landis & Koch, 1977). A large number of items turned out to be problematic. The distribution presented in the aforementioned appendix allowed for the identification of the most

⁷For an R package capable of estimating O'Connell-Dobson-Schouten coefficients, see <https://github.com/mclements/magree>.

problematic cases in each individual classification, and in general. Here, I will only discuss briefly one the most problematic cases for each classification. For a more elaborate analysis, see Reuneker (2017a).

In case of Quirk et al.'s classification, raters agreed only very weakly on the conditional in (3).

- (3) We moeten oppassen dat de toeloop op de opleidingen in Limburg niet te groot wordt. Het is gevaarlijk als 'genoeg werk' het enige argument is om aan de Pabo te gaan studeren. (limburg/nieuws04)
*We must be careful that the number of students for the study programs in Limburg does not grow too large. It is dangerous if 'enough work' is the only argument to study for teacher.*⁸

While most raters decided to annotate the conditional in (3) as a direct conditional (66.7%) and 5.6% as an utterance conditional, 27.8% chose not to classify this item. This could be due to the *als* 'if' clause functioning as a subject to the evaluation in the matrix clause ('it is dangerous'). A relation between antecedent and consequent as a subject that is evaluated is not present in any of the classifications, and it could be the case that this 'evaluative conditional' is a language specific construction, although Ford and Thompson's (1986, p. 368) results suggests otherwise, as they show this use is also present in English and even quite frequent in case of sentence-final antecedents (see sections 5.2 and 5.6). In case of Dancygier and Sweetser's classification, raters also agreed weakly on the conditional in (3). 27.8% of the raters classified (3) as a predictive conditional, another 27.8% as a speech-act conditional, 22.2% as an epistemic conditional, 16.7% as a meta-linguistic conditional, and 5.6% did not classify the conditional. Using Quirk et al.'s classification scheme, this conditional resulted in problems as well, but raters were somewhat more unanimous. It is unclear why this should be the case, as the reasons for the most likely candidate of utterance conditional also apply to speech-act conditionals. As a relatively small group chose not to annotate this example, there must be another reason for the scattered distribution. What could be the case, is that the main parameter of backshift to distinguish between predictive and non-predictive conditionals in Dancygier and Sweetser's classification (see section 3.3.7) led raters to choose the predictive type, as verb tense in Dutch might be a less reliable source of conditional relation than is the case in English, which is indeed what we will test in section 5.4 and chapter 6. The group of raters choosing the epistemic type may have done so by interpreting the consequent as a conclusion, consequently viewing the antecedent as an argument.

Another low score was obtained for the conditional in (4) below.

⁸Examples in this section are taken from the Condix Corpus of written Dutch (Deygers et al., 2000) and from the 'Corpus Gesproken Nederlands' (CGN; Oostdijk, 2000). See Appendix E for details.

- (4) Mmm? Als je 't niet zou weten dan hoor je niet dat de radio aan staat.
 nee, maar was trouwens wel gaaf dat concert. (fn000411)
*Mmm? If you wouldn't know then you would not hear the radio is turned
 on. No, but the concert was really cool by the way.*

For (4), 44.4% chose the predictive type, which seems the right choice, given the hypothetical backshift in the antecedent adding to a counterfactual interpretation. However, there were also raters annotating this example as a speech-act conditional (11.1%), an epistemic conditional (27.8%), and a meta-linguistic conditional (5.6%). 11.1% chose not to annotate this example. The high percentage of raters opting for the epistemic type may be due to the fact that the antecedent concerns knowledge ('if you wouldn't know') and might therefore be easily interpreted as an argument for a conclusion in the consequent. A related indication found in the distribution of item-agreement scores concerns the distinction between the direct and indirect types in Quirk et al., 1985's classification on the one hand, and the predictive and non-predictive types in Dancygier and Sweetser's classification on the other hand. Although there are differences, in many cases these distinctions should result in the same outcome, but raters were able to apply Quirk et al., 1985's distinction more reliably than Dancygier and Sweetser's distinction. This discrepancy seems to be connected to the aforementioned problems in distinguishing between predictive and epistemic conditionals, which in Quirk et al., 1985's classification are both considered direct conditionals. Finally, in case of Athanasiadou and Dirven's classification, raters agreed only weakly on the example in (5).

- (5) Maar dat kan niet want de ZCTU beschikt niet over de kwaliteiten van een president, aldus Moegabe, die er voor de goede orde aan toevoegde: "De vakbonden vergissen zich als ze geloven dat ze sterker zijn dan mijn regering. Ik waarschuw de ZCTU. Ik maak geen grapjes, ik ben bloed-serieus." (tele/nie_s5)
But that is not possible, because the ZCTU does not have the qualities of a president, said Mugabe, who, for the record, added: "The unions are mistaken if they believe they are stronger than my government. I warn the ZCTU. I'm not kidding, I'm dead serious."

The conditional in (5) was annotated as a hypothetical conditional by 44.4% of the raters, as a pragmatic conditional by 27.8%, and as a course-of-event conditional by 27.8%. This example indeed does not fit easily into one of the types of Athanasiadou and Dirven's classification, which is also reflected in low certainty scores provided by the raters. It can be viewed as a hypothetical conditional, as the situation in the antecedent presents a specific hypothetical state of affairs. The consequent however presents an evaluation of the situation in the antecedent, just as in (3). If the evaluation is seen as a conclusion based on an argument, it would amount to a pragmatic conditional of the inferential sub-type.

Reliability is a prerequisite for the demonstration of validity of a classification scheme, i.e., showing ‘that the coding scheme captures the “truth” of the phenomenon being studied’ (Artstein & Poesio, 2008, p. 557). The analysis of problematic cases above, i.e., those cases for which reliability was lowest, provides suggestions for possible ‘blind spots’ of classification schemes. As Carter-Thomas and Rowley-Jolivet (2008) suggest, classifications may be too idealised and detached from actual language use, possibly because the selected examples are not representative of all corpus data (cf. the principle of ‘total accountability’; see McEnery and Hardie, 2012, pp. 14–18). Furthermore, it might be the case that the criteria offered by the respective authors are not clear enough to be applied to other data. In this sense, the classification of implicatures of connectedness is comparable to the annotation of (other) coherence relations, which are also, to a certain extent, interpretative, rather than determined by grammatical features (cf. Spooren, 2004; Sanders & Spooren, 2007; Spooren & Degand, 2010; Artstein & Poesio, 2008).

A possible source of low validity and reliability may be the use of Dutch corpora, while the classifications under inspection are based on and targeted at English. This may lead to problems when encountering language specific types of conditional relations. For example, the scalar type of Quirk et al.’s rhetorical conditional in (6) below can be expressed using a conditional in Dutch, in which case the antecedent needs to be altered to great extent, as in (7). In Dutch, this meaning is expressed more frequently by other means than a conditional. It can be expressed by a rhetorical conditional, as in (8), which also needs to be altered to great extent, not in the least by exchanging propositions between antecedent and consequent.

- (6) The package weighed ten pounds if it weighted an ounce. [‘The package certainly weighed ten pounds.’] (Quirk et al., 1985, p. 1095)
- (7) Het pakketje woog (zeker) tien pond, als het (al) niet meer was.
The package (certainly) weighed ten pounds, if it wasn’t (even) more.
- (8) Als het pakketje geen tien pond woog, dan eet ik mijn hoed op.
If the package did not weigh ten pounds, then I will eat my hat.

Conditionals in which the *if*-clause functions as the subject of an evaluation in the main clause, which are common in Dutch, resulted in low agreement scores too. This may be due to their absence from or only brief mentions in classifications of English conditionals. Comparisons between, in this case, Dutch and English form a testing ground for the applicability of classifications to other languages. It provides, as Verhagen (2007, p. 272) argues, ‘the insight that grammars do not only consist of regularities on the one hand, and idiosyncracies on the other. Rather, some combination of the two seems to be the rule rather than the exception (paradoxically so), so that the balance is always an open issue, and thus deserves investigation’. The current results show that a comparative perspective may help understand this balance between regularities and idiosyncracies in conditional constructions. Furthermore, it has made a

case, as mentioned earlier, for not investing in yet another classification with (sometimes slightly) differing types and boundaries (see also sections 4.4 and 4.5, and Verhagen, forthcoming), but in testing an important aspect of existing accounts on real language data: their applicability and reliability.

4.2.5 Conclusion

This section reported on an experiment in which the reliability of applying three classifications on corpus data was evaluated. This was done both as a preliminary quality measure for subsequent steps in the current study, as to make a case for the application of reliability measures in corpus studies on conditionals.

Three classifications were compared in terms of validity and reliability with respect to both idealised examples and corpus data. While raters were able to apply the classifications to the former, they were unable to classify conditionals from actual corpus data with a sufficient level of reliability. In other words, annotations were not sufficiently replicable between raters. The results of this experiment suggest that replication and generalisation may be compromised by the reliability of classifications. Low reliability scores for the classification of conditionals may be the result of a number of problems, and it is insightful to apply Spooren and Degand's (2010) distinction between two types of disagreement. First, disagreement can be the result of simple coding errors, which we will encounter and deal with in the next chapter. Second, as language underspecifies meaning and context guides interpretation, there is ambiguity as a result of linguistic underspecification, which, Spooren and Degand argue, puts 'perfect agreement' out of reach. The second type of disagreement should however tell us 'something about the stability of our coding scheme and the theoretical conclusions that can be drawn from our analysis' (Spooren & Degand, 2010, p. 251). The low agreement scores reported in this section thus raise the question to what extent existing classifications can be applied to actual language use. This experiment may therefore be seen as a methodological contribution to the study of conditionals, and to corpus linguistics in general, because novel ways of comparing agreement distributions were presented, including item-wise agreement computations in order to identify problematic cases. The methodology may be useful to identify items that resist classification, and may subsequently be used to improve classification schemes by specifically addressing these issues. One step that would have improved the present experiment was a group discussion after the classification task, as the disagreements among raters were not discussed, prohibiting the identification of reasons for disagreement and types of disagreement. On the other hand, reliable classification should, ideally, be the product of independent classification.

The results of this experiment support the analysis of the types of conditionals discussed in section 3.3 as conversational implicatures of connectedness, and it raises the question to what extent they are generalised. Grammatical form may support and license, but will not fully determine the type of connection

between antecedent and consequent, as is also suggested throughout the literature discussed in chapter 3. The results of this experiment show that the application of classifications to conditionals in corpora yields low reliability, which has important ramifications for the available data analyses in answering the research questions of this study. In the next section, therefore, I will discuss the data-analytic approach that will be used in the remainder of this dissertation.

4.3 A corpus-based approach to conditional constructions

4.3.1 Introduction

The central question in this dissertation boils down to the following questions: Which implicatures are licensed by means of conditionals, and how does their grammatical form support these implicatures? These conversational implicatures were narrowed down to further specifications of the conventional meaning aspects of unassertiveness and connectedness. In chapter 3 we discussed types of conditionals in these terms, with additional focus on the grammatical features they were related to in the literature. In the previous section, however, we saw that the annotation of such types in corpora yielded problems with respect to reliability.

The aim of this section is to address this issue, and to deal with its ramifications for the remainder of this study. In section 4.3.2, I will first address the reasons for employing a usage-based approach, and more specifically, the reasons for a corpus-based approach to conditionals in the Dutch language. Next, in section 4.3.3, I will provide arguments for a bottom-up approach to data analysis, which, as will be discussed in section 4.3.4, will lead to the choice for a cluster analysis of conditionals. After drawing brief and intermediate conclusions in section 4.3.5, I will continue by presenting the corpus setup in section 4.4.

4.3.2 Constructions and corpora

In order to analyse the form and meaning of conditionals in unison, I will analyse them in terms of construction grammar, (cf. Goldberg, 1995), a framework we previously discussed in section 2.2. The reason for adopting a usage-based approach in this study is that the meaning aspects mentioned are fundamentally ‘aspects of the use that human beings make of language’ (cf. Verhagen, 2005, p. 24). This also allows for acknowledging that some aspects of this use have become conventionalised by strong generalisations over ‘usage events’ by speakers and hearers, whereas other, less generalised aspects are, by definition, more contextual and more appropriately described in terms of conversational implicatures.

Within construction grammar, it is customary to investigate to what extent the formal (i.e., grammatical) features of an utterance contribute to its meaning (see e.g., Bybee, 2013, p. 51; Goldberg, 1995, pp. 1–9; Goldberg, 2019, pp. 2–3), while, at the same time, leaving room for idiomaticity, i.e., the idea that a construction may ‘specify a semantics (and/or pragmatics) that is distinct from what might be calculated from what might be calculated from the associated semantics of the set of smaller constructions that could be used to build the same morphosyntactic object’ (Fillmore, Kay & O’Connor, 1988, p. 501). With respect to conditional constructions, Dancygier and Sweetser (2000, p. 138) argue that ‘what is needed is an analysis which uses parameters of constructional meaning (verb forms, clause order, intonation, use of mental space builders) to outline the range of constructions which participate in the construal of related meanings (causality, sequentiality, conditionality), and explores the similarities and differences between the constructions with respect to these parameters’. In my view, especially because we discuss part of the non-truth-conditional meaning of conditionals in terms of implicatures, the way to do this, is to conduct a corpus-based study of the distributions of these ‘parameters’ or linguistic features. In chapter 5 these will be systematically investigated and discussed, but before addressing the need to carefully construct a representative collection of conditionals in section 4.4, we will discuss the choice of a language-specific study.

As we saw in chapter 3, most accounts of conditionals are based on English, with the exception of the classic accounts of conditionals in Ancient Greek. As I aim at analysing both the form and meaning of conditionals, and especially their connection, it is needed to construct a language-specific corpus in order to provide a detailed analysis. The reason for this, in line with Croft’s (2001) arguments for his ‘Radical Construction Grammar’, is that it is not to be expected that the systematic relations between form and meaning in English conditionals, such as *will* in consequents to mark q as the causal consequence of p in the antecedent, will be universals. Rather, it is to be expected that a language, and, more to the point, conditionals in a specific language, will have meanings that depend on the part-whole relation between the conditional construction and its elements, rather than meanings that can be derived from independently definable, language independent meanings of its (grammatical) elements. In other words, we need to ‘account for the diversity of the syntactic facts of a single language as well as the syntactic diversity of the world’s languages’ (Croft, 2001, p. 3). This is reminiscent of Verhagen’s (forthcoming) observations of differences in how speech and thought are construed in different languages, even closely related languages. He shows how, in research, the speech and thought representation (STR) categories of ‘direct discourse’, ‘indirect discourse’ and ‘free indirect discourse’ are used as ‘relatively abstract categories’, and are then, as it were, projected onto different languages, whereas the specific grammatical and lexical means a language offers come with (sometimes subtle) differences in how such categories would or should be demarcated, and what interpretations are available. Verhagen therefore suggests to reframe

the question ‘How does language X express STR-types A, B, C?’ to ‘What are the tools that language X makes available for the members of its community to manage the presentation of relationships between the mental states and feelings of different characters in a story, and the relationships of these to the narrator and the reader?’, in order to refrain from presupposing types of phenomena independently definable of specific languages. As a construction is ‘a pairing of a complex syntactic structure and a complex semantic structure’ (Croft, 2001, pp. 203–204), this does not only raise the question whether or not types of conditionals are expressed using the same grammatical means (e.g., verb tense, modal marking, clause order) across languages, but also whether or not the same types of conditionals (and their demarcation) have evolved out of generalisations of conditionals used in usage events.

To acknowledge these difficulties, and to shed light on these matters, in what follows, I will offer a language-specific corpus-based account of conditionals in Dutch, which is not only my native language, but it has the advantage of having a vast body of literature available for investigating the linguistic features suggested in the literature discussed in the previous chapter.⁹ It can also serve to test to which extent these features influence the implicatures of conditionals in languages other than English. Note that such an expectation is not far-fetched, and not at all at odds with the position defended by Croft (2001), as two Germanic languages will, of course, share characteristics, although they will not be identical. Instead of focusing on universality, I will focus on language-specificity. This means that the results of the second part of this dissertation, starting from the next sections, will primarily allow for conclusions about conditionals in Dutch, rather than about conditionals in general. This approach, and its benefits, can also be found in Verhagen’s (2007) study, in which he shows that a comparative study between languages, English and Dutch in this case too, helps to gain a better understanding of the balance between regularities and idiosyncrasies in a language’s grammar, and to get insight into the degree in which one ‘complete grammatical system’ overlaps with that of another language, and in which respects it differs. Notwithstanding, a language-specific study into linguistic features distilled from studies on another language appears, in this case, inevitable and while it may provide interesting insights as noted above, it also comes with the aforementioned risks. I will reflect upon these issues in further detail in chapter 7.

4.3.3 A bottom-up approach to conditional constructions

The initial approach to answering the research questions in this dissertation was to annotate both the types of conditionals distinguished in the accounts discussed in chapter 3, and the grammatical features inventoried. One could then determine to what extent the grammatical features are predictive of the

⁹This literature is mostly concerned with those features irrespective of their use in conditionals, but it will be discussed systematically in relation to each linguistic feature within conditionals in the next chapter.

implicatures of unassertiveness and connectedness using a so-called ‘supervised machine-learning’ approach. I will discuss this approach and an alternative approach in more detail in section 4.3.4 and in chapter 6, but in this section, I will provide four main arguments against a supervised approach for answering the aforementioned research questions.

First, as we saw in chapter 3, there are numerous accounts of conditionals, and in each of those accounts, different types are distinguished based on different criteria or different theoretical positions. Using the types distinguished for annotation would enable assessing which of the classifications is most likely to provide insightful groups of conditionals based on the distribution on their lower-level features. It would, however, to some degree, also assume these types and prohibit discovery of types that are not present in existing accounts. Connected to the argument for a language-specific corpus study above, annotating types of conditionals as discussed in accounts based on English furthermore assumes universal, or at least non-language specific types to exist. It is, however, not clear whether such an assumption is warranted. On the one hand, we do not know *a priori* whether types of English conditionals would have direct counterparts in Dutch. We also would have to assume that they show the same boundaries between types. While these are important questions, studies such as Renmans and van Belle (2003) and Reuneke (2017b) identified the types proposed by Dancygier and Sweetser (2005) in Dutch corpus data, and Verbrugge et al. (2007) provide experimental evidence for these types.¹⁰ Even if we accept that the same types exist and are demarcated identically throughout languages, we would need to investigate to what extent their meaning can be attributed to the same grammatical means. On the other hand, as discussed briefly above, Croft’s (2001) position strongly suggest negative answers to these questions, and although Verhagen’s (forthcoming) conclusions are based on a study on perspectivisation, his conclusion that this phenomenon ‘must not be framed in terms of relatively abstract categories of speech and thought representation, but in terms of interactions between the specific grammatical and lexical tools available in a specific language on the one hand, and the universal method of iconically depicting speech acts on the other’ warrants caution for projecting language-independent categories onto language-specific conditionals too.

Second, if we were to annotate the types of conditionals discussed in the previous chapter, we would have to choose which classifications to use, because manual annotation is time-consuming and the number of accounts discussed in chapter 3 is large. Although a number of classifications show similarities, and all accounts discussed provide analyses of the same phenomenon, there are important differences between them. Although one could, for instance, choose

¹⁰See also the ample studies on coherence relations expressed by causal connectives, such as Scholman, Evers-Vermeul and Sanders (2016), and especially Sanders and Stukker (2012) for a cross-linguistic perspective on how causal connectives express relations in Sweetser’s (1990) domains.

to use a selection of classifications that have been most cited and influential in the field, this would still amount to a biased choice, possibly discarding the most useful classifications.

Third, and what was admittedly the first reason the initial supervised approach was abandoned, concerns the reliability of annotation, as discussed extensively in the previous section. In accordance with the literature discussed, an experimental study by (Reuneker, 2017a; see previous section) showed that trained raters were able to reliably annotate modified textbook examples of implicatures of connectedness based on the accounts of Quirk et al. (1985), Athanasiadou and Dirven (1997a), and Dancygier and Sweetser (2005) (see section 3.3). However, the essential finding was that the same annotators were not able to reliably annotate the types of conditionals in actual language data. It is important to reiterate here that accuracy scores were used to select only competent annotators, and that these annotators turned out to be unable to classify corpus data reliably, with agreement scores ranging from 0.32 to 0.53. These coefficients indicate that annotations are not replicable between annotators, which means that they cannot be used as reliable data for further steps in the analysis. The results of the study suggest that generalisation, replication and meta-analysis may be compromised by the reliability of the classifications as applied to real language data. This is in line with what Carter-Thomas and Rowley-Jolivet (2008) suggest, namely that classifications of conditionals may be too idealised and detached from actual language use, possibly because the selected examples are not representative of all corpus data.

Fourth, by using a ‘bottom-up’ approach to classifying conditionals, i.e., by not using existing classifications of types of conditionals as labels, we can let the data speak for themselves. Although this may introduce the risk of presenting yet another classification of conditionals, as one cannot prevent identifying or discovering new types, and drawing boundaries differently (cf. Verhagen, forthcoming), the overview of types of conditionals and their grammatical features in chapter 3 minimises this risk, and maximises relating findings to existing types and features in the data.

The arguments above led to the decision not to annotate the higher-level types of conditionals, and rather to annotate the lower-level grammatical features inventoried. While many of these features, such as clause order or verb tense, are more explicitly marked and less interpretative than implicatures of unassertiveness and connectedness, other features, such as modality and aspect, are known to be more liable to ambiguity. Therefore, we will discuss the reliability of annotations of these features in the next section. First, however, we will flesh out the decision for a so-called *unsupervised* approach to data analysis in the next section.

4.3.4 Classification and clustering

As we saw in section 4.2, the annotation of the implicatures we are interested in, i.e., the types of conditionals discussed in chapter 3, proved problematic. Not only in terms of low reliability scores, but also in terms of biases introduced by selecting classifications to be used for annotation. This poses a problem for further analysis, as we cannot straightforwardly test which (combinations of) features are predictors of certain implicatures, which is what the research questions steer towards. In more methodological terms it means that we cannot, as is common in the field of machine learning, apply a classification algorithm to the features to be discussed in chapter 5, and see how well sets of features are indicative of types of conditionals, in effect testing the classifications discussed. These problems can and will be addressed, and in this section, I will briefly introduce the type of analysis that will be used to do so.

In the field of machine learning, there is particular interest in so-called *extensional classifications*. A large number of algorithms exists which take a set of features collected from observations or annotations (i.e., *multivariate analyses*), and consequently try to determine underlying classes of objects, which, in this study, would amount to types of conditionals. The two main approaches distinguished in the computational literature are *supervised* and *unsupervised learning*. The term ‘classification’ usually refers to what is called *supervised machine learning*. In this type of machine learning, the correct target labels (classes, types) for objects are known *a priori* for at least a number of observations (see e.g., Libbrecht & Noble, 2015). In contrast, unsupervised algorithms deal with data that lack such labels (see Berry, Mohamed & Yap, 2019, chapter 1). In other words, such algorithms involve pattern recognition without a target label, meaning that an algorithm is implemented to identify clusters of features inherent in the data, without any preconception of the nature of these clusters beyond the features that are used as input. So, whereas in supervised machine learning an algorithm tries to predict the correct label for an observation based on the distribution of features, trying to reach maximum accuracy, in unsupervised machine learning, no such target labels are available, which means that an algorithm has no clear, external labels to compare its results to.

Given the problematic reliability of annotations of types of conditionals in corpus data, no target labels are available for this study. This means that a supervised strategy is beyond reach, and the unsupervised technique of *cluster analysis* will be used and discussed in detail in chapter 6. Although this may seem a negative conclusion, the arguments in favour taking an unsupervised machine-learning approach are threefold, and relate directly to the arguments against classifying types of conditionals provided in the previous section. The first and most prominent argument, related to the third argument in section 4.3.3, is that it turned out that even trained annotators were not able to reliably classify conditionals in real corpus data. This means that there is no ‘gold standard’ (see e.g., Wiebe, Bruce & O’Hara, 1999) against which results

can be compared. The second argument, relating to the second argument in section 4.3.3, is that, even if reliable classification were possible, it is a non-trivial choice which classification or classifications should be used to provide the labels for the target attributes. This would introduce a theoretical bias, which unsupervised machine-learning does not suffer from, as there are no *a priori* class assignments. The results can be used to test to which extent the features suggested in the literature are indeed related to different implicatures of unassertiveness and connectedness. This is, in a sense, truly ‘bottom-up’, as unsupervised algorithms are forced to utilise the full potential of the data to find underlying structures (see also McEnery & Hardie, 2012, and chapter 6 on the corpus-based and corpus-driven distinction). The downside of this is that we are interested in specific implicatures, which is unknown to any algorithm to be implemented. However, given a constructional and pragmatic perspective, it may, as discussed in section 4.3.2, be expected that grammatical features give rise to these implicatures, but will not fully determine them. The unsupervised approach I argue for here provides a critical assessment of the relations between grammatical features and types of conditionals. The third argument, related to the first argument in section 4.3.3, is that it is an assumption that the types of conditionals distinguished in accounts based on English conditionals also exist in Dutch conditionals. Although Dutch and English are related languages, an unsupervised approach to conditionals in Dutch does not make this assumption, apart from the obvious and necessary selection of grammatical features used as input.

In conclusion, the above should be read as argumentation for and an introduction to the final, bottom-up analysis presented in chapter 6. The reason I discuss the approach here in this section is that it entails consequences for the corpus setup discussed next, and, in consequence, for the detailed discussion of the individual features in the next chapter. After all, the grammatical features of conditionals form the input for the cluster analysis presented in chapter 6, with which we will try to measure the extent to which grammatical features of conditionals in Dutch form clues for implicatures of unassertiveness and connectedness, i.e., to which extent such an analysis provides a foundation for a meaningful, data-driven groupings of conditionals.

4.3.5 Conclusion

In this section, we discussed the arguments for a corpus-based approach to conditionals in light of the research questions presented at the end of chapter 2. Based on, among other factors, the problematic reliability scores of annotation types of conditionals, an unsupervised, bottom-up approach of cluster analysis was chosen in this section as the most promising method of uncovering relations between the grammatical form and meaning of conditionals. The input for such an analysis ideally consists of high-quality annotations of corpus data, which we will turn to next by addressing the corpus setup in the next section, and the annotation of corpus data in section 4.5.

4.4 Corpus setup

4.4.1 Introduction

In this section, I discuss the setup of the corpus used in this study, with special attention to the representativeness of the language data used, and the sampling strategies used to arrive at a balanced corpus that allows for specificity as well as generalising of conclusions.

The aim of this section is to provide a clear picture of the data used in the remainder of this study. In section 4.4.2 I will discuss which population the corpus study targets to describe, for which we will look at mode and register in section 4.4.3. Section 4.4.4 is devoted to the identification of conditionals in Dutch, which is less straightforward than in English. In 4.4.5 I will present the final sampling frame, and in 4.4.6, finally, I will offer a brief conclusion before moving on to the annotation of the corpus materials.

4.4.2 Population and representativeness

In this section, I discuss what population the corpus study aims to describe, or, in other terms, what the actual object of study is for answering the research questions. As existing corpus studies show (see Ford & Thompson, 1986; Ferguson, 2001; Carter-Thomas & Rowley-Jolivet, 2008), the use of conditionals differs significantly between modes (spoken, written), genres (e.g., newspaper press, discussion fora, academic texts) and registers (formal, informal). When one strives for maximum representativeness in the sampling frame, it is important, therefore, to ensure that findings can be taken to represent characteristics of the population. Any study, therefore, needs to address what is taken to be the population of interest, i.e., the full range of phenomena of interest, such as ‘spoken language’ or even ‘language’ (see e.g., Buchstaller & Khattab, 2014, p. 74).

In most (corpus) linguistic studies, it is not possible to investigate the whole population directly, which means that appropriate samples must be constructed. Before the samples can be constructed, however, the population itself must be defined. When a researcher is interested ‘only’ in academic writing, child-directed speech or doctor-patient interactions, this determines the population to be sampled. Examples of corpus studies in which this is possible are those focusing on, for instance, the use of certain linguistic features in the complete works of one author, such as the corpus-stylistic work on Dickens’s novels by Mahlberg and Smith (2012). The current study, however, does not limit the population to a specific author, genre or register. The sampling frame should therefore be properly defined with respect to a target population (cf. Atkins, Clear & Ostler, 1992). A target population is a complete set of observations that share at least one characteristic (see e.g., Banerjee & Chaudhury, 2010). The target population of this study is defined as all conditional *als*-sentences in Dutch, as spoken and written in the Netherlands. This definition excludes

several regions in which Dutch is used, such as Belgium, Suriname, Aruba, Curaçao and Sint Maarten. The reason for this exclusion is to limit the influence of regional variation.

As may be expected from this definition, it is not possible to access the target population directly. The accessible population (Bracht & Glass, 1968) (also called ‘study population’, cf. Banerjee and Chaudhury, 2010) is the population that is available for sampling, and is defined as follows: all sentences in which the conditional conjunction *als* is used and that are available in existing corpora of spoken and written Dutch. Notice that conditionals in this definition are limited to those introduced by the conjunction *als*, which was decided in order to have the most direct link to the classifications and features discussed in the previous chapter, and to have a baseline of the default conditional in Dutch to which, in future research, more specific conditional constructions can be compared. The accessible population will be used as reference for the sampling frame, meaning that the conclusions based on the data used in this study are intended to be indicative for Dutch in the Netherlands (the target population) through the accessible population by means of the samples discussed below.

With respect to the studies mentioned above that suggest differences in use of conditionals between modes and genres, it is important to consider the sample representativeness of this study. A representative sample is defined as a sample that has the same distribution of features as the population it was taken from. The notion of ‘representativeness’ is a relative notion, i.e., a sample is representative for a particular population, selected by the researcher (see e.g., Sankoff, 1989). As McEnery and Hardie (2012, p. 10) point out, however, representativeness is an ideal that is ‘rarely, if ever’ attained. Nevertheless, Leech (2007, p. 143) argues that while the goal of representativeness may not be achieved in full, we should not abandon pursuing it: ‘we should aim at a gradual approximation to these goals, as crucial desiderata of corpus design’. In the design of the corpus for this study, I aim to be maximally explicit about the sampling frame and its relation to the population, while acknowledging that perfect representativeness is out of reach, because, among other factors, it is hard to determine and quantify the level of representativeness (cf. Biber, 1993).

As I argued above, I do not intend to limit the object of study to a particular context of use, because any conclusion would then be limited to this context. A clear example of this approach is Ferguson (2001), who provides a detailed analysis of the uses of conditionals in doctor-patient interactions, which provides insights into the use of conditionals in specific contexts. The conclusions cannot easily be generalised to other contexts, however. To be clear, this sample may still be representative, but only for a narrowly defined target population. Rather, I will strive for ‘generalisability’ instead of specificity by constructing a maximally representative corpus relative to a widely defined target population. To make sure the samples are balanced, the sampling procedure I adopt here is ‘random stratified sampling’ (see e.g., Rice, 2010, p. 240). The reason for this is that, as the studies cited above have shown, mode, genre and register

are variables that influence the use of conditionals. As these variables are not evenly distributed in the corpora (see below) and, of course, nor in language in general, I have taken care to represent these ‘stratifying variables’ evenly in the sampling frame.

4.4.3 Balance, mode and register

The corpus study presented here hosts two main strata: spoken and written language. The randomised selection of conditionals from spoken Dutch is comparable in size to the selection of conditionals from the written corpus. Next to the reason provided above, an added benefit is that in most corpus studies, spoken language has, at its most, a subordinate role (see e.g., Gabrielatos, 2010; Reuneker, 2016; for exceptions, see e.g., Ford & Thompson, 1986; Athanasiadou & Dirven, 1995). This has to do with the availability of spoken natural-language data, because written publications – from digital to digitised – are much less time consuming to use as material for a corpus. An added benefit of a stratified approach is that it enables the direct comparison between samples. If a feature is more frequent in the spoken sample than in the written sample, this may be interpreted as evidence for a difference between those two sub-populations. This would not be equally possible with fully random sampling, given the considerable size differences between the two source corpora, which we will discuss next.

The two corpora I used for data collection are the most recent corpus of spoken Dutch, the ‘Corpus Gesproken Nederlands’ or CGN (Oostdijk, 2000), and the most recent corpus of written Dutch, the SoNaR corpus (Oostdijk et al., 2013). The CGN hosts almost 9 million words (van Eerten, 2007), whereas the SoNaR corpus hosts over 500 million words (Oostdijk et al., 2013, p. 222). Not all sections of these corpora were used, as I will discuss below.¹¹ Care was taken to include in the results both the linguistic context of the sentences (i.e., the preceding and following sentence), as well as the necessary metadata.¹²

Biber (1995) argues that a distinction between written and spoken language may be too broad, because these modes may be similar in some respects, but very different in others. Some differences between texts may be connected more to other dimensions than mode itself. The distinction spoken-written is upheld here, however, because previous discourse-oriented studies (Carter-Thomas &

¹¹Note that both corpora feature language use from both The Netherlands and the Dutch-speaking part of Belgium (Flanders). While in the CGN approximately 66 percent of the material is recorded in The Netherlands and 33 percent in Belgium (see Oostdijk, 2000, p. 280), for SoNaR these figures are approximately mirrored (see Oostdijk et al., 2013, p. 244). As I included only data from The Netherlands in this corpus study, these differences are not relevant, but it does mean that not the full corpus sizes should be considered as the accessible population, but the proportions just reported.

¹²The examples from these corpora are presented in this dissertation together with a reference to their origins within the respective corpora. Labels starting with (lowercase) *fn*, as in *fn000149*, indicate an example comes from the CGN, whereas labels starting with capital letters, as in *WR-P-E-A-0005795081* indicate an example comes from the SoNaR corpus.

Rowley-Jolivet, 2008; Ford, 1997; Ford & Thompson, 1986) have shown that, in the case of conditionals, the spoken-written language dimension is relevant. Phenomena like hedging, insubordination and clause order seem related to mode more than to other parameters. Because Biber and Conrad (2009, p. 88) argue that ‘the language of conversation is highly distinctive compared to the language of books’, I chose to define further strata within both modes. Spoken conversation, for instance, may differ more from spoken language in formal debates than from informal written texts on discussion boards (see also the notion of ‘hierarchical sampling strata’ in Biber, 1993, p. 244).

As the sub-populations vary in size, the main set-up of the corpus study is multistage sampling in a stratified design. This means that the sub-populations are divided into homogeneous subgroups or *strata*, which will all be sampled independently. As Biber (1993, p. 244) argues, ‘stratified samples are almost always more representative than non-stratified samples’, because the strata can represent the proportions desired, instead of relying on random sampling. Note that I explicitly choose a stratifying approach here to be able to investigate differences between sub-populations that have been shown to differ with respect to the use of conditionals (see above). The downside is that the collective samples cannot be taken to directly represent the population together, as we do not know their exact distribution in language. The upside is that there is no risk of having a sub-population in random sampling dominate the results, ‘just’ because it forms a larger part of the corpus. This is a real risk, as in most corpora, written texts, such as newspaper texts and, more recently, discussion list texts, make up for the majority of the corpus. In strata, the within-group variance is typically smaller than the between-group variance, representing both the sub-populations and the whole population better. To ensure that the corpus sections I selected vary systematically within the spoken and written modes, two further dimensions distinguished by Biber (1988) are used.

The first parameter on which strata are defined is the dimension ‘involved vs. informational production’ (Biber, 1995, pp. 141–151). Involved language use is highly interactional and features high frequencies of private verbs (*know*, *think*), *that*-deletion, contractions, present tense verbs and second person pronouns, whereas its mirror-image is informational language use, featuring a higher type-token ratio, greater word length, and high frequencies of nouns and prepositions. With respect to the arguments concerning the choice of a specific language, it may be argued that these features can be highly language-specific. In general, however, it may be expected that these dimensions may influence language use in other languages.¹³ The second parameter used is Biber’s third dimension, ‘Situation dependent vs. elaborated’. Situation-dependent language

¹³For instance, recent findings by van Beveren, Coleman and de Sutter (2018) show how register affects the use of the optional prepositional complementiser *om* ‘to’ in Dutch infinitival complements, as in (a) below.

(a) Ik beloof (*om*) op tijd te komen.

I promise *to* be on time.

(van Beveren, Coleman & de Sutter, 2018)

scores high on time adverbials, place adverbials, and other adverbs, while elaborated language features more *wh*-relative clauses on object and subject positions, phrasal coordination and nominalisations (Biber, 1995, pp. 155–159). The reason for choosing these two parameters is that results of the corpus studies previously mentioned, albeit not in such specific terms as textual dimensions, indicate differences in usage of conditionals between genres such as academic and advertorial writing.

Because a large-scale multidimensional analysis of the corpora is outside the scope of this study, Biber's dimensions were used to identify the most appropriate counterparts of Biber's samples in the corpora used as data source. This comparison is only used as a proxy to verify the identification of corpus segments comparable to Biber's registers. For instance, while Biber's register of 'face-to-face conversations' can be matched directly with 'spontaneous face-to-face conversations' in the spoken corpus, 'official documents' cannot, as the written corpus hosts categories that are related, but not identical to Biber's registers, such as 'policy documents' and 'proceedings'. For each of the dimensions, the most similar available sections were chosen from the corpora. For instance, on the dimension 'involved vs. informational production' the register with the highest mean score on features that add up to 'involvedness' is 'face-to-face conversations' (Biber, 1995, p. 117). The register with the lowest mean score on that dimension is 'academic prose' (Biber, 1995, pp. 118–146). For this dimension, thus, 'involved language use' includes genres such as 'spontaneous face-to-face conversations' for the spoken mode and 'discussion lists' for the written mode, while 'informational language use' includes 'news reports' for the spoken mode and 'manuals' for the written mode. In section 4.4.5 the final sampling frame, including the original corpus sections, are presented, but first, in the next section, the distinction between conditional and non-conditional *als* will be elaborated, as it is needed for the identification of conditionals from the selected corpus components.

4.4.4 Identification of conditional *als*-sentences

For each of the samples, all sentences were randomly ordered and I identified which sentences featured *als* 'if' as a conditional conjunction, until the desired number of sentences for each of the samples was found (see below). This was done because the conjunction *als* 'if' can be used in several ways in Dutch. Furthermore, as Pollmann (1975, p. 187) argues, 'many *als*-sentences have more than one interpretation'. Because of this, the identification of *als* 'if' as a *conditional* conjunction is less straight-forward than it is for English *if* (see e.g., Declerck & Reed, 2001, p. 9; Gabrielatos, 2010, p. 45). The procedure of identifying conditional use of *als* 'if' is therefore discussed in detail in this section.

Each of the uses of *als* 'if' as a conjunction distinguished by de Rooy (1965) will be discussed, because his account clarifies how conditional sentences can be distinguished from non-conditional sentences in which *als* 'if' occurs as a

conjunction. Next to its comparative use, de Rooy distinguishes between its use as a conjunction of manner, a conjunction of qualification (or ‘state of being’), a temporal conjunction, and, finally, a conditional conjunction.¹⁴

Before discussing these different uses, a remark on reliability is in order. In what follows, I discuss the relevant literature that was used to identify conditional use of the conjunction *als* ‘if’. This does not mean, however, as we will see below, that no ambiguous cases remained, or no errors could have been made. Although no study of the reliability of this selection procedure was performed, as was done in the experiment reported on before, and as is done for the annotation of features presented in the next chapter, during the annotation of those features, the second annotator was instructed to comment on uses of *als* ‘if’ that, according to him or her, did not qualify as conditional use. Although this does not amount to a full assessment of inter-annotator agreement for the identification of conditional *als* ‘if’, together with the explicit discussion of criteria for the conditional use of *als* ‘if’, it believe the approach was sufficient. Nevertheless, extending the evaluation of reliability to the identification of conditional *als* ‘if’ is suggested here as an improvement for future research.

The first use is *als* ‘if’ as a comparative conjunction, as in (9), comparing a noun phrase to a noun phrase, and (10), comparing an adjectival phrase to a noun phrase.

- (9) Die man heeft een leven *als* een prins. (de Rooy, 1965, p. 144)
That man has a life like a prince.
- (10) Onze metselaar is zo dik *als* een pad. (de Rooy, 1965, p. 144)
Our bricklayer is as thick as a toad.

Als ‘if’ in (11) and (12) below are used as comparatives as well, although the former is infrequent or regional, as the regular conjunction in this use is not *als* ‘if’ but *zoals* ‘like’ (see a.o. Overdiep, 1937, p. 590; Haeseryn et al., 1997, pp. 567–570). *Als* ‘if’ in (12) is an example of ‘incorrect usage’ according to prescriptivists (see e.g., Charivarius, 1943, p. 35; see, for descriptive accounts, Paardekooper, 1950; Paardekooper, 1970; Postma, 2006; Stroop, 2011; Hubers and de Hoop, 2013), because in unequal comparisons, *dan* ‘than’ is prescribed.

- (11) Het is *als* je zegt. (de Rooy, 1965, p. 144)
It is as/like you say it is.
- (12) Hij is groter *als* zijn broer. (de Rooy, 1965, p. 144)
He is larger as his brother.

¹⁴I will ignore the use of *als* ‘if’ as explanatory conjunction, as in *de kloosterlingen, die, als van Frankische afkomst, meest ongeleerd waren...* ‘the monks, who, as of Frankish descent, were most unlearned ...’, which, was not found in the dialects studied by de Rooy and, with respect to standard Dutch, ‘will probably be limited to special styles’ (de Rooy, 1965, p. 37). Furthermore, *als* ‘if’ used as an expletive (redundant) conjunction, as in *hij zou als morgen komen* ‘he would {as/if} come tomorrow’, is ignored as well, as it is considered regional and archaic (de Rooy, 1965, pp. 65–67).

In (13), *als* ‘if’ functions as conjunction of manner, i.e., ‘the air was as it would be if it were wiped clean’, and in (14) as a conjunction of qualification (*hoedanigheid* ‘state of being’), i.e., ‘He rules in his function of king’.

- (13) De lucht was op eenmaal *als* schoon geveegd. (de Rooy, 1965, p. 33)
The air was at once as wiped clean.

- (14) Hij regeert *als* koning. (de Rooy, 1965, p. 36)
He reigns as king.

From (15) to (18) the examples become more relevant to the current discussion, as in all these cases, the conjunction *als* ‘if’ introduces not a phrase, as in the examples above, but a complete clause (subject and predicate), which, by means of the conjunction, is subordinated to the main clause of the complex sentence. This does not mean, however, that all of these examples are conditional sentences.

- (15) *Als* ik gisteravond thuiskwam, waren de anderen al naar bed. (de Rooy, 1965, p. 144)

If [when] *I came home last night, the others were already in bed.*

- (16) *Als* de kippen een sperwer zien, zijn ze bang. (de Rooy, 1965, p. 144)
 {If/When} *the chickens see a sparrow hawk, they are scared.*

- (17) *Als* ik jou was, zou ik het doen. (de Rooy, 1965, p. 144)
 If *I were you, I would do it.*

- (18) *Als* hij het maar deed! (de Rooy, 1965, p. 144)
 If only *he did/would do it!*

In example (15), *als* ‘if’ can only be read as introducing a temporal relation between coming home in the subordinate clause and the others having gone to bed in the main clause. Such a purely temporal use is described as ‘non-standard Dutch’ by de Rooy (1965, p. 143; see also Pollmann, 1975, pp. 188–189). Overdiep (1937, pp. 588–589) mentions this use and connects it to the use of the past tense and the historical present, as in (19) and (20) respectively.

- (19) We waren in dien tijd niet verwend! Als om acht uur de postwagen langs reed en de horen door de straten schalde, dan kregen we allen een schok van blijde verrassing. (Overdiep, 1937, p. 588)

We were not spoiled at that time! {If/When} the mail wagon drove past at eight o'clock and the horn blew through the streets, we all got a shock of happy surprise.

- (20) Verbijsterd stáán (= bleven staan) zij vervolgens in hun loop als achter hen Ballochi's wakk're troep aanstormt [...]. (Overdiep, 1937, pp. 588–589)

Standing stunned in their course as Ballochi's awake troop storms behind them.

Typically, *als* ‘if’ such as in (19) are used to refer to recurring events (‘everytime the mail wagon drove past...’). This can also be seen in (21), in which *meestal* ‘usually’ highlights the recurring nature of the event.

- (21) Zes treffers vielen in de mislukte kwalificatie voor het WK, allemaal tegen de kleinere landen Estland, Andorra en Cyprus en meestal *als* het duel lang en breed was beslist. (WR-P-P-G-newspapers-138000)
Six goals were made in the failed qualification for the World Cup, all against the smaller countries of Estonia, Andorra and Cyprus, and usually if [when] the game was decided already.

In case of reference to a singular event, *toen* ‘when’ is used, and *als* ‘if’ as in (19) is deemed ‘irregular’ by Overdiep (1937).¹⁵ In Belgian-Dutch, however, the temporal use of *als* ‘if’ as in (15) and (19) is common (Haeseryn et al., 1997, pp. 553–554). As the corpus only contains Dutch from the Netherlands, only a few instances of this use were found and they were discarded from the samples. The historical present, as in (22), is found mostly in narrative contexts in Dutch (for a recent account, see Sanders & van Krieken, 2019). These backshifted contexts are easily recognisable, and were subsequently excluded from the samples.

- (22) ‘Dat is uiteindelijk toch het probleem met een eenpartijstaat’, zegt Sie met dat zangerige Indonesische accent van hem, *als* we dat [*sic*] toch aan tafel kunnen schuiven. (WR-P-P-G-newspapers-98000)
‘Ultimately, that is the problem with a one-party state,’ says Sie with his vocal Indonesian accent, if [when] at last we can gather round the table.

Moving on to the example in (16), this use of *als* ‘if’ is termed ‘temporal-hypothetical’ by de Rooy (1965, p. 143), and Overdiep (1937, p. 588) too considers this temporal use, not conditional use of the conjunction. However, as became clear from the previous chapters (see the accounts by Sonnenschein in section 3.2.4, and by Athanasiadou and Dirven in 3.3.9 specifically), I do consider this usage conditional here. In terms of Athanasiadou and Dirven (1996), this would even be a prototypical example of a *course-of-event conditional*. The difficulty here is that it is possible, or even likely, that a temporal relation between antecedent and consequent, over time, develops into a conditional relation through regularity, i.e., there may be a gradual transition from a purely temporal relation (*p* before *q*), to a regular temporal relationship (*p* often before *q*), and finally to a more systematic relation, such as a rule or law (whenever *p*, *q*). For the latter relation, *p* may finally be construed as the cause of or condition for *q* (on the notions of regularity and causality, see e.g., Lewis, 1973a; Schulz, 2011, pp. 14–15). This hints towards a continuum rather than a strict temporal-conditional dichotomy in Dutch conditionals, and given the accounts by Athanasiadou and Dirven and others mentioned above, I will

¹⁵Original text: ‘Ongewoon is in Noord-Nederl. de functie van aanduiding eener enkele, momentane, handeling (gewoon is hier: *toen* [...])’ (Overdiep, 1937, p. 588).

exclude only very clear temporal uses of *als* ‘if’ as non-conditional. Although there are important differences between Dutch conditional *als* ‘if’ and temporal *wanneer* ‘when’ on the one hand, and English conditional *if* and temporal *when* on the other hand, it is important to note, as Dancygier and Sweetser (2000, p. 112) do, that both the similarities and differences between conditional and temporal conjunctions should be analysed not by ‘focusing only on the conjunctions themselves, but by describing the range of constructions they participate in’. Here, we focus on conditionals expressed using *als* ‘if’, but as the aforementioned temporal-conditional continuum may be associated with the further grammatical features of *als*-constructions, such as the extent of modalisation of the consequent, a comparative analysis of conditional *als* ‘if’ and temporal *wanneer* ‘when’, which unfortunately falls outside the scope of this dissertation, may shed light on this matter. Such an analysis is suggested for future research and discussed in more detail in chapter 7. The type of conditional found to be most central in many accounts is found in (17), which de Rooy calls ‘hypothetical’, and it is the only type he describes within the category of *als* ‘if’ as conditional conjunction (de Rooy, 1965, p. 56). Finally, in (18), we see the optative use of *als* ‘if’ in an insubordinate clause. (For an account of Dutch insubordinate conditionals, see Boogaart and Verheij, 2013; and for an account of insubordinate conditionals in Germanic languages, see D’Hertefelt, 2015, Chapter 2.)

The discussion above makes clear that simply isolating sentences with *als* ‘if’ and filtering out some known non-conditional uses, as can be done for English *if* (see Declerck & Reed, 2001, p. 9, and Gabrielatos, 2010, p. 45; see also section 2.2) will not suffice for Dutch. I hope to have shown here that manual inspection and selection of corpus data is necessary.¹⁶ A welcome by-product of this strategy is that it forces the researcher to more clearly define beforehand what grammatical pattern is needed for *als* ‘if’ to receive a conditional reading. What distinguishes the conditional examples above from the non-conditional examples from a syntactic perspective, is that the sentences are complex (involving a subordinate and a main clause or, in case of insubordination, only an insubordinate clause), which is connected to the first criterion of the preliminary characteristics I presented in section 2.2, i.e., conditionals are ‘bi-partite’. As that criterion needed to include conditionals expressed by other means than *als* ‘if’, for the selection of conditional *als*-sentences it can be sharpened here into the criterion of the sentence being ‘bi-clausal’. The use of the conjunc-

¹⁶I would like to remark here that the search capabilities for the corpora used here have been extended during the duration of this project. For this project, I have indexed all texts and converted them into a format easily readable in Python (van Rossum and Drake, 2009; see Appendix F). Still, as far as the metadata, such as POS-tags, go, it is still not possible to separate conditional from non-conditional *als* ‘if’, which is, as mentioned, different for English conditionals, although formulating regular expressions to identify conditionals *if* involves its own challenges, such as excluding indirect interrogatives with *if* is quite tricky, ‘as verb forms other than the bare form may well return conditionals’, and manual cleaning continues to be an important and necessary step (C. Gabrielatos, personal communication, September 11, 2015).

tion *als* ‘if’ allows for distinguishing between conditional sentences and other bi-clausal sentences. As we have seen in the preceding chapters, *als* ‘if’ adds unassertiveness and connectedness to the expression of propositions *p* and *q* (i.e., the second and third characteristics). Furthermore, the subordinate clause, as is expected, has the finite verb in clause-final position.¹⁷ Supplementing these characteristics with the discussion in this section allowed for distinguishing between conditional and temporal use of *als* ‘if’, although this, as discussed, remains an interpretative endeavour to a certain extent. On a side note, although all of the conditional examples in this section have sentence-initial subordinate clauses, this is not necessary. For instance, the conditional clause in (17) can easily be placed in sentence-final position and, somewhat less easily, in sentence-medial position, as can be seen in (23) and (24) below.

- (23) Ik zou het doen, *als* ik jou was.
I would do it, if I were you.

- (24) Ik zou het, *als* ik jou was, doen.
I would, if I were you, do it.

We will discuss variations of clause order in detail in section 5.2. Based on the discussion above, it becomes clear that we are interested primarily in the type in (16), (17) and, to some extent, (18).

One problem needs to be addressed before moving on to the actual sampling frame. Whereas in English, *if* cannot, or only in a very limited range, be used for purely temporal relations (Dancygier, 1998, p. 48; Declerck & Reed, 2001, pp. 31–5), in Dutch, it is customary to use *als* ‘if’ for non-conditional, purely temporal relations, as in (25) below.

- (25) {*Als/Wanneer*} je morgen wakker wordt, krijg je een cadeau.
 {*#If/When*} *you wake up tomorrow, you will get a present.*

In English, it would be mandatory to use *when* instead of *if*.¹⁸ While this example is clear, this is not always the case. As Overdiep (1937, p. 589) argues, ‘[this type of] adverbial temporal clause introduced by *als* almost inevitably describes a future event; therefore the function of the adverbial temporal clause is hard to distinguish from that of the adverbial conditional clause’. In the historical dictionary of Dutch *WNT*, this ambiguity is observed too: ‘Not always unambiguously separable from conditional *als*’.¹⁹ The difference between *als* ‘if’ and *wanneer* ‘when’ as conditional and temporal conjunctions is, as remarked in a footnote, not pursued any further by van Belle (2003, p. 67), although he

¹⁷‘Clause-final position’ is used here in the sense of Broekhuis and Corver (2016, pp. 1245–6), who argue that the term should not be taken to mean that the finite verb ‘demarcate[s] the right boundary of the clause’, as it can be followed by other constituents, such as prepositional phrases. Rather, it is taken to mean that the finite verb is ‘in the right periphery of the clause’.

¹⁸Although this does not mean *when* is never used in English for the expression of a conditional. It is listed in the *Top 50 Grammar Mistakes* (Wallwork, 2018, pp. 41–43).

¹⁹Original text: ‘Niet altijd ondubbelzinnig te scheiden van bet. 1.1.2 “als, wanneer”’.

does mention that the conditional use of *wanneer* ‘when’ is more formal than *als* ‘if’, and that *wanneer* ‘when’ cannot be used in counterfactuals, such as in his example reproduced in (26) below. Duin (2011), however, presents an attested counterexample, as adapted in (27).

- (26) { *Als/?Wanneer/Indien* } de marsmannetjes ons overvallen, blijft niemand van ons in leven. (van Belle, 2003, p. 67)
 {If/?When/In case} *the Martians are attacked, none of us will live.*
- (27) Een verdiende zege voor DZC’09 die zelfs nog hoger had kunnen uitpakken *wanneer* ze het nog wat slimmer hadden uitgespeeld. (Duin, 2011, p. 25)
A deserved victory for DZC’09 that could have turned out even higher
 {if/?when} *they had played a little smarter.*

In fact, more counterexamples can be found.

- (28) Het zou Wellink én Cornet hebben gesierd *wanneer* ze hadden ingezien dat een gentleman die zes maanden in zijn eigen levensonderhoud zou hebben voorzien. (WR-P-P-G-0000004603)
It would have made Wellink and Cornet look good {if/?when} *they had realised that a gentleman would have provided for himself for six months.*

This is in line with the argument in section 2.5.4, in which I argued, along the lines of Karttunen and Peters (1979b, pp. 5–6), Langacker (2008, p. 302), and Dancygier and Sweetser (2005, p. 76), that subjunctive conditionals are better described in terms of implicatures of epistemic distancing than in terms of (semantic or presuppositional) counterfactuality. While, as Duin (2011, p. 36) shows, *wanneer* ‘when’ may be used less often in counterfactual contexts, it is not wholly incompatible. Other factors, most notably considerations of style and formality, are of influence. This point will, for reasons of space, not be taken up further here. The detailed classification of conditional-temporal *als*-sentences by Pollmann (1975) makes clear in which contexts the ambiguity in question arises. For Pollmann, the example in (29) below is ambiguous, because it can be used to express either the speakers certainty about the guests coming tomorrow (i.e., the temporal, *when* interpretation), or to express the speakers uncertainty about the guests coming (i.e., the conditional, *if* interpretation).

- (29) *Als* de logés morgen komen, vinden ze de kamers op orde. (Pollmann, 1975, p. 190)
 {If/When} *the guests arrive tomorrow, they (will) find the rooms in order.*

Pollmann shows that this ambiguity is highly context-dependent and can shift by switching between definite and indefinite descriptions (i.e., ‘If *guests* come tomorrow’ and ‘If *the guests* come tomorrow’) and the place of time adverbials, as in the difference between (29) and (30) below.

- (30) *Als* morgen de logés komen, vinden ze de kamers op orde. (Pollmann, 1975, p. 189)
 {If/When} *tomorrow the guests arrive, they (will) find the rooms in order.*

In this example, Pollmann (1975, p. 190) argues, the speaker does not take into account the possibility that the guests might not come. As can be seen, these judgements are not clear-cut and in the samples used in this study too, a number of such ambiguous cases was found, such as (31).

- (31) Het recht op toekenning of behoud van de persoonlijke garantietoeslag vervalt als de werknemer [...] met (vroeg)pensioen gaat. (WR-P-P-F-0000000014)
The right to grant or retain the personal guarantee allowance lapses if the employee [...] takes (early) retirement.

As this example concerns retiring, which is tied to a certain age, the antecedent can be interpreted as ‘the moment in time the employee retires’, but here, it seems that retiring is presented as a condition for losing the right on an allowance. Although this specific example was treated as conditional, both interpretations can be argued for. As context was included in the samples, in most cases, the preceding texts were used to exclude certain interpretations. A final point related to this discussion is that, as we saw, the uses of *als* and *wanneer* do not coincide with the conditional-temporal distinction to the same extent as English *if* and *when*. Including purely temporal uses of *als* ‘if’ in the corpus, therefore, would amount to including a specific use of Dutch *als* not found (to the same extent) for English *if*, as it would be expressed by another conjunction (*when*).²⁰ Given that the literature used to identify types of conditionals and their suggested linguistic features was based on English *if* only, I chose here to limit the included uses of *als* ‘if’ to conditional uses.

In this section, I discussed which sentences containing the conjunction *als* ‘if’ are included as conditionals in the corpus. We have seen which criteria were used for the identification of conditional *als*-sentences. In the next section, I will present the final sampling frame, before continuing with the discussion of the annotation of data in section 4.5.

4.4.5 Final sampling frame

As *als* ‘if’ is the default conditional conjunction in Dutch, each sample contained a sufficient amount of occurrences. While sample size is important, it is often hard to calculate exactly the number of observations needed for a study to be considered representative and include an appropriate dispersion of the variables involved. The strategy followed here was to strive for a sample of 5.000 *als*-conditionals and to check for dispersion of individual features. This number was chosen by practical argument mostly, as it was large enough for the quantitative analyses presented in the next chapters, while manual annotation was still feasible. This is not to say that there was no more systematic or principled way of evaluating this sample size. For this, as we will see in the next chapter, I have

²⁰As we will see below, not only can *als* ‘if’ be used to express temporal relations, but *wanneer* ‘when’ can also be used to express conditional relations.

performed an initial annotation of a random sub-sample of 500 conditionals to check for dispersion of features. The feature value with the lowest frequency was second-person plural subjects (see section 5.7), which, in this sub-sample, occurred only 2 times in all antecedents and 2 times in all consequents. Crucially, although these numbers are, of course, low, it did indicate that the final sample of 5.000 conditionals would not be void of any non-occurring individual feature values. Before the final sampling frame is presented, including the intended and realised frequencies within each sample, a remark about the sample ‘discussion list’ is in order.

Whereas the full sample of discussion list data in the SoNaR corpus is gathered from a number of sources, almost all data from the Netherlands appear to be gathered from the discussion list section of the website *Ouders Online* ‘Parents Online’, which is mainly used by (soon-to-be) parents. While these data are valuable, this poses problems for the representativity of the respective sample. For instance, almost all discussions in the discussion list data were between women in a narrow age range and revolved around the theme of having babies, raising children and relational problems with partners and parents-in-law. To solve this problem, the administrators of several large Dutch discussion lists were contacted to ask for a sample of their data. Given the time in which this was done – around the same time the General Data Protection Regulation was heavily covered in the news – administrators were reluctant to provide even anonymised, sampled data.²¹ The technology-oriented discussion list *Tweakers*, however, was willing to supply data. While this is not ideal (i.e., more sources would have been preferred), most of the discussion list data in the sampling frame below now comes from not one, but two sources. The upside is that the demographics and topics of both discussion lists differ significantly. A second addition concerned the sources for the formal written texts in the SoNaR corpus, which are largely newspaper articles, newsletters and press releases, whereas legal texts and policy documents are limited. Therefore, I have added texts from five academic journals to the sampling frame, to reach the required number of formal texts outside newspaper texts.²²

With the remarks above in order, the sampling frame is presented in Table 4.5 below.

²¹See <https://gdpr.eu>. I have consulted a Leiden University lawyer (personal communication) on this matter, who ensured anonymous, non-traceable data would not introduce any legal issues.

²²The texts were extracted from the Dutch academic journals *Nederlands Tijdschrift voor Geneeskunde* ‘Dutch Journal of Medicine’, *Tijdschrift voor Geschiedenis* ‘Journal of History’, *Algemeen Nederlands Tijdschrift voor Wijsbegeerte* ‘General Dutch Journal for Philosophy’, *Nederlands Tijdschrift voor Handelsrecht* ‘Dutch Journal of Commercial Law’, and *Tijdschrift voor Criminologie* ‘Journal of Criminology’. Linguistics journals were excluded to prevent inclusion of references to linguistic phenomena and metalinguistic terminology.

Table 4.5:
Final sampling frame

Mode (2500)	<i>n</i>	Register (1250)	<i>n</i>	Genre (625)	<i>n</i>
Written	2462	Formal, informational	1240	Newspaper, newsletter, press release	690
				Legal, policy, academic journal	550
		Informal, involved	1222	Discussion list	605
				Chat, SMS	617
Spoken	2406	Formal, informational	1186	Broadcast news	600
				Political discussions	586
		Informal, involved	1220	Spontaneous conversations	599
				Telephone conversations	621
Total					4868

Note. Targeted frequencies per dimension are represented between parentheses.

As we can see here, due to data selection, not all intended frequencies were achieved in full, but a total size of 4868 was deemed close enough to the intended 5000 conditionals.

4.4.6 Conclusion

In this section, we reviewed the considerations that led to the design of the current corpus. I have discussed the necessary steps to assure representativeness by means of a well-balanced corpus. As became clear in chapter 2, there is no consensus on a clear definition of conditionals in natural language, and atop that, in Dutch, it is not always possible to unambiguously distinguish between conditional and non-conditional use of the conjunction *als* ‘if’, especially in relation to the temporal use of *als* ‘if’. We therefore reviewed the identification of conditional *als* ‘if’ in the corpus, and finally, we discussed the sampling frame. The next section discusses the annotation of the features identified in the previous chapter, which we will turn to now.

4.5 Corpus annotation

4.5.1 Introduction

In the next chapter, the distributions of features identified in the previous chapter will be investigated. Although automatic annotation of grammatical features is preferred (see e.g., Levshina & Degand, 2017), if it can be done reliably, most of the relevant features carefully identified in the previous chapter were not available for such pre-processing. Features were, for the largest part, manually annotated. Therefore, I deem it necessary to elaborate the annotation process and, with an eye on the experiment presented in section 4.2, to critically assess the reliability of the annotation. In this section, I discuss the notion of agreement briefly, and especially the measures to ensure maximisation of reliability.

4.5.2 Reliability measures

As we saw in section 4.2, the application of classifications to natural language conditionals did not produce high reliability scores, (partly) due to the fact that the classifications tested represent coherence relations that are not often explicitly marked in conditionals. This problem of linguistic underspecification extends to lower-level features, for which ambiguities may arise as well, such as in the case of modal verbs. A clear example is provided by Boogaart and Reuneke (2017). The modal verb *must* can be used to express deontic modality, as in (32) below, or to express epistemic modality, as in (33).

(32) He must be home by 6, so he should really go now. (Boogaart & Reuneke, 2017, p. 199)

(33) He must be home since the lights are on. (Boogaart & Reuneke, 2017, p. 199)

In these examples, the linguistic context of ‘he must be home’ singles out either deontic or epistemic use, but annotating natural-language data, one is not always so fortunate, and ‘he must be home’ may very well be the complete observation to be coded for type of modality. This means that, even when using a bottom-up approach as argued for in section 4.3, this problems needs to be dealt with.

Spooren and Degand suggest low reliability scores for the annotation of coherence relations may be the result of a number of problems. First, disagreement can be a result of ambiguity, as language underspecifies meaning and context guides interpretation, as we have seen in detail in our discussions of implicatures. Second, disagreement can be a result of coding error. Ambiguity as a result of linguistic underspecification puts ‘perfect agreement’ out of reach, whereas the second type of disagreement should tell us ‘something about the stability of our coding scheme and the theoretical conclusions that can be

drawn from our analysis' (Spooren & Degand, 2010, p. 251). As this study strives aims at maximally reliable annotation of data, as they form the input for further analysis, the problem must be dealt with in a systematic way. Therefore, five steps were taken to reach for maximum reliability of annotation. Note that a second annotator was asked to aid in annotation, which was vital for a number of steps discussed below.²³

The first step in reaching maximally reliable annotations of the features distilled from the literature was writing clear annotation guidelines for each feature. Each feature received a general description, criteria for classification, and codes for the actual labels to be applied. Furthermore, they were accompanied by examples. The guidelines were discussed with the second annotator before annotation began. For transparency and future use, they can be found in Appendix A. Because, as was discussed above, natural-language data tend to be more 'messy' than textbook examples, and no complete inventory of possible feature values was available for most features, the guidelines were fine-tuned by both annotators during the process.

The second step was to include not only the conditional sentences in the corpus, but also their adjacent sentences. Given the number of sentences and features in the main corpus, this context was limited to one sentence preceding, and one sentence following the conditional sentence. In most cases, this provided sufficient context to annotate context-dependent features, but I admit that it is, given the complex nature of natural language data, limited. I have tried, however, to balance the need for detailed analysis and the need for a large number of conditionals.

The third step was to include comments to observations when in doubt. Sometimes a feature may receive multiple interpretations, as was discussed above. In such cases, one value was chosen, and the considerations were included in the comments column in the corpus.

The fourth step was to randomly select a subset of 10 percent of all *als*-conditionals in the corpus. This sample of approximately 500 sentences was annotated for all features independently by both annotators. The annotations were then subjected to measurements of inter-rater agreement. In the table below the percentage of agreement is reported, as is Cohen's Kappa (Cohen, 1960). The latter is included, because it is the most used measurement of agreement, making these results ready for comparison to other annotation studies. However, Cohen's Kappa does not correct for the influence of features with disproportionately frequent values, i.e., the problem of so-called *category prevalence*. We will deal with this in the next section shortly. The results of this systematic assessment of annotation reliability are presented and discussed in the next section.

²³(Then) MA student in Linguistics M. P. M. Bogaards was found willing to carry out annotation tasks as part of a research internship in the project.

The last step to maximise the reliability of annotation follows up on the suggestion in section 4.2, and was to select the cases of disagreement between annotators and discuss them in detail. Please note here that this was done *after* calculating the reported inter-rater agreement scores. In most cases, these discussions led to agreement. However, as specific cases of disagreement often shed light on the ambiguities that are part of natural language, they are discussed in some detail in the sections reporting on individual features in chapter 5. The motivation for this discussion is to see which proportion of disagreement was due to mistakes like mislabelling, and which disagreements suggested an actual, systematic difference of opinion of an ambiguous case (cf. the difference mentioned by Spooren & Degand, 2010)). After discussion, these insights into systematic differences and agreed upon annotations were used to improve the annotations in the main corpus.

4.5.3 Calculation of agreement

In this section, I discuss the indices of reliability used by means of the calculation of agreement between annotators. I will present and briefly discuss the results of these calculations, whereas a detailed discussion of disagreements per feature is postponed until next chapter.

As mentioned above, the simplest way of calculating and reporting the level of agreement between annotators is to use the percentage of cases in which they agree. The use of raw percentages as indices of agreement is heavily debated, however (see e.g., Banerjee et al., 1999). On the one hand, raw percentages provide easily interpretable measures of agreement between annotators, and therefore they are included in the table below, but on the other hand, it does not take into account that agreement can be reached by chance (cf. Cohen, 1960), in which case chance correlates with the number of categories available (i.e., the lower the number of categories, the higher the chance on agreement). Cohen’s Kappa (Cohen, 1960), and variations such as Fleiss’ Kappa (Fleiss & Cohen, 1973), correct for chance agreement, but do not take into account asymmetries in frequency distributions within features. When one category is more prevalent than others, this could lead to high agreement but a low Kappa (Gwet, 2008, p. 33). Therefore, agreement coefficients in the form of Gwet’s *AC1* (Gwet, 2014) were calculated.²⁴ Because of the interpretability of percent agreement and the widespread use of Kappa in many research fields, these measurements are also reported below.

Gwet’s *AC1* was used for assessment, as it explicitly corrects for trait prevalence (Gwet, 2008; Gwet, 2014, pp. 59–60; see also the paradoxes discussed in Feinstein & Cicchetti, 1990; Cicchetti & Feinstein, 1990). While other features have prevalent categories too (for example, an overwhelming majority of clauses in conditionals has simple present verb tense, see section 5.4), we will look briefly at sentence type. The percent agreement for this feature is 0.93,

²⁴Krippendorff’s Alpha (Krippendorff, 2004; Hayes & Krippendorff, 2007) were not included. For a detailed discussion, see Gwet (2011).

whereas Cohen’s Kappa is only 0.72. The reason for this is that declarative sentences, as one might expect, are much more frequent than any of the other sentence types. This consequently impacts the probability of chance agreement. Gwet’s *AC1* coefficient corrects for this and results in 0.92. The most extreme difference can be observed when looking at focus particles, with 93 percent agreement, but a Cohen’s Kappa value of only 0.57, which is partly due to choices in coding of this variable. Therefore, a brief discussion of so-called non-necessary features is in order.

4.5.4 Non-necessary features and missing values

In principle, every conditional, apart from the insubordinate cases, has a consequent and thus a sentence type of that consequent. The classification of consequents into sentence types is both mutually exclusive, as each consequent is of one sentence type only, and exhaustive, as the four sentence types discussed in section 5.8 cover all possibilities. This is not the case for, for instance, focus particles, because not all conditionals are accompanied by a focus particle. In fact, only a minority of conditionals is. The question then is how to annotate the cases without a focus particle.

Two options are available. First, we could treat these cases as missing values and code them accordingly as ‘NA’.²⁵ If both annotators agree on this for a particular sentence, the sentence is basically ignored in the calculation of agreement (i.e., ‘pairwise deletion’, see e.g., Peugh & Enders, 2004; de Raadt et al., 2019). However, conceptually, one could argue that these annotations are not missing data, or data that could not be collected, but data indicating that there was an absence of the feature, which could be argued to be a category in itself. To be clear, ‘missing data’ are defined in the literature on reliability measures and imputation of data as the results of situations in which ‘some observers do not attend to all recording units’ (Krippendorff, 2004, p. 222) and ‘data are considered missing if one or both ratings of a unit are missing’ (de Raadt et al., 2019, p. 559; see also Enders, 2010, chapter 1). As this is not the case here, conditionals without a focus particle were annotated for that feature using the value ‘no’ instead of ‘NA’, i.e., ‘units with only one missing rating are considered and treated as disagreements, whereas units with two missing ratings are treated as agreements’ (‘regular category kappa’ de Raadt et al., 2019, p. 564; see also Strijbos & Stahl, 2007). As Strijbos and Stahl (2007; cited in de Raadt et al., 2019, p. 560) show, different ways of dealing with missing data can produce very different agreement scores. As a result of using the ‘regular category kappa’ strategy, ‘no’ was a highly prevalent trait for the focus particle data.²⁶ Using *AC1* corrects for this, whereas Cohen’s Kappa does not. Because, as mentioned above, the different ways of dealing

²⁵‘NA’ stands for either ‘not available’, i.e., the feature exists in a given case, but is has not been annotated, or ‘not applicable’, i.e., the feature does not exist in a given case.

²⁶The use of this strategy was also discussed with Matthijs J. Warrens (p.c.), the corresponding author of de Raadt et al. (2019).

with missing data may lead to different reliability assessments, I will include the results of both strategies in the table below. However, I note here that, while highly prevalent traits and binary coding into ‘present’ and ‘absent’ categories are discussed at length in the statistical literature on reliability assessment, the specific situation at hand is, to my knowledge, not discussed in the literature on either reliability assessment or other corpus linguistic studies.²⁷ Therefore, I decided to include the agreement scores for both strategies dealing with missing data (i.e., regular category kappa, pairwise deletion) for non-necessary features, which, in this study, are modality, negation, and focus particles.

4.5.5 Results of agreement calculations

The results from the agreement calculations are presented in the table below, followed by a short, general discussion. Detailed discussions are provided in each feature’s section. If a feature is accompanied by ‘(a, c)’, this means that the feature was annotated for both the antecedent and the consequent. If the feature is accompanied by ‘(c)’ only, this means the feature is only applicable to the consequent. Lastly, if the feature is not followed by parentheses, this means that the feature is annotated for the conditional as a whole. This convention is followed throughout the remainder of this dissertation.

Table 4.6:
Inter-annotator agreement scores per feature

Feature	%	Cohen’s κ	<i>AC1</i>
Clause order	88	0.79	0.86
Syntactic integration	88	0.85	0.87
Verb tense (a, c)	95, 91	0.82, 0.78	0.94, 0.90
Modality (a, c)	83, 91	0.79, 0.82	0.94, 0.89
	<i>67, 73</i>	<i>0.53, 0.62</i>	<i>0.60, 0.68</i>
Aspect (a, c)	79, 74	0.70, 0.65	0.75, 0.69
Person & number (a, c)	94, 86	0.92, 0.82	0.93, 0.84
Sentence type (c)	93	0.72	0.92
Negation (a, c)	93, 93	0.81, 0.85	0.92, 0.92
	<i>73, 78</i>	<i>0.59, 0.66</i>	<i>0.65, 0.72</i>
Focus particles	95	0.65	0.95
	<i>49</i>	<i>0.45</i>	<i>0.46</i>

Note. Italics indicate pairwise deletion scores.

²⁷This was also discussed with Stefan Th. Gries during the Summer Institute of the Linguistic Society of America (LSA; personal communication, July 2, 2019).

Interpreting the figures in Table 4.6 along the lines of Landis and Koch (1977), all features reached substantial (0.61-0.80) to almost perfect (0.81-1.00) agreement.²⁸ This is somewhat surprising in two ways.²⁹

First, I expected certain features, such as clause order, to reach almost 100 percent agreement (not necessarily corresponding to an equally high *AC1*, given distributions of feature values). After all, such a feature was not considered interpretative, but objectively classifiable. Although I will postpone more detailed discussion of this feature until the next chapter (see section 5.2), the main reason for the lower outcome is that a sentence such as in one in (34) below can be either classified as sentence-initial, focusing on *als* as the starting point of the conditional, or sentence-medial, focusing on the conditional as intercalated in the subordinated clause (see also the discussion in Reuneker, 2016).

- (34) Ja maar ik neem wel aan dat jij als je naar Spanje gaat dat je dan al Spaans kent. (fn007887)
Yes, but I assume that you if you go to Spain that you already know Spanish then.

The decision made in this case was to regard this example as a sentence-medial case, because the conditional clause is inserted between the subject *jij* ‘you’ and predicate *je als Spaans kent* ‘you already know Spanish’, and because we see resumptive *dat* ‘that’ after the conditional clause and, finally, because the main clause has a verb-final word order typical for subordinated clauses, but not for main clauses of conditionals. (For a more detailed discussion of such cases, see section 5.2.)

Second, even a highly interpretative feature like *modality* scores *AC1* values of 0.94 and 0.89. This cannot be due only to prevalence of the ‘no’ category, as the ‘uncorrected’ Kappa is high too. Also notice the relatively high scores on the pairwise deletion strategy for a number of features in Table 4.6. During the post-annotation discussion between annotators it indeed seemed to be the case that in most cases, the annotators agreed on the type of modality of the clause and the motivation behind that classification. The lowest agreement was reached for (lexical) aspect, both in the antecedent and the consequent. This probably reflects the complex and interpretative nature of this feature (see section 5.6).

²⁸There is criticism on using these boundaries. However, as Landis and Koch (1977, p. 165) remark, ‘although these divisions are clearly arbitrary, they do provide useful “benchmarks” for the example they are discussing. I’m using these figures in the same vein here.

²⁹Also note the substantial difference between the regular category scores and pairwise deletion scores for focus particles. This is due to the low number of focus particles in general, which, as discussed above, increases the impact of disagreements.

4.5.6 Conclusion

In this section, I argued for the necessity of maximising the reliability of corpus annotation, and I suggested multiple steps before, during and after the annotation process, with a focus on chance- and distribution-corrected measurement of inter-annotator agreement. Before discussing the actual features and their distributions, I will offer an account of how the distributions of features and their associations to the dimensions *mode* and *register* are analysed in the following section.

4.6 Data analysis

4.6.1 Introduction

Before discussing the distributions of each individual feature in the next chapter, I will discuss the analysis and presentation of the data, in order to prevent redundancy by doing so for each individual feature. Although the data for each feature differ, the analysis thereof follows the same steps and assessments. These will be discussed below.

4.6.2 Data presentation

All (multi-level) features are compared on two dimensions, namely *mode* (spoken, written) and *register* (formal, informal). As there are multi-level features and two dimensions, the tables presenting these distributions of features tend to become large and complex. Therefore, I used the ‘division of the visual processing of graphical displays into pattern perception and table look-up’ by Cleveland (1993) to present the distributions visually for overview, while offering a more detailed view of the data by means of tables in Appendix B. For each feature, a reference to the respective section in the aforementioned Appendix will be provided.

The features will be analysed individually first in chapter 5 and explored collectively in chapter 6. The reason for doing so is that the first step allows for a detailed account of each feature, including a discussion of the literature on that feature, and an inspection of its distribution over the dimensions of *mode* and *register*. However, these features are part of the conditional constructions under discussion, and they do not occur in isolation. This means that a univariate analysis alone will not do. After all, we want to know how these features work together in interaction to give rise to implicatures of unassertiveness and connectedness. In the next section, I will discuss the univariate analysis of the data, while the specification of the (multivariate) cluster analysis as introduced in section 4.3 is postponed until chapter 6.

4.6.3 Analysis of individual feature distributions

As all features are categorical variables, and the data for which they are annotated are the same across features, the setup of these tests is the same throughout the next chapter. For each feature, its distribution over mode and register is presented. As each feature may involve associations to mode and register, more than two variables are involved in testing these associations. A simple goodness-of-fit test, such as the well-known chi-square test, will not suffice, as this would only account for main effects between two variables only. We are interested not only in associations between two variables, but in associations between more than two variables, including their higher-level associations or *interactions*. Therefore loglinear analysis was used to analyse the data (see Agresti, 2007, pp. 204–243), which is a multidimensional extension of the chi-square test. This non-parametric type of analysis is ‘regarded as the method of choice for analysing multidimensional contingency tables’ summarising categorical data (McEvoy & Richards, 2001, p. 867). Loglinear analysis constitutes a modelling approach, which means that its objective is to find a parsimonious model that fits the data best. As such, loglinear models combine evaluation of the fit between observed and expected cell counts with testing of main and interaction effects. This approach is also referred to as ‘ANOVA for categorical data’ (Scheepers, 2017, p. 887).

In the next chapter, we will use loglinear analysis to try and explain the data by finding the smallest set of variables and their interactions that estimate the distributions of the feature of interest (for an introduction to loglinear analysis, see Everitt, 1977; Kuroda, 2007).³⁰ In order to arrive at the most parsimonious model, backward elimination was carried out (see e.g., Howitt & Cramer, 2008, chapters 38, 39; Kuroda, 2007, p. 115; Desarbo & Hildebrand, 1980, pp. 45–46), which means that for each of the features, the full (saturated) model formed the starting point of analysis. This model always perfectly fits the data, but in most cases, it is unnecessarily complex. Therefore, components of the model were removed subsequently, starting from the highest-level interactions, until the model reached a significantly worse fit to the data. The last model with a non-significant difference to the actual data is the model chosen for further inspection by breaking down the higher-order effects (McEvoy & Richards, 2001, p. 869). Note that, like the majority of models constructed using loglinear analysis, the models in this study are hierarchical, meaning that a model including a higher-order interaction also contains the lower-order interactions and main effect of that interaction (see e.g., Desarbo & Hildebrand, 1980, p. 43). In case of significant higher-order associations (in this case, two-way and three-way interactions), the effects were broken down using separate chi-square tests (Field, Miles & Field, 2012, p. 850). In case of significant associations, a measure of strength of association was calculated, because the significance of an associ-

³⁰Although loglinear analysis is seen as the categorical variant of analysis of variance for continuous data (ANOVA), please note that no distinction between dependent and independent variables is made in loglinear analysis.

ation does not tell the strength of the association (cf. Acock & Stavig, 1979, p. 1381). In other words, a significant association between for instance clause order and mode (spoken vs. written text) does not tell us what the size of this effect is. Therefore, Cramér's V (Cohen, 1992) was calculated as a measure of strength of association.^{31,32}

As may be expected from large samples and multiple variables, many associations and interactions turn out to be statistically significant. As models resulting from loglinear analysis may involve complex interactions, they are not always easily interpreted. Therefore, in breaking down the higher-order effects, I found it insightful to evaluate which frequencies contributed significantly to the overall association found. One way to do this, is to perform post-hoc tests on all comparisons in the main distribution, which comes down to generating and testing each of the (broken-down) 2x2 tables. The resulting p values then need to be evaluated using the Bonferroni correction (see Harris, 2001, pp. 13–41 and Cabin and Mitchell, 2000 for a critical discussion of this correction). This correction comes down to dividing the standard alpha level α of 0.05 by the number of comparisons, resulting in a new, lower alpha level α' , as shown below in (35).

$$(35) \alpha' = 1 - (1 - \alpha)^{1/k}$$

Only those distributions that resulted in p values below α' are considered to be associated significantly to the dimension in question. Despite the apparent usefulness of such post-hoc testing, the results of these tests, especially for large tables, are not always readily interpretable in relation to the main features discussed. The reason for this is that all levels of dimensions are tested against each other individually, and not against the rest of the distribution. Furthermore, the Bonferroni correction is considered too conservative by some scholars (see e.g., Gries, 2013, pp. 273–274). Therefore, I chose to use the standardised residuals from the chi-square test instead (see Agresti, 2007, p. 87), which provide information on the extent each cell contributes to the significant outcome of the omnibus test. These residuals reflect the ratio of the difference between the observed and expected frequency to the standard deviation of the expected frequency, and are comparable to z -scores (see Field, Miles & Field, 2012, p. 826),

³¹In many cases in this study the tables are larger than a 2x2 contingency table because, for instance, a feature like verb tense may take four verb tenses as values. Cramér's V takes the χ^2 value and divides it by the number of observations N multiplied by $k-1$, where k is the lowest number of categories (either rows or columns in the contingency table). As k is variable, this formula can be used for contingency tables of sizes exceeding 2x2.

³²The following value ranges (Cohen, 1988, pp. 79–80) are used here to evaluate effect size.

1 degree of freedom: ≥ 0.10 , small; ≥ 0.30 , medium; ≥ 0.50 , large.

2 degrees of freedom: ≥ 0.07 , small; ≥ 0.21 , medium; ≥ 0.35 , large.

3 degrees of freedom: ≥ 0.06 , small; ≥ 0.17 , medium; ≥ 0.29 , large.

Although Cohen (1988) does not provide guidelines for $df > 3$, these can be calculated by dividing the $df=1$ thresholds by the square root of the desired degrees of freedom, resulting in the following guidelines (see also Kim, 2017, p. 154).

4 degrees of freedom: ≥ 0.05 , small; ≥ 0.15 , medium; ≥ 0.25 , large.

5 degrees of freedom: ≥ 0.04 , small; ≥ 0.13 , medium; ≥ 0.22 , large.

meaning that they are a measure of how significant the contribution of each cell of a table is with respect to the overall chi-square value. A standardised residual of 0 would mean that the frequency of the corresponding cell does not deviate from what was expected based on the overall distribution, in turn contributing nothing to the chi-square value. The stronger the standardised residual deviates from 0, the greater the contribution of that cell to the chi-square value (see e.g., Delucchi, 1976, p. 314; Agresti, 2007, p. 38; Sharpe, 2015, p. 2). A standardised residual outside ± 1.96 is significant at $p < 0.05$, a value outside ± 2.58 is significant at $p < 0.01$, and a value outside ± 3.29 is significant at $p < 0.001$ (cf. Field, Miles and Field, 2012, pp. 825–826; see also Sharpe, 2015, p. 3 for discussion on Bonferroni correction of these alpha levels). In other words, these values tell us whether the cell of a table contributes to the chi-square value, and if so, whether it is a weak or major contributor.

4.6.4 Conclusion

In this section, I explained how comparisons between distributions on the dimensions *mode* and *register* will be presented and analysed. As the distribution of each feature will be compared on two dimensions (mode, register), loglinear analysis will be used in the next chapter, because there may be interactions between these dimensions and features. I have also discussed the general approach to breaking down high-order effects by testing multiple lower-level associations in the final models and using standardised residuals to interpret the direction and strength of the associations found.

4.7 Conclusion

In this chapter, we first discussed the reliability of annotating types of conditionals in corpus data. The results showed that reliability was low, and the ramifications of this finding led to the choice for a bottom-up approach to conditionals, and more specifically, the clustering of grammatical features to inspect their relations to implicatures of unassertiveness and connectedness. I introduced the analyses that will be used to investigate the individual distributions of features, while a detailed account of the cluster analyses on the collective feature set was postponed until chapter 6.

As annotated features form the input of further analyses in this study, the construction of a representative and balanced corpus was discussed, and with it, the choice for a language-specific corpus study of Dutch conditionals. I also discussed the need for, and construction of a representative and balanced corpus. Before the final sampling frame was presented, the identification of the conditional use of the conjunction *als* ‘if’ was discussed, as it strongly determined which sentences were included in the corpus of Dutch conditionals. Next, I discussed several measures taken to ensure a high level of reliability of the manual annotation of corpus data. This resulted in annotation guidelines, double-blind

and independent annotation of a subset of the data, measurements of inter-rater agreement and post-annotation discussion. I also reviewed the results of inter-agreement calculations on the annotations in general, and postponed their detailed discussion per feature until next chapter.

Finally, I described the data presentation and (quantitative) analysis. This enables us to use the general setup for each individual feature in the next chapter, in order to get a detailed view of how the features are distributed over the parts of the aforementioned corpus. With these preliminaries set, we are ready to discuss each of the features related to specific implicatures of unassertiveness and connectedness inventoried in chapter 3 in the following chapter.

CHAPTER 5

Grammatical features of Dutch conditionals

5.1 Introduction

In the previous chapter, I presented the corpus-based approach to conditionals employed in this study, the data selection and the annotation of features in the corpus. Furthermore, I discussed, in general terms, the statistical procedures used for data analysis in this dissertation. In this chapter, I discuss each of the features identified in chapter 3 individually, to arrive at a thorough understanding of possible factors in licensing implicatures of unassertiveness and connectedness.

The main aim of this chapter is to present, analyse and discuss the distributions of features that were linked to implicatures of unassertiveness and connectedness in chapter 3. These features are discussed individually and in detail in this chapter. This is needed to enable discovering groups of conditionals using the data-driven, unsupervised analyses argued for in chapter 4, which take the collective feature set as input (see next chapter). Furthermore, I hope this chapter will be useful to other researchers in future studies of conditionals independent of the goals aimed at here, as it provides an overview of the grammar of conditionals in Dutch. Each relevant feature identified in the literature on English conditionals is inspected for Dutch conditionals, and in this sense, this chapter also functions as a bridge between a more theoretical approach, mostly on English conditionals, and a data-driven, corpus-based approach to conditional constructions in Dutch. Finally, I included a comparison of each feature distribution to results from previous studies on these features. Although this sometimes adds significantly to the magnitude of this (admittedly already

extensive) chapter, the reason for doing so is that a thorough understanding of possible factors in distributions of individual features must be taken into account in the multivariate analysis in the next chapter, which aims to finding clusters of features, which can subsequently be used for identifying possible implicatures of those clusters. This chapter therefore does not only maximise the understanding of features in their grammatical contexts, but it also minimises the risk of overlooking known factors involved in distributions which could influence the results presented in the next chapter. As such, this chapter completes the preliminary work for answering the second research question, namely to what extent the grammatical features of conditionals contribute to specific implicatures of unassertiveness and connectedness, and consequently, to what extent conditionals in Dutch form a network of constructions.

The features discussed in this chapter are clause order (section 5.2), syntactic integration (section 5.3), verb tense (section 5.4), modality (section 5.5), (lexical) aspect (section 5.6), person and number (section 5.7), sentence type (section 5.8), negation (section 5.9) and focus particles (section 5.10). In section 5.11, a summary of feature distributions in Dutch conditionals is presented as conclusion to this chapter.

5.2 Clause order

5.2.1 Introduction

The order in which the antecedent and the consequent of a conditional are presented, i.e., *clause order*, has been widely researched, mostly in discourse-oriented studies. In most cases, pragmatic effects are attributed to the different clause orders, and their distributions have been shown to differ between modes and registers.¹

In this section, I discuss the clause orders occurring in Dutch conditionals in 5.2.2. I will discuss their annotation in 5.2.3, and in section 5.2.4, I will present the distribution of these orders in the corpus. After that, I will compare the results with insights from the literature in section 5.2.5 and, finally, I will provide a conclusion in section 5.2.6.

5.2.2 Clause orders

In the majority of studies on clause order in conditionals (see section 5.2.5 below), two orders are distinguished: conditionals with sentence-initial antecedents, as in (1), and those with sentence-final antecedents, as in (2).

¹Parts of this section have been extended and published as A. Reuneker (2020). ‘Clause Order and Syntactic Integration Patterns in Dutch Conditionals’. In: *Linguistics in the Netherlands* 37, pp. 119–134. DOI: <https://doi.org/10.1075/avt.00041.reu>. This paper has been awarded the *Academische Jaarprijs van de Maatschappij der Nederlandse Letterkunde voor het beste artikel op het gebied van de Nederlandse taalkunde 2019-2020* ‘Academic Year Award of the Society of Dutch Literature for the best paper on Dutch linguistics 2019-2020’.

- (1) Als de partijen er dit weekend niet uitkomen dan zijn er maandag in hele land acties in de ziekenhuizen. (fn002695)
If the parties cannot resolve their dispute this weekend, then there will be strikes in hospitals throughout the country on Monday.
- (2) Je hebt gelijk als je bedoelt dat het eerder ons probleem is en niet die van onze dochter. (WR-P-E-A-0004734842)
You are right if you mean that it is our problem rather than our daughter's.

The tendency in the literature is to present the sentence-initial antecedent as the default order. Greenberg, for instance, declares it as the following universal.

Universal 14: In conditional statements, the conditional clause precedes the conclusion as the normal order in all languages.
 (Greenberg, 1966, p. 84)

Sentence-final antecedents are seen as ‘syntactically marked’ by Declerck and Reed (2001, pp. 39, 367–368), because they are ‘post-script’ remarks usually restricting the ‘truth or applicability’ of the consequent. In contrast to sentence-initial conditionals, as we will see in section 5.3, they are not or less integrated into the main clause, and, as such, they resemble a third order that has been distinguished in a small number of studies (Dancygier, 1998; Auer, 2000; Carter-Thomas & Rowley-Jolivet, 2008; Reuneker, 2017b), namely the insertion of the antecedent into the consequent, also called ‘parenthetical positioning’ (cf. Auer, 2000, p. 10) and ‘intercalation’ (cf. Schelfhout, Coppen & Oostdijk, 2003).² In the examples in (3) and (4), this ‘sentence-medial’ position of the antecedent can be seen.

- (3) Enige tijd na ontvangst van de cd-rom volgt, als u ons niet hebt gemachtigd, een acceptgirokaart voor de betaling voor een bedrag van de kosten van de special, verhoogd met 2,50 administratiekosten. (WR-P-P-D-0000000003)
Some time after receiving the CD-ROM, if you have not authorised us, a cheque will be issued for payment of the costs of the special, plus 2.50 administration costs.
- (4) This tumor is very amenable if it's a carcinoma by biopsy to local excision. (Carter-Thomas & Rowley-Jolivet, 2008, p. 199)

The antecedents in these examples are clearly sentence-medial, as they are inserted into their ‘host sentences’ (cf. Schelfhout, Coppen & Oostdijk, 2003, p. 155). They resemble other parenthetical clauses, such as the example in (5)

²See also Zwaan (1968, pp. 360–362), who does not mention intercalated conditional clauses, but discusses intercalation in general terms and argues that the only formal criterion for the so-called *tussenzin* ‘parenthetical’ is that it ‘is “between”, [and] breaks the order of the sentence’, which is also the case for sentence-medial antecedents, which ‘break’ the consequent into two parts.

below, which illustrates the suggestion by Pollmann and Sturm (1977, p. 140) that such intercalated clauses often express certain types of modality (see section 5.5). As can be seen in the example in (6), we can easily replace the expression of modality *volgens mij* ‘I think’ by a conditional clause expressing the same type of evidential modality.

- (5) Dat is, *volgens mij*, een hele verbetering. (Pollmann & Sturm, 1977, p. 140)
That is, I think, quite an improvement.
- (6) Dat is, *als ik me niet vergis*, een hele verbetering.
That is, if I am not mistaken, quite an improvement.

As can be seen in these examples, sentence-medial antecedents can be inserted between the two parts of the predicate, i.e., the finite verb *volgt* ‘follows’ and the subject *een acceptgirokaart [...]* ‘a cheque [...]’ in (3), or between parts of the predicate, as in (4) in (6). Sentences of the type in (7) are less clearly cases of sentence-medial conditionals, however.

- (7) De Vries meldde wel *dat* als Soliman Rais niet zou zijn neergeschoten, hij eventuele Nederlandse christenslaven *zou hebben vrijgelaten*. (WR-X-A-A-journals-001)
De Vries reported that if Soliman Rais had not been shot, he would have released any Dutch Christian slaves.

When *dat* ‘that’ in (7) is analysed as the first pole of the sentence, the example should be classified as a sentence-medial conditional, i.e., the *als*-clause is inserted into the subordinate clause. It is however also possible to classify this example as sentence-initial, as one could argue that the complete conditional is embedded in another clause and that the sentence-initial order is maintained within the embedded clause. In the remainder of this section, I will discuss how embedded conditionals are analysed with respect to clause order.

Reuneke (2017b) considers all cases such as the example in (7) sentence-medial antecedents. The arguments are the following. First, the embedded clause of the conditional has regular SOV order, as in (8), as opposed to subject-verb inversion typical in main clauses of non-embedded sentence-initial conditionals, as in (9). Consequently, deletion of the *als*-clause in (8) renders a grammatical result, as in (10), whereas deletion of the matrix clause would not. This shows that the word order in the *dat* ‘that’ clause is determined by being a subordinate clause, not by the fact that it is preceded by a (conditional) adverbial clause.

- (8) Het eerste ziektejaar is zo verregaand geprivatiseerd dat, als het fout gaat, pas na een jaar duidelijk wordt hoe het zit. [...] (Reuneke, 2017b, p. 140)
The first year of illness is privatized to such an extent that, if it goes wrong, the situation will only become clear after a year.

- (9) Als het fout gaat, wordt pas na een jaar duidelijk hoe het zit. (Reuneker, 2017b, p. 140)
If it goes wrong, the situation will only become clear after a year.
- (10) Het eerste ziektejaar is zo verregaand geprivatiseerd dat pas na een jaar duidelijk wordt hoe het zit. (Reuneker, 2017b, p. 140)
The first year of illness is privatized to such an extent that the situation will only become clear after a year.

Second, the intonation pattern of an embedded conditional resembles that of the non-embedded sentence-medial type in (3): *als* is stressed and there is an intonation break before and after the conditional clause, after which the intonation pattern of the matrix clause is continued. Finally, data from spoken texts in the corpus revealed that, after the *als*-clause, the speaker often resumes the embedded clause by repeating the subordinating conjunction *dat* ‘that’, as in (11) below.

- (11) [...] u weet ook dat als je iets koelt dat dat je uh uh dat je warmte onttrekt [...] (Reuneker, 2017b, p. 141)
 [...] you also know that if you cool something that you extract heat [...]

Although no conversation-analytic approach is chosen here, such cases resemble a specific form of what Schiffrin (2006) calls ‘type 1 repair’, as in her example in (12) below.

- (12) (a) And for some reason, *they* –
 (b) whether or not she owed rent or something like that,
 (c) *they* were putting her out. (Schiffrin, 2006, p. 45)

Here the speaker ‘begins a clause with *they* and then self-interrupts [...] to insert a qualification that intensifies the injustice about to be reported [...] then returns to the same referent and referring expression’ (Schiffrin, 2006, p. 45). In the same vein, the speaker in (11) starts an embedded clause with *dat* ‘that’, then ‘self-interrupts’ to insert a conditional clause and then returns to the embedded clause by repeating the subordinating conjunction *dat* ‘that’. According to Reuneker (2017b, pp. 139–141), when the complex sentence as a whole is taken into account, *als*-clauses following *dat* ‘that’ should be interpreted as sentence-medial conditionals, as should conditionals in embedded sentences without overt *dat* ‘that’ directly preceding *als* ‘if’, as in (13).

- (13) Uh dus ik zou zelf van mening zijn als we het hebben over het groene Poldermodel dat dat veel breder zou moeten dan het model van de commissie van de SER. (fn000162)
Uh so I would have the opinion if we are talking about the green ‘Polder model’ that that should be much broader than the model of the SER committee.

I note furthermore that the antecedent in this example (*als we het hebben over het groene Poldermodel* ‘if we are talking about the green “Polder model”’) is an adverbial clause occurring in the main (matrix) clause, but which should be interpreted in the embedded clause (cf. Barbiers, 2018, pp. 68–77; see also de Schepper et al., 2014), an issue that will return in the discussion of disagreements between annotators in this chapter.

In (14), the syntactic structure of the host sentence remains the same as in the original example in (13) when the antecedent is removed, although, with this alteration, the consequent becomes a statement in itself, without dependency on a conditional clause.

- (14) Uh dus ik zou zelf van mening zijn dat dat veel breder zou moeten dan het model van de commissie van de SER.
Uh so I would have the opinion that that should be much broader than the model of the SER committee.

The removal of the antecedent from (13), as presented in (14), shows how the host sentence ‘continues after the intercalation as if the intercalation were not there’ (cf. Schelfhout, Coppen & Oostdijk, 2003, p. 155). This is, in a number of cases, also indicated by comma’s in written texts, as in (15) below.

- (15) Want het betekent dat, als je tussen de regels door leest, het Nederlandse en Belgische homohuwelijk eigenlijk door Europa wordt erkend. (WR-P-P-G-0000104844)
Because it means that, if you read between the lines, Dutch and Belgian same-sex marriage is actually recognised by Europe.

In this study, I will take a slightly different approach to embedded conditionals. I will consider a conditional of which the *als*-clause follows the subordinating conjunction *dat* ‘that’ directly, as in (16), to be sentence-initial.³ Conversely, a conditional of which the consequent rather than the antecedent directly follows *that*, as in (17), will be considered sentence-final.

- (16) Plato laat op meesterlijke wijze zien dat als een goed iemand verliefd is, zich een innerlijk conflict in zijn ziel afspeelt, om zijn hartstocht, de mania waaraan hij ten prooi is gevallen, in goede banen te leiden. (WR-X-A-A-journals-001)
Plato masterfully shows that if a good person is in love, there is an inner conflict in his soul to guide his passion, the hysteria to which he has fallen prey.

³Note that in educational and prescriptive grammars, this so-called *dat/als-constructie* ‘that/if construction’ is considered a stylistic error. It is considered a *tangconstructie* ‘plier construction’ (literal translation) or *bijzin-tang* ‘subordinate clause in the middle-field’ (cf. Jansen, 2009), and the advice is to use sentence-final order in such embedded conditionals (see, for instance, the influential prescriptive grammar *Schrijfwijzer* Renkema, 2020, p. 104). See Reuneker and Boogaart (2021) for a comparative account of this construction in usage guides and in language use in corpora, and for the question whether this is indeed a ‘stylistic error’.

- (17) Hij zei dat maatregelen tegen de korpschef niet uitblijven, als diens wangedrag wordt bevestigd. (WR-P-P-G-0000023116)
He said that action will be taken against the chief of police, if the wrongdoing is confirmed.

In (16), the embedded conditional functions as a direct object of *showing*, and in (17), as a direct object of *saying*. The example in (16) resembles a sentence-medial conditional to the extent that the conditional clause is inserted between the subordinating conjunction *dat* ‘that’ and the embedded clause, like the sentence-medial antecedent in for instance (3) is positioned between the finite verb and the subject. In line with the ‘repair’ example in (12) above, repetition of *dat* ‘that’ and the use of *dan* ‘then’ are possible here, as can be seen in the corpus example in (18) below.⁴

- (18) Friedman [...] suggereert dat als geen enkele reductie werkt, dat opschorting dan eerder moet worden gezien als een sui generis houding, een houding op zichzelf die niet verder uitgelegd kan worden. (WR-X-A-A-journals-001)
Friedman [...] suggests that if none of the reductions work, that suspension then should rather be seen as a sui generis attitude, an attitude in itself that cannot be explained any further.

In (17), the conditional clause is not positioned between conjunction and embedded clause, but it is post-posed to the main clause of the conditional. Still, in both cases, the complete conditional is embedded, and the connection between antecedent and consequent must be interpreted accordingly (e.g., in (17) there is a relation between actions taken and confirming of wrong-doing, not between this confirmation and saying). Cases in which the conditional is part of a direct-object clause are analysed in the same way. The example in (19) is thus considered to be a sentence-final conditional, as the complete conditional is part of the direct object of *toetsen* ‘test’ and is followed by the rest of the predicate of the matrix clause.

- (19) De hypothese dat (volwassen) kinderen meer risicovol gedrag vertonen als hun ouders tijdens de socialisatiefase meer risicovol gedrag vertoonden toetsen we opnieuw aan de hand van model A. (WR-X-A-A-journals-002)
The hypothesis that (adult) children exhibit more risky behaviour if their parents showed more risky behaviour during the socialisation phase is tested again using model A.

⁴In a small number of cases, resumptive *dan* is used in embedded sentence-initial conditionals, as in (a) below. See also section 5.3.

- (a) Ik zal ze nooit gebruiken en als je... ze zijn zo flinterdun dat als je ze gebruikt dan buigen ze. (fn008197)
I will never use them and if you ... they are so wafer-thin that if you use them then they will bend.

We will now look at the last possible pattern in embedded conditionals, namely embedded sentence-medial conditionals, as in (20) below.

- (20) Ik heb geleerd dat je, als je veilig een tweebaansweg wilt oversteken, eerst naar links, dan naar rechts, en ten slotte nog een keer naar links moet kijken. (WR-X-A-A-journals-txt-antw-003)
I've learned that you, if you want to cross a two-lane road safely, first have to look left, then right, and finally look left again.

The embedded conditional in (20) has a sentence-medial antecedent, because the antecedent is inserted into the (embedded) main clause, i.e., it is positioned between the subject *je* ‘you’ and the predicate *eerst [...] kijken* ‘first [...] watch’ of the embedded clause. Although these complex structures have a low frequency, they do occur in the corpus.

To summarise, one can consider all embedded conditionals as sentence-medial conditionals based on their resemblance to intercalations (i.e., they do not influence the structure of the clause they are inserted into, they are intonationally differentiated), or one can consider clause order as a feature within embedded conditionals. While embedded conditionals are clearly different from non-embedded conditionals, in the current study, I will treat the order of antecedents and consequents in embedded conditionals the same as in non-embedded conditionals. Although this is a different approach than Reunecker (2017b) takes, the reason is not so much a disagreement, but the fact that in this study, the word-order argument discussed above will be dealt with in the next section on syntactic integration, a feature absent from the study by Reunecker (2017b).

A last remark in this section is that insubordinate antecedents (i.e., cases in which the main clause is omitted, Evans, 2007, cf.), as in (21) below, are mostly neglected in the literature on clause order.

- (21) Zeker, maar Rademaker gaat niet mee, dus ik dacht, als je nog zin had. (WR-U-E-D-0000000038)
Certainly, but Rademaker is not coming along, so I thought, if you still felt like it.

In this study, insubordinate antecedents are included as a separate category, although, of course, there is no connection between antecedent and consequent, as the latter is not present in these cases, and I will refrain from formulating implicit consequents.

5.2.3 Inter-rater reliability

All sentences in the corpus were manually annotated for clause order based on the manual provided in Appendix A.3. As was presented in section 4.5, the agreement score of this feature was high ($AC1=0.86$). Still, there were disagreements, which were discussed in detail after annotation.

The most frequent cause of disagreement between annotators was due to the sentence type of the consequent (see section 5.8). In case the consequent was not a declarative sentence, but for instance an exclamation, as in (22) below, one annotator decided to code this sentence as ‘NA’ (‘not applicable’, see section 4.5.4), while the other annotator annotated the conditional as having a sentence-initial antecedent.

- (22) En als je meewilt naar Pauls housewarming in Chillburg, *gezellig!!* (WR-U-E-D-0000000301)
And if you want to come to Paul’s housewarming in Chillburg, fun!!

As it is good practice to keep coding of separate features independent, the final label for such cases was the order of antecedent and consequent, irrespective of the sentence type of the latter, so ‘sentence initial’ for (22) above.

Another source of disagreement were intercalated conditionals, as in (23) below.

- (23) Het is volgens het ingeschakelde adviesbureau dan ook nog maar de vraag of een nadere analyse zal leiden tot de conclusie dat er geen sprake is van een toetredingsdrempel en als dat wel zo is of dit effect voldoende wordt gecompenseerd. (WR-X-A-A-journals-txt-nthr-010)
According to the consultants it is therefore debatable whether a subsequent analysis will lead to the conclusion that there is no entry threshold and if it is the case, whether this effect will be sufficiently compensated.

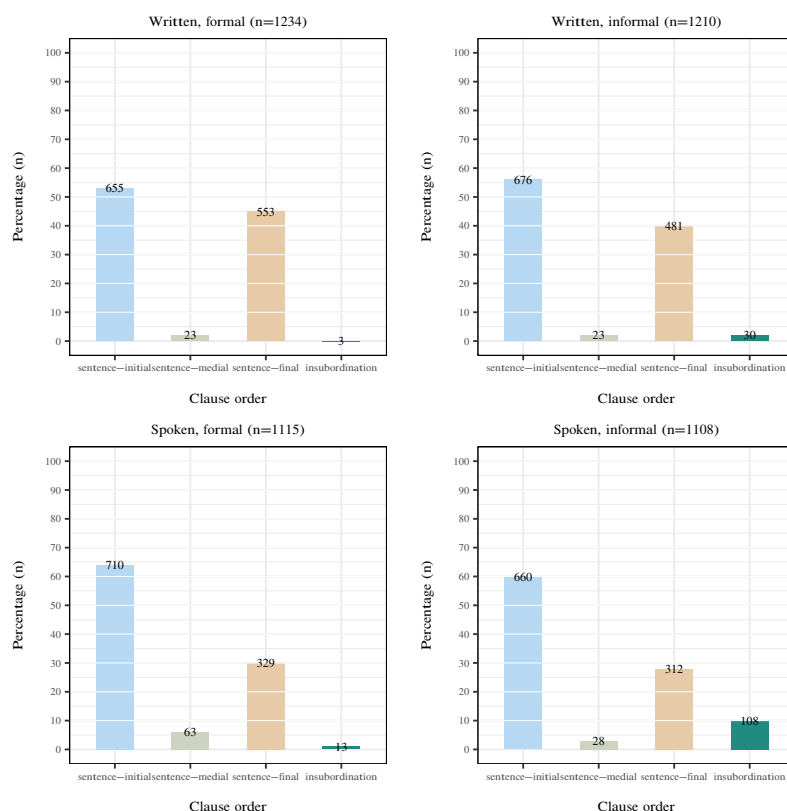
In such cases, the antecedent is inserted into the host sentence, but it does not modify its syntax.⁵ The discussion concerned whether to code such sentences as sentence-initial antecedents, as the antecedent is presented right before the consequent, or sentence-medial antecedents, because the antecedent is inserted into the coordination of the two sentences embedded in the *dat*-clause. The latter option was chosen. Further disagreements mainly concerned mistakes in annotation, and situations that were not foreseen in the annotation guidelines.

5.2.4 Distribution of clause orders

The distributions of clause order by mode and register are presented in Figure 5.1 below. For a more detailed view on the data, the reader is referred to page 472 in Appendix B.

⁵Note that this is not the same as an embedded conditional. See discussion in the previous section.

Figure 5.1:
Distribution of clause orders by mode and register



What we see in this figure is in line with what previous studies for English conditionals showed: consistently higher frequencies of sentence-initial antecedents as compared to sentence-final antecedents (see next section). Sentence-initial antecedents are most frequent in Dutch in both modes and registers. However, sentence-final antecedents are by no means marginal, as was shown earlier by Reuneker (2017b) based on data from the Condiv Corpus of written Dutch (Deygers et al., 2000), especially in written texts, as can be seen in the upper half of Figure 5.1. Combining all modes and registers, sentence-initial antecedents are featured in 57.87% of all conditionals, sentence-final antecedents in 35.89%, and sentence-medial and insubordinate antecedents 2.94% and 3.30% respectively (see also the aforementioned table on page 472).

To inspect associations between mode, register and clause order, a three-way loglinear analysis was performed, which produced a final model that retained the *mode* $\times$ *clause order* and *register* $\times$ *clause order* interactions. The likelihood ratio of this model was $\chi^2=7.43$, $df=4$, $p=0.11$. The association between mode and clause order is stronger (Cramér's $V=0.18$) than the association between register and clause order (Cramér's $V=0.15$). The *mode* $\times$ *clause order* interaction was significant ($\chi^2=147.70$, $df=3$, $p<0.001$), which indicates that the distribution of clause orders was different across the two modes. To break down this interaction, the residuals were inspected. These showed that all clause orders contributed to the overall significance. Sentence-initial antecedents occur more frequently than expected in spoken texts as compared to written texts ($z=2.33$, $p<0.05$; $z=-2.22$, $p<0.05$), as do sentence-medial antecedents ($z=3.19$, $p<0.01$; $z=-3.04$, $p<0.01$) and in subordinate antecedents ($z=5.56$, $p<0.001$; $z=-5.31$, $p<0.001$). Sentence-final antecedents showed a reverse preference ($z=-5.55$, $p<0.001$; $z=5.30$, $p<0.001$), i.e., this clause order occurs less frequently than expected in spoken texts as compared to written texts. The register $\times$ clause order interaction was significant as well ($\chi^2=110.43$, $df=3$, $p<0.001$). The residuals indicated that only the distributions of subordinate and sentence-medial antecedents significantly contributed to the overall significance. Subordination occurs less frequently than expected in formal texts as compared to informal texts ($z=-6.99$, $p<0.001$; $z=7.03$, $p<0.001$), whereas sentence-medial antecedents occur more frequently than expected in formal texts than compared to informal texts ($z=2.05$, $p<0.05$; $z=-2.07$, $p<0.05$). As this is somewhat surprising, these conditionals were inspected in more detail and results suggest they operate mostly on the pragmatic level, as in (24) below, in which the antecedent is used as politeness strategy (see also Reuneker, 2017b, p. 142; and for subordination as independent speech acts, see Panther & Thornburg, 2005, pp. 61–66). This type does not make up for all results, however, as predictive relations are expressed in this pattern as well, as can be seen in (25).⁶

- (24) En daarbij is enige normstelling als je die kunt geven ook wenselijk.
(fn000211)

And in addition, some norms if you can give them are also desirable.

- (25) En tot slot voorzitter dan neemt u eventueel als u negatief zou oordelen
alle boetes voor lief? U die zegt dat u zo erg uh zo zich zo zorgen maakt
om die administratieve lasten? (fn000216)

*And finally, chairman, would you possibly if you were to judge negatively
accept all fines? You who says that you are so uh so worried about the
administrative burdens?*

⁶This example could also be analysed as a speech-act conditional, but then the antecedent should have been established in prior context and be an echoic utterance here. The prior context, however, suggests this is not the case, as does the distanced verb form.

From Figure 5.1 and the analyses, we see that clause order in Dutch conditionals is associated with mode and, to a lesser extent, with register. While all clause orders contribute to the significance of the association with modes, the latter association is mainly due to the distributions of insubordinate and sentence-medial antecedents. The preference for sentence-initial antecedents is stronger in spoken texts when compared to written texts. Sentence-final antecedents have a slightly higher frequency in formal texts in both modes as compared to informal texts. Insubordination is, as might be expected, most frequent in spoken, informal texts and least in written, formal texts (for insubordinate conditional clauses in informal spoken German, see Günthner, 2016; in informal spoken and written Italian, see Lombardi Vallauri, 2016; and in spoken British and American English, see Mato Míguez, 2016).

As mentioned in the introduction, clause order in conditionals is well-researched and before drawing further conclusions, the results are discussed in light of the literature available on this feature.

5.2.5 Comparison with previous studies

In this section, I compare the current results with those from earlier studies, in order to be able to interpret the distributions of clause orders in Dutch conditionals in light of what is already known from previous studies.

The most prominent difference between previous studies on English conditionals and the current study is that sentence-initial antecedents are less dominant in Dutch conditionals. In most studies, the sentence-initial clause order accounted for between 70% and 80% of all conditionals. In line with Greenberg's (1966) universal cited above, Comrie (1986, p. 84) calls the sentence-initial clause order the 'usual order' and Dancygier (1998, pp. 145–149) calls it the 'default order', arguing that this order 'reflects a common observation that in the majority of cases *if*-clauses precede the main clauses', and she suggests that this also holds in other languages. Quirk et al. (1985, p. 1089) include examples of sentence-final antecedents, but they do not offer a further analysis. Declerck and Reed (2001, pp. 367, 397) argue that sentence-final antecedents are 'syntactically marked', licensing pragmatic differences. For Dutch, van der Horst (1995, p. 144) remarks that 'when one would count in a large corpus, the order in (a) [sentence-initial antecedent] is much more frequent than the order in (b) [sentence-final antecedent]'. Sentence-final antecedents are thus viewed as the non-default order. As we have seen above, sentence-initial antecedents are indeed most frequent, but less dominantly so than is suggested in the literature.

Linde (1976, pp. 282–284) reports 79.4% sentence-initial and 20.6% sentence-final antecedents. She argues that the tendency to express antecedents sentence-initially follows from the 'fundamental principle' that the ordering of information follows the natural temporal order of events (i.e., iconicity).⁷ Ford

⁷Given her rather small corpus of 34 conditionals in 'a series of interviews with middle class New York City housewives' (Linde, 1976, p. 280), however, such claims must be interpreted with caution.

and Thompson (1986) too found that sentence-initial antecedents are more frequent than sentence-final antecedents in both written and spoken English (77%-23% and 82%-18% respectively). Ramsey (1987, p. 406) reports 65% initial, and 35% final antecedents and in her analysis, a sentence-final *if*-clause 'only adds something to the assertion made by the main clause or modifies part of what was stated there'.⁸ The findings by Diessel (2005) corroborate these figures. In his corpus of 506 conditionals in spoken and written English, sentence-initial antecedents were more frequent than sentence-final antecedents in both modes (70.7% vs. 29.3% respectively). In a more recent study, Nall and Nall (2010) report 65.8% of 7,259 *if*-clauses were sentence-initial and 33.1% sentence-final. In spoken texts, 79.2% of all conditionals had sentence-initial antecedents, against 21.8% sentence-final, and in written texts, 61.3% of all conditionals had sentence-initial antecedents, against 38.7% sentence-final antecedents. Furthermore, they report significant deviations from these figures in face-to-face conversations (69.2%, 30.8%) and telephone conversations (74.9%, 25.1%)

Sentence-initial antecedents in Dutch conditionals make up for roughly 58% in this study (see Table B.1 on page 472), which is lower than the figures presented for studies on English conditionals. Comparing these data, however, is not entirely justified, as the majority of studies mentioned above excluded sentence-medial and insubordinate conditionals. When we exclude these orders from the results above, the proportions of sentence-initial and sentence-final antecedents are 68.13% and 31.87% respectively for spoken data, and 56.28 and 43.72% for written data. These findings corroborate those of Renmans and van Belle (2003), who found an even weaker dominance of sentence-initial antecedents. In their written corpus of 400 Dutch conditionals, only 50.75% of the conditionals had sentence-initial antecedents and 49.25% had sentence-final antecedents. Given the corpus design in the study of Renmans and van Belle (2003, pp. 147–148), however, another comparison might prove more reliable. Their corpus consists written texts only, mainly from Dutch and Belgian newspapers and university newspapers, which, in this study, would fall under the written-formal register. The balance between sentence-initial and sentence-final antecedents in this sub-corpus – ignoring sentence-medial and insubordinate antecedents, as Renmans and van Belle (2003) do – is 655 to 553 respectively, or 54.22% and 45.78%. It seems, then, that Renmans and van Belle's (2003, p. 148) observation still holds, namely that it is 'rather remarkable in that the conditionals with preposed protases obviously fail to significantly outnumber the ones with sentence-final *als*-clauses'.

Several explanations for preferences in clause orders have been suggested in the literature. First, however, the result reported by Diessel (2005) make clear that it is not the case that the preference for sentence-initial conditional clauses is a reflection of a more general preference of sentence-initial adverbial

⁸As with Linde's study, these results too should be interpreted with caution, as Ramsay's corpus consists of only one, highly genre-specific source, namely a 'murder mystery novel' (Ramsey, 1987, p. 385).

clauses. From the 1032 temporal clauses, 36.6% occurred sentence-initially, and from the 496 causal clauses, only 12.8% occurred in sentence-initial position, while 70.7% of the conditional clauses occurred in sentence-initial position (see above). This is in line with observations by Ford (1993) and Dancygier and Sweetser (2000, p. 135), of whom the latter argue that adverbial *because*-clauses typically follow the main clause, because they ‘do not set up new spaces, but establish causal relations in the base space’. Diessel (2013) argues that, in contrast to other adverbial clauses, antecedents of conditionals prefer sentence-initial position because they set up ‘a specific semantic constellation’, or ‘mental model’ (Johnson-Laird & Byrne, 2002 as cited by Diessel, 2013, p. 350), which provides the necessary instructions for interpreting the main clause. The antecedent establishes a specific (e.g., hypothetical) framework for interpreting the subsequent clause, while a sentence-final antecedent might mistakenly lead the reader or listener to interpret the sentence-initial consequent temporarily as an assertion.

Sentence-final antecedents do occur frequently, however, and Diessel (2013) shows that when the antecedent is postponed, the main clause often features other grammatical means of non-factuality (or non-assertability), such as *wouldn’t* in the consequent of the example in (26) below.

- (26) I wouldn’t be sick if I were, excuse me, ... pregnant. (Diessel, 2013, p. 462)

For sentence-final antecedents, Ramsey (1987) observes that the majority of antecedents refer to the subject in the main clause, whereas sentence-initial *if*-clauses often scope over many clauses in the preceding context. Ford and Thompson (1986, p. 367) too argue that sentence-initial clauses constitute ‘pivotal points’ in texts by their linking and background-creating function, whereas sentence-final *if*-clauses qualify their main clauses.⁹ Lee (2001) suggests that discourse-related differences motivate the choice between a sentence-initial and sentence-final antecedent. Although no numbers are provided, Lee (2001, p. 484) observes that the choice of clause order in conditionals is ‘closely related to the information status of the conditional antecedent in a local discourse context’. He argues that the antecedent is postponed when ‘something in the main clause makes an inferential link with the preceding context as carrying the discourse-old or inferable information’.

Differences in clause order frequencies have been linked to mode as well. Ford and Thompson (1986, p. 367) suggest that, in spoken texts, speakers might ‘produce conditionals as afterthoughts or reminders’, due to the ‘less planned nature of spoken discourse’. Another suggestion is that new and important information motivates postponing the antecedent (Ford & Thompson, 1986, p. 368). In spoken language, sentence-final antecedents can be signalled by the same grammatical means, but also by intonation (cf. Chafe, 1984; referred to

⁹For reasons of space, I will not discuss the question whether or not conditionals are topics. See, for this discussion, Haiman (1978), Schiffrin (1992) and Akatsuka (1986).

by Diessel, 2005, pp. 462–463). According to Dancygier and Sweetser (2000, p. 132) clause order relates to mental-space set-up as follows. In the sentence-initial order, as in their example in (27), the antecedent sets up a mental space and makes ‘a prediction within it’, whereas (28) ‘might be said to involve at least a potential pre-built P space, to which the utterance adds Q, subsequently confirming with a clause that yes, P was the intended space for elaboration by Q’. The example in (29) finally ‘presupposes’ *q* and links it to *p*.

- (27) If the home computer breaks down, I’ll work at my office. (Dancygier & Sweetser, 2000, p. 132)
- (28) I’ll work at my office, if the home computer breaks down. (Dancygier & Sweetser, 2000, p. 132)
- (29) I’ll work at my office if the home computer breaks down. (Dancygier & Sweetser, 2000, p. 132)

A last factor mentioned in the studies discussed here is the *syntactic weight* of the antecedent. Sentence-final antecedents are ‘about 2.5 words longer’ (Diessel, 2005, p. 453) than sentence-initial antecedents. Ford and Thompson (1986, p. 367) too remark that ‘disproportionally long’ antecedents seem to be avoided in sentence-initial position.

Remarkably, almost none of the studies mentioned above include sentence-medial antecedents. Ford and Thompson (1986, p. 356) explicitly exclude any sentence not adhering to the initial-final dichotomy, while they do find such sentences in which the condition ‘appeared somewhere in the middle of the “consequent” clause’.¹⁰ They argue this type of ordering is only represented by a small number of tokens, but the actual number is not reported. This observation is partially in line with findings in this study, Carter-Thomas and Rowley-Jolivet (2008) and Reuneke (2017b), as frequencies for sentence medial conditionals are low, especially in written discourse. However, this type of pattern does occur and should be taken into account without *a priori* disqualification. Dancygier’s (1998, pp. 106–107, 152–154) and Dancygier and Sweetser’s

¹⁰An early example of a sentence-medial conditional is provided by van Haeringen (1946, pp. 13–15) in a discussion what he coined as *tangconstructie* ‘plier construction’ (see also remarks on *dat als* ‘that if’ in section 5.2.2 above). With respect to (a) below, he mentions that the separation of the finite verb *hak* ‘chop’ and the direct object *hout* ‘wood’ is ‘very troublesome’.

(a) Ik hak iedere avond, als het begint te schemeren, hout. (van Haeringen, 1946, p. 13)

He says, however, that it is quite common (*ja misschien wel de enig natuurlijke zinsbouw* ‘maybe even the only natural syntax’) in spoken Dutch to use this position for the conditional clause and to reiterate the finite verb, as in (b).

(b) Ik hak iedere avond, als het begint te schemeren, hak ik hout. (van Haeringen, 1946, p. 13)

Reuneke and Boogaart (2021), however, show that this is not the case for *dat als* ‘that if’, which features reiteration of *dat* ‘that’ in only a minority of cases. The corpus data analysed for this study also do not indicate that reiteration of any part of the consequent is common in sentence-medial conditionals in spoken Dutch.

(2005, p. 176) observation that the sentence-medial position is related to metalinguistic use of conditionals can indeed be found in corpus data. For Dutch, Reuneker (2017b, pp. 142–143) found that sentence medial *if*-clauses, like *if*-clauses in other positions, are used most frequently to express content relations, but when the perspective is shifted from clause order to function, it becomes clear that almost all metalinguistic relations are expressed in sentence-medial position. Reuneker (2017b) compared these findings to an American-English corpus and found that English sentence-medial conditionals are found mostly in the metatextual domain, which corresponds to Dancygier’s (1998, p. 152) observation that they ‘frequently take a position as close as possible to the “text” commented on – which may mean a position within the main clause rather than preceding or following it’.

From this overview, we see that the current results deviate from results in previous literature on English conditionals. In Dutch too, sentence-initial antecedents are most frequent, but their dominance is clearly weaker, and more in line with earlier results by Renmans and van Belle (2003) on Dutch conditionals. The explanations discussed in this section suggest clause order to be associated with mode and register. Furthermore, the literature suggests that especially conditionals implicating a predictive connection between antecedent and consequent will feature high frequencies of sentence-initial antecedents, whereas other connections, such as speech-act and politeness connections, will relatively more frequently feature sentence-final antecedents. It is also worth noting that sentence-medial antecedents have already been linked to implicatures of metalinguistic nature, although their frequencies in the current results may be too low to form stable ground for clustering. Finally, a connection between modal marking and clause order is suggested by Diessel (2013), and if they are indeed related in tandem to implicatures of unassertiveness, this should be picked up by the cluster analyses presented in the next chapter.

5.2.6 Conclusion

Having analysed the results and discussed the literature on clause order in conditionals, it seems fair to conclude that in Dutch, clause order in conditionals is associated with mode and, to a lesser extent, with register. The results show that sentence-initial position of antecedents is most frequent in written and spoken texts, both formal and informal. Sentence-final antecedents are more frequent than one would expect based on the literature, especially in written texts. The association between register and clause order is most strongly influenced by the distributions of insubordinate and sentence-medial antecedents. The frequencies of sentence-final order are higher than may be expected based on the literature on (English) conditionals. Sentence-medial and insubordinate antecedents take up the margins of the distribution, with the notable exception of a relatively high frequency of sentence-medial antecedents in spoken, formal texts and insubordination in spoken, informal texts.

In this section, we saw how clause orders in Dutch conditionals are distributed over mode and register. As I argued before, such detailed accounts of individual features are needed before we can subject it to the analysis in the next chapter. As we saw in this section, for example, clause order is not only associated with mode and register, but the literature also mentions associations with other features and implicatures, especially those of connectedness, as, for instance, speech-act connections are suggested to feature higher numbers of sentence-final antecedents. Discussing the distribution of this feature, and the insights gathered from the existing literature enable us to explore the role of clause order in licensing of implicatures by the grammatical features of conditionals combined. To arrive at this collective feature set, we will continue with syntactic integration in the next section.

5.3 Syntactic integration

5.3.1 Introduction

Related to clause order is the degree of *syntactic integration* of the subordinate conditional clause into the main clause. This feature is relevant to the current study, because the degree of syntactic integration has been linked to connections between antecedents and consequents before.¹¹

In this section, I discuss the possible patterns of syntactic integration in Dutch conditionals and the annotation of this feature in 5.3.2 and 5.3.3 respectively. In section 5.3.4, I will present the distribution of these patterns in the corpus, after which I will compare the results with insights from the literature in section 5.3.5. In section 5.3.6, I will provide a conclusion.

5.3.2 Patterns of syntactic integration

Antecedents of *als*-conditionals in Dutch are adverbial clauses subordinated to the main clause that presents the consequent. In this section, we will look at the different patterns of syntactic integration of the subordinate clause into the main clause. First note, however, that this feature is not independent of clause order. In what follows, I will explain why only sentence-initial conditionals are included in this part of the analysis.

Word order in the surface structure of Dutch clauses is Subject-Verb-Object (SVO) in finite main clauses, as in (30) below, and Subject-Object-Verb (SOV) in other clauses (Zwart, 2011, p. 243), as in the subordinated clause in (31).

- (30) Peter_{SUBJ}. schenkt_{FIN. VERB} sterke koffie_{OBJECT}.
Peter_{SUBJ}. serves_{FIN. VERB} strong coffee_{OBJECT}.

¹¹Parts of this section have been extended and published as A. Reuneker (2020). ‘Clause Order and Syntactic Integration Patterns in Dutch Conditionals’. In: *Linguistics in the Netherlands* 37, pp. 119–134. doi: <https://doi.org/10.1075/avt.00041.reu>.

- (31) Ik zei dat Peters_{SUBJ.} sterke koffie_{OBJECT} schenkt_{FIN. VERB.}
I said that Peter_{SUBJ.} serves_{FIN. VERB} strong coffee_{OBJECT}.

In the generative tradition, there is discussion on which order is ‘base generated’ and which is derived.¹² In regular main clauses, the finite verb takes second position, as in (30) above and (32) below. When a main clause follows a subordinated clause, as is the case with sentence-initial conditionals, the antecedent takes first position in the sentence and is followed directly by the finite verb of the main clause, resulting in subject-verb inversion in the matrix clause, as can be seen in (33) below.

- (32) *De regering-Balkenende* _{SUBJ.} *komt* _{FIN. VERB} met haar bezuinigingsbeleid in Europa nog meer alleen te staan.
 The Balkenende government _{SUBJ.} stands _{FIN. VERB} *alone even more with its economic policy in Europe.*

- (33) Als de regering-Schröder daartoe inderdaad besluit, *komt* _{FIN. VERB}
de regering-Balkenende _{SUBJ.} met haar bezuinigingsbeleid in Europa nog
 meer alleen te staan. (WR-P-P-G-0000105269)
If the Schröder government does indeed decide to do so, the Balkenende government _{SUBJ.} *stands* _{FIN. VERB} *alone even more with its economic policy in Europe.*

Two other word-order patterns are possible in conditionals, namely the resumptive word order and non-integrative word order (cf. König & van der Auwera, 1988), which can be seen in the examples in (34) and (35) below respectively.

- (34) Als iemand werkelijk gelukkig is *dan* _{RES.} *moet* _{FIN. VERB}
deze persoon _{SUBJ.} in het bezit zijn van het goede. (WR-X-A-A-journals-001)
If someone is really happy then _{RES.} *this person* _{SUBJ.} *must* _{FIN. VERB}
be in possession of the good.
- (35) Als je kijkt wat er de laatste zes, zeven jaar over ons is geschreven: *ik*
_{SUBJ.} *ben* _{FIN. VERB} niet anders gewend. (WR-P-P-G-newspapers-115000)
If you look at what has been written about us in the last six or seven years:
I _{SUBJ.} *am* _{FIN. VERB} *not used to anything else.*

¹²I do not wish to make any claim here as to whether this is indeed ‘THE word order’ of Dutch. Koster (1975, p. 133) argues that ‘the word order of subordinate clauses (SOV) is more basic for Dutch’ because the main clause word order is the result of a transformation from a deep structure to a surface structure. See van der Wouden and Foolen (2011) and van der Wouden and Foolen (2015, p. 222) for a short explanation, Zwart (2011) for an elaboration and alternative view, and, for instance, Duinhoven (1997) for a diachronic account.

What we see in (34) is the use of a resumptive element, *dan* 'then'. The word order in the main clause is the same as in (33), i.e., there is subject-verb inversion. In (35), however, no sign of subordination is visible in the main clause. The subordinate *als*-clause is not embedded into the main clause, because the latter does not feature inversion and the resumptive element *dan* 'then' is absent. In other words, the main clause has the same word order as a regular main clause in Dutch.

As noted above, these patterns are only applicable to conditionals with sentence-initial antecedents. Main clauses of sentence-final conditionals cannot be introduced by resumptive *dan* 'then', as was noted earlier for English by Dancygier and Sweetser (1997, pp. 130–131), although they also show that *then* can be used as reference to some prior context, as in (36) below.

- (36) Then I'll do it, if you come to my office. (Dancygier & Sweetser, 1997, p. 131)

The examples below show that there is basically one possible word order in resumptive conditionals. The word order in (37) is only possible if the example is interpreted as a question, and resumptive *dan* 'then' in (38) can only be interpreted as referring to prior context.¹³ Because the regular main clause word order is the only possible word order, sentence-final conditionals are excluded from further analysis in this section.

- (37) * *Gaat* FIN. VERB *het licht* SUBJ. aan, als je op de knop drukt.
 ? Switches FIN. VERB the light SUBJ. on, if you press the button.
- (38) ? *Dan* RES. *gaat* FIN. VERB *het licht* SUBJ. aan, als je op de knop drukt.
 ? Then RES. switches FIN. VERB the light SUBJ. on, if you press the button.
- (39) *Het licht* SUBJ. *gaat* FIN. VERB aan, als je op de knop drukt.
 The light SUBJ. switches FIN. VERB on, if you press the button.

Sentence-medial conditionals can be analysed as parentheticals (see previous section), so by that definition they do not influence the structure of the clause they are inserted into (see also Schelfhout, Coppen & Oostdijk, 2003). This predicts that no signs of clause integration will be found in sentence-medial conditionals.

- (40) * *Gaat* FIN. VERB *het licht* SUBJ., als je op de knop drukt, aan.
 Switches FIN. VERB the light SUBJ., if you press the button, on.
- (41) ? *Dan* RES. *gaat* FIN. VERB *het licht* SUBJ., als je op de knop drukt, aan.
 Then RES. switches FIN. VERB the light SUBJ., if you press the button, on.

¹³This can occur, for instance, in co-construction of utterances (cf. Jacoby & Ochs, 1995). For co-construction of conditionals, see Akatsuka (1997b), Akatsuka (1999).

- (42) *Het licht* SUBJ. *gaat* FIN. VERB, als je op de knop drukt, aan.
The light SUBJ. switches FIN. VERB, if you press the button, on.

As we see here too, only one word order seems possible. The word order in (40) again is only possible in case the example is interpreted as a question, and resumptive *dan* ‘then’ in (41) can only be interpreted as referring to prior context. The corpus data however reveal that natural-language data do not always adhere to neatly defined patterns. For instance, as we saw in the previous section, embedded conditionals sometimes feature resumptive *dat* ‘that’ instead of *dan* ‘then’, as in (43), which can be explained by the fact that the main clause of the conditional behaves as a subordinate clause and the subordinating conjunction *that* is repeated. As discussed, *dan* ‘then’ can be used in the remainder of the subordinated main clause, as in (44). Contrary to expectations the integrative pattern can also be found, as in (45).

- (43) De eerste dag dat ik daar kwam kreeg ik een uh een stuk ijzer met een vijl erbij en de boodschap dat als stuk ijzer op was *dat* RES. *ik* SUBJ. in magazijn een nieuw stuk ijzer *kon* FIN. VERB komen halen. (fn008659)
The first day I got there I received a uh a piece of iron with a file and the message that if a piece of iron was used up that RES. *I* SUBJ. could FIN. VERB come and get a new piece of iron in the warehouse.
- (44) Ik ben juist zo bang dat als we dit punt nu met elkaar vandaag keer op keer gaan staan aandikken *dat* REP. *dan* RES. iedereen hakken in zand uh steekt. (fn000217)
I am scared that if we take this point and exaggerate it over and over that REP. then RES. *everyone will cut their heels into sand.*
- (45) Nou is punt dat als die koningin eenmaal onbevuchte eieren gaat afzetten waar mannetjes uit komen *kan* FIN. VERB *ze* SUBJ. niet meer terug. (fn007331)
Well, the point is that once that queen is going to drop unfertilized eggs from which males hatch, she SUBJ. can’t FIN. VERB *she can’t go back.*

Most of these patterns are found only in spoken texts in the corpus and their frequencies are low.

Although variation in word order is found in embedded conditionals, the word order in the consequent is mainly influenced by the fact that it is embedded. These conditionals were therefore also excluded from further analysis in this section. Conditionals with sentence types in the consequent other than the declarative kind were removed too, for instance interrogative consequents, as in (46) below, because word order patterns are influenced by the sentence type of the main clause (see section 5.8).¹⁴

¹⁴Of course, this does not mean that there is no variation in syntactic integration in non-declarative consequents of conditionals. For instance, imperative consequents can feature resumptive *dan* ‘then’, as in *Als je twijfelt, bel dan* ‘If you’re in doubt, then call’ (see sections 5.7 and 5.8).

- (46) Uhm *ben* FIN. VERB *ik* SUBJ. correct als uh ik er vanuit ga dat uh de ontwikkelingen in Nederland rond geregistreerd partnerschap eigenlijk een aanjaagfunctie in Europa hebben gehad? (fn000196)
Uhm am FIN. VERB I SUBJ. correct if uh I assume that uh developments in the Netherlands regarding registered partnership have actually provided a catalyst for Europe?

As insubordinate antecedents have no explicit consequent, syntactic integration could not be annotated and such sentences were excluded from further analysis as well.

5.3.3 Inter-rater reliability

All sentences in the corpus were manually annotated for syntactic integration based on the manual provided in section A.4 of Appendix A. The agreement score of this feature was high ($AC1=0.87$). Disagreements were discussed in detail after annotation.

One source of disagreement was the embedding of conditionals, as exemplified in (47) below.

- (47) Alleen het is natuurlijk wel zo dat uhm als het gaat om de besluitvorming je natuurlijk ook moet constateren dat er steeds minder mensen gaan stemmen. (fn000162)
Only it is, of course, true that if it comes to decision-making you must of course also conclude that fewer and fewer people are going to vote.

The annotation guidelines include both the category *embedded* and several options for sentence-initial conditionals. However, the word order in consequents of embedded conditionals are influenced by the fact that they are subordinated clauses themselves (see previous section). In such cases, therefore, the conditional was labelled ‘embedded’. Because of this, these conditionals were removed from further analysis of this feature (syntactic integration), thereby removing the largest source of disagreement.

Another recurrent source of disagreement was constituted by incomplete conditionals, such as those in (48) and (49) below.

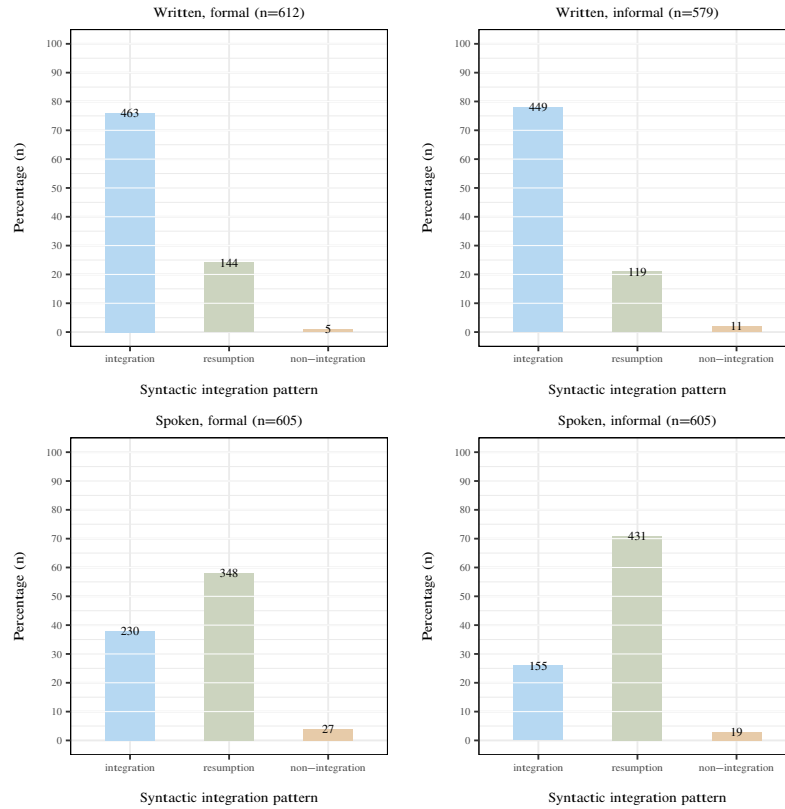
- (48) Kijk als niemand er last van heeft dan uh... (fn007723)
Look if it doesn't bother anyone then uh...
- (49) Vanmorgen zegt ze: we zouden de spenen toch doorknippen? Ja, zeg ik, maar alleen als jij het wil. (WR-P-E-A-0005983263)
This morning she says: wouldn't we cut the pacifiers? Yes, I said, but only if you want it.

One annotator chose to annotate (48) as resumptive, because *dan* ‘then’ was explicitly mentioned before the end of the turn. It was decided, however, to ignore clauses without a verb phrase, because the majority of the features would

not be applicable. Although Elder and Savva (2018, p. 49) argue that such ‘incomplete conditionals’, are incomplete only in the sense that no main clause is uttered, while they are complete in the sense that ‘the *if*-clause still succeeds at communicating a fully-fledged conditional proposition’, for the current purposes, these cases were labelled ‘NA’. In case of (49), the consequent is *ja* ‘yes’, which is a confirmation of the (modalised) clause ‘wouldn’t we cut the pacifiers?’. This case was labelled ‘sentence-final’, as the most direct relation was between *ja* ‘yes’ and the antecedent. It was also acknowledged that this difference would have no bearing on the analysis of syntactic integration, as only sentence-initial antecedents are liable for these patterns. As was the case with clause order, a number of disagreements concerned simple errors in annotation. These were discussed and taken care of in the full corpus.

5.3.4 Distribution of syntactic integration patterns

The results of the annotation are presented in Figure 5.2 below. For a more detailed view on the data, the reader is referred to page 473 in Appendix B. Please note that the total number of conditionals in the distribution presented is lower than the number of conditionals in the full corpus, because the syntactic integration patterns discussed can only be found within sentence-initial antecedents. Sentence-medial and sentence-final antecedents are therefore ignored in the remainder of this section.

Figure 5.2:*Distribution of syntactic integration patterns by mode and register*

Looking at Figure 5.2, it seems that there is a clear difference between modes, i.e., in written texts, in the top section of the figure, there is a clear preference for the integrative over the resumptive pattern (76.57% vs. 22.08%), whereas in spoken Dutch, in the bottom section of the figure, we see resumption in the majority of conditionals and integration in a minority (64.38% vs. 31.82%). The non-integrative pattern has a low frequency in both the spoken mode (3.80%) and the written mode (1.34%). We can also see some differences between registers but they are less pronounced than those between modes. A three-way loglinear analysis was performed and produced a final model that retained all effects, indicating that the highest order interaction ($mode \times register \times syntactic\ integration$) was significant ($\chi^2=19.96$, $df=2$, $p<0.001$). Comparing the two-way interactions against the model without the three-way interaction indicated that removing the $mode \times syntactic\ integration$ interaction

would significantly worsen the fit of the model ($\chi^2=522.59$, $df=4$, $p<0.001$; $\Delta\chi^2=502.64$, $df=2$, $p<0.001$) as would removing the *register* $\times$ *syntactic integration* interaction ($\chi^2=28.95$, $df=4$, $p<0.001$; $\Delta\chi^2=8.99$, $df=2$, $p=0.01$). As the largest contribution to the three-way interaction comes from the interaction between mode and syntactic integration, as is reflected in Figure 5.2, the dataset was split into written and spoken datasets, which were subsequently subjected to separate chi-square tests. For written Dutch, there was no significant association between register and syntactic integration ($\chi^2=3.93$, $df=2$, $p=0.14$), for spoken Dutch there was ($\chi^2=24.85$, $df=2$, $p<0.001$). The effect size of this association in spoken Dutch is small (Cramér's $V=0.14$), and both integration and resumption contribute to the overall significance. The integrative pattern occurs more frequently than expected in spoken formal texts as compared to spoken informal texts ($z=2.70$, $p<0.01$; $z=-2.70$, $p<0.01$), whereas resumptive conditionals occur less frequently than expected in formal spoken texts, and more frequently than expected in informal spoken texts ($z=-2.10$, $p<0.05$; $z=2.10$, $p<0.05$). The distribution of the non-integrative pattern does not contribute significantly to the overall association between register and syntactic integration in spoken Dutch.

When we look at register instead of mode, we see, unexpectedly, that non-integration is more frequent in the formal register than in the informal register in spoken Dutch, which is not the case for written Dutch. The examples below show that almost all non-integrated conditionals found in the corpus are of the type Rowley-Jolivet and Carter-Thomas (2008) call 'discourse management' conditionals, directing the addressee's attention to what is expressed in the consequent.¹⁵

- (50) En wat ik altijd zo grappig vind van die twee als je nou kijkt daar rechtsboven dat is Wega die zit in sterrenbeeld de Lier en daar ietsjes linksonder van die heldere ster is Deneb in de sterrenbeeld de Zwaan. (fn007465)
And what I always think is so funny about those two if you look to the top right there is Wega, which is in the Lyra constellation and a little lower left of that bright star is Deneb in the Cygnus constellation.
- (51) Bovendien als u even concreet probeert te maken uh een bedrijf zal sowieso wel even extra uh vingers natellen voordat die aan iemand uh iemand [...] nou juist in die positie zitten omdat je al snel de verdenking op je laadt dat daarmee te maken zou kunnen hebben. (fn000217)
In addition, if you try to make something concrete uh a company will count extra uh fingers anyway before they are placed in someone uh some [...] precisely in that position because you will soon be suspected that this might have something to do with it.

As frequencies of non-integrative conditionals are low overall, care should be taken in drawing any conclusions.

¹⁵In Renmans and van Belle's (2003) terms, they have 'low semantic integration'.

5.3.5 Comparison with previous studies

König and van der Auwera (1988) argue that the three syntactic patterns described above correspond to three degrees of clause integration in Dutch (and in German). Renmans and van Belle (2003, p. 141) too argue that the three degrees of syntactic integration correspond to three degrees of ‘semantic-pragmatic integration’.¹⁶ Note, however, that, for reasons provided in section 4.3, annotation of types of conditionals was not part of this study, the aforementioned relation between syntactic and semantic integration will be discussed below, but could not be tested. This relation does however, as we will see, strengthen the expectation that syntactic integration as a feature will have discriminatory power in the cluster analysis in the next chapter.

The overall most frequent pattern in the corpus was full integration of the conditional clause into the main clause by means of subject-verb inversion and non-occurrence of a resumptive element, resulting in what König and van der Auwera (1988, p. 107) call the ‘integrative word order’, as in (52) below.¹⁷

- (52) Als de proef een succes is wordt FIN. VERB de digitale brievenbus SUBJ.
eind dit jaar landelijk ingevoerd. (fn002955)
In case of a successful test the digital mailbox SUBJ will FIN. VERB be
introduced nationwide at the end of this year.

Here, the first clause is signalled to be a constituent of the main clause, or to be ‘in [its] scope’ (cf. Haiman & Thompson, 1984, p. 517). The integration is marked by the initial position of the finite verb in the main clause (cf. König & van der Auwera, 1988, p. 127). When the conditional as a whole presents ‘the propositional content of just one speech act’, the semantic integration is highest. Such conditionals indicate ‘a content relationship because the protasis is an integral part of the predicate of the apodosis’ (Renmans & van Belle, 2003, p. 146). In these cases, the antecedent can be replaced by a prepositional phrase or another constituent, as in the paraphrase of (52) in (53) below.

- (53) Bij een succesvolle proef wordt de digitale brievenbus eind dit jaar lan-
delijk ingevoerd. (fn002955)
If the test is a success, the digital mailbox will be introduced nationwide
at the end of this year.

Although the second most frequent pattern, i.e., the resumptive pattern, has subject-verb inversion, it is less integrated, because the clauses are linked explicitly by the resumptive element *dan* ‘then’, as in (54).

¹⁶See also Breitbarth, Delva and Leuschner (2016) for an analysis of integration of antecedents and consequents of V1-conditionals with *mochten* ‘must’ in Dutch. See Boogaart (2007a) for an analysis of Dutch *mochten* ‘must’ and *moesten* ‘must’ in combination with *dan* ‘then’. See Hsu, Wang and Hu (2015) for the relation between the grammaticalisation of Chinese *yaoshi* ‘if’ and *yaobush* ‘if not’, and different degrees of subjectivity and intersubjectivity.

¹⁷According to van der Horst (2010, pp. 56–57), the non-integrative word order was the default order in Middle Dutch.

- (54) Als bijvoorbeeld je overtuiging dat de trein om 15:15 vertrekt onwaar is omdat de trein in werkelijkheid reeds een uur eerder is vertrokken, *dan* RES. *heeft* FIN. VERB *dit* SUBJ tot gevolg dat je de trein mist. (WR-X-A-A-journals-txt-antw-008)
For example, if your belief that the train departs at 3:15 PM is false because the train actually departed an hour earlier, then RES. this SUBJ will FIN. VERB cause you to miss the train.

Inferential conditionals, as in example in (54), ‘consist of two separate propositions’ (Renmans & van Belle, 2003, p. 146) and do not allow reformulation with a prepositional phrase. Furthermore, reformulating the conditional into a question is possible only for conditionals with high semantic integration, and the inferential kind either features a modal element, such as epistemic *moeten* ‘must’ in the consequent, or allows for the insertion of such an element.

In the least frequent pattern, the non-integrative pattern, the clauses are simply juxtaposed without any sign of integration, as in (55) below.

- (55) Als je vragen hebt... *ik* SUBJ. *zit* FIN. VERB naast een engels specialist. (WR-U-E-A-0000001292)
If you have any questions ... I SUBJ. am FIN. VERB sitting next to an English specialist.

Renmans and van Belle (2003) link this non-integrative pattern to the lowest degree of semantic integration, as in the pragmatic conditional in (56) below.

- (56) Als je dorst hebt, er is limonade in de koelkast.
If you are thirsty, there is lemonade in the refrigerator. (Renmans & van Belle, 2003, p. 142)

In the spoken corpus, the intonation pattern in such conditionals frequently provides a clue to the integration, as in (55) above. As can be seen in Figure 5.2, this pattern is highly infrequent in written discourse, in which such intonational information is absent. Examples are provided in (57) and (58) below.

- (57) Als je kijkt wat er de laatste zes, zeven jaar over ons is geschreven: *ik* SUBJ [ben] FIN. VERB niet anders gewend. (WR-P-P-G-0000125917)
If you look at what has been written about us in the last six or seven years: I SUBJ [am] FIN. VERB not used to anything else.
- (58) Nu zegt hij: ‘Als ik zie hoe Afrikaanse mensen hier bejegend en ontvangen worden, *dat* SUBJ [is] FIN. VERB zo weinig respectabel. Ik word er steeds meer Afrikaans nationalistisch door.’ (WR-P-P-G-0000106539)
Now he says: ‘If I see how African people are being treated and met here, that SUBJ [is] FIN. VERB so disrespectful. It makes me more and more African nationalistic.’

We can see in (57) that the colon indicates the relation between antecedent and consequent. As this pattern only occurs a small number of times in the written part of the corpus, and the examples above are exemplary of these attestations, we can safely say that the non-integrative pattern is almost exclusively used in conditionals in spoken Dutch.

Renmans and van Belle (2003, p. 148) did not find (nor expected to find) a one-to-one relation between syntactic patterns and semantic integration. In the 203 sentence-initial conditionals in their corpus, 155 integrative conditionals, 48 resumptive conditionals and no occurrences of the non-integrative pattern were found, which, as we have seen in the previous section, may be due to influences of mode and register. From the 155 conditionals with the integrative word order pattern, 56% was of the predictive type, while 23% was of the inferential type.¹⁸ The remaining 21% was a mixed set of what Renmans and van Belle (2003, pp. 153–154) call *focus* and *frame* relations, and a number of ‘remaining’ conditionals. For the resumptive word order pattern, ‘only’ 22% were classified as content conditionals, and 70% as either inferential or pragmatic conditionals.¹⁹ Furthermore, they found that 58% of resumptive conditionals had antecedents in which one or more non-verbal constituents followed the finite verb. From this, they conclude that ‘syntactic weight triggers the use of the resumptive particle *dan*’ (Renmans & van Belle, 2003, p. 154).

A last factor that influences the use of the resumptive pattern mentioned in the literature is the biconditional implicature (*if and only if*) discussed in detail in section 2.6. Dancygier and Sweetser (1997, p. 116) argue that *then* in English conditionals ‘points deictically to a particular [...] mental space, and locates the event or state described in the apodosis in that mental space’ (see also Fortuin, 2011, p. 113) and they stress that *then* is anaphoric, because it restricts the possible mental spaces to which it refers to exactly one. They further argue that the biconditional implicature arises compositionally from the semantics of *if* and *then*. Dancygier and Sweetser (1997, p. 110) remark that *then* adds ‘some bidirectionality’ to the interpretation, in terms of presuppositions: *then* is a marker of the presupposition that $\neg p$ is compatible with $\neg q$ (cf. Iatridou, 1991; Iatridou, 1993, referred to by Dancygier and Sweetser, 1997, p. 110).

A number of scholars argue that pragmatic (or *biscuit*, *relevance*, *utterance*) conditionals do not allow for *then*. Iatridou (1991) and Bhatt and Pancheva (2005), for instance, provide the following examples (see also Geis & Lycan, 1993, p. 36).

(59) If I may be honest then you’re not looking good. (Iatridou, 1991, p. 54)

(60) If you want to know then 4 isn’t a prime number. (Iatridou, 1991, p. 54)

(61) If you are thirsty, (# then) there’s beer in the fridge. (Bhatt & Pancheva, 2005)

¹⁸More specifically in their study, the argument-conclusion type.

¹⁹The remaining 8% was not classified as either one of these types.

Declerck and Reed (2001), however, argue that, in general, pragmatic conditionals may not feature *then*, as in (62) below, but certain sub-types indeed can, as in (63), because they have an ‘actualizing-conditioning or purely case-specifying connotation’ (see the classification by Declerck & Reed, 2001, discussed in section 3.3).

(62) If you want to go out and it’s raining, (*then) there is an umbrella in the wardrobe. [...] (Declerck & Reed, 2001, pp. 321–322)

(63) If you are interested, then I can tell you more about it next time. [...] (Declerck & Reed, 2001, pp. 321–322)

Zakkou (2017) too provides examples of situations in which pragmatic conditionals feature ‘prohibited *then*’, and do not seem to license the implicature that the consequent is not true in case the antecedent is not true, as in (64) below.

(64) If you care for my honest opinion, you look bad today. But if you want me to lie, then you look great. (Zakkou, 2017, p. 86)

One could argue here that the latter conditional in (64) actually is predictive (‘hypothetical’), but Zakkou shows how such examples behave in most respects like other pragmatic conditionals (for discussion, arguments and counterarguments, see Zakkou, 2017, pp. 86–90). According to Dancygier and Sweetser, *then* compatible with predictive, epistemic and speech-act conditionals (see section 3.3.7), but it occurs most frequently in epistemic conditionals. As we have seen, in the literature on Dutch and German conditionals the degree of syntactic integration is linked to the degree of semantic integration (cf. König & van der Auwera, 1988; Renmans & van Belle, 2003, pp. 141–142), and it is argued for Dutch as well that the resumptive pattern is used in inferential (i.e., argument-conclusion) conditionals most frequently. Verbrugge and Smessaert (2011) introduce a further distinction between inferential and meta-inferential conditionals and show how inferential conditionals, as in the example in (65) below, exhibit a lower degree of syntactic integration than meta-inferential conditionals, in which the inferential process is commented upon explicitly, as in the example in (66) (see also Reunecker, 2020, p. 123).

(65) Als de gordijnen dicht zijn, zijn ze op reis.
If the curtains closed are, are they on holiday. (Verbrugge & Smessaert, 2011, p. 3389)

(66) Als de gordijnen dicht zijn, dan mag je concluderen dat ze op reis zijn.
If the curtains closed are, then may you conclude that they on holiday are. (Verbrugge & Smessaert, 2011, p. 3389)

The relation between syntactic integration and ‘semantic-pragmatic dependence’ of the consequent on the antecedent is corroborated by the findings of Vandergriff (2009, p. 209). However, she argues that syntactic integration in

German *wenn* ‘if’ conditionals ‘marks neither the distinction between predictive and non-predictive conditionals, nor between content and speech-act conditionals’. In her analysis, non-integration is linked to König and van der Auwera’s (1988, p. 126)’s ‘separate assertibility’. Vandergriff (2009, p. 204) argues that syntactic integration should be linked to the notions of ‘alternativity’ (cf. Dancygier & Sweetser, 2005, p. 35) and ‘contrastivity’, in which the former presents $\neg p$ as the only situation in which q does not hold, whereas the latter presents $\neg p$ as one of multiple situations in which q does not hold. To illustrate this, she contrasts her analysis with Köpcke and Panther’s analysis of the examples in (67) and (68) below.

- (67) Wenn du meine Meinung hören willst, die Aktien *fallen* bald. [...]
If you want to hear my point of view the stocks will go down soon. (Köpcke & Panther, 1989, p. 702)

- (68) Wenn du meine Meinung hören willst, *fallen* die Aktien bald. [...]
If you want to hear my point of view the stocks will go down soon. (Köpcke & Panther, 1989, p. 702)

Whereas in Köpcke and Panther’s (1989, p. 702) analysis the non-integrative example in (67) expresses a higher degree of certainty in the antecedent, and the integrative example in (68) a lower degree of certainty, in Vandergriff’s (2009, p. 202) analysis, the difference is that the example in (67) is ‘unambiguously interpreted in the speech-act domain’, whereas the example in (68) is not. This means that in (67) q is still true, but the prediction in the consequent is not performed in case the hearer does not want to hear the point of view of the speaker (the alternative scenario), whereas the example in (68) is ambiguous and can be either interpreted in the same vein, or, in case the antecedent does not hold, another contrasting q holds. Although the analyses differ, the insights they provide are of importance for this study, as the studies discussed here all relate the feature of syntactic integration (and, as we will see below, focus particles) to specific implicatures of connectedness.

A last remark on the factors at play in resumptive patterns is that Dancygier and Sweetser (1997) mention the incompatibility of the resumptive pattern with concessive conditionals (with or without overt *even*), because concessive conditionals are used to express that the antecedent is only one of the possible conditions for the consequent. Furthermore, *then* seems incompatible with necessary conditionals (*only if*). A full discussion of this observation is outside the scope of this study, but I note here that Dancygier and Sweetser’s observation seems to hold for Dutch conditionals too, as the Dutch counterparts of *even if* and *only if* were found only five times in combination with the resumptive

pattern.²⁰ For an elaborate discussion of the incompatibility of concessive conditionals and necessary conditions, see Dancygier and Sweetser (1997, pp. 119–122, 124–125), and for recent views, see Tellings (2017) and Gomes (2020).

5.3.6 Conclusion

The results presented in this section show that the distribution of syntactic patterns is strongly associated with mode and to a lesser degree with register. Written texts show a preference for the integrative pattern, whereas in spoken Dutch, resumption is most frequent. Independent of mode and register, the integrative pattern is most frequent, followed by the resumptive pattern. The non-integrative pattern is infrequent in both modes, and occurs least frequently in written texts.

Next to the distributions of syntactic integration patterns, we discussed possible relations between patterns of syntactic integration and specific implicatures of connectedness, which is, of course, of importance to this study, as it suggests syntactic integration to be a promising grammatical feature in the analyses in the next chapter.

5.4 Verb tense

5.4.1 Introduction

As was the case with the previous features, verb tense is an important characteristic of conditionals with respect to connections between antecedents and consequents, as can be seen in Crouch’s examples reproduced below.

(69) If the bimetallic strip bent, then the temperature rose. (Crouch, 1994, p. 4)

(70) If the bimetallic strip bends, then the temperature rises. (Crouch, 1994, p. 4)

In (69), the antecedent can be either interpreted as the cause of the consequent, or as an argument, in turn reversing causality, while in (70), the antecedent can only be interpreted as cause of the consequent. In chapter 3, we saw that the classifications by, amongst others, Quirk et al. (1985), Nieuwint (1992), and Dancygier (1998), are (partly) based on tense. In other accounts, such as Kaegi’s (1905) and Celce-Murcia and Larsen-Freeman’s (1999) accounts, epistemic distancing expressed in English by past tenses is used to distinguish between indicative and counterfactual conditionals. As different tense patterns have been linked to different connections between antecedents and consequents, we will look in detail at their distributions.

²⁰I note here that in case of concessives, this was only investigated for overt cases (*zelfs als* ‘even if’). Two occurrences of *zelfs als* ‘even if’ and three occurrences of *alleen als* ‘only if’ were found, which amounts to only 0.001% of all conditionals in the corpus.

In this section, I discuss the possible tense patterns in Dutch conditionals and the annotation of this feature in 5.4.2 and 5.4.3 respectively. In section 5.4.4, I will present the distribution of tense patterns in the corpus, after which I will compare the results with insights from the literature in section 5.4.5. In section 5.4.6, I will provide a conclusion.

5.4.2 Verb tenses

The feature *verb tense* represents the grammatical tense of the finite verb in a clause. For this study, Broekhuis, Corver and Vos's (2015a, p. 157) adaptation of te Winkel's (1866) and Verkuyl's (2008) 'Binary Tense Theory' is used. In this system, two binary features determine tense: $\pm$ past (*present, past*) and $\pm$ perfect (*perfect, imperfect*), which results in four basic tenses, namely simple present (present, imperfect), present perfect (present, perfect), simple past (past, imperfect), and past perfect (past, perfect), as in the examples in (71) to (74) respectively.

- (71) Als er genoeg water bij Lobith *binnenkomt*, *staat* de stuw open. (WR-P-P-G-newspapers-128000)
If enough water enters at Lobith, the weir is open. (simple present, simple present)
- (72) U heeft uh als ik u goed *begrepen heb heeft* u dus *gezegd* dat u zich daar graag nog een keer over wilt buigen om te kij want dan heb je ook kwa over kwaliteit gehad van de rechtshulp. (fn000149)
You have if I have understood you correctly you have said that you would like to think about it again because then you have also discussed quality of the legal aid. (present perfect, present perfect)
- (73) De leraren *maakten* bezwerende gebaren als de uitbundigheid binnen of buiten te groot *werd*. (WR-P-P-G-0000101700)
The teachers made bewildering gestures if there was too much exuberance inside or outside. (simple past, simple past)
- (74) Maar dat zou net zo goed gelden voor de soorten die dan toevallig uitgestorven zijn: Als hun omgeving (waarbij ik dus ook alle interacties met andere soorten meereken) niet veranderd was, waren ze niet uitgestorven. (WR-X-B-A-discussion-lists-tweakers-96703)
But that would just as well be the case for the species that happened to be extinct: If their environment (including all interactions with other species) had not changed, they would not have become extinct. (past perfect, past perfect)

The feature $\pm$ past represents whether the verb form is used to refer 'temporal domain *i* that includes *n*' (present) or not (past), whereas $\pm$ perfect represents whether the verb form is used to refer to a situation as completed within the temporal domain it is situated in (perfect) or not (imperfect) (cf. Broekhuis,

Corver & Vos, 2015a, pp. 104, 106–107; see also Fortuin, 2019, p. 8; de Haan, 1991, and references therein). In contrast to traditional approaches to tense, in this perspective, *zullen* ‘will’ is treated as an epistemic modal, not a future auxiliary (see Verkuyl & Broekhuis, 2013a). However, whether or not *zullen* ‘will’ should be seen as a future or modal auxiliary is subject to considerable debate, and discussed at large by Boogaart (2013) in reaction to Verkuyl and Broekhuis (2013a).²¹ In short, the question is whether or not the meaning of *zullen* ‘will’ can be analysed in terms of both future-reference and epistemic modality, or should always be analysed in terms epistemic modality. Boogaart (2013) argues for the former by pointing out that the epistemic interpretation is not part of the meaning of the verb alone, but also depends on factors like finiteness, present tense and aspectual properties of the complement. Furthermore, from a diachronic perspective, the epistemic meaning of *zullen* ‘will’ has developed from the future meaning of the verb, and the distinction between these two meanings is frequently hard to make in actual language use. Finally, tense itself can be used to express modality. As discussed in section 2.5, past tense can be used not only to refer to past time, but also to create epistemic distance, which is not compatible with a strictly temporal difference between tenses in Verkuyl and Broekhuis’s (2013a, p. 345) account. They reply that the ‘epistemic interpretation of modal verbs, including *zullen* ‘will’, is inherent in the lexical meaning of the verb itself and has nothing to do with the meaning of PRES and PAST: from a semantic perspective there is temporality and modality’.

From the discussion only briefly outlined above, it becomes clear that the question of tense and modality with respect to Dutch *zullen* ‘will’ is complex, and no consensus exists among scholars. In line with Palmer (2001, p. 104), who argues that *will* and *shall* ‘are formally modal verbs by the criteria proposed [...] they are often used to refer to future time’, *zullen* ‘will’ will be treated as a marker of modality in section 5.5. This means that for a sentence such as in (75), the verb tense in both clauses is *simple present*, not, as is common in in traditional grammars *present future* for the consequent (see e.g., te Winkel, 1866, p. 70; Kollewijn, 1892, pp. 142–147; Paardekooper, 1957, p. 38; Overdiep, 1937, p. 58; Kirsner, 1970; Hermkens, 1974, p. 27; Geerts et al., 1984, p. 429; Janssen, 1989, p. 305).

- (75) Als je dat gelooft zal het zeker zo lopen. (WR-P-E-A-discussion-lists-470000)

If you believe that it will definitely work out that way. (simple present, simple present)

As the traditional tense system, i.e., the eight tenses by te Winkel (1866), is still commonly used, I have included Table 5.1 below to show the relation between the four-tense system used and the original system by te Winkel.

²¹See, for the full discussion, also Verkuyl and Broekhuis (2013b).

Table 5.1:
Verb tenses in Binary Tense and traditional tense system

$\pm$ Past	$\pm$ Perfect	$\pm$ Future	Form	Binary Tense	Traditional
—	—	—	conjugated stem	simple present	o.t.t., presens
—	—	+	<i>zullen</i> + infinitive		o.t.t.t., futurum
—	+	—	<i>hebben/zijn</i> + participle	present perfect	v.t.t., perfectum
—	+	+	<i>zullen</i> + <i>hebben/zijn</i> + participle		v.t.t.t., futurum exactum
+	—	—	conjugated stem	simple past	o.v.t., imperfectum
+	—	+	<i>zouden</i> + infinitive		o.v.t.t., futurum praeteriti
+	+	—	<i>waren/hadden</i> + participle	past perfect	o.v.t.t., plusquamperfectum
+	+	+	<i>zouden</i> + <i>hebben/zijn</i> + participle		v.v.t.t., futurum exactum praeteriti

One may wonder why I chose a system comprised of two binary features determining tense in this study, basically ignoring future tenses, especially given the aforementioned debate. The reasons for this are mainly methodological. First, tense, like conditionality, is a topic of much debate and involves a large body of literature that is outside the scope of this study, as becomes apparent in Comrie's remark below.

We find discussions of future time reference ranging from the acceptance of the existence of a future tense as something self-evident to denial of the very existence of a distinct future tense, these latter usually arguing that the future time reference attributed to the auxiliaries *will/shall*, *werden*, or *zullen* is merely a special case of a more basic modal meaning. (Comrie, 1989, p. 51)

Determining whether the use of *zullen* in a given sentence is an expression of future time or of modality is affected by many factors (see Broekhuis, Corver & Vos, 2015a, pp. 135–141), and as Boogaart and Janssen (2010, p. 118) argue, the future tenses in Table 5.1 are 'so-called future tenses; so-called, for it

should be noted that they can serve to express not only the possibility that the situations [...] occur at a time later than the time of epistemic evaluation, but also the possibility that these situations are a fact at the time of epistemic evaluation' (see also Janssen, 1989; Smedts & van Belle, 1993, pp. 149, 152; Vandeweghe, 2000, p. 210; Nivelle, 2008, p. 41; de Haan, 2009). Such differences in interpretation are expected to lead to low reliability of annotation in a corpus whose size prohibits such detailed analysis of the specific contexts of each sentence. As this debate is ongoing, and annotation in which both the temporal and the modal meaning of *zullen* is more complex than can be dealt with in this large corpus study, *zullen* will be annotated as a modal auxiliary.

Second, as the future tenses are composed of one of the binary tenses plus the auxiliary *zullen*, the labels in the four tenses system can be relatively easily 'converted' into the eight tenses by including those sentences annotated for the use of that modal verb (see section 5.5), keeping in mind of course that there will be ambiguous cases.

Third, as I noted before, methodologically it is good practice to keep features both independent and indicative of one characteristic only. It could be argued that including the future tenses would amount, at least in some cases, to annotating both tense and modality in one and the same feature.

5.4.3 Inter-rater reliability

All clauses in the corpus were manually annotated for verb tense using the manual provided in section A.5 of Appendix A.²² Please note that for each conditional sentence, this resulted in two annotations: verb tense in the antecedent and verb tense in the consequent. As presented in section 4.5, the agreement scores of this feature were high ($AC1=0.94$ and $AC1=0.90$ for antecedents and consequents respectively).

The small number of disagreements mainly concerned clauses which had a combination of the verb *zijn* 'to be' with a participle, in which case it can either be a copular verb or an auxiliary verb. In the first case, the predicate describes what the subject *is*, in the latter, what the subject *does*, as in (76) and (77) respectively.

(76) Het kasteel *is* bewoond.

The castle is inhabited.

(77) Het kasteel *is* geverfd (door schilders).

The castle has been painted (by painters).

As can be seen in these examples, the difference is not always easy to tell and needs interpretation. In other words, as Verhagen (1992, p. 309) argues, 'the Dutch *zijn*+participle construction [...] is ambiguous between the perfect of the

²²As an aid in annotation, the verb tenses were also indexed using the *Pattern* module for Python (de Smedt & Daelemans, 2012). As accuracy decreases by including other text modes and genres than those the module was trained on, manual annotation remained necessary.

passive and the simple present/past of the passive (or a statal passive)'. For instance, the example in (77) can mean that the state of the castle is 'painted', as opposed to 'unpainted', while the intended meaning here is that the castle has undergone a process of painting, which is the only meaning readily available when adding 'by painters', as exemplified in the matching translations in (76) and (77) above. Another clear example is provided by Aarts and Wekker (cited in Verhagen, 1992, p. 309). The Dutch example in (78) can be translated into English as (79) or (80), respectively reporting on 'the action of burying [...] or the resultant state'.

- (78) Hij wist dat het lijk in de tuin begraven was. (Aarts & Wekker, 1987, p. 275)
- (79) He knew that the body had been buried in the garden. (Aarts & Wekker, 1987, p. 275)
- (80) He knew that the body was/lay buried in the garden. (Aarts & Wekker, 1987, p. 275)

The difference is important for the annotation of verb tense, because in case of a copular verb, tense is simple present or past, whereas in case of an auxiliary, it is present or past perfect. The annotation guidelines include tests to determine the most appropriate label (i.e., testing for the acceptability of the orders finite verb-participle and vice versa; possibility to add a duration to the clause; possibility to add a prepositional phrase indicating an actor), while I acknowledge these test to be less than perfect. Examples of disagreements concerning this notion are presented below.

- (81) Die vrijheid is er zelfs als het onderscheid tussen wat wel en wat niet is gedekt, (in de woorden van het Hof:) 'gekunsteld' is, zie HR 16 mei 2008, NJ 2008, 284 (Chubb/Dagenstaed). (WR-X-A-A-journals-txt-nthr-007)
That freedom exists even if the distinction between what is and what is not covered (in the words of the Court :) is 'artificial', see HR 16 May 2008, NJ 2008, 284 (Chubb/Dagenstaed).
- (82) Hierbij zijn vrouwelijke respondenten die drie tot zeven dagen in de week maximaal één standaardglas alcohol drinken tot de matige drinkers gerekend en tot de excessieve drinkers als zij twee of meer glazen alcohol drinken. (WR-X-A-A-journals-txt-mem-006)
Female respondents who drink a maximum of one standard glass of alcohol for three to seven days a week are considered moderate drinkers and excessive drinkers if they drink two or more glasses of alcohol.

For (81), it was agreed that the antecedent should be considered a case of simple present tense (i.e., *is* as copular verb), whereas for (82), which most likely concerned a simple coding error instead of disagreement concerning the analysis, the consequent was finally classified as having present perfect tense (i.e., *is* as an auxiliary verb).

Another source of disagreement involved embedded clauses, as in the examples in (83) and (84) below.

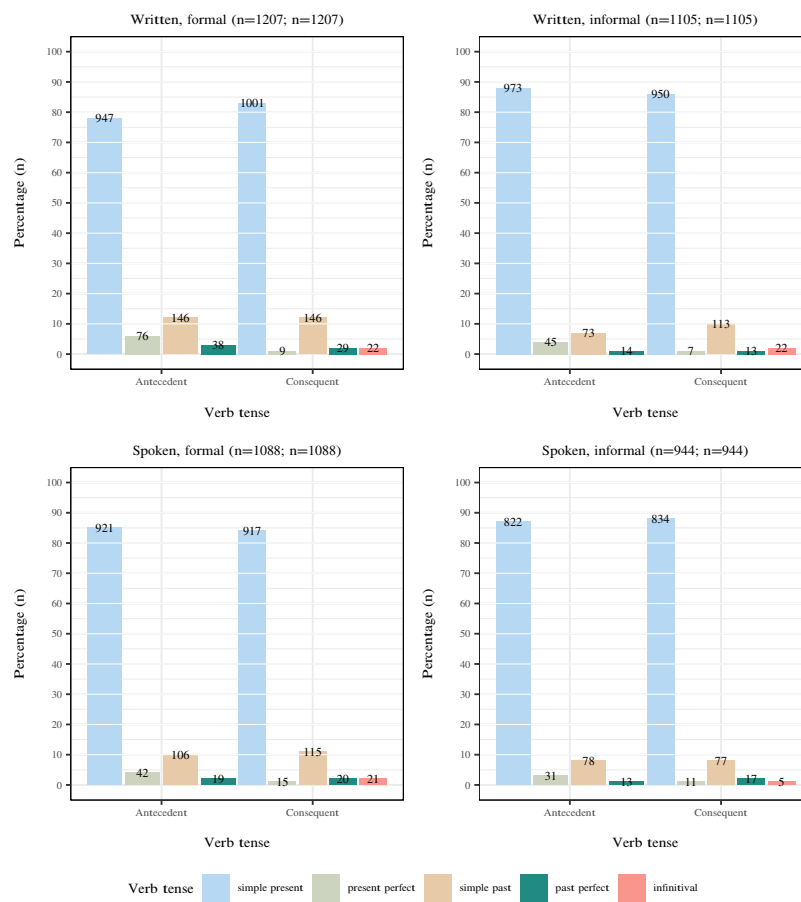
- (83) Mohammed is van plan om zijn opleiding op te pakken als hij weer beter is en zich goed voelt. (WR-X-A-A-journals-txt-ped-001)
Mohammed is planning to resume his education if [when] he is well and feels good again.
- (84) De lowbudget-maatschappij Ryanair dreigt het populaire vliegveld Charleroi te verlaten als de Europese Commissie haar een boete geeft. (WR-P-P-G-0000032619)
The low-budget airline Ryanair threatens to leave the popular Charleroi airport if the European Commission hands out a fine.

Both in (83) and (84) the question is what the consequent of the conditional is. Is it the full complex clause, or only the embedded clause? In (83), it seems to be the case that Mohammed is planning to get back to school if or when he feels better. It does not seem plausible that he starts planning at the moment he feels better. The same goes for (84): does the airline company threaten ‘to leave if the European Committee fines the company’, or does the airline company ‘threaten to leave if the European Committee fines the company’? Recall the issue discussed in section 5.2, namely that of adverbial clauses occurring in the main clause, while being interpretable in both the embedded clause (the first interpretation) and the main clause (the second interpretation) (see also Barbiers, 2018). Here too, the former seems more plausible, as it is the fining and leaving between which the conditional connection holds, not between fining and threatening. The discussion of these cases has resulted in a new category for the feature verb tense, namely *infinitival*, which was subsequently added to the annotation manual (see section A.5 of Appendix A). Further disagreements concerned simple errors in annotation, which were resolved by adding the correct annotation.

5.4.4 Distribution of tenses

The results of the annotation are presented in Figure 5.3 below. To limit the number of dimensions in the table, not the individual tenses per clause, but the tense patterns in the antecedent and consequent are combined in the presentation of the results. For a more detailed view on the data, the reader is referred to page 474 in Appendix B.

Figure 5.3:
Distribution of verb tenses by mode and register



The picture concerning verb tense is clear: *simple present* makes up for the vast majority of antecedents (84.32%), consequents (85.22%) and their combination (78.27%). The *simple past* is the second most frequent tense, with a relative frequency of 9.28% in the antecedent, 10.38% in the consequent and 6.05% in both clauses. The prevalence of the simple tenses thus leaves only relatively marginal frequencies for the perfect tenses: present perfect in 4.47% of antecedents, 0.97% in consequents, and only 0.16% in both clauses; past perfect tense in 1.93% of antecedents, 1.82% of consequents, and 1.43% in both clauses.

Before subjecting the distributions of tense to any of the statistical procedures discussed in section 4.6, a remark is in order. As can be seen in Figure 5.3, the distributions of tense in both the antecedent and the consequent are strongly skewed towards the simple present. Furthermore, as may be expected, tense in one clause is strongly associated with tense in the other clause ($\chi^2=4018.30$, $df=12$, $p<0.001$, Cramér's $V=0.56$). As one may expect with respect to tense patterns, simple present in both clauses is dominant, and accounts for 78.27% of all conditionals. By inspecting the residuals for this association, it becomes clear that the interaction between tense in antecedents and in consequents is largely influenced by two patterns: the simple past in both clauses ($z=34.19$, $p<0.001$), and past perfect in both clauses ($z=48.93$, $p<0.001$). Apart from these associations, only a small number of patterns adds significantly to the overall association: the past perfect in the antecedent is followed more often than expected by the simple past in the consequent ($z=2.13$, $p<0.05$) and less often by the simple present ($z=-7.75$, $p<0.001$). The present perfect in antecedents is followed by the present perfect in the consequent more often than expected ($z=3.74$, $p<0.001$), at the cost of the simple past mainly ($z=-3.37$, $p<0.001$). Next to the simple past occurring in both clauses, the simple past in antecedents is followed by the past perfect in consequents more frequently than expected ($z=2.10$, $p<0.05$) and less by the simple present ($z=-12.27$, $p<0.001$). Finally, the simple present in antecedents is followed less often by the past perfect and simple past in consequents ($z=-7.67$, $p<0.001$; $z=-10.89$, $p<0.001$ respectively), and more often than expected by the simple present ($z=-4.98$, $p<0.001$), although we can see the strength of this association is weaker than for the association between simple past or past perfect in both clauses. The combination of simple past in both clauses accounts for 6.05%, and simple present-simple past in antecedents and consequents respectively make up for 3.87%. This leaves only very low frequencies for the remaining 17 possible combinations of tenses. A number of tense patterns, as we will see below in section 5.4.5, does not occur at all.²³ It is for these reasons that we will not analyse tense in antecedents and consequents as a pattern together, but I

²³Because of this, a Fisher's Exact test may be preferred as an omnibus test. A two-tailed Fisher's Exact test also indicates a highly significant association between tense in the antecedent and tense in the consequent ($p<0.001$).

will perform separate loglinear analyses to inspect their individual relations to mode and register, as was done for the previous features.²⁴ All results below should be interpreted keeping these remarks in mind.

For antecedents, a three-way loglinear analysis was performed, which produced a final model that retained all effects, indicating that the highest order interaction (*mode* $\times$ *register* $\times$ *tense*) was significant ($\chi^2=9.03$, $df=3$, $p=0.03$). Comparing the two-way interactions against the model without the three-way interaction showed that removing the *mode* $\times$ *tense* interaction would significantly worsen the fit of the model ($\chi^2=19.81$, $df=6$, $p<0.001$; $\Delta\chi^2=10.78$, $df=3$, $p=0.01$), as would removing the *register* $\times$ *tense* interaction ($\chi^2=42.68$, $df=6$, $p<0.001$; $\Delta\chi^2=33.65$, $df=3$, $p<0.001$). As the largest contribution to the three-way interaction comes from the interaction between register and tense, we will split the dataset into the formal and informal registers. For formal texts, the association between mode and tense in the antecedent is significant ($\chi^2=16.72$, $df=3$, $p<0.001$), but weak (Cramér's $V=0.09$) and none of the individual tenses contributes significantly individually to the overall significance. For informal texts, the association to tense is not significant ($\chi^2=2.85$, $df=3$, $p=0.42$). For antecedents, we thus see that there is a small association with mode in formal texts which is not influenced significantly by any one tense distribution, and we see no significant association between mode and tense in the antecedent in informal texts.

For consequents too, a three-way loglinear analysis was performed, which produced a final model that retained the *mode* $\times$ *tense* and *register* $\times$ *tense* interactions. The likelihood ratio of this model was $\chi^2=9.77$, $df=5$, $p=0.08$. The *mode* $\times$ *tense* interaction was significant ($\chi^2=10.08$, $df=4$, $p=0.04$), which indicates that the distribution of tenses in consequents differed across the two modes. The effect size of this association is small (Cramér's $V=0.05$, $df=3$) and by inspection of the residuals, none of the tenses appears to contribute significantly individually to the overall significance. The *register* $\times$ *tense* interaction was significant too ($\chi^2=11.22$, $df=4$, $p=0.02$), which indicates that the distribution of tenses in consequents differed across the two modes. The effect size of this association is small (Cramér's $V=0.05$, $df=4$) and by inspection of the residuals, none of the tenses appears to contribute significantly individually to the overall significance. This is in line with Figure 5.3, which shows roughly the same distributions over modes and registers. While tense distributions are significantly associated with mode and register, these associations are small. The largest association of tense in either clause is, as discussed, the tense in the other clause.

²⁴For sake of completeness, a four-way loglinear analysis was performed and produced a final model that retained the *mode* $\times$ *register* $\times$ *tense* (*a*), *mode* $\times$ *register* $\times$ *tense* (*c*) and *mode* $\times$ *tense* (*a*) $\times$ *tense* (*c*) interactions. The likelihood ratio of this model was $\chi^2=28.91$, $df=24$, $p=0.22$. Of course, breaking down this effect on mode reveals the dominance of tense patterns here: the interaction between tense in antecedents and tense in consequents in written texts is highly significant ($\chi^2=2156.50$, $df=12$, $p<0.001$, Cramér's $V=0.56$), as is the corresponding interaction in spoken texts ($\chi^2=1913.31$, $df=12$, $p<0.001$, Cramér's $V=0.56$).

Given the analyses of tense distributions in antecedents and consequents, it seems fair to conclude that the small differences in their distributions are only weakly attributable to actual differences between modes and registers. The more informative, albeit general conclusion is that the simple present is, irrespective of both dimensions, the dominant tense in both clauses of conditionals, and that tense comes in patterns. We will discuss this further in light of the available literature in the next section.

5.4.5 Comparison with previous studies

In this section, I will first briefly compare the results in Figure 5.3 to Biber and Conrad's (2009) findings. Next, I will discuss each tense pattern individually.

Biber and Conrad (2009, pp. 116–117) show that the present tense in English is most common in conversation and 'academic prose' and only slightly more common than past tense in newspapers. The results from the corpus of Dutch conditionals show a different picture, namely that in Dutch conditionals present tense is dominant overall. As the current corpus contains genre information too, we can make a more detailed comparison to Biber and Conrad's (2009) characterisations of conversations, newspapers and academic prose. In the current corpus, face-to-face conversations feature present tense in 88.22% of all antecedents and 88.64% of all consequents, newspapers 85.49% and 83.28% respectively, and academic journals 82.06% and 85.28% respectively. The remaining percentages are for the past tenses, which are characterised by Biber and Conrad (2009, p. 116) as uncommon in conversation, very common in newspapers, and rare in academic prose. As Biber and Conrad's figures concern not only conditionals, however, care should be taken in drawing conclusions these differences, as they could reflect a difference between Dutch and English, but also between conditional and non-conditional sentences.

Next, we will look at the tense patterns found, starting with those involving the present tense, as in the examples in (85) to (87) below, showing present tense in both clauses, in the antecedent, and in the consequent respectively.

- (85) Als ze hun hele opleiding in het buitenland *volgen kunnen* ze vanaf het schooljaar tweeduizend twee tweeduizend drie *rekenen* op een Nederlandse studiebeurs. (fn002896)
If they do their entire education abroad, they can count on a Dutch study grant from school year 2002-2003.
- (86) Auto staat weer voor de deur:) Nee, als ie niet voor de deur *staat is* ie *gejat*:P (WR-U-E-D-0000000321)
Car is back at the door:) No, if it is not at the door it is stolen:P
- (87) Werknemers in strikt gereuleerde huishoudens *krijgen* dus *te maken* met additionele restricties in termen van kosten en risicos als ze meer uren *zouden willen werken*. (WR-X-A-A-journals-txt-mem-001)

Employees in strictly regulated households are therefore faced with additional restrictions in terms of costs and risks if they would like to work more hours.

The ‘simple present, simple present’ pattern in (85) was found in almost 80% of all conditionals in the corpus. In (86), the verb tense in the antecedent is simple present, and in the consequent it is present perfect, presenting the situation as completed. In (87), the antecedent’s verb tense is simple past, and that in the consequent is simple present. Please note that this is a direct consequence of the tense system used in this study. While the past tense of *zou* ‘would’ of *zullen* ‘will’ can indeed express posteriority, as Boogaart (2013, p. 335) argues for the example in (88), in most cases it expresses epistemic distance.

- (88) Vier jaar later zou hij de eerste democratisch gekozen president van Zuid-Afrika worden. (www.maandbladzuidafrika.nl) (Boogaart, 2013, p. 335)
Four years later, he would become South Africa’s first democratically elected president.

It could be argued that *zou* ‘would’ is on its way on a path of grammaticalisation and that it is unclear to what extent precisely it should still be seen as the past tense of *zullen* ‘will’. This is, of course, a debate in its own right, and in this study, I will consistently treat *zou* ‘would’ as the past tense of *zullen* ‘will’ (but see Boogaart, 2013; Verkuyl and Broekhuis, 2013a; Verkuyl and Broekhuis, 2013b, and, on grammaticalisation of English *will*, Bybee, 2013, pp. 65–66, cited in Boogaart, 2013, p. 335). Schouten (2000, p. 31) remarks that ‘unlike English, Dutch usually has a present tense in both clauses of open conditionals’. As her tense system is different from the one used here, this must be interpreted as English frequently having *will* in the consequent, which is seen by Schouten (2000) as a marker of future tense, while consequents of Dutch conditionals do not. In fact, if we look at the corpus data, the ‘simple future’, comprised of *zullen* ‘will’ and an infinitive, as in (89), occurs in only 3.7% of consequents, whereas the present (simple) tense without *zullen* ‘will’ occurs in 82.92% of consequents.

- (89) ‘Als hij doorvecht *zullen* we hem *vermoorden*’, kondigt de komende man alvast aan in interviews. (WR-P-P-G-0000108221)
If he keeps fighting we will kill him’, the next man announces in interviews.

Whereas English conditionals frequently feature *will* in the consequent, Dutch conditionals do not frequently feature *zullen* ‘will’, as it is far more frequent to refer to the future in the consequent of a conditional using a regular present tense without a modal verb, as in (90) below.

- (90) Als alles goed gaat *wordt* volgend jaar een convenant *getekend* waarin staat dat een aantal middelbare scholen in de regio maar beperkt leerlingen uit de stad Utrecht aanneemt om te voorkomen dat alleen zwarte

leerlingen achterblijven en het voortbestaan van alle Utrechtse scholen wordt bedreigd. (WR-P-P-G-0000076623)

If all goes well, a covenant will be signed next year stating that a number of secondary schools in the region only accept pupils from the city of Utrecht to prevent only black pupils from being left behind and the continued existence of all schools in Utrecht being threatened.

This is not a characteristic of Dutch conditionals. As Broekhuis, Corver and Vos (2015a, p. 158) argue, future (i.e., ‘non-actualized’) events ‘need not be marked by the presence of *will* (or some other modal verb); Dutch *zullen* “will” is optional in such cases’, as in (91) below.

- (91) Morgen *bak* ik koekjes voor je.
Tomorrow I will bake cookies for you.

Kirsner (1970, pp. 121–122) argues that Dutch *zullen* ‘will’ marks a situation expressed not as ‘a neutral “fact”’: *moeten* ‘must’ marks the situation as more likely, and *kunnen* ‘can’ as less likely when compared to *zullen*, as can be seen in Kirsner (1970, pp. 121–122)’s examples reproduced below in (92).²⁵

- (92) Piet {*werkt/zal werken/moet werken/kan werken*}.
Piet {works/is working/will work/will be working/must work/must be working/can work/can be working}. (Kirsner, 1970, pp. 121–122)

We thus see that *zullen* ‘will’ is not needed in Dutch for future reference, and, as we have seen, is not used frequently for future reference in conditionals.

We will continue by looking at the present perfect. Before discussing this compound tense, however, it is worth mentioning that two of the logically possible tense patterns did not occur at all in the corpus, as we saw already in section 5.4.4, and as can be seen in Table B.3 on page 474 in Appendix B, the patterns ‘present perfect, past perfect’ and its reverse, ‘past perfect, present perfect’, as exemplified in the constructed examples in (93) and (94) respectively, did not occur at all.

- (93) If the drummer *has listened* to Deep Purple, he *had* not yet *decided* on joining the band.
 (94) If the drummer *had listened* to Deep Purple, he *has* not yet *decided* on joining the band.

Although some other tense patterns, such as ‘simple past, present perfect’ have very low frequencies, it is striking that the two patterns above are absent from a corpus of more than 4000 conditionals having a finite verb in both clauses. The rest of the logically possible patterns were found. The patterns ‘present perfect, present perfect’, ‘present perfect, simple present’, and ‘simple past, present perfect’ are exemplified below.

²⁵This is not to say that *zullen* ‘will’ does not have other functions, such as expressing promises (see Kirsner, 1970, p. 137).

- (72) U heeft uh als ik u goed *begrepen heb heeft* u dus *gezegd* dat u zich daar graag nog een keer over wilt buigen om te kij want dan heb je ook kwa over kwaliteit gehad van de rechtshulp. (fn000149)
You have if I have understood you correctly you have said that you would like to think about it again because then you have also discussed quality of the legal aid. (present perfect, present perfect)
- (95) U heeft uh als ik u goed *begrepen heb heeft* u dus *gezegd* dat u zich daar graag nog een keer over wilt buigen om te kij want dan heb je ook kwa over kwaliteit gehad van de rechtshulp. (fn000149)
You have uh if I have understood you correctly, you have said that you would like to look at it again, because it also involves quality of legal aid.
- (96) In eerste instantie zit er wel stoom in, maar als je het 2 minuten *hebt laten koelen komt* er bij mij geen stoom meer onder de deksel vandaan. (WR-P-E-A-0005795081)
On first instance there is steam in it, but if you have let it cool for 2 minutes in my case no more steam comes out from under the lid.
- (97) Op basis van deze levensloopgegevens is er een variabele gecreëerd waarbij de waarde 1 *is toegekend* als een respondent in een jaar *startte* met een sport. (R-X-A-A-journals-txt-mem-007)
Based on these lifecycle data, a variable has been created to which the value 1 is assigned if a respondent started exercising in a year.

These patterns are infrequent, and, based on the corpus data, seem to be used in specialised settings mostly. The pattern in (95), for example, occurs mostly in spoken data and to express politeness or ‘extralinguistic uncertainty’ (see section 3.3.4 and Quirk et al., 1985, p. 1096). The pattern in (97) occurs only two times. The simple past is used here to describe a past situation and the present perfect to describe a completed action, together describing a procedure.

Next, we will look at the simple past, as exemplified in (97). Two examples of the ‘simple past, simple past’ pattern are included, as they show two frequent uses of this pattern. In (98) we see the simple past being used to express epistemic distance with respect to the situations expressed, with the antecedent clearly being counterfactual (see also e.g., Schulz, 2014; Mackay, 2015, 2017 on ‘fake tense’, as well as section 2.5 in this dissertation).

- (98) Als ik jou *was liep* ik gewoon eens wat rond om te kijken waar er plek is en waar het er gezellig uitziet. (WR-P-E-A-0004631229)
If I were you, I would just walk around to see where there is room and where it looks cozy.

As Broekhuis, Corver and Vos (2015a, pp. 164–165) show, the antecedent does not have to be known to be counterfactual by world-knowledge (i.e., one cannot be someone else) to license an implicature of counterfactuality.

- (99) Als ik genoeg geld had, ging ik op vakantie.
{When/If} I had enough money, I {went/would go} on holiday.
 (Broekhuis, Corver & Vos, 2015a, p. 164)

In (100) below, the simple past is used in both clauses to refer to past situations, frequently, though not exclusively, licensing an habitual interpretation.

- (100) De verzoeker *kon* hoger beroep *instellen* bij de Afdeling Rechtspraak van de Raad voor het Rechtsherstel, een onafhankelijke rechter, als hij het voorstel van de notaris-bemiddelaar *afwees*. (WR-X-A-A-journals-txt-tvg-004)
The applicant could appeal to the Judiciary Division of the Council for the Restoration of Rights, an independent judge, if he rejected the proposal of the notary-mediator.

In (101) below, we see the ‘simple past, simple present’ pattern being used to express, as in (97) above, a recurrent pattern between a situation in the past, and a consequence in the present.

- (101) Zonen *hebben* een groter risico dan dochters om een excessieve drinker te worden als hun vader een excessieve drinker *was*. (WR-X-A-A-journals-txt-mem-006)
Sons have a greater risk than daughters of becoming an excessive drinker if their father was an excessive drinker.

In (102), we see the past perfect in the antecedent being used to create epistemic distance to what is implicated to be a counterfactual situation (i.e., America did in fact intervene), while presenting this situation as completed before the moment of speech.

- (102) Ik zeg niet de huidige Duitsers maar als Amerika niet *had ingegrepen* (waar ze overigens een goeie reden voor hadden er werden tenslotte passagiersschepen tot zinken gebracht door de Duitsers) *zaten* wij vrolijk allemaal Duits *te praten* nu. (WR-X-B-A-discussion-lists-tweakers-647247)
I do not say the current Germans, but if America had not intervened (for which, incidentally, they had a good reason, as passenger ships were sunk by the Germans) we were all happily talking German now.

In the consequent, the simple past is used to express a consequence of this intervention. In these cases of ‘non-past’ past tense it is clear that the verb tense is used for epistemic distancing, as can be seen in Kirsner’s ‘typical examples’ of this phenomenon reproduced in (103) below too.

- (103) Als ik morgen wat geld *vond*, (dan *zou* ik naar Parijs *gaan*).
 If I *found* some money tomorrow, (*I’d go* to Paris). (Kirsner, 1970, p. 118)

As can be seen by the temporal adverb *morgen* ‘tomorrow’, the antecedent refers to the future, while the past tense *vond* ‘found’ is used to mark the situation expressed as ‘hypothetical, less probable’ (Kirsner, 1970, p. 118). For

Dutch, Balk-Smit Duyzentkunst (1963, p. 131) has described this difference between the simple present and simple past in terms not of reality and ‘unreality’ (or *counterfactuality*), but in terms of ‘reality A’ versus ‘reality non-A’, or ‘realis’ versus ‘hetero-realis’, the former meaning a time and space of which the speaker is part, the latter meaning a different time and space than that of which the speaker is part. Janssen (1989) analyses tense in terms of one binary, non-time-based feature. In case of the present tense, the verb form signals ‘verb-in-THIS-context-of-situation’, and a verb in the past tense signals ‘verb-in-THAT-context-of-situation’ (see also Boogaart & Janssen, 2007). Schouten (2000, pp. 32, 35) mentions that the use of ‘the preterite [excluding *zou(den)* ‘would’] in hypothetical main clauses is rare’ in Dutch. The figures however show that the simple past in both clauses, although largely overshadowed by the simple present, is one of the most frequent verb tense patterns. With respect to the foregoing discussion, it is perhaps not surprising that 64.75% of those consequents are modalised by means of a modal verb and the majority seems to refer not to past situations, but to express epistemic distance, especially by means of the past tense of *zullen* ‘will’, as can be seen in (104) and (105).

- (104) Lizzy, je gaf aan dat je een dief van je eigen portemonnee *zou zijn* als je niet gebruik maakt van de overheidssubsidies die er zijn. (WR-P-P-G-0000129541)
Lizzy, you indicated that you would be a thief of your own wallet if you would not use the existing government grants.
- (105) Als je die van mij morgen naar de vergadering mee wil nemen *zou dat* fantastisch *zijn*! (WR-U-E-D-0000000312)
If you want to take mine to the meeting tomorrow, that would be fantastic!

In the latter example, the past tense is used for purposes of politeness.

The ‘non-past subjunctive conditional’ (cf. Ippolito, 2003, p. 145) use of the past tense leads us to the past perfect, as it is seen often as the verb tense to implicate counterfactuality in conditionals (see Comrie, 1986; Athanasiadou & Dirven, 1997a; Wierzbicka, 1997; Ippolito, 2013; for Dutch, see Paardekooper, 1957, p. 44; Overdiep, 1937, p. 58; Balk-Smit Duyzentkunst, 1963, pp. 130–131; Janssen, 1989, p. 325; Haeseryn et al., 1997, p. 129; van Bart & Sturm, 1987, p. 57). In Ippolito’s terminology, ‘subjunctive’ is used to refer to ‘one layer of past morphology which is not interpreted temporally’, i.e., it concerns a semantic notion of the subjunctive as counterfactual. As the current section concerns verb tense as a *grammatical* feature, I will not use the term ‘subjunctive’ here, as it refers to a mood, whereas Dutch uses tense rather than mood to indicate counterfactuality. Therefore, I will use the term ‘counterfactual’ in this section in order to refer to the modal notion of distancing *p* from the world of the speaker expressed by the grammatical means of verb tense (see also the discussion on terminology concerning subjunctives and counterfactuals in sec-

tion 2.5). The use of the past perfect in Dutch conditionals is exemplified below in (106) to (108), showing the ‘past perfect, past perfect’, ‘past perfect, simple past’, and ‘simple present, past perfect’ patterns respectively.

- (106) ‘Als ik een pistool of mes *had gehad*, *had* ik dat *gebruikt*’, tekende de politie op uit de mond van Kahlid L. (WR-P-P-G-0000009005)
 ‘If I had had a gun or knife, I had would have used it’, police registered Kahlid L. saying.
- (107) De Amerikanen zelf *zouden* nooit akkoord *gaan* als Europa een dergelijk voorstel *had gedaan*. (WR-P-P-G-0000125911)
 The Americans themselves would never agree if Europe had made such a proposal.
- (108) En als de VUT in klap *wordt afgeschaft* zou zelfs de spanning op de arbeidsmarkt in keer *zijn opgelost*. (fn000242)
 And if the VUT is abolished at once, even the tension on the labour market would be resolved in one go.

Wierzbicka (1997, pp. 29–30) has shown for English that the ‘past perfect, past perfect’ pattern is interpreted by her informants exclusively as a counterfactual expression. Fauconnier (1994, pp. 111–112) argues for the same, as can be seen in his examples reproduced below.

- (109) If Boris comes tomorrow, Olga will be happy. (Fauconnier, 1994, p. 111)
- (110) If Boris came tomorrow, Olga would be happy. (Fauconnier, 1994, p. 111)
- (111) If Boris had come tomorrow, Olga would have been happy. (Fauconnier, 1994, p. 112)

In contrasting the examples in (109) and (110), we see that (110) tense is not not used to refer a past situation, which would be incompatible with the time adverbial *tomorrow*, but rather expresses epistemic distance towards *p*. In Fauconnier’s (1994, p. 112) words, (109) can be used only if it is ‘established’ or ‘undetermined’ that Boris comes, while (110) can only be used if it is established that Boris is not coming or it is undetermined whether or not he comes. Conversely, (111) ‘can only be used counterfactually’. In section 2.5.4, I argued for the status of an implicature of the counterfactual interpretation of such conditionals (see also Fauconnier, 1994, Chapter 4). I note here that what we see in (106), namely that the ‘past perfect, past perfect’ pattern is used for counterfactual expressions, is, as far as the corpus data go, the case for all conditionals with this tense pattern. This suggest a strongly generalised conversational implicature, which can only be overruled by strong contextual clues contrasting the implicature.

5.4.6 Conclusion

The results presented in this section show that an overwhelming majority of Dutch conditionals has a simple present verb in both clauses, and does not occur with *zullen* ‘will’ in the consequent often, as would be expected when compared to English. Furthermore, looking at the minority of cases in which other tenses are involved, the simple past is most frequent, and, in case of the ‘simple past, simple past’ pattern, it is used to express either epistemic distance, as is the case with past perfect patterns, or to express recurrence in the past, as discussed in terms of implicatures of unassertiveness in section 2.5 and the accounts thereof discussed in section 3.2. These two tense patterns have an overwhelming influence on the overall association between tense in antecedents and in consequents, whereas tense distributions are significantly, but only weakly associated with mode and register.

Next to the distributions of verb tenses, we discussed tense in relation to previous studies, which showed strong relations between tense and specific implicatures of unassertiveness, i.e., epistemic distancing by means of tense. Even though a large majority of conditionals has simple present tense in both clauses, clustering should be able to use the deviations from this pattern together with other features, which brings us to the strong relation between tense and modality frequently mentioned in the literature discussed. Therefore, we will discuss modality in Dutch conditionals in the next section.

5.5 Modality

5.5.1 Introduction

The feature *modality* represents the type of modality, i.e., ‘the question of what is possible and what is necessary’ expressed in the antecedent and consequent (cf. Bueno & Shalkowski, 2021). Like conditionality (see chapter 2), modality is not easily defined (see Declerck, 2011, for overview and discussion; for a recent discussion of modality in terms of possible worlds, see De, 2021; for a recent introduction, see Schulze & Hohaus, 2020), which means that we have to deal with that issue first.

In this section, I first discuss the notion of modality, and then the types of modality distinguished in the literature in section 5.5.2. Next, I will discuss the annotation of modality in antecedents and consequents of Dutch conditionals in section 5.5.3. In section 5.5.4, I will present the distribution of types of modality in the corpus, after which I will compare the results with insights from the literature on modality in conditionals in section 5.5.5. In section 5.5.6, I will provide a brief conclusion.

5.5.2 Markers and types of modality

Conditionals and modality have been suggested to be connected (see e.g., Over, Douven & Verbrugge, 2013; Kratzer, 2012; Over, Douven & Verbrugge, 2013; Sztencel & Duffy, 2019). Like modals, conditionals ‘never expresses the factuality of either of its constituent propositions’ (Comrie, 1976, pp. 79, 89). Similar views can be found in e.g., Sweetser (1990, p. 141), Dancygier (1998, p. 72), Huddleston and Pullum (2002, p. 741), and, Gabrielatos (2019), although analyses in terms of semantics and implicatures vary.²⁶ On defining the notion of modality, Nuyts remarks the following.

‘Modality’ is one of the ‘golden oldies’ among the basic notions in the semantic analysis of language. But, in spite of this, it also remains one of the most problematic and controversial notions: there is no consensus on how to define and characterise it, let alone on how to apply definitions in the empirical analysis of data. (Nuyts, 2005, p. 5)

As we in fact do need a characterisation of modality for application to empirical data, we have to arrive, at least, at a general definition to work with. In arguing that ‘mood and modality are not so easily defined [as tense and aspect]’, Bybee, Perkins and Pagliuca (1994, p. 176) mention that ‘a definition often proposed is that modality is the grammaticization of speakers’ (subjective) attitudes and opinions’. Modality, as characterised by Quirk et al. (1985, p. 219), reflects the ‘manner in which the meaning of a clause is qualified so as to reflect the speaker’s judgement of the likelihood of the proposition it expresses being true’. Palmer (1986, p. 189) argues that modality marks both non-factuality and the ‘speaker’s degree of commitment’ to what is expressed. In this sense, modality is the view a speaker presents on the situation expressed, either in relation to reality, or to her attitude. Modality is a widely researched topic, both independently and in relation to conditionals. Sweetser (1990, p. 140) for instance links conditionality to ‘causality and modality’ (in different domains; see below), Dancygier (1998, p. 44) links ‘predictive modality’, as in future reference with *will*, to the predictive use of conditionals. As we saw in section 2.2, in Kratzer’s (2012, pp. 64, 90–91) analysis, *if*-clauses ‘restrict the modal base of the associated modal in the matrix clause’, or, put differently, their function is ‘to restrict the domain of the adverb’, meaning a restriction on the ‘modal base’ or the set of available possible worlds the consequent applies to (as discussed in section 2.2.2, in Kratzer’s (2012, p. 105) account, main clauses without explicit modals are ‘implicitly modalized’). According to Palmer (1986, p. 189), a conditional does not assert any of the propositions it expresses, it ‘merely

²⁶See also the recent corpus study of English and Russian by Trnavac and Taboada (2021, p. 8) in which they view conditionals as constructions similar to modals, both being used to ‘engage in’ and ‘entertain’ thoughts about non-factual situations (cf. Martin & White, 2005, pp. 104–111).

indicates the dependence of the truth of the one proposition upon the truth of another', introducing notions akin to modality, such as possibility, likelihood, permission and prediction.

Before going into the different types of modality distinguished in this study, it is important to note that, as Boogaart and Fortuin (2016, p. 534) argue, much of the research on modality has focused on modal *verbs* in particular. However, modality is not only expressed by means of (certain) verbs and tenses, but also by means of adverbs, predicative adjectives, modal auxiliaries, and mental-state predicates (cf. Nuyts & Vonk, 1999, p. 700). For the annotation of modality in this study, a number of markers were indexed using a custom Python script as a first step to annotation. These included adverbs like *waarschijnlijk* 'probably', *misschien* 'maybe', *naar verluidt* 'reportedly'. The list was based on Vandeweghe (2000, pp. 146–153), de Haan (2006), and Diepeveen et al. (2006) and Nuyts (2006). The same was done for modal auxiliaries (see the annotation guidelines in section A.6 of Appendix A, based on the publications mentioned above, and on Rijpma & Schuringa, 1972, p. 205). The automatic annotations were checked manually and used as aids for the manual annotation of modality type. Of special interest is the marking of modality by means of composed tenses with *zullen* 'will' as modals rather than future tenses. We will come back to this in section 5.5.5.

A complicating factor in modality marking in conditionals is that conditional constructions themselves can be viewed as markers of modality (see e.g., Kaufmann & Kaufmann, 2015, pp. 248–249). Gabrielatos (2010, p. 326) argues that *if*-conditionals do not only attract a higher degree of further modalisation than other clauses, but in his view 'the protasis [antecedent] acts as a modal marker for the apodosis'. Although the conjunction *als* 'if' is present in all conditionals in the current corpus, however, we will not include this as a modal marker of its own. In this view, in an example like (112) below neither clause is marked for modality.

- (112) Als ze zich onbehoorlijk gedragen, jagen ze de klanten weg. (WR-P-P-G-0000102311)
If they behave improperly, they scare away the customers.

Moving on to types of modality, the literature shows that not only is modality not easily defined, but also that no consensus exists on how many types of modality exist and which types should be distinguished. According to Sweetser (1990, pp. 49–53), for instance, modality can be described in terms of the three domains we have discussed earlier, namely root modality (i.e., in the content domain), epistemic modality, and speech-act modality. Sweetser (1990) provides the following examples of each type respectively.

- (113) John *must* be home by ten; Mother won't let him stay out any later.
 (Sweetser, 1990, p. 49)
- (114) John *must* be home already; I see his coat. (Sweetser, 1990, p. 49)

- (115) There *may* be a six-pack in the fridge, but we have work to do. (Sweetser, 1990, p. 70)

In this study, however, I distinguish between four types of modality proposed by Palmer (2001), which is both influential (see e.g., Nuyts, 2006, pp. 5–7) and can be brought down to two main types of modality distinguished in many other accounts. The main types are *propositional modality*, within which *epistemic* and *evidential* are distinguished, and *event modality*, which is further divided into *deontic* and *dynamic modality* (cf. Palmer, 2001, p. 22).

The first type of modality is propositional modality, which is ‘concerned with the speaker’s attitude to the truth-value or factual status of the proposition’: the sub-type of epistemic modality marks the speakers judgements ‘about the factual status of the proposition’, whereas the sub-type of evidential modality marks the evidence for the proposition expressed (cf. Palmer, 2001, p. 24), as can be seen in the corpus examples below.

- (116) Alleen gaat het *waarschijnlijk* fout als n-2 wel overlapt. (WR-X-B-A-discussion-lists-tweakers-1550304)
However it will probably go wrong if n-2 does overlap.
- (117) Als nou zou *blijken door de rechter of anderszins* dat dat absoluut niet kan dan neem ik aan dat kabinet dus geneigd is om tuurlijk naar de regelgeving te kijken. (fn000237)
If through a judge or otherwise it would appear that it is absolutely impossible, then I assume that the government is therefore inclined to look at the regulations.

In (116), the consequent is marked for epistemic modality by the adverb *waarschijnlijk* ‘probably’. The speaker expresses that she deems it likely that something will go wrong if the condition in the antecedent is met, but does not present it as a necessary consequence. In the example in (117), the antecedent is marked for evidential modality, as evidence for the expressed proposition comes from others (the judge).^{27, 28}

The second main type of modality distinguished by Palmer (2001, p. 70) is event modality, which refers to ‘events that have not taken place but are merely potential’. The two sub-types are deontic and dynamic modality, which differ in source of potentiality. Deontic modality refers to factors external to a person, resulting in notions such as permission and obligation, while dynamic modality refers to factors internal to a person, resulting in notions like ability and willingness, as in (118) and (119) respectively.

²⁷Here the antecedent is also marked for epistemic modality by the past tense of the modal verb *zullen* ‘will’.

²⁸Palmer distinguishes between further types of epistemic modality (‘speculative epistemic modality’, ‘deductive modality’, and ‘assumptive modality’; see Palmer, 2001, pp. 29–30) and evidential modality (‘reported evidential modality’, and ‘sensory modality’; see Palmer, 2001, p. 40). In this study, I will not use these further subdivisions of modality.

- (118) Als ik zeg dat illegalen terug *moeten*, *moeten* ze terug. (WR-P-P-G-0000035830)

If I say that illegal immigrants must return, they must return.

- (119) Mam, Joost *wil* ook graag mee als je kaarten *kunt* krijgen. (WR-U-E-D-0000000312)

Mom, Joost also wants to come if you can get tickets.

In (118), the speaker expresses her view on illegal immigrants and expresses their obligation to return. In (119), the antecedent is marked for ability, while the consequent is marked for desire, both of which are internal to the subjects of the respective clauses. The former is a sub-type of dynamic modality, which not only concerns ability, but also ‘need’, as in Nuyts’s example below.

- (120) I have to clean up this room, I can’t stand the chaos. (Nuyts, 2006, p. 8)

With respect to the modality in the consequent of (119), the expression of a wish is not part of Palmer’s classification and is ‘a little more obscure’, because wishes are both deontic and epistemic (see Palmer, 2001, p. 13).²⁹ In line with Nuyts’s discussion, I will treat wishes, as expressed by *wil* ‘want’ in (119), as examples of dynamic modality.

5.5.3 Inter-rater reliability

All clauses in the corpus were manually annotated for type of modality using the manual provided in section A.6 of Appendix A. Note that for each conditional sentence, this resulted in two annotations: the type of modality in the antecedent and the type of modality in the consequent. The reliability of annotations of modality in the antecedent and in the consequent is high ($AC1=0.94$, 0.89) with the ‘regular kappa strategy’, but decreases notably ($AC1=0.60$, $AC1=0.68$) with pairwise deletion. This is due to the number of conditionals without at least one clause being marked for modality. For details and discussion, see section 4.5.

When we look in detail at the cases in which annotators did not agree, we see the disagreements appear at the level of sub-types of propositional and event modality mostly, i.e., a clause being annotated for epistemic modality by one annotator, and evidential modality by the other, or deontic modality by one, and dynamic modality by the other. In (121), for instance, the antecedent refers to the source of the information (cf. Chafe & Nichols, 1986) presented in the consequent.

- (121) Als ik Kelly *mag geloven* ga ik het feest van het jaar missen, maar ik heb ‘t er maar mee te doen. (WR-U-E-D-0000000301)

If I may believe Kelly I am going to miss the party of the year, but there’s nothing I can do about it.

²⁹Palmer further subdivides deontic modality into ‘obligative modality’ and ‘commissive modality’, and dynamic modality into ‘abilitative modality’, and ‘volitive modality’ (Palmer, 2001, p. 184). Again, these further subdivisions are not used in this study.

As Nuyts (2006, pp. 11–12) shows, some accounts include ‘evidentiality’ in the category of epistemic modality, while others see both types as sub-types of a higher category. Palmer (1986), for instance, presents the former option, while Palmer (2001) chooses the latter. Cornillie (2009) presents an account in which evidential and epistemic modality are clearly separated. Here, the situation is complicated by the antecedent itself functioning as a modaliser of the consequent. However, as discussed above, we only look at modal markers within the clauses. The post-annotation discussion of (121) led to the decision to annotate the antecedent for evidential modality, as the most viable interpretation seems to be ‘according to Kelly’, which is a reference to an information source, and in this case goes beyond the modality marked strictly by the modal verb *mag* ‘may’.

Disagreements on the level of the two main types (propositional and event modality) occurred less often, but did occur. For the example in (122), the disagreement concerned whether the consequent is marked for deontic modality, or epistemic modality.

- (122) Als ik bijvoorbeeld evenveel reden heb om te denken dat mijn kat in Doos 1 kroop dan dat het Doos 2 was, dan *moet* ik het even *waarschijnlijk* achten dat de kat in Doos 1 zit, als dat ze in Doos 2 zit. (WR-X-A-A-journals-txt-antw-007)
If I for example have as much reason to think that my cat crawled into box 1 as into box 2, then I must consider it as likely that the cat is in box 1 as it is in box 2.

Here, the consequent is marked for modality by *moet* ‘must’ and *waarschijnlijk* ‘likely’. One could argue that the information presented in the antecedent *obliges* the speaker to consider it as likely that the cat is in the first box, as in the second box. This line of reasoning, however, would risk considering all uses of *moeten* ‘must’ as markers of deontic modality. Furthermore, in this case the adverb *waarschijnlijk* ‘likely’ marks the consequent not for deontic, but for epistemic modality, which is consistent with the complete utterance concerning knowledge, not obligation. For this reason, this consequent was annotated for epistemic modality, but the example shows that such matters are interpretative and open for debate.

Some disagreements showed signs of the difficulty of ‘ignoring’ the conditional as a whole. In (123) below, one annotator classified the consequent as being marked for dynamic modality, as ‘making the trade’ is dependent on the ability referred to in the antecedent.

- (123) Als we konden ruilen, *zou* ik het doen. (WR-U-E-D-0000000050)
If we could trade, I would do it.

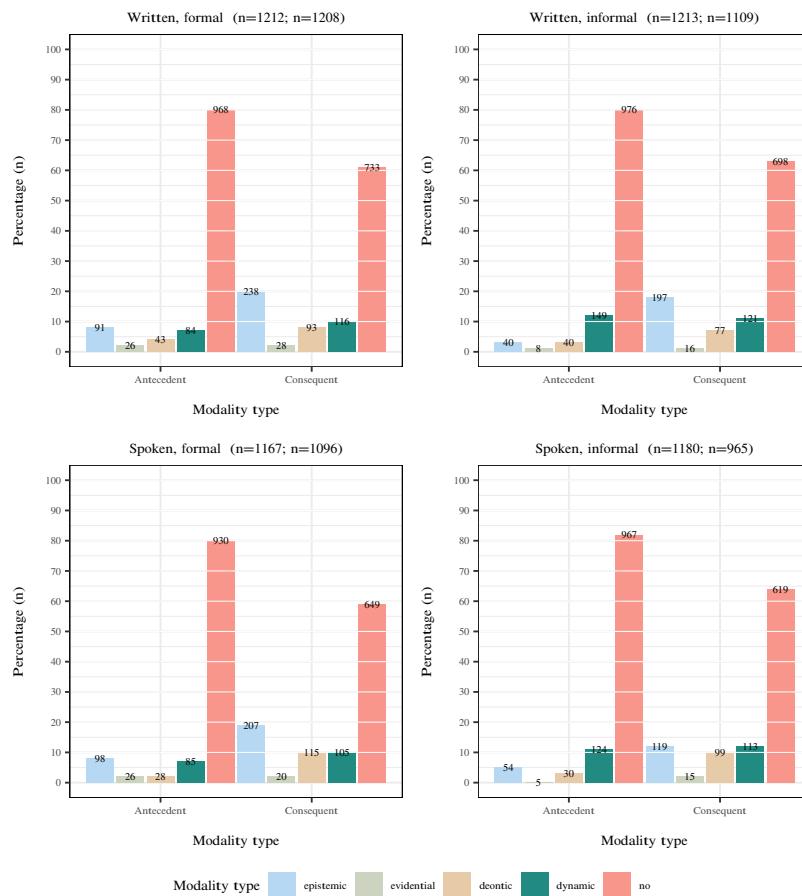
In isolation, however, the consequent is marked for epistemic modality by means of *zou* ‘would’, indicating epistemic distance. What is unfortunate in this situation is that one could argue that the antecedent here is also marked for epistemic modality by means of the backshifted verb *konden* ‘could’ (see also the

notion of ‘*modal backshifting* or *formal distancing*’ in Declerck, 2011, p. 28). However, a consequence of the tense system used in this study is that the antecedent of (123) is annotated for simple past tense, and dynamic modality by means of the verb *kunnen* ‘can’, rather than epistemic modality.

5.5.4 Distribution of modality types

The results of the annotation of modality are presented below in Figure 5.4. For more detailed information, the reader is referred to page 476 in Appendix B.

Figure 5.4:
Distribution of modality types by mode and register



What we see in Figure 5.4 is that the distributions are very comparable between modes and registers. In all four mode-register combinations non-modalised clauses are most frequent in antecedents ($\pm 80\%$), and in consequents ($\pm 60\%$) too. This also shows that, as may be expected based on the inherent modal marking of antecedents by *als* ‘if’, consequents are more frequently marked for modality than antecedents. If we look at modalised versus non-modalised clauses, we see no differences in overall distributions for mode and only small differences for register. Antecedents are modalised in 19.17% of conditionals in spoken texts and 19.84% in written texts, and consequents are modalised in 38.48% of spoken texts and 38.24% of written texts. Looking at register, we see the same: antecedents are modalised in 20.22% of conditionals in formal texts and 18.80% of informal texts, and consequents are modalised in 40.02% of formal texts and 36.50% of informal texts. Whereas Biber and Conrad (2009, pp. 116–177) report that modals are ‘uncommon’ in newspapers and academic prose, and ‘more common’ in conversations, this is not observed in the data presented here. On the contrary, antecedents in conversations are modalised less often than in academic journals and newspapers (16.26% vs. 19.53% and 20.24%). The picture is less clear for consequents: 36.44% is modalised in conversations versus 40.83% in academic journals and 36.91% in newspapers. We thus see that modals are not uncommon in newspapers and academic journals, but as with tense, this might very well be an effect of the conditionals themselves. Before we look more closely at the modalised clauses, we will test the distributions over mode and register.

As can be seen in Figure 5.4, most clauses are not modalised. Like tense, modality in one clause is associated with modality in the other clause ($\chi^2=149.56$, $df=16$, $p<0.001$), although, contrary to tense, the association is very weak (Cramér’s $V=0.09$). For that reason, I will include both clauses in the first (saturated) model, and I will work towards the most parsimonious model using backward-elimination. A four-way loglinear analysis was performed, which produced a final model with a likelihood ratio of $\chi^2=66.71$, $df=57$, $p=0.18$. None of the three-way interactions were significant, but removing the two-way interaction *mode* $\times$ *modality* (*a*) would significantly worsen the fit of the model ($\chi^2=6.73$, $df=4$, $p=.015$; $\Delta\chi^2=11.72$, $df=4$, $p=0.02$), as would removing the *register* $\times$ *modality* (*a*) interaction ($\chi^2=80.26$, $df=4$, $p<0.001$; $\Delta\chi^2=63.93$, $df=4$, $p<0.001$), the *mode* $\times$ *modality* (*c*) interaction ($\chi^2=17.41$, $df=4$, $p=.002$; $\Delta\chi^2=18.50$, $df=4$, $p<0.001$), the *register* $\times$ *modality* (*c*) interaction ($\chi^2=18.10$, $df=4$, $p=0.001$; $\Delta\chi^2=14.06$, $df=4$, $p=0.01$), and the *modality* (*a*) $\times$ *modality* (*c*) interaction ($\chi^2=149.56$, $df=16$, $p<0.001$; $\Delta\chi^2=120.42$, $df=16$, $p<0.001$). We will break down these interactions, starting with the largest. Inspecting the residuals of the *modality* (*a*) $\times$ *modality* (*c*) interaction shows that the largest contribution to the overall association between modality in antecedents and consequents comes from the combination of epistemic modality in antecedents and in consequents ($z=9.12$, $p<0.001$), mostly at the cost of non-modalised consequents ($z=-4.22$, $p<0.001$). In other words, antecedents marked for epistemic modality are more frequently followed

by consequents marked for epistemic modality than expected as compared to non- or differently modalised antecedents. Compared to non-modalised antecedents, we see less consequents marked for epistemic modality than expected ($z=-2.25$, $p<0.05$). Another significant contribution is found in antecedents marked for dynamic modality. The conditionals feature deontic modality in the consequent more often than expect ($z=5.04$, $p<0.001$), and are less frequently non-modalised ($z=-2.09$, $p<0.05$). For the *mode* $\times$ *modality* (*a*) association, none of the individual mode-modality type combinations significantly contribute to the overall association. For register, we see that antecedents in informal texts are more frequently marked for dynamic modality as compared to formal texts ($z=3.45$, $p<0.001$; $z=-3.46$, $p<0.001$), whereas epistemic and evidential modality are more frequent in formal texts ($z=4.03$, $p<0.001$; $z=3.44$, $p<0.001$) as compared to informal texts ($z=-4.02$, $p<0.001$; $z=-3.43$, $p<0.001$). Looking at consequents, we see that clauses marked for deontic modality are more frequent than expected in spoken texts as compared to written texts ($z=2.47$, $p<0.05$; $z=-2.33$, $p<0.05$). With respect to register, we see more epistemic modality than expected in formal texts as compared to informal texts ($z=2.22$, $p<0.05$; $z=-2.34$, $p<0.05$).

Given the analyses of modality distributions in antecedents and consequents, we can conclude that there are modality patterns between clauses of conditionals, especially in the case of epistemic modality marked by the past tense of *zullen*, as in example (124) below.

- (124) Strikt voorgeschreven methoden en toetsen *zouden* niet hoeven als we *zouden* accepteren dat niet elke leerling hetzelfde leert en de leraar zelf als enige capabel is om te bepalen wat goed voor de leerling is. (WR-X-A-A-journals-002)
Strictly prescribed methods and tests would not be necessary if we would that not every student learns the same way and the teacher is the only one capable of determining what is good for the student.

Next to this association, we see that dynamic modality in antecedents is associated with informal texts, as in (125) below, whereas epistemic and evidential modality occur more often in formal texts, as in (126) and (127).

- (125) Zeg kom er niet eens tussen joh als ik *wil* wat zeggen. (fn000957)
Hey, I can't even even intervene if I want to say something.
- (126) Dat zal hem nog problemen opleveren, zeker als – *hetgeen waarschijnlijk is* – het straks de sociaal-democraten zijn die de regering gaan domineren. (WR-P-P-G-0000096824)
That will still cause him problems, especially if – which is likely – it will soon be the Social Democrats who will dominate the government.
- (127) Hans Huisinga stapt op als *blijkt* dat het nieuwe verbeteringsplan ‘Bestemming Klant Nu’ niets oplevert. (fn006507)
Hans Huisinga will step down if it turns out that the new improvement plan ‘Destination Customer Now’ is unsuccessful.

Formal texts feature more epistemic marking in consequents too compared to informal texts, as in (128) below. Deontic modality in consequents, as in (129) below, is associated with spoken texts more than with written texts.

- (128) Het *zou* ook voordelig zijn om kritisch en voorzichtig te zijn in het vormen van een mening, en vatbaar te zijn voor mogelijke problemen en nieuwe overwegingen, zeker als de bewijsgronden ontoereikend zijn (in veel religieuze of politieke kwesties), of als de experts het oneens zijn (in de wetenschap). (WR-X-A-A-journals-001)
It would also be beneficial to be critical and prudent in forming an opinion, and susceptible to potential problems and new considerations, especially if the evidence is insufficient (in many religious or political issues), or if the experts disagree (in science).

- (129) Als je een compliment hoort dan *moet* je dat even doorgeven. (fn008285)
If you hear a compliment, you have to pass it on.

Again, epistemic modality in consequents is frequently expressed by past tense *zullen* ‘will’ (see previous section). In (129) we see a typical use of *moeten* ‘must’ combined with a conditional clause in spoken texts, i.e., an obligation is expressed, but on condition that one first receives a compliment.

5.5.5 Comparison with previous studies

In this section, I discuss the distributions of types of modality presented in 5.5.2 in light of the relevant literature on modality.

Epistemic modality is the most frequent type of modality in antecedents and consequents in both modes and registers, although the majority of epistemic modality is larger in consequents than in antecedents. When we look at how epistemic modality is marked, we see that a minority is marked by adverbs like *waarschijnlijk* ‘probably’, *echt* ‘real(ly)’, *natuurlijk* ‘naturally/of course’ and *misschien* ‘maybe’, as in (130) to (133) respectively.

- (130) Als er dan nog geen akkoord is rijden morgen *waarschijnlijk* geen treinen. (fn001745)
If there is still no agreement, there will probably be no trains tomorrow
- (131) Nee maar als ik zou kunnen zou ik ook *echt* mee gaan! (WR-U-E-A-0000001248)
No but if I could, I would really go too!
- (132) Maar het zou *natuurlijk* ook geen ramp zijn als hij vertrekt. (WR-P-P-G-0000042521)
But it would of course not be a disaster if he left.
- (133) *Misschien* werkt whatsapp nog wel als je simkaart geblokt is, voor wif heb je geen mobiel netwerk nodig... (WR-U-E-D-0000000305)
Maybe whatsapp still works if your SIM card is blocked, for wif you don't need a mobile network...

In all of these cases, the consequent is marked for epistemic modality, either in terms of uncertainty, as in (130), ‘inference from observable evidence’, as in the specific situations in (131) and (132), or in terms of ‘inference from what is generally known’, as in (133) (Palmer, 2001, p. 25).

As is exemplified in (131) and (132), modal adverbs are frequently used in combination with modal verbs, most frequently *zullen* ‘will’, as in the examples just mentioned. We also find modal verbs like *kunnen* ‘can’ and *moeten* ‘must’, as in (134) and (135) below.

- (134) Als je je frustraties publiek maakt, *kun* je ook sarcasme terugkrijgen.
(WR-U-E-A-0000000210)
If you make your frustrations public, you can also get sarcasm back.
- (135) Als iemand werkelijk gelukkig is dan moet deze persoon in het bezit zijn
van het goede. (WR-X-A-A-journals-txt-antw-005)
*If someone is really happy then this person must be in possession of the
good.*

In (134), *kunnen* ‘can’ should be interpreted as ‘it is possible that’, while, as we will see in what follows, *kunnen* ‘can’ more frequently marks dynamic and, to a lesser extent, deontic modality in the current corpus, which is corroborated by the frequencies reported by Nuyts (2002, pp. 442–443). In (135), we see the epistemic use of *moeten* ‘must’, which has developed from deontic use (see e.g., Traugott, 1989; Sweetser, 1990, Chapter 3; see also Boogaart & Fortuin, 2016; Boogaart & Reuneker, 2017, pp. 199–201), indicating not ‘real-world obligation’, but, in this case, ‘necessity [...] in reasoning’ (cf. Sweetser, 1990, p. 49).

As the epistemic use of *zullen* ‘will’ requires a more detailed discussion, largely because of its interaction with verb tense as discussed in the previous section, we will first briefly discuss the other types of modality and their marking in the corpus, continuing with evidential modality. Evidential modality is marked in only a small number of cases by adverbs. Whereas Diepeveen et al. (2006, p. 5) mention *blijkbaar* ‘apparently’, this evidential adverb was very infrequent in conditionals in the corpus. An example is provided in (136). Although overall frequencies are low, the most frequent evidential adverb was *inderdaad* ‘indeed’, both in antecedents and consequents, as in (137) and (138) below, followed by *volgens* ‘according to’, as in (139).

- (136) Maar ja dat krijg je dus *blijkbaar* als je met vijven iets organiseert.
(fn008210)
But yes you get that apparently when you organize something with five.
- (137) Als *inderdaad* sprake is van een gebrek aan morele lading, komt de hand-
havingspiramide op drijfzand te staan. (WR-X-A-A-journals-txt-tvc-005)
*If there is indeed a lack of moral charge, the enforcement pyramid will be
put on quicksand.*

- (138) Als je het halve huis wil laten trillen bij explosies en dergelijke ben je *inderdaad* beter uit met een subwoofer [...]. (WR-X-B-A-discussion-lists-tweakers-1547562)

If you want to make half the house vibrate during explosions and things like that you are indeed better off with a subwoofer.

- (139) Als Kok in tweeduizend twee voor het premierschap beschikbaar is dan is dat *volgens hem* voor de volle vier jaar. (fn005065)

If Kok is available for premiership in 2002, then it is according to him for the full four years.

For (137) and (138), I suggest *inderdaad* ‘indeed’ marks evidential modality, because it refers to what was previously established in the context, referring to ‘the evidence [they have] for its factual status’ (Palmer, 2001, p. 8), or ‘the origins of the knowledge about the state of affairs’ (Nuyts, 2006, p. 10), much like *blijkbaar* ‘apparently’ in (136). The context preceding the conditional in (137) is presented in (140), which indeed shows that the ‘lack of moral charge’ is already mentioned in terms of not making clear what the intentions and interests are.

- (140) Dit wordt vergemakkelijkt als de overheid zelf niet duidelijk kan maken wat de bedoelingen van de regels en de te beschermen belangen zijn. (WR-X-A-A-journals-txt-tvc-005)

This is facilitated if the government itself cannot make clear what the intentions of the rules and the interests to be protected are.

Evidentiality is also marked by verbs, most notably *blijken* ‘turn out’ in antecedents, and *lijken* ‘seem’ in consequents, as in (141) and (142) respectively.

- (141) Als *blijkt*, ambtshalve of op basis van een mededeling van de betrokkene, dat onjuiste gegevens of gegevens, die niet hadden mogen worden verstrekt, zijn verstrekt dan moet dit onverwijld aan de ontvangende Verdragsluitende Partij of de ontvangende Verdragsluitende Partijen worden meegedeeld. (WR-P-P-F-0000000001)

If it turns out, ex officio or on basis of communication with the involved party, that incorrect data or data which should not have been provided, has been provided, this must be notified immediately to the receiving Contracting Party or Parties.

- (142) Als het gaat om een keuze voor de organisatievorm *lijken* echter de sociale aspecten doorslaggevend. (WR-X-A-A-journals-txt-mem-007)

When it comes to choosing the form of organization, however, the social aspects seem to be decisive.

In (141) the verb *blijkt* ‘turns out’ is used to refer to evidence that would indicate that incorrect or private data had been shared. The source is explicitly mentioned in the interjection following the verb. In (142), we see the evidential verb *lijken* ‘appear/seem to’ in the consequent, which refers to results of the study of which the report features this conditional.

Deontic modality is marked by the modal verb *moeten* ‘must’ most frequently, both in antecedents as in consequents, as is exemplified in (143) and (144).

- (143) Ik heb zo de pest aan als je dan *moet* stofzuigen dan *moet* je alles aan de kant halen. (fn008068)
I hate it so much if you have to vacuum and then you have to put everything aside.
- (144) Als KPN met nieuwe voicemaildiensten komt *moeten* de mensen die die gebruiken er maar voor betalen en niet iedereen zegt de bond. (fn002304)
If KPN comes up with new voicemail services, the people who use it must pay for it and not everyone says the union.

Nuyts, Byloo and Diepeveen’s (2010) results show that *moeten* ‘must’ expresses dynamic modality most in their corpus, but this is not corroborated in this study. Dynamic use of *moeten* ‘must’, as in (145) below, accounts for only approximately 17.5% of modal *moeten* ‘must’ in antecedents when compared with deontic use, and 16.5% in consequents.³⁰

- (145) Het is voor mensen die slechtiend of blind zijn niet altijd even eenvoudig om een goede muzikleraar te vinden, vooral als je niet weet waar je moet zoeken. (WR-P-P-D-0000000005)
It is not always easy for people who are visually impaired or blind to find a good music teacher, especially if you do not know where you must/have to look.

Here *moeten* ‘must’ marks not an external force, but an internal ‘need or necessity’ (cf. Nuyts, Byloo & Diepeveen, 2010, pp. 22–23).

In consequents *mogen* ‘may’, *kunnen* ‘can’, and *hoeven* ‘have to’ may also mark deontic modality relatively frequently (see also Nuyts, Byloo & Diepeveen, 2010).

- (146) In zijn kruistocht tegen de advocatuur in het algemeen en sommige advocaten in het bijzonder betoogt de jurist Hendrik Kaptein dat als het aan hem ligt advocaten zich niet *mogen* beroepen op de mazen in de wet. (WR-P-P-G-0000003954)
In his crusade against the legal profession in general and some lawyers in particular, the lawyer Hendrik Kaptein argues that if it is up to him, lawyers may not rely on loopholes in the law.
- (147) Gemeenten *kunnen* de witte scholen niet uitbreiden met extra lokalen, als die schooluitbreiding een gevolg is van witte vlucht. (WR-P-P-G-0000132488)
Municipalities cannot expand the white schools with extra classrooms, if that school expansion is the result of white children leaving.

³⁰This may reflect a difference in the use of *moeten* ‘must’ in Dutch in the Netherlands and Belgium.

- (148) Gesproken studie- en vaklektuur *hoeft* u pas terug te sturen als u die niet meer nodig heeft. (WR-P-P-D-0000000005)
You only have to return spoken study and subject literature if you no longer need it.

In all cases the modal verb still expresses obligation.³¹ Although the example in (147), marked by *kunnen* ‘can’, could also be interpreted as expressing not deontic, but dynamic modality, it is clear from context that it is legislation that prohibits municipalities to expand schools with extra classrooms, not an internal inability.

Finally, before turning to tense and modal *zullen* ‘will’, we look at dynamic modality, which is expressed mainly by the verbs *kunnen* ‘can’ and *willen* ‘want’, as in (149) to (150).³²

- (149) Als mensen met pensioen gaan, verkrijgen ze allereerst meer vrije tijd die ze *kunnen* besteden aan sport. (WR-X-A-A-journals-txt-mem-007)
If people retire, they first of all get more free time which they can spend on sports.
- (150) Als ik dus de CPU op 2,13 Ghz *wil* krijgen zal ik de bus op 171 Mhz moeten zetten, alleen dan valt mij systeem dus uit. (WR-X-B-A-discussion-lists-tweakers-821468)
So if I want to get the CPU at 2.13 GHz I will have to put the bus at 171 Mhz, but then will my system fail.

As Palmer (2001) argues, dynamic modality ‘has to be interpreted rather more widely than in terms of the subjects’ physical and mental powers, to include circumstances that immediately affect them’. So, *kunnen* ‘can’ in (149) does not refer to personal ability per se, but more generally to possibility, comparable to Palmer’s example below.

- (151) He can escape. (Dynamic: the door’s not locked) (Palmer, 2001, p. 10)

In the sense that the door not being locked here enables one to escape, having more free time in (149) enables one to spend more time on sports. There is a clear difference in distribution of these two modal verbs when clauses are compared. Dynamic *kunnen* ‘can’ occurs 300 times in consequents and 150 times in antecedents, while dynamic *willen* ‘want’ occurs 239 times in antecedents, and only 84 times in consequents ($\chi^2=124.35$, $df=1$, $p<0.001$, Cramér’s $V=0.40$). Without further detailed analysis, this at least indicates that antecedents are marked more often for needs and wants, while consequents are marked more often for ability.

³¹In the special case of (148) the modal verb gets a permission reading at clause level because of the negative polarity item *pas* ‘only’.

³²One could argue that *als* ‘if’ in (149) marks a temporal rather than a conditional relation. See the discussion in 2.2.

Returning finally to *zullen* ‘will’, as we have discussed in the previous section, tense and modality show interactions. This is also observed by de Haan (2006, p. 34), who argues that ‘an obvious candidate for such interaction is the future’, because events in the future always involve an amount of uncertainty. With respect to *zullen* ‘will’, Kirsner (1970, p. 120) argues that it expresses hypothetical meaning, not actuality. *Zullen* ‘will’ expresses the situation as ‘less likely’ than *moeten* ‘must’ ‘must’, and ‘more likely’ than *kunnen* ‘can’, as was already discussed in section 5.4. We will therefore look in more detail at the distribution of the modal verb *zullen* ‘will’ in the different tenses.³³

Table 5.2:
Distribution of modal zullen by tense

	Simple present	%	Present per- fect	%	Simple past	%	Past per- fect	%	Total
Antecedent	3	1.55	0	0.00	178	92.23	12	6.22	193
Consequent	158	37.35	0	0.00	249	58.87	16	3.78	423

Note. Percentages are row-based.

To illustrate these figures, see the examples of *zullen* ‘willen’ in simple present, simple past, and past perfect tense in the consequents of (152) to (154) respectively.

- (152) Als je dat gelooft *zal* het zeker zo lopen. (WR-P-E-A-0005330763)
If you believe that, it will certainly work out that way.
- (153) Als boeken niet worden teruggestuurd, *zou* de toezending stagneren.
(WR-P-P-D-0000000003)
If books are not returned, shipment would stagnate.
- (154) Als de Amerikanen en de Britten hem niet hadden omhelsd, als hij alleen in Zwitserland succes had gehad, dan weet ik niet of hij zo’n respectvolle stilte *bewaard zou hebben*. (WR-P-P-G-0000159427)
If the Americans and the British hadn’t embraced him, if he’d only been successful in Switzerland, then I don’t know if he would have kept such a respectful silence.

As we saw previously in section 5.4, an overwhelming majority of conditionals feature simple present verb tense in one or both clauses. What we saw in this section, is that the number of modalised clauses is low overall in comparison to

³³It is noted that in case of the perfect tenses, *zullen* ‘will’ functions as part of the compound tenses formed by *zullen* ‘will’ and a participle. The figures thus do not reflect, for instance, the past perfect tense of *zullen* ‘will’ itself, which would be *had zullen* ‘would have’.

non-modalised clauses. The verb *zullen* ‘will’ is not used in combination with present perfect in either antecedents or consequents, which could be a reflection of the general lower frequency of this combination of tense and modal *zullen* ‘will’.³⁴ This presents the problem that testing for an association between tense and the use of the modal verb *zullen* ‘will’ results in high probability of incorrect approximation, because of cells with low frequencies and even null counts, as can be seen in Table 5.2 above. We will therefore inspect the distribution by means of the standardised residuals, without losing sight of the approximate nature of these figures. A first strong deviation from the expected distribution is the low frequency of *zullen* ‘will’ in antecedents with simple present tense ($z=-12.57$, $p<0.001$), which occurs only three times in the entire corpus. An example is provided below.

- (155) Als die versterking plaats *zal* vinden is het mijn stellige overtuiging dat de landbouw ook ten aanzien van grondbeslag in Nederland een toekomst heeft en ik wil ook graag vanuit mijn verantwoordelijkheid bijdragen om die versterking van de landbouw gestalte te geven. (fn000222)
If that reinforcement will take place, it is my firm conviction that agriculture also has a future with regard to land use in the Netherlands, and out of my responsibility I would also like to contribute to shape that reinforcement of agriculture.

As in English, the antecedent does not feature *zullen* ‘will’ often. According to Comrie (1986, pp. 95–96), *will* (or another means to ‘indicate future time reference’) is used in antecedents only when the consequent presents the cause of what is referred to in the antecedent, as in his examples in (156) and (157) below.

- (156) If this will hurt you, I won’t do it. (Comrie, 1986, pp. 95–96)
 (157) If it will amuse you, I’ll tell you a joke. (Comrie, 1986, p. 96)

Haegeman and Wekker (1984, p. 46) remark that English ‘seems to have a rule that the modals *will* and *would* cannot appear in futurate or counterfactual conditional clauses unless these modals denote disposition or volition, [...] or unless they have the so-called “assumed likelihood”-meaning’ as in their example in (158) below.

³⁴This does not mean the so-called ‘future perfect’ cannot be found in the corpus outside of conditionals, as in the example below.

- (a) Geneviève *zal* zich eenzaam gevoeld hebben. (WR-P-E-G-0000002366)
Geneviève will have felt lonely.

A larger corpus search revealed an instance of the use of this tense and *zullen* ‘will’ in a consequent, as can be seen in (b), which shows that null counts in sampled data should be interpreted with caution.

- (b) Als de pensioenleeftijd *t* zelfde blijft, *zal* ik dan exact 4 jaar van mijn pensioen *genoten* hebben. (WR-P-E-A-0000713789)
If the retirement age remains the same, I will have enjoyed my retirement for exactly 4 years.

- (158) If you will not be in receipt of a scholarship or Award or if the Award will be inadequate to meet the full fees and expenses of your course and your maintenance, please state how you propose to meet those fees and expenses. (UCL application form for postgraduate students 1979) (Haegeman & Wekker, 1984, p. 46)

This 'assumed likelihood' seems to be comparable to the use of *zullen* 'will' in (155) and in (159) below, in which *blijken* 'appear' adds (evidential) modality to the clause.

- (159) Als het een echte verschuiving in de strategie zal blijken, zal deze toespraak de geschiedenis ingaan als de belangrijkste van Bush. (WR-P-P-G-0000075423)
If it will turn out to be a real shift in strategy, this speech will go down in history as the most important of Bush.

Such antecedents may frequently be echoic (i.e., the antecedent has been asserted in previous context). In Nieuwint's (1986) analysis however, a conditional antecedent with *will* refers to something else than what an antecedent without *will* refers to. In Nieuwint's examples in (160) and (161) below, the antecedent of the former would refer to a 'real-world event', while the latter would refer to the prediction of such an event.

- (160) If I die, some people are going to ask nasty questions. (Nieuwint, 1986, p. 381)
 (161) If I'll die anyway, I might as well have another beer. (Nieuwint, 1986, p. 381)

In other words, the condition presented in the antecedent in (160) is "'I die" is true'; the condition presented in the antecedent in (161) is "'I'll die" is true'. The former being 'only [...] true at the moment of my death', whereas the latter is true now. The question now is whether or not this analysis also holds for (155) and (159) – the example provided has the quirk of death being inevitable for all. 'I will die' is true for every speaker, but 'that reinforcement will take place' is not. The same goes for 'turning out to be a real shift in strategy' in (159). The preceding text of the particular example in (159), does indeed mention the reinforcement, but does not assert it (*dat zal wel afhangen van een positionering van de landbouw een versterking van de landbouw ook als economische factor* 'that will depend on the positioning of agriculture and the reinforcement of agriculture also as an economic factor'). In this specific example, it seems to be the case that the consequent expresses 'a decision (or exhortation) to perform *q* in the future while the condition expressed is that there must be certainty (confirmation) that *p* will be realized' (Declerck, 1984, pp. 293–294). For reasons of space and focus, we cannot go into further detail here, but for further discussion of modal *will* in antecedents of conditionals, see Leech (1971), Haegeman and Wekker (1984), and Dancygier (1998, p. 26).

The volition-use of *zullen* ‘will’ was not found in the corpus, but given the low frequency of *zullen* ‘will’ in antecedents in present tense, no conclusions should be drawn from this.

In consequents, the frequency of *zullen* ‘will’ in combination with simple present tense is also lower than expected ($z=-10.77$, $p<0.001$). Whereas the example in (155) is one of only three attestations, the combination of tense and modality in the consequents of the example in (162) below is more common.

- (162) Ten tweede staat in het hoofdlijnenakkoord (het regeerakkoord van Balkenende II) dat het kabinet “nadere maatregelen” zal treffen als het begrotingstekort groter wordt dan 2,5 procent van het bbp [...]. (WR-P-P-G-0000063504)

Secondly, the agreement (the coalition agreement of Balkenende II) states that the government will take “further measures” if the budget deficit exceeds 2.5% of GDP [...].

This shows that, as we discussed in the previous section, in English *will* is used in the majority of consequents of predictive conditionals, while this is not the case for Dutch conditionals. Compare the consequent of (162) to the example in (163) below, with simple present tense and no modal verb in the consequent. The latter pattern makes up for 95.76%, while only 4.24% of consequents in simple present tense feature *zullen* ‘will’.

- (163) Als ook de Senaat er zo over denkt wordt het wet. (fn005732)
If the Senate also feels that way, it will become law.

The most striking deviation from what may be expected based on the total distribution is the use of *zullen* ‘will’ in simple past tense, i.e., *zouden* ‘would’, in antecedents ($z=39.03$, $p<0.001$) and consequents ($z=30.81$, $p<0.001$) when compared to non-modalised clauses and clauses with other modal verbs. This means that antecedents and consequents with *zullen* ‘will’ and simple past tense as in (164) and (165) respectively are much more frequent than what may be expected based on the distribution of modal verbs and tense.

- (164) Als ze een vrije vrijdag zouden krijgen, hebben ze meer tijd om hun huiswerk te maken. (WR-P-P-G-0000144705)

If they would get a Friday off, they have more time to do their homework.

- (165) Als er een mogelijkheid is dat je zwanger bent, zou je natuurlijk kunnen testen, en dan weet je tenminste iets. (WR-P-E-A-0006184732)

If there is a possibility that you are pregnant, you could of course test, and then at least you know something.

As we have seen in section 2.5.4 on counterfactuality, the combination of past tense and modal *zullen* ‘will’ in examples such as (164) and (165) create ‘epistemic distance’ (see also Boogaart & Trnavac, 2011, on imperfective aspect and ‘irrealis modality’). The example in (164) above does indeed express a low likelihood (not counterfactuality) of the condition being fulfilled, but in (165), the epistemic distance is used as a politeness strategy.

Turning to *zullen* ‘will’ in combination with past perfect tense, as reported on in Table 5.2, I deem it necessary to explain how these cases were annotated, because treating *zou* ‘would’ with a perfective complement, as in (166), as an instance of past perfect tense is not without problems and therefore subject to debate. Let us look at the example in (166) below.

- (166) De Franse president Chirac en de Duitse kanselier Schröder *zouden* Prodi bij wijze van spreken om de nek *zijn gevlogen* als hij Solbes – de man die met ijzeren hand regeert over de begrotingstekorten in de lidstaten – in deze economisch zware tijd onschadelijk *zou hebben gemaakt*. (WR-P-P-G-0000026291)

The French President Chirac and the German Chancellor Schröder would have hugged Prodi, so to speak, if he would have defused Solbes – the man who rules the budget deficits in the Member States with iron – in this economically difficult time.

It can be argued that *zouden* ‘would’ is ‘just’ a simple past here, on par with simple past verbs like *moesten* ‘had to’, or *vlogen* ‘flew’. In that case, the example in (166) should indeed be classified as instances of simple past *zou(den)* ‘would’. This would be consistent with treating *zullen* ‘will’ purely as a modal verb, as I argued for in section 5.4. However, this would also mean that, for instance, the antecedents and consequents of (167) and its counterpart with modified verb cluster in (168) would both be annotated for simple past tense (*zou* ‘would’) and modal *zullen* ‘willen’, without considering the complements of the finite verb (the perfective *hebben gelegen* ‘have been’ and *zijn gestopt* ‘have stopped’ in (167), the imperfective *liggen* ‘be’ and *stoppen* ‘stop’ in (168)). In this approach, (167) and (168) would receive identical annotation for verb tense and modality.

- (167) De Wereldbank becijferde dat de wereldmarktprijs afgelopen seizoen meer dan een kwart hoger *zou hebben gelegen* als alleen al de vs. *gestopt zou zijn* met de productiesubsidies. (WR-P-P-I-0000000001)

The World Bank calculated that the world market price would have been more than a quarter higher last season if the US alone would have stopped production subsidies.

- (168) De Wereldbank becijferde dat de wereldmarktprijs afgelopen seizoen meer dan een kwart hoger *zou liggen* als alleen al de vs. *zou stoppen* met de productiesubsidies.

The World Bank calculated that the world market price would be more than a quarter higher last season if the US alone would stop production subsidies.

I have chosen here to treat *zou* ‘would’ with a perfective complement as cases of past perfect tense. The prime reason for this choice is that the combination of *would* and a perfective complement has been, as we have seen in chapters 2 and 3, explicitly analysed as a means of implicating counterfactuality in a large

number of accounts (see especially section 3.2). This insight cannot be used fruitfully when choosing the alternative, more strict approach, which would render cases of *would* with either a perfective or an imperfective complement as identical from an annotational point of view. From a methodological standpoint, the current approach ‘simply’ provides a more informative feature set. Furthermore, given that the consequents of (166) and (167) are most naturally paraphrased with a pure past perfect (i.e., *was (om de nek) zijn gevlogen* ‘had thanked’ and *had gemaakt* ‘had defused’, *had bewaard* ‘had kept’, and *had gelegen* ‘had been’ and *was gestopt* ‘had stopped’), the choice made here is, in my view, justifiable, but again not without some inconsistency with the discussions in section 5.4, in which *zullen* ‘will’ was treated purely as a modal verb.³⁵ The number of past perfect clauses with modal *zullen* ‘will’ is low, and although the problem is one mainly of theoretical implications, this does not, of course, render it unimportant. In line with the observations from the literature mentioned above, the small number of occurrences (see Table 5.2 above), they do show a clear use, as can be seen (166) and (167), but also in (169) below.

- (169) Als de Amerikanen en de Britten hem niet hadden omhelsd, als hij alleen in Zwitserland succes had gehad, dan weet ik niet of hij zo’n respectvolle stilte bewaard zou hebben. (WR-P-P-G-0000159427)
If the Americans and the British had not embraced him, if he had only been successful in Switzerland, I would not know if he would have kept such a respectful silence.

In this example, as in the above cases, either the antecedent, as in (166), or the consequent, as in (169), feature *zullen* ‘will’ and past perfect. In all of the cases found in the corpus in which the antecedent features past tense *zullen* ‘will’ (*zou(den)* ‘would’) with a perfective complement, the conditional has to be interpreted as a counterfactual, as the examples in (166) to (167) show, and as was already remarked in the previous section.

5.5.6 Conclusion

The results presented in this section show that most clauses in Dutch conditionals are not marked for modality. In case a clause is marked for modality, the most frequent type in antecedents is dynamic modality, especially in informal texts, and epistemic modality in formal texts, whereas epistemic modality is dominant in consequents across genres and registers. Of course, much more can be said about modality in (Dutch) conditionals, let alone its intimate connection with verb tense patterns.

³⁵To be clear here, I thus treat *zullen* ‘will’ + present perfect, as in *zal hebben gedaan* ‘will have done’ as present perfect, and *zullen* ‘will’ + past perfect, as in *zou hebben gedaan* ‘would have done’, as past perfect.

With respect to implicatures of unassertiveness, we looked in more detail at the modal verb *zullen* ‘will’, as it is frequently used in combination with past tense to create epistemic distance and to implicate counterfactuality. We have seen also that the present tense of *zullen* ‘will’ is not (by far) as systematically used as *will* in English predictive conditionals.

5.6 Aspect

5.6.1 Introduction

The term ‘aspectuality’ is used in the literature mainly as a cover term for both lexical aspect, dealing with situation types, and grammatical aspect, dealing with the (grammatically marked) ‘internal temporal constituency of a situation’ (cf. Comrie, 1976, p. 3; for a recent overview and discussion of terminology, see Binnick, 2020). In this study, I take into account lexical aspect only, because we have included the verbal aspect of the perfective and imperfective distinction in the feature of verb tense, and because aspect is not grammaticalised by exclusive means in Dutch (see e.g., Bogaards, 2019). As such, the feature of *aspect* represents the ‘lexical situation type’, which is also referred to as ‘situation aspect’, the aforementioned ‘lexical aspect’, and ‘Aktionsart’ (see Boogaart, 1999, Chapter 1; Binnick, 2006). This also means that known interactions between grammatical aspect, tense and modality, such as the incompatibility of perfective past and epistemic meaning discussed by Boogaart (2007b), fall out of the scope of this section.

In this section, I discuss the notion of lexical aspect in terms of situation types in antecedents and consequents of Dutch conditionals in section 5.6.2. Next I will discuss the annotation of situation types in antecedents and consequents of Dutch conditionals in section 5.6.3. In section 5.6.4, I will present the distribution of this feature in the corpus, after which I will compare the results with insights from the literature on aspect in conditionals in section 5.6.5. In section 5.6.6, I will provide a conclusion.

5.6.2 Situation types

Lexical aspect is expressed by the predicate of a clause, and concerns the temporal characteristics of the type of ‘state of affairs’ presented by a clause (for general discussion, see Boogaart, 2004).³⁶ The situation types this feature refers to are coded for the clause’s main predicate, and are based on the four classes distinguished by Vendler (1967, Chapter 4), namely *states*, *activities*, *accomplishments* and *achievements*.³⁷ This feature is included in the current study,

³⁶This section is based on collaborative work with Maarten Bogaards, who has written the extended annotation guidelines for this feature as part of an internship and has worked on aspect in both Dutch and Mandarin Chinese (see Bogaards, 2019).

³⁷For discussion, see e.g., Comrie (1976, Chapter 2), Verkuyl (1989), Binnick (2006).

because it has been suggested in the literature that time reference in conditionals may depend on the type of situation expressed by the main verb, as in Dancygier and Mioduszevska's examples below.

(170) If I knew the answer, I would help you (but I don't know it). (Dancygier & Mioduszevska, 1984, p. 130)

(171) If she came, I would propose to her (but I don't think she will come). (Dancygier & Mioduszevska, 1984, p. 130)

Dancygier and Mioduszevska argue that, in backshifted or epistemically distanced conditionals (see sections 2.5 and 3.3.7), state verbs tend to refer to the present, as *knew* in (170) makes a reference to the present, while event verbs, like *came* in (171), tend to refer to the future (see also Dancygier, 1993, p. 410; Fillmore, 1986; see Fleischman, 1995, pp. 523–524 on imperfective aspect in conditional sentences; and Boogaart and Trnavac, 2011 on the relation between imperfective aspect and epistemic modality). Fillmore (1992) connects static and dynamic predicates to differences between counterfactual interpretations and interpretations that are counter to expectation respectively. Schouten (2000, pp. 62–64) shows how conditionals with an event verb in the antecedent behave differently from antecedents containing states. Whereas the event verb in the antecedent in (172) is used in 'talking about an imaginary future event', changing its tense to the present tense changes the interpretation to what could be called uncertainty in (173), which is in line with the discussion in section 2.5.4.

(172) If I fell ill... (Schouten, 2000, p. 62)

(173) If I fall ill... (Schouten, 2000, p. 62)

Changing the tense of a stative verb in the antecedent, however, changes the conditional in quite a different way, as can be seen in the difference between (174) and (175).

(174) If I knew. (Schouten, 2000, p. 62)

(175) ? If I know... (Schouten, 2000, p. 62)

Here, the antecedent of (174) expresses the same kind of epistemic distance as (172), but (175), in present tense, can, according to Schouten (2000, p. 62), 'only be interpreted as meaning something like *as soon as I know* or a non-predictive conditional with present time reference: *if (you say that) it is true that I know...*'³⁸ Perhaps more clearly, Schouten's examples in (176) and (177)

³⁸Observe however that 'If I know' is possible with a temporal meaning (i.e., 'once/as soon as I know'), or in epistemic conditionals, as in (a).

(a) If I know the answer, I must be smart.

show how antecedents with a backshifted event verb cannot (easily) be combined with a past perfect consequent used to implicate counterfactuality, because the antecedent in (176) has future time reference and receives a 'hypothetical interpretation' ('*I will* or *will not* fall ill'), whereas the antecedent in (177) refers to the present time and receives a counterfactual interpretation ('*I do* not know'), and as such can be combined with a consequent also implicating counterfactuality.

(176) ? If I fell ill, I would have gone to the doctor's. (Schouten, 2000, p. 63)

(177) If I knew, I would have told you. (Schouten, 2000, p. 63)

This difference, Schouten (2000, p. 64) argues, is a result of the 'inherent temporal characteristics' of two kinds of conditionals. Although this feature is not present in many accounts of conditionals, and it is not expected to be of equal importance as for instance verb tense and modality, we see an influence of situation types on specific implicatures of unassertiveness, and therefore it is included in the current study.

As mentioned above, four situation types are distinguished. Verbs like *love* in (178), *know*, *believe*, *have* and *desire* refer to states of affairs that do not involve change.

(178) I love her.

In contrast, verbs like *walking*, *swimming*, and *running*, as in (179), refer to events, because they involve change.

(179) I am running.

(180) I am running a mile.

(181) I reached the top.

As we can see in (180), the verb *running* accompanied by a direct object ('a mile') refers to an accomplishment, as it adds an endpoint to the activity, as in 'paint a picture', 'make a chair', 'deliver a sermon', and 'draw a circle'.³⁹ Finally, 'reach the top' in (181) refers to an achievement, as there is an inherent endpoint, but, in contrast to 'running a mile', it is punctual instead of durative (cf. Dowty, 1986, p. 42).

Before discussing the different situation types, it needs to be clarified what exactly the object of annotation is for this feature, as Dutch has no exclusive means for expressing lexical aspect. As de Vuyt (1983, pp. 29–30) shows, there is ample discussion on what situation types actually apply to: verbs, (verb) phrases or sentences (see Verkuyt, 1986, for discussion and references). By contrasting (179) and (180) above we have already seen that the inclusion of a direct object (see footnote can change the type of situation referred to, i.e., 'to

³⁹Note that 'a mile' is seen here as a 'quantised (direct) object'. See also Verkuyt (1972), Krifka (1989), and for a more recent discussion Smollett (2005).

run’ refers to an activity, whereas ‘to run a mile’ refers to an accomplishment, because the latter, but not the former, expresses an endpoint. For this reason, in this study the subject-predicate unit was annotated, i.e., the main verb of the antecedent or consequent, its (grammatical) subject and, in cases of transitive verbs, its direct object. In general, quantitatively unspecified subjects and objects receive an atelic interpretation, i.e., not bound by an endpoint, while predicates with quantitatively specified subjects and objects receive a telic interpretation, i.e., bound by an endpoint (see Verkuy1, 1993). Another important remark is that the term *main verb* refers to the verb that ‘in itself forms the core meaning of the verb phrase’, in contrast to an auxiliary verb, which ‘is then a supplier of additional information to that core meaning’ (cf. Haeseryn et al., 1997, p. 46). This most deeply embedded verb of the sentence has the most direct relation to the subject and object(s). This means that in sentences with non-main verbs, the main verb must first be identified. In the consequent of (182) below, not *kunnen* ‘can’, a modal auxiliary, but *halen* ‘get’ is the main verb.

- (182) We ja we hebben brood in huis maar je kan nog wat *brood bij halen* als je wilt. (fn008361)

We yes we still have bread but you can get some more bread if you want.

Here, it is not the case that *kunnen* ‘can’ expresses the subject’s relation to the object, but *halen* ‘get’, i.e., *je kan wat brood bij halen* ‘you can get some more bread’ is annotated for situation type, here an accomplishment (see below), instead of *je kan wat brood* ‘you can some bread’. The reason for using the main verb is twofold. First, it provides a richer and more informative annotation of the corpus data. Second, the majority of non-main verbs are temporal auxiliaries (*hebben* ‘to have’ and *zijn* ‘to be’), which are part of the annotation of tense (see section 5.4), and modal auxiliaries, which are covered by the feature *modality* (see section 5.5).

As I discussed in the introduction to this section, in this study, grammatical aspect, which marks the ‘different ways of viewing the internal temporal constituency of a situation’ (Comrie, 1976, p. 30), will not be considered further.⁴⁰ The feature *aspect* will thus only refer to lexical situation types based on the four Vendler classes, applied to the subject-predicate unit in the antecedent and the consequent of the conditionals in the corpus. The type of situation is determined by three binary features: $\pm telicity$ (telic vs. atelic), $\pm change$ (dynamic vs. stative), and $\pm duration$ (durative vs. punctual).⁴¹ In (183), *vrij zijn* ‘to be available’ refers to a state, as the state of affairs does have duration (+duration), but does not change or extend over time (–change), and does not have an inherent endpoint (–telic).

- (183) Ga ik even nog een bonte was doen als *de machine vrij is*. (fn000584)
I’m just going to do a color wash if the machine is available.

⁴⁰

⁴¹See Dowty (1979, Chapter 2) for a decomposition of Vendler classes in terms of the abstract predicates DO, CAUSE and BECOME.

In contrast to the other situation types, states refer to situations which do not involve change. Although stative situations can be argued to begin or end somewhere, ‘as long as they are holding, they remain the same throughout, at every moment of their duration’ (Boogaart, 2004, p. 1168). This can be seen clearly in (183) – a washing machine will be in use before and after it being available, but the situation the antecedent refers to is a state, as long as it is holding. A test to distinguish states from the other situation types is to use the predicate with a progressive verb form (see e.g., Dowty, 1979, p. 54). So, for (183), we can see that the predicate of the antecedent cannot be presented in progressive form, as shown in (184), whereas this is possible with the dynamic state of affairs in the consequent, as can be seen in (185).

- (184) ? *De machine is vrij aan het zijn.*
 ? The machine is being free.

- (185) *Ik ben een kleurenwas aan het doen.*
 I’m doing a color wash.

The next situation type is *activity*, which is dynamic and durative, but atelic, as in the antecedent of (186) below.

- (186) Een andere jongere (geboren meisje) omschreef negeren als volgt: ‘Nou, ik heb dan een vriendengroepje, en als *we met zn vieren lopen*, dan komen er andere jongens langs en die groeten dan iedereen, behalve mij, bijvoorbeeld.’ (WR-X-A-A-journals-txt-ped-010)
Another young person (born a girl) described ignoring as follows: ‘Well, I have a group of friends, and when we walk around with the four of us, other boys come by and they greet everyone, except me, for example.’

Here, *lopen* ‘to walk’ in the antecedent refers to an activity. A test for telicity is to include temporal *in* and *for* adverbials. Atelic predicates can be combined with *for* in English, but not with *in* (cf. Dowty, 1986, p. 39). In Dutch, this translates into durational adverbials like *urenlang* ‘for hours’ (cf. Verkuyl, 1972, p. 2) or *een uur lang* ‘for an hour’ as can be seen in (187) and (188).

- (187) ? *We lopen met z’n vieren in een uur.*
 ? The four of us walk in an hour.

- (188) *We lopen met z’n vieren een uur lang.*
 The four of us walk for an hour.

As can be seen in (190), the reverse is true for telic predicates.

- (189) *We lopen met z’n vieren vijf kilometer in een uur.*
 The four of us walk five kilometers in an hour.
- (190) ? *We lopen met z’n vieren vijf kilometer een uur lang.*
 ? The four of us walk five kilometers for an hour.

Next to states and activities, there are the telic situation types *accomplishment*, as in the antecedent of (191), and *achievement*, as in the antecedent of (192), which are both dynamic, but only the former is durative.

- (191) Onze jongens hebben (bijna) nooit luierslag. Als *ik ze verschoon*, gebruik ik zwitsaldoekjes en daarna laat ik de biljetjes lekker uit zichzelf drogen voordat ik de nieuwe luier omdoe. (WR-P-E-A-0004214842)
Our boys (almost) never have diaper rashes. If I change them, I use Zwisal cotton wipes and then I let the legs dry on their own before I put on the new diaper.
- (192) Als *dit project* bij de KGB bekend werd, zouden de vs. altijd nog winnen: de Sovjets zouden voortaan alle gestolen technologie wantrouwen. (WR-P-P-G-0000083346)
If this project got known to the KGB, the US would still win: from now on the Soviets would distrust all stolen technology.

To distinguish the two, again the progressive form can be used. Although achievements in progressive form do not result in ungrammaticality, they receive an ‘iterative interpretation’ (Boogaart, 2004, p. 1169), whereas accomplishments do not, as can be seen below.

- (193) *Ik ben ze aan het verschoonen.*
 I am cleaning them.
- (194) *Het project is bij de KGB bekend aan het worden.*
 The project is getting known to the KGB.

In (194) the punctual state of affairs (i.e., having a coinciding begin- and endpoint, no internal structure), gets a in which the progressive refers to ‘the process leading up to the actual state of affairs’ (cf. Boogaart, 2004).

5.6.3 Inter-rater reliability

All antecedents and consequents in the corpus were manually annotated for situation type using the manual provided in Appendix A.7. For each conditional sentence, this resulted in two annotations: the situation type in the antecedent and the situation type in the consequent.

The agreement scores of this feature were the lowest of all features ($AC1=0.75$ and 0.69 for antecedents and consequents respectively; see section 4.5), which is not surprising, given the frequent mention of the interpretative nature of the situation types. As, for example, Boogaart (2004, p. 1171) argues, ‘the determination of all Aktionsart features is partly dependent on other elements in the clause, context, and, ultimately, world knowledge’.

When we look in detail at the cases in which annotators did not agree, there is no clear pattern. What did occur frequently, however, is that durative verbs like *zeggen* ‘to say’ in (195) below were used to express a (punctual) decision.

- (195) En als dan *gezegd wordt* ja maar dan hoeven we de lasten niet nog meer te verhogen voorzitter dan denk ik dat een gemeente welke dat ook is want dan denk ik dat een gemeente ook moet kijken wat hun ambitieniveau kost. (fn000151)
And if it is said yes but then we do not have to increase the burden even more, chairman, then I think that a municipality whichever that is, because then I think that a municipality should also look at what their level of ambition costs.

In such cases, the intended interpretation decision was used for annotation, resulting in this case in *achievement* for the antecedent.

A related source of disagreement concerned idioms and the figurative use of verbs, such as *slepen* ‘to drag’ in the consequent of (196) below (for the aspect of idiomatic verb phrases, see Glasbey, 2007).

- (196) ‘Iedere bezoekende buitenlandse delegatie dreigt Beshir en Taha dat ze voor een internationaal gerechtshof *worden gesleept* als ze de Janjaweed in Darfur niet ontwapenen’, zegt hij met genoegen. (WR-P-P-G-0000096092)
‘Every visiting foreign delegation threatens Beshir and Taha to be dragged before an international court if they do not disarm the Janjaweed in Darfur’, he says with delight.

Here, ‘to drag (before a court)’ refers not to the physical process of dragging someone or something, but to the decision of going to court. Accordingly, such cases were annotated as achievements.

Another difficulty in annotating this feature involved non-main verbs that express aspectual information. Semi-aspectual non-main verbs are the following posture auxiliaries: *zitten* ‘sitting’, *staan* ‘standing’, *liggen* ‘lying’, *lopen* ‘walking’ and *hangen* ‘hanging’ plus *te* ‘to’ and an infinitive (see Broekhuis, Corver & Vos, 2015a, Chapter 6), as in (197) below.

- (197) Kijk als ik hier avonds zo effe *zit te lezen of TV zit te kijken* joh dan hoor ik ze lachen of weet ik veel wat maar da niet erg. (fn000939)
Look if I sit here and read or watch TV then come on I hear them laughing or I don’t know but that’s OK

For future research, the semi-aspectual non-main verbs were annotated as an added, independent feature, whereas the main predicate, here *lezen/TV kijken* ‘read/watch TV’, is used for annotation of situation type. In this case, an activity. The same goes for the aspectual non-main verbs *gaan* ‘going’, *komen* ‘come’, *blijven* ‘stay’+infinitive, and *aan het*+infinitive+*zijn*, as in (198) below.

- (198) Je moet goed uitkijken als je *aan het schommelen bent*. (WR-P-P-G-0000107290)
You should be very cautious if [when] you’re playing on the swings.

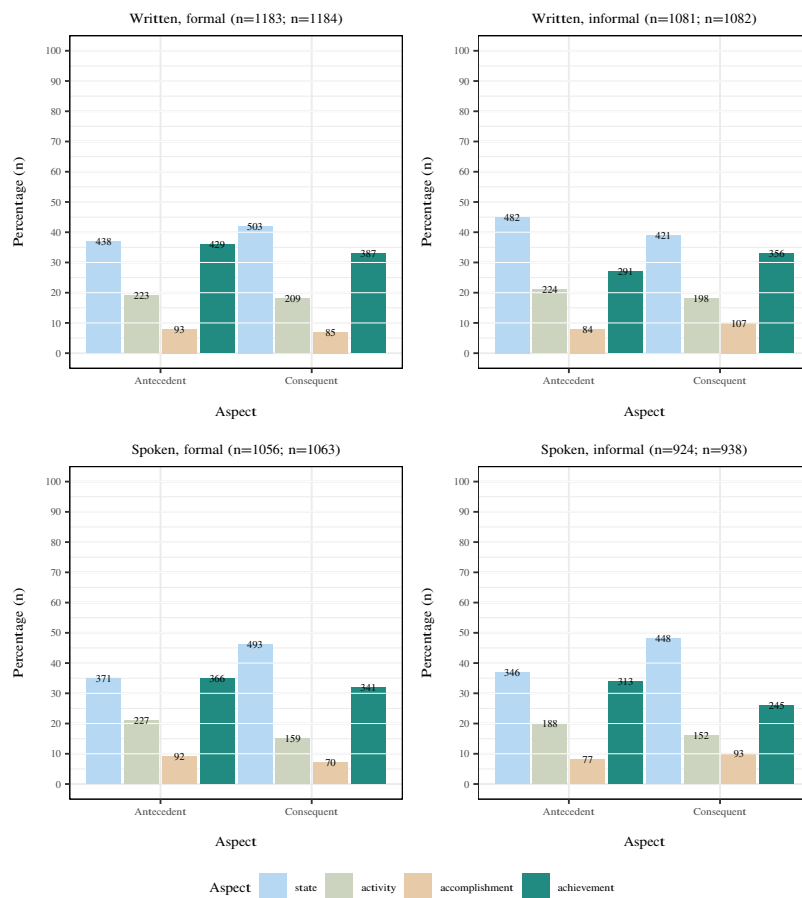
In this case, the main verb *schommelen* ‘playing on the swings’ was used for annotation, i.e., an activity.

5.6.4 Distribution of situation types

The results of the annotation are presented in Figure 5.5 below. For a more detailed view on the data, the reader is referred to page 478 in Appendix B.

Figure 5.5:

Distribution of situation types (aspect) by mode and register



What we see in Figure 5.5, is that the distributions of situation types are very comparable between modes and registers. For both antecedents and consequents, states are most frequent. The difference with respect to other situation types seems largest in consequents, at the cost of achievements. To arrive at more detailed insights with respect to these distributions, and especially at a possible association between situation types in antecedents and consequents, a

four-way loglinear analysis was performed, which produced a final model with a likelihood ratio of $\chi^2=26.65$, $df=30$, $p=0.64$. Removing the three-way interaction *mode* $\times$ *register* $\times$ *aspect* (*a*) would significantly decrease the fit of the model ($\Delta\chi^2=9.35$, $df=9$, $p=0.03$), as would removing the two-way interactions *mode* $\times$ *aspect* (*c*) ($\chi^2=17.52$ $df=3$, $p<0.001$; $\Delta\chi^2=16.68$, $df=3$, $p<0.001$), *register* $\times$ *aspect* (*c*) ($\chi^2=14.91$ $df=3$, $p=0.002$; $\Delta\chi^2=13.13$, $df=3$, $p=0.004$), and *aspect* (*a*) $\times$ *aspect* (*c*) ($\chi^2=100.28$ $df=9$, $p<0.001$; $\Delta\chi^2=87.50$, $df=9$, $p<0.001$). We will break down these interactions, starting with the highest-order association. Breaking down the three-way interaction *mode* $\times$ *register* $\times$ *aspect* (*a*) indicates that this interaction is largely due to the associations between *mode* and *aspect* (*a*) ($\chi^2=8.78$, $df=3$, $p=0.03$), and between *register* $\times$ *aspect* (*a*) ($\chi^2=13.13$, $df=3$, $p<0.001$). The effect sizes of both associations are small (Cramér's $V=0.05$; Cramér's $V=0.06$). For the *mode* $\times$ *aspect* (*a*) association, none of the individual mode-aspect combinations significantly contribute to the overall association. For register, we see that antecedents in formal texts more frequently involve achievements as compared to informal texts ($z=2.10$, $p<0.05$; $z=-2.22$, $p<0.05$). Antecedents in informal texts feature states more often than expected as compared to formal texts ($z=1.96$, $p\leq 0.05$; $z=-1.86$, $p>0.05$). For the two-way interactions, we see a weak association between *mode* and *aspect* (*c*) (Cramér's $V=0.06$). Only the distribution of states individually contributes to the overall significance, occurring more often than expected in consequents in spoken texts as compared to consequents in written texts ($z=2.25$, $p<0.05$; $z=-2.11$, $p<0.05$). The association between *register* and *aspect* (*c*) is also weak (Cramér's $V=0.06$). Only the distribution of accomplishments individually contributes significantly to the overall association, occurring more often in informal texts as compared to formal texts ($z=2.46$, $p<0.05$; $z=-2.34$, $p<0.05$). Finally, we see a weak association between *aspect* (*a*) and *aspect* (*c*) (Cramér's $V=0.09$), meaning that the situation type of one clause is only weakly influenced by the situation type in the other clause. Inspecting the residuals, we see that conditionals with accomplishments, achievements or activities in both clauses occur more often than expected ($z=6.78$, $p<0.001$; $z=2.42$, $p<0.05$; $z=3.94$, $p<0.001$). Conditionals with matching state situation types do not contribute significantly to the association. Accomplishments in antecedents are followed by activities in consequents less often than expected ($z=-1.98$, $p<0.05$). Antecedents expressing achievements are followed by accomplishments and by activities less often than expected ($z=-2.42$, $p<0.05$; $z=-3.11$, $p<0.01$). Finally, activities in antecedents are less often followed by accomplishments than expected ($z=-2.54$, $p<0.01$).

Although the analyses results in significant interactions, we can conclude that the interactions are all very weak. The situation type in antecedents and consequents are only very marginally associated with mode, register and the situation type in the other clause.

5.6.5 Comparison with previous studies

In this section, we will discuss each situation type found in the corpus. Starting with the most frequent situation type, namely *state*. In antecedents with a predicate expressing a state, this state functions as the condition for the consequent, such as having a certain opinion in (199) and a video game having certain system requirements in (200).

- (199) Als *u van mening bent* dat het belangrijkste thema in onze geschiedenis de strijd tegen het water is, dan is Lely de man op wie u moet stemmen. (WR-P-P-G-0000040971)

If you believe that the most important theme in our history is the battle against water, then Lely is the man you should vote for.

- (200) Als *er staat*: ‘Recomme[nde]d: P4 1 GHz or greater’, zoals bij UT2003, dan is het je toch wel duidelijk dat het niet een 2d spelletje is met kut-grapics die je op je P1 nog even kan spelen. (WR-X-B-A-discussion-lists-tweakers-638496)

If it says: ‘Recommended: P4 1 GHz or greater’, as with UT2003, then it is clear to you that it is not a 2d game with lousy graphics that you can play on your P1.

When the consequent expresses a stative state of affairs, in a number of cases, it expresses a conclusion (i.e., an epistemic conditional cf. section 3.3.7), as in (201), but this is not always the case, as can be seen in the predictive conditional in (202).

- (201) Als het hebben van een opvatting een mentale houding is, dan *is het opschorten ervan* dat waarschijnlijk ook. (WR-X-A-A-journals-txt-antw-006)

If having a view is a mental attitude, then suspending it is probably also an attitude.

- (202) Als Tom Holkenborg (1967) frequent flyer miles zou sparen, *had hij inmiddels genoeg* om drie keer de wereld rond te kunnen vliegen. (WR-X-A-A-journals-txt-nthr-005)

If Tom Holkenborg (1967) were to collect frequent flyer miles, he would have enough by now to fly around the world three times.

Most ‘evaluative conditionals’ (cf., Ford & Thompson, 1986, p. 368 as discussed in section 5.2.2) also express a state in the consequent, as in (203) and (204) below.

- (203) *De liberalen zouden het een goed idee vinden als [de] minister de NS een boete oplegt wegens wanprestatie.* (fn002308)
 The liberals would think it a good idea *if [the] minister imposed a fine on the NS for bad results.*⁴²

- (204) Denk ja als jij toch gaat *is dat eigenlijk wel zo leuk.* (fn006710)
 Think yes if you go, that's actually quite nice.

Here, the consequents express an evaluation of the state of affairs expressed in the antecedents.

The second most frequent situation type is *achievement*, as exemplified in (205) and (206) below.

- (205) Kijk en als *die dat huisje kopen* dan weet ik wel waar wij zitten uh in de winter. (fn007858)
 Look and if they buy that house then I know where we will be uh in the winter.
- (206) 'Als *ik niet zo vroeg op kop was gekomen*, had ik doorgetrokken.' (WR-P-P-G-0000106163)
 'If I had not taken the lead that early, I would have continued going fast.'

Here, the antecedents express a state of affairs that is telic and dynamic, but non-durative, i.e., punctual. In (205) the buying of a house is a decision made, which does not extend over time. Again, as was discussed in the previous section, such an activity can also be viewed as a long and complex process, in which case the predicate expressed not an achievement but an accomplishment. The difference can be seen in by using the aforementioned test in (207).

- (207) *Ze zijn het huis aan het kopen.*
 They are buying the house.

If the antecedent of (205) is viewed as an accomplishment (durative), then (207) should be unproblematic, i.e., it could refer to, for instance, the process of visiting the house, checking its state and finally signing a contract. The other interpretation, however, seems more viable, as the consequent refers to the decision to buy the house, not the process of doing so. In (206) the situation of taking the lead is also an instantaneous change of state, although, again, one could argue that a cyclist could also 'be taking the lead' when in the process of overtaking his or her competitors. In (208) and (209) below, the consequents express achievements.

- (208) Als het rotweer is, *pak ik gewoon de bus ;-)* (WR-U-E-D-0000000043)
 If the weather is bad, I'll just take the bus ;-)

⁴²One can analyse this example as involving a conditional relation between 'imposing a fine' and 'thinking it is a good idea' (i.e., evaluating), or between 'imposing a fine' and 'something being a good idea' (i.e., the assessment itself).

- (209) ‘Als ik andermans foto’s zie, *zie ik mijn werk terug*’, zegt hij vol overtuiging. (WR-P-P-G-0000103206)
 ‘*When I see other people’s photos, I see my own work*’, he says with conviction.

The punctual states of affairs in these examples do not have temporal duration, as ‘taking the bus’ refers to a decision, and ‘seeing my own work’ to an evaluation of what the speaker sees.

As discussed in the introduction to this section, it was observed in the literature that ‘conditionals with an event verb in the *if*-clause behave differently from *if*-clauses containing states’ (Schouten, 2000, p. 63; see section 5.6.1 for discussion, examples and references). Whereas eventive verbs in antecedents refer to future situations, stative verbs refer to present situations. Antecedents with a backshifted event verb cannot (easily) be combined with a past perfect consequent used to implicate counterfactuality, because, as discussed, the future time reference receives a ‘hypothetical interpretation’, whereas stative verbs in the antecedent refer to present time and receive a counterfactual interpretation and can be combined with a consequent implicating counterfactuality. Corpus examples of Dutch conditionals seem to suggest predictive conditionals allow stative *weten* ‘to know’ in present tense to express predictive conditionality, especially in combination with adverbs like *weer* ‘again’, as in (210) below, which, as the translation shows, would be expressed by means of *when* in English.

- (210) Ik meld me morgen wel weer als ik hopelijk eindelijk een uitslag *weet*. (WR-P-E-A-0004691879)
I will report again tomorrow if [when] I finally hope to know [have] a result.

As discussed, a backshifted antecedent with a past perfect in the consequent ‘signalling counterfactuality’ (Schouten, 2000, p. 63) cannot be combined with eventive verbs, but this is possible with stative verbs, as in (176) and (177), repeated below for convenience.

- (176) ? If I fell ill, I would have gone to the doctor’s. (Schouten, 2000, p. 63)
 (177) If I knew, I would have told you. (Schouten, 2000, p. 63)

Dutch conditionals with simple past stative verbs in the antecedent indeed can (but do not have to) receive counterfactual interpretation too, as can be seen in (211) below. This, again, seems not to be the case for simple past antecedent with eventive verbs, as can be seen in (212) and (213) below.

- (211) Tarik: Als ik mijn ouders niet *had*... Ik weet niet, ik denk niet eens dat ik dan school *had* gehaald. (WR-X-A-A-journals-003)
Tarik: If I didn’t have my parents... I don’t know, I don’t even think I would have finished school.

- (212) Hun Nederlandse nageslacht *zou* er vermoedelijk meer mee *gediend zijn* als ze het voorbeeld *volgden* van vele immigranten in Amerika. (WR-P-P-G-0000116174)
Their Dutch offspring would probably be better served if they followed the example of many immigrants in America.
- (213) ? Hun Nederlandse nageslacht *zou* er vermoedelijk meer mee *gediend zijn geweest* als ze het voorbeeld *volgden* van vele immigranten in Amerika.
Their Dutch offspring would probably have been better served if they followed the example of many immigrants in America.

Dancygier (1993), however, shows that the reference of simple past antecedents with counterfactual consequents ‘may in fact be timeless’, as in (214) below.

- (214) If water boiled at 200 C, making tea would take twice as long. (Dancygier, 1993, p. 410)

Although states and achievements outnumber the other two situation types, the situation type *activity*, as in (215) and (216) below, are by no means infrequent. As they are, compared to the types discussed above, relatively straightforward in conditionals, it will suffice to end this section by briefly discussing a number of examples from the corpus.

- (215) Daar ga misschien nog wel eventjes bij informeren want als ik zelf ook al twee keer per week *hardloop* kan ik ook best op dinsdagavond uh of op donderdagavond daar gaan hardlopen. (fn008017)
Perhaps I will also briefly inquire about this because if I also run twice a week I can also go running there on Tuesday night uh or on Thursday evening.
- (216) Ik zou toch wel vaker *fietsen* als ik in Vossenveld woonde. (WR-P-E-A-0005870848)
I would cycle more often if I lived on Vossenveld.

In (215), the antecedent presents a durative and dynamic, but atelic state of affairs, as does the consequent in the examples in (216). Turning to accomplishments, which are telic and dynamic like achievements, but also durative, as can be seen in the antecedent in (217) below, and the consequent in (218).

- (217) Als jij dan alleen nog even iets van *een groente haalt* of zo dan hebben we vanavond uh wel iets lekkers te eten. (fn006949)
If you just get something like a vegetable or something, then we have something tasty to eat tonight.
- (218) Als er veel rolstoelers zijn onder de passagiers dan *kunnen de banken en tafeltjes er makkelijk uitgehaald worden*. (WR-P-P-G-0000102534)
If there are many wheelchair users among the passengers, the benches and tables can easily be removed.

In (217), ‘getting vegetables’ is a dynamic, durative, like an activity, but has an endpoint and thus is a telic state of affairs. In (218), ‘removing the benches and tables’ is a durative, dynamic and telic state of affairs, as it has internal time-development, involves a change, and an endpoint, i.e., the benches and tables being removed.

5.6.6 Conclusion

The results presented in this section show that most most antecedents and consequents of Dutch conditionals refer to states, followed by achievements. To my knowledge, there are no corpus studies available reporting on distributions of situation types in Dutch. The figures reported in this section therefore could reflect, or, given the lesser prominence of aspect in studies on conditionals, may likely reflect the general distribution of lexical aspect. There seems to be only a very weak association with mode and register and between clauses, as the distributions of situation types in antecedents and consequents are very comparable across those dimensions.

It was already mentioned that aspect is not as frequently discussed in relation to conditionals as, for instance, tense and modality are. Still, we have seen that states in antecedents interact with tense with respect to implicatures of unassertiveness in the sense that they are more able to express counterfactuality than events in antecedents. Such interactions may be found in the analyses in the next chapter.

5.7 Person and number

5.7.1 Introduction

Person and number of the grammatical subjects in the antecedent and consequent of conditionals are not strongly linked in the literature to the connection between these clauses. However, mention is made of first-person subjects in counterfactuals, as in the example in (219) by Quirk et al. (1985), the example in (220) provided by Dancygier and Sweetser, and the ‘counteridentical-*P* conditionals’ as in (221), discussed by Declerck and Reed (2001).

- (219) If I had seen you, I would have invited you home. (Quirk et al., 1985, p. 1092)
- (220) If I were he, I’d throw me out. (Dancygier & Sweetser, 2005, pp. 68–69)
- (221) I {would/should} reconsider my assumptions if I were you. (Declerck & Reed, 2001, p. 100)

As we saw in chapter 3, examples of pragmatic conditionals frequently involve second-person subjects, as in Athanasiadou and Dirven’s example in (222), and Geis’s example in (223) below.

- (222) If you are thirsty, there's beer in the fridge. (Athanasiadou & Dirven, 1997a, p. 61)
- (223) If you're hungry, there is food in the fridge. (Geis, 1973, p. 233 cited in Declerck and Reed, 2001, p. 321)

As can be seen in these examples, the second-person subjects are related to the fact that suggestions or offers are made in the indirect speech act in the consequents of these conditionals.

In section 5.7.2, I will discuss person and number of grammatical subjects. In section 5.7.3, I will discuss their annotation. Then, in section 5.7.4, I will present the distributions of this feature in the corpus, after which I will compare these results with insights from the literature on person and number in conditionals in section 5.7.5. In section 5.7.6, I will provide a brief conclusion.

5.7.2 Person and number

In this study, the grammatical subject, i.e., the noun phrase congruent with the finite verb, is annotated for person and number in one feature.

Noun phrases are specified for *number*, the grammatical category that refers to quantity in a binary fashion, either *singular* or *plural*. Apart from some exceptions, such as mass nouns which are always singular, or 'pluralia tantum', which are always plural, all noun phrases can be either singular or plural. The difference can be seen in the inclusion of a suffix, in most cases *-s* or *-en*, to form a plural (Haeseryn et al., 1997, pp. 165–184; Booij, 2002), as in the examples in (224) and (225) respectively.

- (224) Half 6, als *de trein* een beetje *doorrijdt*. (WR-U-E-D-0000000301)
Half past five, if the train drives fast.
- (225) Half 6, als *de treinen* een beetje *doorrijden*.
Half past five, if the trains drive fast.

What we see here, is that the subject in the antecedent, *de trein* 'the train' is singular in (224) and plural in (225), both by the form of the noun (suffix *-en* in the latter), and the conjugation of the finite verb *doorrijden* 'keep driving'. This conjugation is also what distinguishes singular *ze* 'she' from plural *ze* 'they', as in (226) and (227) below.

- (226) Nu als *ze spuugt*, bijv. na hapje of sap, *lijkt ze* er gelukkig niet zo heel veel last van te hebben, *ze trekt* dan alleen een vies gezicht en dat is na een paar tellen ook over. (WR-P-E-A-0004932452)
Now if she vomits, like after a snack or juice, luckily she does not seem bothered to too much, she just makes a dirty face and that is gone after a few seconds too.
- (227) Nu als *ze spugen*, bijv. na hapje of sap, *lijken ze* er gelukkig niet zo heel veel last van te hebben, *ze trekken* dan alleen een vies gezicht en dat is na een paar tellen ook over.

Now if they vomit, like after a snack or juice, luckily they do not seem bothered to too much, they just make a dirty face and that is gone after a few seconds too.

The examples show that, in order to determine the number of the subject in a clause, both the form of the head noun and the finite verb can be used.

The feature *person* represents the grammatical distinction between speaker (first person), addressee (second person, either specific or general reference; see Haeseryn et al., 1997; Malamud, 2012; de Hoop and Tarenskeen, 2015), and other entities talked about (third person; cf. Broekhuis and Keizer, 2012, pp. 7–8), as in the antecedents of (228) to (230) respectively.

- (228) Wie is er overleden? Als *ik* dat mag vragen. (WR-U-E-A-0000000036)
Who passed away? If I may ask.
- (229) Als *je* het server-side doet weet je zeker dat het altijd goed gaat. ((WR-X-B-A-discussion-lists-tweakers-801435)
If you do it server-side you know for sure it will go well.
- (230) Als *de vermeende mondiale opwarming* slechts een urbanisatie-effect was zouden de winderige waarnemingen een veel minder uitgesproken trend moeten opleveren. (WR-P-P-G-0000094705)
If the alleged global warming was only an urbanisation effect, the windy observations should produce a much less pronounced trend.

Number and person are combined into one feature. Therefore six values are possible. The singular first, second and third person are exemplified above; their plural uses can be found below in the antecedents in (231) to (233) respectively.

- (231) Als *we* ons beperken tot het pensioen na 65 jaar, dan kan bij benadering het volgende geconstateerd worden. (WR-P-P-G-0000097881)
If we limit ourselves to the pension after the age of 65, the following can be approximated.
- (232) Het is jouw keuze, samen met je man en als *jullie* in je gezin op die manier gelukkig zijn, is het goed. (WR-P-E-A-0004750168)
It's your choice, together with your husband and if you are happy in your family that way, that is fine.
- (233) Als *ze* blijven leven heeft dat nadelige gevolgen voor de export. (fn001784)
If they stay alive, it will have negative effect on export.

These examples exhaust the person and number combinations discussed, although we will see in the next sections that some grammatical contexts do not allow for easy assignment into one of these categories.

5.7.3 Inter-rater reliability

All clauses in the corpus were manually annotated for person and number using the manual provided in Appendix A.8. Please note that for each conditional sentence, this resulted in two annotations: the person and number combination in the antecedent and the person and number combination in the consequent. As I mentioned in section 4.5, the agreement scores of this feature were high ($AC1=0.93$ and $AC1=0.84$ for antecedents and consequents respectively).⁴³

Most disagreements on this feature in the antecedent concerned incomplete clauses for which one annotator had included an annotation, while the other had annotated ‘NA’. Examples are the antecedents in the following examples.

- (234) Maar als door blijft gaan dan houdt op. (fn008876)
But if continues then ends.
- (235) Dus als dat opzijzet dan is dat goed. (fn008468)
So if sets that aside then it is well.
- (236) Als het in ijsland had staan was je het toch kwijt geweest? (WR-U-E-A-0000001279)
If {had it/had been} in iceland you would have lost it?

In (234) we see that the finite verb *blijft* ‘stays’ does not give us a definitive answer on what subject is omitted, as it is congruent with both second and third-person singular subjects. This occurs many times in spoken data (see footnote 43 below), as we can see in (235) and (236) (see also Biber and Conrad, 2009, pp. 116–117, who remark that conversations involve ‘many fractured clauses, incomplete utterances, etc’). In the former, the subject could be either person, and in the latter, either the second-person subject *je* ‘you’ was omitted, or *staan* ‘had it’ was expressed instead of the participle *gestaan* ‘had been’. The same goes for (237) below, although in this case, it might be argued that it is very unlikely that the omitted subject is not *ik* ‘I’.

- (237) Uh voorzitter als daarop mag reageren? (fn000197)
Uh chairman if allowed to respond to that?

Technically, the subject could be first-person, second-person or third-person singular, as the verb *mogen* ‘may’ has the same form for all subjects in singular form. In all of these cases, the person and number feature was set to ‘NA’. Incomplete consequents were found too, predominantly in spoken data, as can in (238) and (239) below.

- (238) Als ik in de lift sta moet naar de zesde verdieping. (fn000434)
{If/When} I am in the elevator must go to the sixth floor.

⁴³As can be seen, the annotation of person and number in the consequent was almost 0.1 lower. This may be a result of the fact that consequents are more frequently incomplete, especially in spoken texts.

- (239) *Toch triest* als je al zo jong niet meer mee kan doen.
Still sad *if you can no longer participate at such a young age.*

In line with the annotation of antecedents, these consequents were annotated as having ‘NA’ for person and number.

Cases like (240) constituted another difficulty, and contributed to the lower agreement score for consequents.

- (240) Meer regels en afspraken op huishoudenniveau vormen dus een nuttig instrumentarium om vrouwen aan de tijdsklem te helpen ontsnappen als de druk vanuit hun werk toeneemt. (WR-X-A-A-journals-txt-mem-001)
More rules and agreements at household level therefore constitute a useful set of instruments to help women escape the time constraint as the pressure from their work increases.

Here the consequent is an infinitival complement (see a.o. van Haaften, 1991; Broekhuis et al., 1995) and (optionally) introduced by the complementizer *om*. Depending on the type (*om+te*, *te-* and bare infinitivals; see Broekhuis, Corver and Vos, 2015b, Chapter 5) and theoretical perspective, such complements contain an implied subject (PRO) which is ‘normally coreferential with [...] the subject or the object of the ‘matrix clause [...]’ (Broekhuis, Corver & Vos, 2015b, pp. 766–767). Such non-finite clauses are frequently introduced by communicative or mental verbs, such as in *adviseren* ‘advise’ in (241), and, *dreigen* ‘threaten’ in (242).

- (241) Wij *adviseren* u dan ook cd 1 pas terug te sturen als u het hele boek uit heeft. (WR-P-P-D-0000000005)
We therefore advise you not to return CD 1 until you have finished the entire book.

- (242) De ouders van de kinderen hebben al *gedreigd* het recht in eigen hand te nemen als de verdachten terugkeren naar de wijk in Leeuwarden waar ze wonen. (fn006050)
The parents of the children have already threatened to take the right into their own hands if the suspects return to the neighbourhood in Leeuwarden where they live.

There is a large body of literature on the interpretation of implied subjects in infinitival clauses (see provided references above), and although the question at which level the conditional relation holds in such cases is of theoretical

interest,⁴⁴ I will follow the guideline presented in Appendix A, namely not to annotate features that are not directly observable and interpretative. Therefore these cases are labelled ‘NA’ for person and subject.⁴⁵

Another source of disagreement concerned affirmative (or denying) consequents, as in (243) below.

- (243) Vanmorgen zegt ze: we zouden de spenen toch doorknippen? Ja, zeg ik,
 maar alleen als jij het wil. (WR-P-E-A-0005983263)
*This morning she says: wouldn't we cut the teats? Yes, I say, but only if
 you want it.*

In this example, the consequent is an affirmation (*ja* ‘yes’) of something said prior to the uttering of the conditional. In such cases, it is unclear what the consequent actually is. In (243), what is conditionally affirmed is ‘we were going to cut the teats, right?’. As is unclear however how to construe the structure of the consequent, these cases were labelled ‘NA’ after discussion.

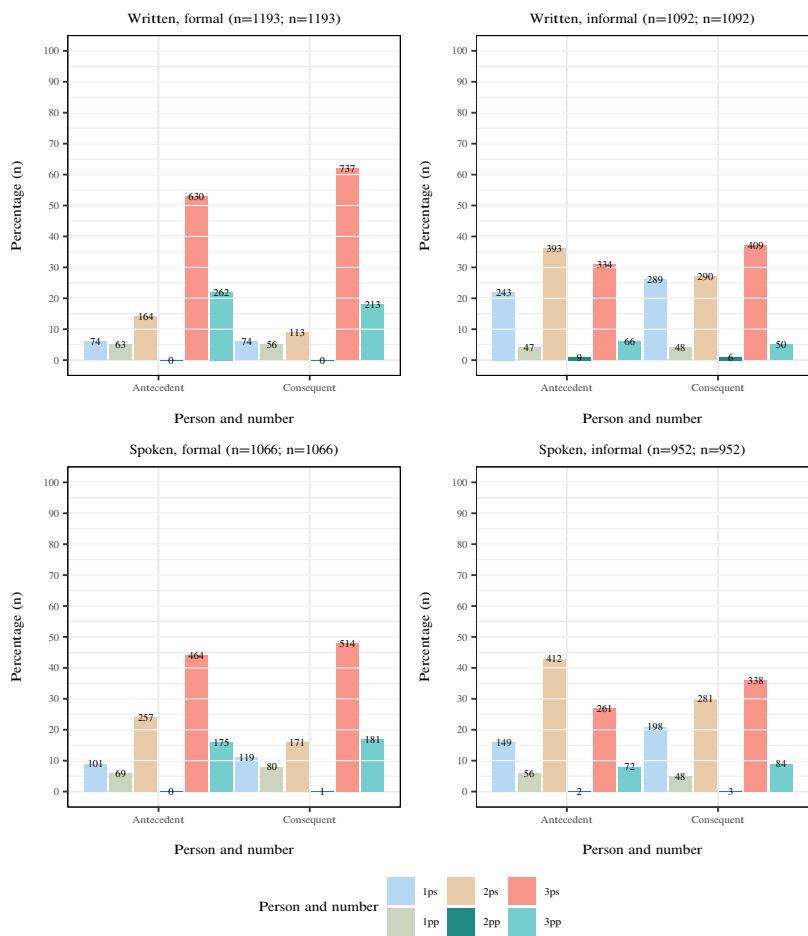
5.7.4 Distribution of person and number

The results of the annotation are presented in Figure 5.6 below. For a more detailed view on the data, the reader is referred to page 479 in Appendix B.

⁴⁴The question here is whether the relation in the consequent is between the antecedent and the infinitival clause, or between the antecedent and the matrix clause. In (241) it is clear that the consequent is the infinitival clause, resulting in a relation between finishing the book and sending it back, not a relation between finishing the book and advising, i.e., the advise is not given conditionally, but conditional advise is given (see also sections 3.3.7 and 5.8.5 on discussion of conditional speech acts). (240) is more ambiguous, however, as a viable relation can be interpreted between the antecedent (an increase in work pressure) and either the matrix clause (having more rules and regulations) or the infinitival clause (helping women escape).

⁴⁵In the database, the label ‘infinitival’ is preserved for possible future research.

Figure 5.6:
Distribution of grammatical person and number by mode and register



What we see when we compare the left side of Figure 5.6 to the right side, is that antecedents and consequents in formal texts, either written or spoken, feature third-person singular subjects most frequently (52.81%, 61.78%, and 43.53%, 48.22% in written and spoken texts respectively), while in informal texts, on the right side of Figure 5.6, the subject is most frequently second-person singular in the antecedent (43.28% and 35.99% in spoken and written texts), and third-person singular in the consequent (35.50% and 37.45% in spoken and written texts), but less dominantly so than in formal texts. Before we look at the patterns individually, we will test the distributions over mode and register, with special attention to possible interactions between subject (person and number) in both clauses.

A four-way loglinear analysis was performed on the data, which produced a final model that retained all effects, indicating that the highest order interaction ($mode \times register \times subject(a) \times subject(c)$) was significant ($\chi^2=69.77$, $df=25$, $p<0.001$). As such an higher-order interaction is difficult to interpret, the effect was broken down by comparing the three-way interactions against the model without the four-way interaction. This showed that removing the $mode \times register \times subject(c)$ was detrimental to the model ($\Delta=20.44$, $df=5$, $p=0.001$), as was removing the $register \times subject(a) \times subject(c)$ interaction ($\Delta=105.04$, $df=25$, $p<0.001$). To interpret these effects, the embedded two-way effects were inspected. This showed that the $mode \times register \times subject(c)$ interaction was influenced mostly by the $mode \times subject(c)$ association ($\chi^2=35.64$, $df=5$, $p<0.001$, Cramér's $V=0.09$), and, especially, the $register \times subject(c)$ associations ($\chi^2=482.37$, $df=5$, $p<0.001$, Cramér's $V=0.33$). Looking at the strongest association more closely by inspecting the residuals, we see that both first-person and second-person singular subjects occur more often than expect in informal texts ($z=9.12$, $p<0.001$; $z=8.18$, $p<0.001$) as compared to formal texts ($z=-8.68$, $p<0.001$; $z=-7.78$, $p<0.001$), largely at the cost of third-person singular and plural subjects in informal texts ($z=-6.56$, $p<0.001$; $z=-7.38$, $p<0.001$) as compared to formal texts ($z=6.24$, $p<0.001$; $z=7.02$, $p<0.001$). Looking at the three-way interaction $register \times subject(a) \times subject(c)$, all two-way interactions are significant: $register \times subject(a)$ ($\chi^2=511.34$, $df=5$, $p<0.001$, Cramér's $V=0.34$), $register \times subject(c)$ ($\chi^2=482.37$, $df=5$, $p<0.001$, Cramér's $V=0.34$), $register \times subject(c)$ ($\chi^2=2552.14$, $df=25$, $p<0.001$, Cramér's $V=0.34$).⁴⁶ The residuals of the first two interactions show the same pattern: first-person and second-person singular subjects are more common in informal texts ($z=7.47$, $p<0.001$; $z=9.23$, $p<0.001$ for antecedents, $z=9.12$, $p<0.001$; $z=8.18$, $p<0.001$ for consequents) as compared to informal texts ($z=-7.11$, $p<0.001$; $z=-8.78$, $p<0.001$ for antecedents, $z=-8.68$, $p<0.001$; $z=-7.78$, $p<0.001$ for consequents), and in antecedents, this difference between informal and formal texts is also significant for second-person plural subjects ($z=2.53$, $p<0.05$; $z=-2.40$, $p<0.05$). Conversely, first-person plural subject are

⁴⁶Note that the degrees of freedom between the former two interactions and the latter interaction differs. As the Cramér's V values are the same for these associations, the higher number of degrees of freedom suggests a stronger association.

observed more often in formal texts than in informal texts, although this difference does not reach significance. Third-person subjects are observed frequently less than expected in antecedents in informal texts as compared to formal texts ($z=-7.32$, $p<0.001$; $z=6.96$, $p<0.001$ for third-person singular subjects respectively, $z=-8.18$, $p<0.001$; $z=7.78$, $p<0.001$ for third-person plural subjects). The same is the case for consequents, in which third-person subjects are observed less frequently than expected in antecedents in informal texts as compared to formal texts ($z=-6.56$, $p<0.001$; $z=6.24$, $p<0.001$ for third-person singular subjects respectively, $z=-7.38$, $p<0.001$; $z=7.02$, $p<0.001$ for third-person plural subjects). Inspecting the residuals of this latter association shows that all combinations of the same person and number in the subject of both clauses contribute highly significantly to the overall association ($z=23.60$, $z=21.73$, $z=22.71$, $z=6.10$, $z=9.02$, $z=19.46$; $p<0.001$ for first-person singular, first-person plural, second-person singular, second-person plural, third-person singular, third-person plural respectively).

Given the results on person-number distributions in antecedents and consequents, we see that subjects in both clauses of conditionals pattern, especially first- and second-person subjects, in the sense that, for instance, a first-person subject in the antecedent is very likely to be followed by a first-person singular subject in the consequent. There are significant associations with mode and especially register, but the association between antecedent and consequent is strongest.

5.7.5 Comparison with previous studies

As a first observation, it is important to note that only person and number of the *grammatical* subject were annotated. A complex sentence, as in (244) below, in which the grammatical subject of the embedded sentence is the actual ‘thematic subject’ (*een school* ‘a school’), was annotated for the person and number of the matrix clause (*ik* ‘I’).

- (244) Als ik erachter zou komen dat een school regels stelt om groepen leerlingen te weren, zou ik onmiddellijk ingrijpen. (WR-P-P-G-0000076623)
If I found out that a school sets rules to exclude groups of students, I would intervene immediately.

The reason for doing so is consistency and prevention of interpretative issues as much as possible, as sometimes the matrix clause and sometimes the subordinated clause contains the most prominent subject (Verhagen, 2005, p. 94). In (244), we see that the grammatical subject of the antecedent is *een school* ‘a school’ in the embedded clause, while the grammatical subject of the matrix clause itself is *ik* ‘I’ in the matrix clause. In this case, the most plausible relation between the antecedent and consequent is indeed that between the matrix clause in the antecedent and the consequent, i.e., the intervening is dependent on the noticing, not on the school setting rules. This is different in the example in (245) below.

- (245) Als je dat niet uh... als dat niet in je zit dan denk ik dat je nooit bij die waterpolitie moet uh gaan werken. (fn008602)
If you don't uh ... if that's not in you then I guess you should never uh work for that water police.

The subject of the consequent in (245) is *ik* 'I'. In the sense of van Duijn and Verhagen's (2019) three-dimensional model of embedded viewpoints, however, the 'third-party subject' of the antecedent is *je* 'you', as the connection between the antecedent and consequent holds between 'having something in you' and 'not working for the water police'. Therefore, such an example could be seen as featuring a second-person singular subject, but as mentioned above, for consistency only the grammatical subject of the matrix was annotated in such cases.

The subject in imperative clauses is analysed differently in different traditions (for an overview of views on the subject in imperative clauses in generative grammar, i.e., non-overt subjects, *you*-deletion, see van der Wurff, 2007; see also Barbiers, 2007; Fortuin, 2004, p. 109; Fortuin and Boogaart, 2009; van Olmen, 2011, p. 318; van Olmen and Heinold, 2017). The implicit subject of imperative clauses in Dutch is always the addressee, and mostly seen as second-person singular (see e.g., de Haan, 1986, p. 254; Bennis, 2007). The relatively small number of imperative consequents allowed for manual inspection and in all cases (specific or generic) *je* was implied, as in (246) to (248).⁴⁷

- (246) Als je wilt liften, *laat* maar weten! (WR-U-E-D-0000000301)
If you want to hitch a ride, let me know!
- (247) Als u een hertseldiskette hebruikt: – *Schakel* het systeem UIT. (WR-X-B-A-discussion-lists-tweakers-654320)
If you use a recovery disk: – Switch the system OFF.
- (248) Als een verslaafd kind je alles van je weg heeft geroofd en een psychisch wrak van je heeft gemaakt, okee, *bekijk* dan nog eens opnieuw wat de opties zijn. (WR-P-E-A-0004407425)
If an addicted child has robbed you of everything and has turned you into a psychic wreck, okay, review the options again.

Given these findings and the fact that imperative clauses are finite, the decision here is different than for infinitival clauses (which received *NA* for person and number). Imperative clauses are thus annotated for second-person singular subjects.

Apart from the mentions discussed in the introduction to this section, no literature was found on person and number in conditionals specifically. The results found are in line with more general observations of distributions of

⁴⁷Here, conditionals raise an interesting question with regard to determining whether *you* is used for specific or generic reference in (imperative) consequents, as it could be argued that the antecedent identifies the referent to which the implied subject of the imperative in the consequent refers. For a related discussion on subjects in paratactic conditionals (i.e., conditional imperatives), see Thumm (2000).

of conditionals, the strongest association actually exists between the person and number of the subjects of both clauses, in the sense that subjects in one clause attract a subject in the other clause of the same person and number.

The results support the observation we started this section with, namely that examples of conditionals implicating a pragmatic or ‘speech-act’ connection between the antecedent and consequent in the literature frequently feature second-person subjects. Both register studies and politeness theory (see Biber, 2006, p. 77; Brown and Levinson, 1987, p. 272; see also section 3.3.4) show that conditionals can be, and are indeed used for directive speech act to tone down their directive force. Person and number remain, however, only indirectly linked to the implicatures of interest in this study. Nevertheless, it may provide useful in combination with distributions of other features, which will be investigated in the next chapter.

5.8 Sentence type

5.8.1 Introduction

In a number of the classifications discussed in chapter 3, it is mentioned that consequents of conditionals may be of a non-declarative sentence type, such as imperative consequents discussed at the end of the previous section (see examples (246) to (248)). In section 3.3.7, we already saw mentions of this in several classifications, as in Declerck and Reed’s example, and van der Auwera’s example repeated below.

(251) If Oswald didn’t kill Kennedy, who did? (Declerck & Reed, 2001, p. 103)

(252) If you phone Mary, ask her to dinner. (van der Auwera, 1986, p. 199)

These examples show that consequents of conditionals may also be interrogative or imperative, and in the accounts discussed in chapter 3, especially in section 3.3, non-declarative consequents were related to implicatures of indirect or (non-predictive) connection between antecedent and consequent, which suggests this feature to be relevant to this study.

In section 5.8.2, I will discuss the possible sentence types of consequents of Dutch conditionals. In section 5.8.3, I will discuss their annotation, and in section 5.8.4, I will present the distribution of sentence types in the corpus. Next, in section 5.8.5, I will compare the results with insights from the literature in section. In section 5.8.6, I will provide a brief conclusion.

5.8.2 Sentence types

The feature *sentence type* in this study represents the type of sentence in the consequent, which is reflected mostly in the word order of the consequent (for discussion, see section 5.8.5). Please note that there is no necessary or exclusive relation between sentence type and illocutionary act. For example, a declarative

sentence canonically performs an assertive speech act (i.e., in default situations, it has the illocution of a statement), but it can also be used indirectly to perform a directive speech act like a request (see e.g., Searle, 1975; Birner, 2013, p. 195). In this study, sentence type was annotated, not illocutionary force, and four sentence types were distinguished.

The first is *declarative*, as in (253) below.

- (253) Als de economie minder dan 7 procent groeit, dreigt deflatie. (WR-P-P-G-0000055244)

If the economy grows less than 7%, there is a risk of deflation.

A declarative consequent makes an assertion of a proposition of which the truth, in conditionals, is dependent on the antecedent. The word order of the consequent is one of the patterns of syntactic integration discussed in section 5.3, namely subject-verb inversion in the integrative and resumptive patterns, or the regular main clause word order in the non-integrative pattern. The second type is the imperative consequent, which is canonically used to give a command or make a request, as in (254).

- (254) Maar ook op de tv zullen ze dingen te zien krijgen, doe er gewoon over en als ze met vragen komen *probeer er zo goed mogelijk over te praten*. (WR-P-E-A-0006022805)

But they will see also things on TV, just talk about it and if they ask questions try to talk about it as well as possible.

There is no overt subject, or there is a second-person subject (see also section 5.7 on person). Third, conditionals can have interrogative consequents, as in (255), either to ask a question about a conditional, or ask a conditional question. The difference will be discussed later on in this section.

- (255) Maar als opschorting niet begrepen kan worden als overwegen plus niet weten wat te geloven, *wat voor houding is het dan?* (WR-X-A-A-journals-001)

But if suspension cannot be understood as considering plus not knowing what to believe, what kind of attitude is it?

Next to declarative, imperative and interrogative consequents, exclamatory consequents were distinguished, as in (256), although this is not considered to be a sentence type by everyone. The definition used in this study will be discussed shortly.

- (256) En als je meewilt naar Pauls housewarming in Chillburg, *gezellig!!* (WR-U-E-D-0000000301)

And if you want to come to Paul's housewarming in Chillburg, fun!!

As can be seen here, consequents of conditionals can be of any of the four sentence types, although the exclamative example in (256) is debatable. We will leave that discussion for section 5.8.5.

5.8.3 Inter-rater reliability

All consequents in the corpus were manually annotated for sentence type using the manual provided in Appendix A.9. As I have showed in section 4.5, the agreement score of this feature was high ($AC1=0.92$). The disagreements mainly concerned conditionals with incomplete or elliptical clauses such as those in (257) and (258) below.

- (257) Ik gebruik eigenlijk ook nooit smileys en als, dan nog op de oude manier met haakjes en puntjes op mijn toetsenbord. (WR-U-E-A-0000000013)
I never actually use smileys and if, then in the old way with brackets and dots on my keyboard.
- (258) Daarmee ben ik zo'n 13 jaar geleden begonnen, als ik het me goed herinner met Door het oog van de naald van Ken Follett. (WR-P-P-G-0000032453)
I started that about 13 years ago, if I remember correctly with Eye of the Needle by Ken Follett.

In these cases, the consequents were classified as regular declarative clauses.

Another source of disagreement involved interrogative consequents. These could be interpreted as questions about a conditional, or as conditional questions. Examples to illustrate the difference are presented in (259) and (236), which we discussed already in section 5.7 and of which the latter is repeated below for convenience.

- (259) Waarom krijg ik, als ik bij Google de zoekterm 'website' invul, bijna alleen evenementenlocaties en pretparken als hit? (WR-U-E-A-00000000129)
Why do I, when I enter the search term 'website' at Google, almost exclusively get event locations and amusement parks as a result?
- (236) Als het in ijsland had [ge]staan was je het toch kwijt geweest? (WR-U-E-A-00000001279)
If it had been in Iceland you would have lost it?

Looking at the example in (259), we see a question is asked conditionally by means of a sentence-medial antecedent. In other words, the speech act of asking 'why do I get these results' is conditional on the typing of 'website' at Google. One of the annotators had annotated this consequent as 'declarative', but it is clear that this is an interrogative consequent, introduced by the interrogative *wh*-word *waarom* 'why'. In (236), the situation is less clear, however. There is subject-verb inversion in the consequent, which could be either a sign of an interrogative word order, or of high syntactic integration (see section 5.3). This becomes clear when we compare it to its non-interrogative counterpart, for which only the question mark needs to be changed to a period.

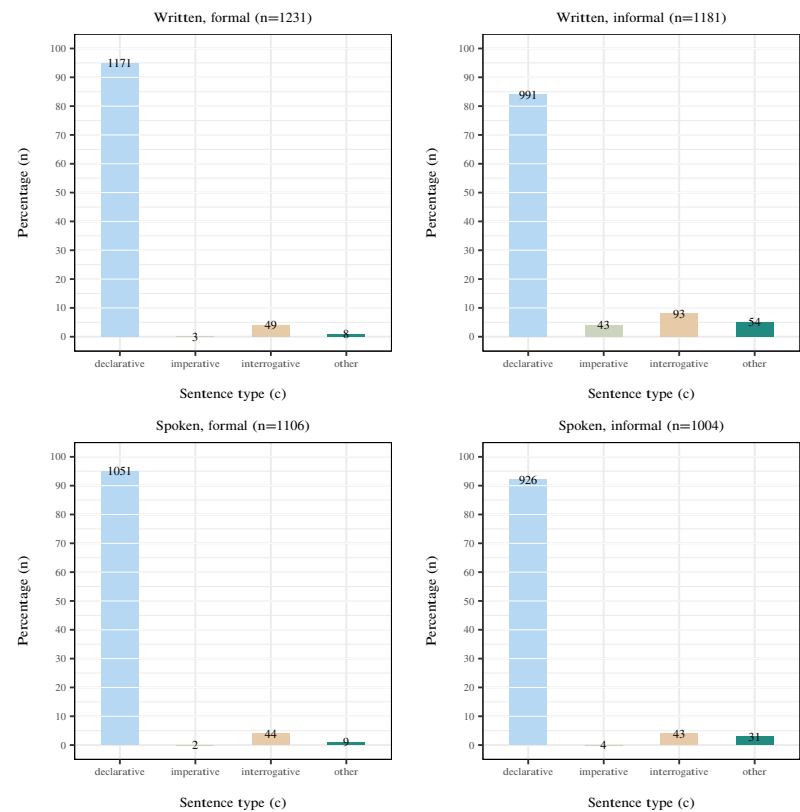
- (260) Als het in ijsland had [ge]staan was je het toch kwijt geweest.
If it had been in Iceland you would have lost it.

In this case, the consequent was labelled as an interrogative, although it must be remarked that by van der Auwera’s (1986) analysis, which we will discuss later on in this section, something can be said for labelling this use as declarative too, as the conditional as a whole is questioned, instead of an interrogative consequent being dependent on the antecedent.

5.8.4 **Distribution of sentence types**

The results of the annotation of sentence type are presented below in Figure 5.7. For more detailed information, the reader is referred to page 481 in Appendix B.

Figure 5.7:
Distribution of sentence types by mode and register



What we see in Figure 5.7 is in line with what may be expected: the declarative sentence type makes up for more than 90% of all consequents. The rest of this section must, therefore, be interpreted in light of this skewed distribution. The second most frequent sentence type is the interrogative consequent, which accounts for 5%, and occurs most frequently in written, informal texts.

A three-way loglinear analysis was performed on the data, which produced a final model that retained all effects, indicating that the highest order interaction (*mode* $\times$ *register* $\times$ *sentence type*) was significant ($\chi^2=10.83$, $df=3$, $p=0.01$). Comparing the two-way interactions against the model without the three-way interaction showed that the *mode* $\times$ *sentence type* interaction was significant ($\chi^2=36.99$, $df=3$, $p<0.001$; $\Delta\chi^2=40.26$, $df=3$, $p<0.001$), as was the *register* $\times$ *sentence type* interaction ($\chi^2=104.82$, $df=3$, $p<0.001$; $\Delta\chi^2=113.32$, $df=3$, $p<0.001$). Both effects are small (Cramér's $V=0.09$; Cramér's $V=0.15$). Inspecting the residuals for the *mode* $\times$ *sentence type* interaction shows that only the distribution of imperative clauses over both modes individually contributes to the overall association between mode and sentence type. Unexpectedly, imperatives occur more often in written texts as compared to spoken texts ($z=3.47$, $p<0.01$; $z=-3.71$, $p<0.01$). As we can see in Figure 5.7, this is largely due to the informal register, with examples like (261) and (262) below.

- (261) Bel me zsm terug als je dit leest! (WR-U-E-D-0000000312)
Call me back if [as soon as] you read this!
- (262) Als je het echt proffie wil aanpakken, schrijf dan een applet. (WR-X-B-A-discussion-lists-tweakers-142235)
If you really want to tackle it in a professional way, write an applet.

The informal written texts in the corpus feature conditionals in text messages, as in (261), and in discussion lists, as in (262). The text messages, most of the conditionals with imperative consequents are used to ask someone for a favour, whereas in discussion lists, most imperative consequents are used to offer advice. This is most likely a reflection of what text messages and discussion lists are used for. The residuals for the *register* $\times$ *sentence type* interaction show that all but the distribution of declarative consequents significantly contribute to the overall association. Informal texts feature conditionals with imperative consequents more often than informal texts ($z=4.36$, $p<0.001$; $z=-4.22$, $p<0.001$), which is also the case for interrogative consequents ($z=2.41$, $p<0.05$; $z=-2.33$, $p<0.05$) and for other types of consequents ($z=5.09$, $p<0.001$; $z=-4.92$, $p<0.001$).

Looking at both registers, it is clear that the declarative type is the default sentence type. In informal texts, slightly more diversity is found in comparison to formal texts. As mentioned in the introduction, sentence types in conditional consequents are not often analysed in the literature discussed. From the figures presented here, it seems that the overwhelming frequency of declarative consequents explains this hiatus, as in formal, written texts, from which most of the data in previous studies are drawn, 95.1% of the consequents is of

the declarative type, versus 87.8% in informal texts. Although this looks like a small difference, the overall figures are distorted by the prevalence of declarative consequents. To be able to get insight into the use of declarative and non-declarative consequents, the results are discussed in light of the literature available on sentence type in general in the next section.

5.8.5 Comparison with previous studies

There is not much literature on sentence types in conditionals, and therefore this section will provide a close look at the data, resulting in a more descriptive overview of variation in sentence types of consequents. Of course, the relevant literature that is available will be used. Before doing so, please note that the word order in declarative consequents may vary, as we saw in section 5.3. As we have discussed integrative, resumptive and non-integrative conditionals in detail in that section, we will not discuss this topic further here.

What can be seen in the results, is that imperative consequents make up only 0.21% of consequents in formal texts, and 2.15% in informal texts. Although care has to be taken with low frequencies, it seems that Biber et al.'s (1999, p. 221) observation that imperatives are most frequent in spoken texts is not corroborated by these numbers, as 0.3% of consequents in spoken texts is imperative, versus 1.9% in written texts. The current results suggest that the dimension of register is more relevant. Imperative consequents may have the characteristics of prototypical imperative clauses in Dutch, namely that they feature the (stressed) stem of the verb on the first position of the sentence, and there is no overt subject (see a.o. Proeme, 1984, pp. 241–242; Piwek, 2000; Broekhuis, Corver and Vos, 2015a, pp. 87–96; see also section 5.7 on person and number). In the most prototypical use, imperatives are directive, meaning that they are used to get the addressee to ‘do something’ (see Austin, 1962, pp. 76–77; also see e.g., Hilton, 2016). (For analyses of conditional commands in terms of material implication, see Williamson, 2020, pp. 126–131. For alternative views, see e.g., Dummett, 1973; Edgington, 1995, p. 288.) Examples of such imperatives as consequents of conditionals are provided below in (263) and (264).

- (263) Onderbouw even met een URL waar je dat vandaan haalt als je wilt.
(WR-X-B-A-discussion-lists-tweakers-1269237)
Substantiate with a URL where you read that if you want.
- (264) Als iemand om advies vraagt, doe dan op z'n minst alsof je een soort van neutraal bent. (WR-X-B-A-discussion-lists-tweakers-1416572)
If someone asks for advice, at least act as if you are kind of neutral.

Broekhuis, Corver and Vos (2015a) provide examples of the possibility to use imperatives as consequences in conditionals, as in (265) below, and they show that, contrary to independent imperatives, imperatives as consequents can occur in the past tense, as in (266).

- (265) Als hij een slecht humeur heeft, berg je dan maar.
If he has a bad temper, you better hide (Broekhuis, Corver & Vos, 2015a, p. 85)
- (266) Als hij een slecht humeur had, borg je dan maar.
If he had a bad temper, you'd better hide. (Broekhuis, Corver & Vos, 2015a, p. 86)

In the latter case, the recurrence meaning (i.e., *whenever*) arises. Next to the standard form of the imperative, there are other possibilities to convey ‘imperative meaning’, and de Haan (1986, p. 251) mentions various forms that can functionally be considered imperatives (see also Duinhoven, 1984, p. 148; Vandeweghe, 2000, p. 227; van der Wurff, 2007, pp. 51–55; Coussé & Oosterhof, 2012). Broekhuis, Corver and Vos (2015a) provides examples of infinitives with ‘imperative force’, such as (267), in which the verb is typically sentence-final, instead of sentence-initial.

- (267) Je bord leeg eten_{infinitive}!
Empty your plate! (Broekhuis, Corver & Vos, 2015a, p. 72)

Such uses were found in the corpus, as in the example in (268) below.

- (268) Als het regent, gewoon komen hè. (WR-U-E-A-0000001387)
If it rains, just come, okay.

Duinhoven (1995) provides examples of imperatives with past perfect tense, as in (269) below.

- (269) Had me even gebeld!
You should have called me! (Duinhoven, 1995, p. 346)

Such imperatives are compatible with a conditional clause, as in the constructed example in (270), but they were not found as consequents in the corpus.

- (270) Als je zo’n zin had om te praten, had me even gebeld!
If you were wanting to talk, you should have called me!

As we can see, this form of the imperative seems highly suitable in using conditionals for adding reasons to reproaches.

Next to the forms discussed so far, another possibility is the participial imperative, as in (271) and (272) adapted from Broekhuis, Corver and Vos (2015a), and Rooryck and Postma (2007) respectively.

- (271) Opgepast!
Watch out! (Broekhuis, Corver & Vos, 2015a, p. 94)
- (272) Ingerukt!
Dismiss[ed]! (military) (Rooryck & Postma, 2007, p. 274)

According to Rooryck and Postma (2007, pp. 287–291), participial imperatives can be grouped into one of two ‘semantic subsets’, namely the ‘watch out’ class, or the ‘sod off’ class, as in the respective examples above. As these two types of use are very clearly addressee and action oriented, it may be expected that restrictions, by means of a conditional clause, on ‘watching out’ or ‘sodding off’ can be applied, but, to my knowledge, no mention of this is made in the literature on participial imperatives. It does seem possible to use such imperatives as the consequent of a conditional, as can be seen in the constructed example in (273).

- (273) Als je geen virusscanner hebt, opgepast!
If you haven't got an antivirus programme, be warned!

Other forms of imperatives mentioned in the literature, such as the use of adverbial phrases and prepositional phrases, as in (274) and (275), were not found in the corpus either (see Duinhoven, 1995; Broekhuis, Corver & Vos, 2015a, p. 96).

- (274) Als jullie nu nog niet weg zijn, naar buiten!
If you still haven't left, outside!

- (275) Als niemand nog heeft besteld, drie bier!
If no one has ordered yet, three beers please!

Looking at interrogative consequents, we see that they are more frequent in informal texts than in formal texts (3.98% versus 6.22% respectively). In comparison, Biber and Conrad (2009, pp. 216–217) list questions as ‘rare’ in newspapers and academic prose, and ‘very common’ in conversations. In Figure 5.7 we see the relative frequencies for interrogative consequents are similar in formal spoken and formal written texts (3.98%), and in informal spoken texts (most comparable to ‘conversations’) a slightly higher percentage (4.28%). In informal written texts, however, we see a much higher relative frequency (7.80%), which may be due to the conversational nature of text messaging and the already mentioned function of discussion lists, in which advising and answering questions plays a large role. This type of consequent was discussed in some detail in section 3.3.7 with respect to the difference between speech acts about conditionals and conditional speech acts, as in the examples from van der Auwera (1986) repeated for convenience below.

- (276) If you inherit, will you invest?
 Yes, if I inherit, I will invest. (van der Auwera, 1986, p. 198)
- (277) If you saw John, did you talk to him?
 Yes, (I saw him and) I talked to him. (van der Auwera, 1986, p. 198)

In (276), a question about a conditional is asked (i.e., ‘is there a relation between inheriting and investing?’), while in (277) the question in the consequent is dependent on the antecedent (cf. van der Auwera, 1986; see also Declerck &

Reed, 2001, p. 103; Andor, 2015, Chapter 6; Elder, 2019a, Chapter 4). Similarly, in Dancygier and Sweetser's example in (278) below, the question in the consequent is 'presented as contingent on the newly acquired knowledge' of Deirdre's death.

- (278) If you knew she was dead, why did you come down here? (SP.TV.113)
(Dancygier & Sweetser, 2005, p. 115)

They further suggest that (279) is 'almost impossible' to interpret as a conditional question, because of the distancing verb forms.

- (279) # If you had known she was dead, why had you (would you have) come down here? (Dancygier & Sweetser, 2005, p. 115)

Dancygier and Sweetser (2005, p. 114) do however accept the possibility of distancing other speech-act conditionals and provide the following example, which features a declarative consequent.⁴⁸

- (280) If you need any help, the emergency number is 911. (Dancygier & Sweetser, 2005, p. 114)
(281) If you needed any help, the emergency number would be 911. (Dancygier & Sweetser, 2005, p. 114)

Although the majority of conditionals with an interrogative consequent have present tense clauses, distanced conditional questions were found in the corpus, as can be seen in (282).

- (282) Anders had ik er toch wel een zwarte in gezet? Als die geel goed stond?
Oh ja ze staan dus ook niet goed. (fn000623)
Otherwise I would have put a black one in, right? If the yellow looked nice? Oh, yes, they don't look nice either.

It seems however that most 'distanced' interrogative consequents in fact are questions about conditionals, not conditional questions, as can be seen in (283) and (284) below.

- (283) Want was de discussie ook gevoerd als er geen krapte was? (fn000242)
Was it also discussed if there was no shortage?
(284) Zou Geert Wilders 7 of 18 zetels halen als er nu verkiezingen waren?
(WR-P-P-G-0000049699)
Would Geert Wilders get 7 or 18 seats if there were elections now?

In (283), we see the simple past in the antecedent, and the past perfect in the consequent used to create epistemic distance, and in (286), we see the simple past in the antecedent and the simple past with *zullen* 'will' in its consequent to create epistemic distance.

⁴⁸The example in (281) was provided to them by Fauconnier through personal communication.

Finally, as we have seen in sections 5.4 and 5.5, the past tense can, of course, also be used in a purely temporal sense.

- (285) Was wel zon dan als je beneden zat? (fn008093)
Was there sun then when you were downstairs?

- (286) Als een luchtalarm kwam waar gingen die dan heen? (fn007575)
If an air alarm came where did they go then?

In (285) and (286), we see the simple past used to refer to a situation in the past, creating recurrence meaning.⁴⁹

Consequents with other sentence types, such as imperatives, as in (287), may be conditional speech acts too.

- (287) Open the window, if I may ask you to. (van der Auwera, 1986, p. 199)

For van der Auwera (1986, p. 202), this is an example of a conditional speech act, as it is ‘both an assertion about an imperative and a performance of that imperative’. For the feature discussed in this section, however, not the function of the whole conditional was annotated, but only the sentence type of consequent, meaning that the examples from (276) to (287), if they were corpus attestations, would have received the *interrogative* label. Interrogative consequents were most frequent in written informal texts. One possible explanation mentioned above is that discussion boards are included in this sample, and they involved many instances of technological and parenting advice, as in (288) and (289) below.

- (288) Als dat een vertekend beeld is waarom is dan de cpu zo warm in idle stand? (WR-X-B-A-discussion-lists-tweakers-1646342)
If that is a distorted image, then why is the CPU so warm in idle mode?

- (289) Wat nu als mijn dochter een even oud vriendinnetje vertelt wat ze weet? (WR-P-E-A-0006029261)
What if my daughter tells an old friend what she knows?

Chat and messaging texts in the corpus frequently involved interrogative consequents too, as in (290) and (291).

- (290) Als je tijd hebt, wil je dan vandaag even bellen naar die unicef veiling? (WR-U-E-D-0000000301)
If you have time, would you call that Unicef auction today?

- (291) He Wiebe is het goed als ik vanmiddag je fiets meeneem naar m’n werk? (WR-U-E-D-0000000301)
Hey Wiebe is it okay if I take your bike to work this afternoon?

⁴⁹If these examples would refer to a single, specific event, *toen* ‘then’ would have been used. In a more general sense, here we see how one situation usually preceding another could lead to conditionality by regularity. *Als* ‘if’ in this sense expresses that the relation between antecedent and consequent is based on a recurrent pattern and not a specific instance, which also relates to the unassertiveness of conditionals I argued for in chapter 2.

Next to declarative, imperative and interrogative consequents, exclamatory consequents were found in the corpus. This is the category in which the difference between formal and informal texts is largest (0.73% and 3.89%), although care has to be taken in interpreting these figures, as exclamatory consequents were grouped together with other consequents that did not fit the sentence types discussed. When the specific cases are reviewed, we see that in informal texts, a larger number of these uses consists of exclamatory, one-word consequents in chats and texting, as in (292) below.

- (292) Als ik kan komen eten, graag :-) en ben met de auto, is 's avondspits ook handiger! (WR-U-E-D-0000000305)
If I can come over and have dinner, yes please :-) and I've come by car, so that's more convenient at evening rush hour too!

Such 'exclamations' are not considered a sentence type by everyone however. 'Wishes and exclamations' are explicitly discarded by den Hertog (1903, p. 16), because there is no exclusive form tied to such speech acts. However, van den Toorn (1984, p. 309) does distinguish exclamatives as a sentence type. He provides examples like those in (293) and (294) below.

- (293) Wat 'n hitte! (van den Toorn, 1984, p. 59)
What a heat!
- (294) Vuil, dat het er was! (van den Toorn, 1984, p. 101)
Dirty, that it was!

Haeseryn et al. (1997) provide examples of different exclamatory uses of the pronominal *wat* 'what', as in (295) to (296) below.

- (295) Wat een leven heeft die kerel! (Haeseryn et al., 1997, p. 376)
What a life that guy has!
- (296) {Wat/Hoe} mooi! (Haeseryn et al., 1997, p. 376)
{What/how} beautiful!
- (297) Wat heb ik geslapen! (Haeseryn et al., 1997, p. 378)
What have I slept!

Here, *wat* 'what' is used with *een* 'a' and a nominal constituent, with an adjectival constituent, and with a verb phrase respectively. In (296) we see that *hoe* 'how' can also be used for exclamations (see also van den Toorn, 1984, p. 309). In fact, Broekhuis and Corver (2016, p. 1484) discuss exclamatives and propose to distinguish between *exclamations* and *exclamatives*, the former being a functional category, the latter a syntactic category, of which the first criterion is that 'exclamatives involve an exclamative *wh*-element'. Of their examples, the example in (298) is an exclamation but not an exclamative, while the example in (299) is an exclamation in the form of an exclamative.

- (298) De boeken die Peter leest!
The books Peter is reading! (Broekhuis & Corver, 2016, p. 1484)

- (299) Wat heb jij vandaag gewerkt!
Boy, how you have worked today! (Broekhuis & Corver, 2016, p. 1461)

In this study, I use the term ‘exclamation’, signalling a functional perspective. This term is not as strict as the ‘pure exclamatives’ as discussed by Broekhuis and Corver (2016, pp. 1481–1486), and the reason for doing so is that sentences with exclamative *wat* ‘what’ or *hoe* ‘how’ simply do not occur in the corpus, while examples like (300) do, and could functionally be seen as exclamations.

- (300) Echt knap als een bot zichzelf op kan trekken en weer kan laten zakken.
 (WR-U-E-A-0000001218)
Really clever {if/when} a bot can pull itself up and lower it again

This may seem like a stretch, but Broekhuis and Corver (2016, pp. 1460, 1480) also propose to view utterances like *bah!* ‘yuk!’ as exclamations, although not in syntactic, but in lexical terms, and exclamations like the example in (301) below in purely pragmatic terms.

- (301) Wat vind je van dit schilderij? Dat is fantastisch!
What do you think of this painting? That is fantastic! (Broekhuis & Corver, 2016, p. 1480)

Castroviejo Miró (2008) also considers interjections like *gee!*, *wow!* or *damn!*, and for instance predicative constructions with predicate inversion, as in Castroviejo Miró’s (302) example of an exclamation in (302).

- (302) ‘Delicious, the (Catalan) cream!’ (Castroviejo Miró, 2008, p. 75)

This also paves the way for including less-standard exclamatory patterns, such as the ‘Mad Magazine sentence’ in (303) below, as discussed by Akmajian (1984).

- (303) Speaker A: I hear that John may wear a tuxedo to the ball...
 Speaker B: Him wear a tuxedo?! He doesn’t even own a clean shirt.
 (Akmajian, 1984, p. 3)

So, by accepting a functionally defined category like ‘exclamation’, we are left with a somewhat heterogeneous category, of, basically, sentences that do not fit the three major sentence types. In other words, not all consequents can be classified easily into the sentence types discussed above.

Sometimes, the consequent consists of only one word or word group, mainly adverbs and adjectives like *graag* ‘gladly’ and *super* ‘super’, as in (304) and (305), and *boeien* ‘interesting’, as in (306) below (see also den Hertog, 1903, pp. 248–252).⁵⁰

⁵⁰Note that *boeien* ‘interesting’ in the last example is not a verb (‘to interest someone’), nor a noun (‘buoys’), but a shortened and sarcastic use of the adjective *boeiend* ‘interesting’.

- (304) Dus als je de decoupeerzaag wilt meenemen als je in tilburg komt, graag!
(WR-U-E-D-0000000301)
So if you want to take the saw with you when you come to tilburg, please!
- (305) Als je kan helpen, super, ander weekend mag ook we hebben genoeg te klussen vanaf volgende week!
(WR-U-E-D-0000000041)
If you can help, super, another weekend is also fine, we have enough odd jobs from next week!
- (306) Ik heb er nog nooit problemen mee gehad, en als die er zijn. Boeien.
(WR-X-B-A-discussion-lists-tweakers-181829)
I have never had any problems with it, and if there are any. Not interesting.

Another use in this rest category consists of conditionals with an noun phrase as consequent, as in (307) below.

- (307) Dat je tegen die tijd met je nieuwe vlam uitzoekt. En dan tot slot, omdat het kan en omdat je die vroeger graag wilde, een DAT recoder, Minidisc player en DCC recorder. En als je echt oud bent, een reel2reel tapedeck.
(WR-X-B-A-discussion-lists-tweakers-1646814)
That by that time you will choose together with your new girlfriend. And finally, because it is possible and because you used to want it, a DAT recorder, Minidisc player and DCC recorder. And if you are really old, a reel2reel tape deck.

It must be noted though that in this use, the noun phrase in the consequent always has a direct relation to previous context. In (307) it introduces an alternative to other audio players. Affirmative interjections are also used as consequents, as in (308) below (see also section 5.7).

- (308) Vanmorgen zegt ze: we zouden de spenen toch doorknippen? Ja, zeg ik, maar alleen als jij het wil.
(WR-P-E-A-0005983263)
This morning she says: weren't we supposed to cut the teats? Yes, I say, but only if you want it.

Finally, prepositional phrases are also used as consequents, mostly in instructions.

- (309) Als je van de kassa komt rechts om de hoek. (WR-U-E-D-0000000030)
If you come from the cash register on your right around the corner.
- (310) Als je rechts bent, dan in de linkerarm of als je links bent in je rechterarm.
(WR-P-E-A-0005370833)
If you are right-handed, then in the left arm or if you are left-handed in your right arm.

As the number of all of these uses in the last category is small, no generalisations should be made.

5.8.6 Conclusion

In this section, we observed that more than 90% of the consequents are of the declarative type. In section 5.3, we already discussed their word order patterns. Although the associations between mode and register on the one hand, and sentence type on the other are small, there seems to be a somewhat stronger association between register and sentence type. In informal texts, the dominance of the declarative type is smaller than in formal texts, leaving more room for the minority of other types of consequents, namely, in descending order, interrogative, exclamatory, and imperative consequents.

As the data are strongly skewed towards declarative consequents, it is not expected that sentence type will be a strong grouping feature, although deviations from the declarative type of consequent may, by their relative infrequency, strongly invite implicatures of connectedness. Of course, this remains to be seen in the next chapter.

5.9 Negation

5.9.1 Introduction

In chapter 3 we saw that negation was linked to a number of sub-types of conditionals, such as Declerck and Reed's 'preclusive *P*'-conditionals, in which *p* prevents *q* (section 3.3.11), and Wierzbicka's negative counterfactuals, as in (311) and (312) repeated below (see section 3.2.10).

(311) If it freezes, the contest will not be cancelled. (Declerck & Reed, 2001, p. 278)

(312) If X hadn't happened, Y would not have happened. (Wierzbicka, 1997, p. 29)

Furthermore, Akatsuka (1997b) links negation patterns in counterfactual conditionals to expression of desirability in the following line of reasoning: 'P [DE-SIRABLE], because if not P, then not Q [UNDESIRABLE]', as in (313) below.

(313) I was lucky that the fire did not cross the highway. If it had, my house would have been destroyed. (Akatsuka, 1997b, p. 784)

Akatsuka argues that co-construction of such conditionals depends partly on the connection between antecedent and consequent and on the ability to reason from negation of a desirable situation to its undesirable consequence (see also the 'desirability table' in Akatsuka, 1997a, p. 345).

In section 5.9.2, I will discuss types of negation in antecedents and consequents of Dutch conditionals, and their annotation in section 5.9.3. In section 5.9.4, I will present the distribution of negation in the corpus, after which I will compare the results with insights from the literature in section 5.9.5. In section 5.9.6, I will provide a brief conclusion.

5.9.2 Types of negation

The feature *negation* represents the polarity of a clause, both of the antecedent and the consequent, i.e., it refers to whether or not the antecedent and consequent contains negation. This feature is thus not defined in terms of desirability or evaluation, as for example Akatsuka (1997a) does. Three types of negation are distinguished: *syntactic*, *morphological* and *implicit* or *lexical* negation. Syntactic negation is exemplified below.

- (314) Dus toen dacht ik, als jij mij *niet* wil accepteren, dan hoef ik ook *geen* contact met jou. (WR-X-A-A-journals-txt-ped-010)
So then I thought, if you don't want to accept me, then I don't have to contact you.

In (314), both the antecedent and the consequent feature syntactic negation, in this case by means of the adverbial negations *niet* ‘not’ and *geen* ‘no’ respectively. Other adverbial negations are *nooit* ‘never’ and *nergens* ‘nowhere’, and negative pronouns are *niemand* ‘nobody’ and *niets* ‘nothing’ (see also Haeseryn et al., 1997, pp. 1645–1647; Postma & Bennis, 2006; Albert-Balázs, 2018). Included in this type is *no* ‘nee’, which can function as an independent negative utterance (see Haeseryn et al., 1997, p. 1640), as in (315) below, and as an answer to a question phrased as a conditional, as in (316) (see van der Wouden, 2018 and references therein on uses of *nee* ‘no’; see also section 5.8 for its affirmative counterpart).

- (315) *Nee* als hij op racefiets is dan uh kan ik daar *niet* tegenaan skeeleren. (fn008171)
No, if he is on a racing bike then uh I can't keep up on skates.
- (316) Als u mij nu direct vraagt verwacht u daar alle wonderen uh van deze wereld van? *Nee*. (fn000237)
If you ask me now directly, do you expect miracles from that? No.

In (317) below, the antecedent features morphological negation by means of the prefix *ont* ‘de’ in *ontraaden* ‘to advise against’.

- (317) Als de minister ons amendement *ontraadt* dan wijkt hij ook eigenlijk af van de Europese richtlijn waarin dat recht op verzet nou juist is opgenomen. (fn000218)
If the minister advises against our amendment, then he actually departs from the European guideline which includes the very right to object.

Other prefixes used for negation are *on* ‘un’, *de* ‘de’, *dis* ‘dis’, *mis* ‘mis’, *min* ‘de’, *non* ‘non’, *niet* ‘not’, *in* ‘in’, *a* ‘a’, *il* ‘il’, *im* ‘im’ and *ir* ‘ir’, and the suffixes *loos* ‘less’, *vrij* ‘free’, *arm* ‘low’ and *luw* ‘free’ (see van der Wouden, 1995).

In (318) finally, both clauses are implicitly negated by means of the lexical negations *slecht* ‘bad’ and *moeilijk* ‘difficult’.

- (318) Als de inhoud van boeken me zo *slecht* beviel, was het erg *moeilijk* om ‘mee te denken’ over verbeteringen. (WR-P-P-G-000012952)
If the content of books pleased me so badly, it was very difficult to constructively ‘think along’ about improvements.

Lexical items expressing negative meaning are exemplified in the guidelines in section A.10 of Appendix A (based on Haeseryn et al., 1997, pp. 1640–1647; Vandeweghe, 2000, pp. 144–146), but no exhaustive list could be provided. Examples are *allerminst* ‘not at all’, *amper* ‘barely’, *nauwelijks* ‘barely’, *noch* ‘neither’, *ternauwernood* ‘barely’, *weinig* ‘few’, and *zonder* ‘without’, but also clear cases of verbs like *twijfelen* ‘doubt’, *voorkomen* ‘prevent’ and *verbieden* ‘prohibit’, as in (319) below. The list was expanded and discussed by the annotators to minimise the risk of overlooking items of lexical negation. Unfortunately, however, for reasons of inter-rater reliability, lexical negation had to be removed as annotation from the dataset. We will discuss and assess this point further in the next section.

- (319) Terzijde liet de rechter doorschemeren dat het hem een lief ding waard is als exploitanten van potentieel gevaarlijke attracties het zouden *verbieden* dat jonge kinderen zonder ouderlijke begeleiding van de attractie gebruik maken. (WR-P-P-G-0000021933)
Aside that, the judge hinted that it would be worth it to him if operators of potentially dangerous attractions would prohibit young children from using the attraction without parental guidance.

5.9.3 Inter-rater reliability

The reliability of annotations for negation in the antecedent and in the consequent is identical and high ($AC1=0.92$) with the ‘regular kappa strategy’, and there is substantial agreement ($AC1=0.65$ and $AC1=0.72$) with pairwise deletion (see section 4.5).

When looking in more detail at the cases in which the annotators did not agree, the source of most disagreements appeared to be lexical negation, as may be expected. Examples are provided in (323) and (324).

- (320) Als je zegt dat woorden *alleen* in context betek[e]nis hebben dan onder-
 vang je dat toch juist? (WR-U-E-A-0000001226)
If you say that words only have meaning in context, then you actually forestall that, right?

Indeed, the literature mentions *alleen* ‘only’ as ‘implicit negation’ (Haeseryn et al., 1997, pp. 1640–1647; Vandeweghe, 2000, pp. 144–146). Haeseryn et al. (1997) for instance provide a number of examples in which ‘words or word combinations have a negative meaning aspect’, of which two are presented below.

- (321) Ze heeft nog *amper* tijd voor andere dingen. ('bijna *geen*') (Haeseryn et al., 1997, p. 1647)
She barely has time for other things. ('almost none')

- (322) Je hoeft er *pas* om tien uur te zijn. ('*niet* eerder dan') (Haeseryn et al., 1997, p. 1647)
You don't have to be there until ten o'clock. ('no sooner than')

It is questionable whether this is the case in (320). Even if such cases were reliably annotated, once one starts annotating lexical negation, the boundary between what is and what is not negation starts to shift, as can be seen in the examples below, in which the presence of negation is even more debatable.

- (323) Er gaat pas een significante stroom lopen als de kring *gesloten* is. (WR-X-B-A-discussion-lists-tweakers-1794361)
A significant current will only start if the circuit is closed.

- (324) Als iemand uh heel *raar* staat te doen. (fn008661)
If someone is uh being very weird.

In (323), the post-annotation discussion showed that one annotator had interpreted 'a circuit being closed' as the negation of 'a circuit being open'. The question then arises where such 'negation' ends. The same goes for 'being very weird' in (324) – it is not the case that this should be interpreted as the negation of 'being (very) normal'. As Zwarts (1981, pp. 41–42; referred to by van der Wouden, 1998) argues, it has been a tradition to use 'lexical decomposition' to show that such implicit negation is indeed negation by paraphrasing words like *zelden* 'rarely' in terms of *niet vaak* 'not often'. In the examples Zwarts (1981) provides, we see in (325) that *zelden* 'rarely' indeed licenses the negative polarity items (NPI) *hoeven* 'must/have to', as does its explicitly negated paraphrase in (326), but not the non-negated counterpart in (327).

- (325) Deze beambte heeft zich *zelden hoeven* in te spannen. (Zwarts, 1981, p. 41)
This officer has rarely had to make an effort.

- (326) Deze beambte heeft zich *niet vaak hoeven* in te spannen. (Zwarts, 1981, p. 41)
This officer has not often had to make an effort.

- (327) * Deze beambte heeft zich daar vaak hoeven in te spannen. (Zwarts, 1981, p. 41)
This officer often had to make an effort there.

However, this procedure is circular, in the sense that when you paraphrase *rarely* as *not often*, you could as well paraphrase *often* as *not rarely* (for more detailed discussions, see Zwarts, 1981; van der Wouden, 1998).⁵¹ The same problem with the annotation of lexical negation can be seen in consequents, as in those in (328) and (329).

- (328) Als hij *niet* elders binnen het bedrijf aan de slag kan, komt hij in een *lastig parket*. (WR-P-P-G-0000110880)
If he cannot work elsewhere within the company, he will be in a difficult position.
- (329) Als je op de middelbare school het *niet* haalt, dan krijgt die school een *slechte naam*. (WR-X-A-A-journals-txt-ped-001)
If you don't make it in high school, then that school will get a bad reputation.

In (328), the antecedent features syntactic negation with *niet* 'not', and the consequent was annotated by one annotator for lexical negation, because of the phrase *in een lastig parket zijn* 'being in a difficult situation'. The same goes for (329) in which the antecedent features *niet* 'not', while the consequent features *een slechte naam krijgen* 'getting a bad reputation'. In such cases, it seems that negation and negative evaluation are hard to separate. Furthermore, lexical negation can itself be negated without resulting in apparent double negation, as can be seen in (330) below.

- (330) Zou een burgemeester ook *niet* een wedstrijd moeten *verbieden* als KNVB-officials zich komen misdragen zoals toen zij de wedstrijd Feyenoord – FC Twente gewoon door lieten gaan? (WR-P-P-G-0000003556)
Shouldn't a mayor also forbid a match if KNVB officials misbehave like when they just let the Feyenoord – FC Twente match continue to be played?

Here, *verbieden* 'to forbid' constitutes lexical negation, but the phrase itself is negated by *niet* 'not' and on top of that, it could be said that the verb *zou* 'should' and the fact that the conditional is part of a rhetorical question all add to the complexity. A somewhat simpler example can be found in (331) below, which was annotated for having lexical negation by means of *limiet* 'limit'.

- (331) Als je bekijkt dat oudere versies van outlook ook een *limiet* van 2 gig op een pst bestand hebben, is dat niet zo heel erg verwonderlijk hoor. (WR-X-B-A-discussion-lists-tweakers-974686)
If you consider the fact that older versions of outlook also have a 2 gig limit on a pst file, that's hardly surprising.

As can be seen in (332) below, in which adding syntactic negation (*geen limiet* 'no limit') does not result in double negation.

⁵¹See van der Wouden (1994, p. 73) and van der Wouden (1996) on *hoeven* 'must/have to' in conditional clauses. I will not discuss negative polarity items in this study.

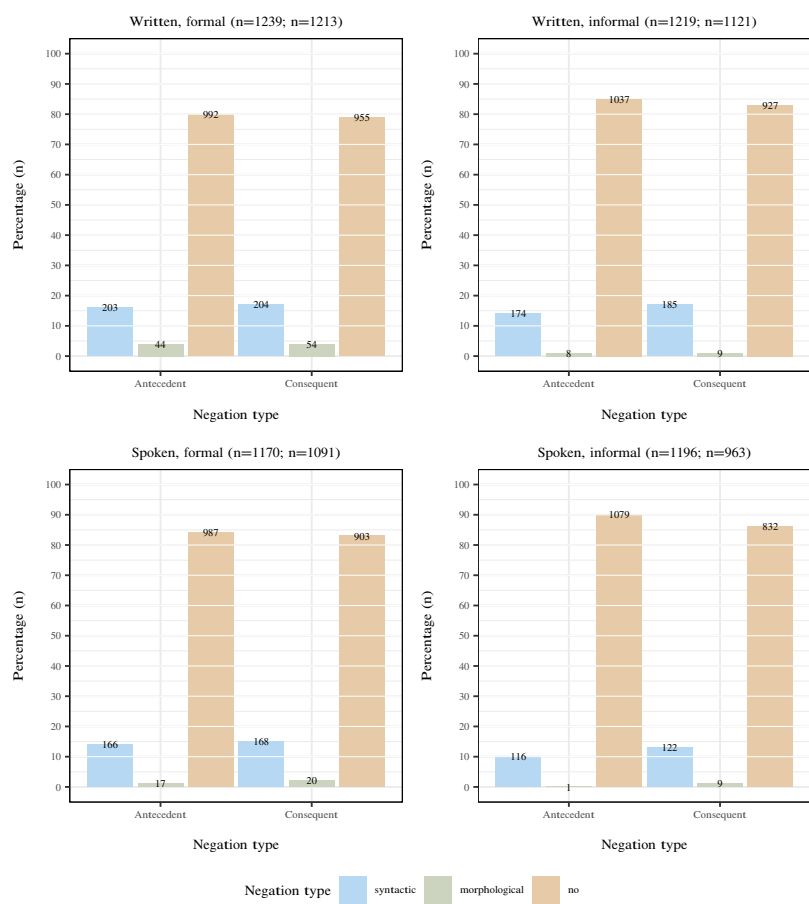
- (332) Als je bekijkt dat oudere versies van outlook *geen limiet* van 2 gig op een pst bestand hebben, is dat niet zo heel erg verwonderlijk hoor.
If you consider the fact that older versions of outlook have no limit of 2 gig on a pst file, that's hardly surprising.

In grammars, this type of negation is mostly just mentioned and followed by a non-exhaustive list of ‘negative elements’, but a clear definition is lacking. Such cases were numerous as well, the ways of expressing ‘negative meaning’ were ample, and the influence of lexical negation on inter-rater reliability was detrimental. Therefore, lexical negation was removed as a possible value of the feature *negation*. This does not have to be problematic, though, as most studies on negation focus on syntactic and/or morphological negation and not on lexical negation. Furthermore, lexical negation in conditionals was disregarded earlier in Reuneker (2016, p. 130), whose results show that morphological and syntactic negation together provided sufficient data to find a significant relation between negation and conditional use of prepositional phrases introduced by *zonder* ‘without’ (see also Tyler & Evans, 2003). Removing lexical negation from further analysis increased agreement for antecedents from 93% and $AC1=0.65$ to 98% and $AC1=0.98$, and from 93% and $AC1=0.92$ for consequents to 94% and $AC1=0.98$ (88% and $AC1=0.85$ for antecedents, 90% and $AC1=0.88$ for consequents using pairwise deletion). The above means that only antecedents and consequents featuring syntactic or morphological negation are included in the results presented and discussed in the next sections.

5.9.4 Distribution of negation types

The results of the annotation of negation are presented in Figure 5.8 below. For a more detailed view on the data, the reader is referred to page 482 in Appendix B.

Figure 5.8:
Distribution of negation types by mode and register



What we see is that most clauses of conditionals are not negated. The percentage of non-negated clauses is around 80%, except for antecedents in spoken, informal texts ($\pm 90\%$). The results presented here are comparable to Reuneke's (2016) findings: 18.5% of the consequents in that study, which was carried out using a different corpus, were negated, compared to 17.6% in this study overall. What we can further see in Figure 5.8 is that syntactic negation is more common than morphological negation across genres and registers.⁵²

A four-way loglinear analysis was performed on the data, which produced a final model with a likelihood ratio of $\chi^2=20.73$, $df=17$, $p=0.24$. The model retained only the following two-way interactions, removing which would worsen the fit of the model without the four- and three-way interactions *mode* $\times$ *negation* (*a*) ($\chi^2=28.80$, $df=2$, $p<0.001$, Cramér's $V=0.07$; $\Delta\chi^2=21.65$, $df=16$, $p<0.001$), *mode* $\times$ *negation* (*c*) ($\chi^2=15.17$, $df=2$, $p<0.001$, Cramér's $V=0.06$; $\Delta\chi^2=11.85$, $df=16$, $p=0.002$), *register* $\times$ *negation* (*a*) ($\chi^2=52.67$, $df=2$, $p<0.001$, Cramér's $V=0.10$; $\Delta\chi^2=47.78$, $df=16$, $p<0.001$), *register* $\times$ *negation* (*c*) ($\chi^2=32.07$, $df=2$, $p<0.001$, Cramér's $V=0.09$; $\Delta\chi^2=28.57$, $df=16$, $p<0.001$), and *negation* (*a*) $\times$ *negation* (*c*) ($\chi^2=77.15$, $df=4$, $p<0.001$, Cramér's $V=0.09$; $\Delta\chi^2=55.02$, $df=16$, $p<0.001$). As these figures show, the associations are significant, but weak, which is likely due to the size of the dataset. Inspecting the residuals, we see that antecedents in written texts feature syntactic and morphological negation more often than spoken texts ($z=2.25$, $p<0.05$; $z=2.74$, $p<0.01$ for written texts, $z=-2.29$, $p<0.05$; $z=-2.79$, $p<0.01$ for spoken texts respectively). For consequents, we see the same trend, although only morphological negation individually contributes to the overall association significantly ($z=2.01$, $p<0.05$; $z=-2.14$, $p<0.05$ for written and spoken texts respectively). For register, we see that antecedents in formal texts feature syntactic and morphological negation more often than informal texts ($z=2.20$, $p<0.05$; $z=4.41$, $p<0.001$ for formal texts, $z=-2.20$, $p<0.05$; $z=-4.40$, $p<0.001$ for informal texts respectively). For consequents, we see the same trend, and again, only morphological negation individually contributes to the overall association significantly ($z=3.70$, $p<0.05$; $z=-3.89$, $p<0.05$ for formal and informal texts respectively). Finally, the residuals for the association between negation in antecedents and consequents show that antecedents with syntactic negation are followed by consequents with syntactic negation and morphological negation more often than expected in comparison with non-negation consequents ($z=5.19$, $p<0.001$; $z=3.20$, $p<0.001$; $z=-2.76$, $p<0.01$ for syntactic, morphological and non-negated consequents respectively). This association is weaker for antecedents with morphological negation ($z=2.23$, $p<0.01$; $z=3.77$, $p<0.001$; $z=-1.57$, $p>0.05$ for syntactic, morphological and non-negated consequents respectively). Non-negated antecedents are followed by syntactically negated con-

⁵²As with remarks on for instance the feature of person and number, this distribution may reflect the general distribution of types of negation in clauses (i.e., independent of conditionals).

sequents less often than expected as compared with morphologically and non-negated consequents ($z=-2.39$, $p<0.05$; $z=-1.89$, $p>0.05$; $z=1.33$, $p>0.05$ for syntactic, morphological and non-negated consequents respectively).

It was not expected that negation would be strongly associated with mode, register or both. These figures tell us that such associations are present, and while they are significant, this is probably due to corpus size, as the effects are very small. This is reflected in Figure 5.8. Furthermore, the results show that it is not the case that negation strongly patterns across clauses, as was the case for, for instance, verb tense (see section 5.4). On a speculative note, this may be due to processing difficulties, and although an example such as in (333) may not seem inherently complex, ‘language users might avoid negation in apodoses of ‘als NEG’-conditionals, because double sentential negation can result in complex mental space-configurations and processing difficulties’ (cf. Reuneker, 2016, p. 132).

- (333) Ik vind dat kinderen dat *niet* hoeven te doen als zij dat *niet* willen. (WR-X-A-A-journals-003)
I think children should not have to do that if they do not want to.

For further research on the effects of double negation in conditionals, see Evans and Handley (1999) and references therein.

5.9.5 Comparison with previous studies

The majority of conditionals does not have negation in either clause (71.45%), as in (334). The second most frequent pattern is a non-negated antecedent together with a negated consequent (13.23%), as in (336), followed by negation in the antecedent, but not in the consequent (10.94%), as in (335). Finally, only 4.37% of *als*-conditionals has negation in both clauses, as in (337).

- (334) Als je lief bent in de supermarkt mag je zo meteen bij de kassa iets uitzoeken. (fn000415)
If you behave in the supermarket you can have something at the counter.
- (335) Je bent zo weer een week verder als je *niet* uitkijkt. (fn008327)
The week will pass by if you don't watch out.
- (336) Deze tweede reden geldt *niet* als sprake is van een bestaande, open polis die partijen willen omzetten in een getaxeerde polis. (WR-X-A-A-journals-txt-nthr-005)
This second reason does not apply if there is an existing, open policy that the parties want to convert into a valued policy.
- (337) Ik heb overigens wel mee gedaan aan MvM. Als dat *niet* bestond was ik zelf *niet* geboren [...]. (WR-P-E-A-0004650486)
By the way, I did participate in MvM. If that did not exist, I would not have been born myself[...].

In (334) neither the antecedent nor the consequent is negated. Given the assumed causal relation between behaving well and getting a reward, this conditional amounts to a promise (see below). In (335), however, we see a negation in the antecedent, and its negatively evaluated results in the consequent.⁵³ In (336) only the consequent contains a negation, and presents the consequence of converting an existing policy, i.e., Declerck and Reed's (2001, p. 278) 'preclusive *P*-conditionals' mentioned earlier, comparable to the example in (311) above. In (337), finally, both clauses contain a negation, combined with past tense in both clauses (simple past and past perfect respectively), expressing what would have happened if the speaker had not participated in MvM ('Moeders voor Moeders', an organisation helping women with fertility problems). Here, we see Wierzbicka's aforementioned 'negative counterfactual', comparable to the example in (312) above.

Although there is a vast body of literature on both conditionals and negation, and negation *of* conditionals (see below), I did not find many studies on negation *in* conditionals, except for experiments done in the psychological literature on conditionals (see e.g., Evans, 1972; Evans, Clibbens & Rood, 1996; Evans & Handley, 1999; Handley, Evans & Thompson, 2006; Schroyens & Schaeken, 2003; Espino & Byrne, 2012; for recent discussion of negation in and of conditionals, see also Willer, 2022). However, such studies typically test reasoning abilities and, as Khemlani, Orenes and Johnson-Laird (2014, p. 6) mention, their materials 'introduce no temporal or causal relations, or any effects in which the meanings or referents of clauses modify the interpretation of sentential connectives'.⁵⁴ A classic fallacy focused on is 'denying the antecedent' (see e.g., Copi, 1973, pp. 22–23), in which the conclusion 'not *Q*' is fallaciously drawn from the conditional 'if *P*, then *Q*' and the negation of the antecedent (i.e., 'not *P*'; see Evans and Handley, 1999, p. 741; Juhos, Quelhas and Byrne, 2015; see also work on this fallacy in informal logic, e.g., Burke, 1994; Godden and Walton, 2004; Stone, 2012. See Cook, 2009, p. 87 for a definition). As (in)formal reasoning with conditionals and its associated fallacies lie outside the scope of this study, we will not pursue this line further.

In linguistic and pragmatic studies, negation and conditionals are studied together in terms of negation *of* conditionals mostly, rather than *in* conditionals.⁵⁵ In most cases, the question concern the logical analysis of 'not (if *p* then *q*)' as '*p* and not *q*'. Nieuwint for instance provides the following example.

⁵³Mind that, given the choice to exclude lexical negation, 'passing by' here does not constitute a negation.

⁵⁴A notable and recent exception is Zevakhina and Prigorkina (2020), who devised an experiment based on Fillenbaum (1975) that shows conditionals featuring negation in both clauses 'significantly facilitate[s] the derivation of Conditional Perfection and [are] processed faster than the single negation or no negation'.

⁵⁵See also the notion of 'polarity' in CCR (cf. Sanders, Spooren & Noordman, 1992); see section 3.3.8.

(338) *Premise:*

It is not the case that if the peace treaty is signed, war will be avoided.

Conclusions:

The peace treaty will be signed.

War will not be avoided.

(Nieuwint, 1992, p. 114)

Although ‘not (if p then q)’ implies ‘ p and not q ’ (see e.g., Horn, 1989, p. 377), Nieuwint (1992, p. 114) argues that ‘no speaker or hearer will deem both conclusions valid’. According to Grice (1989, pp. 80–85; cited in Horn, 1989, p. 378), someone who expresses the negation of a conditional, as in the (major) premise of (338) ‘is not so much negating the contained conditional proposition as asserting his unwillingness to assert that proposition’. As can be seen, this is negation with scope over the (complete) conditional, instead of negation *within* conditionals, which is not what this section focuses on (but see section 2.6.4 for discussion).

Dancygier and Sweetser (2005, pp. 230–232) do focus briefly on what they call the ‘if that NEG construction’, as in their example reproduced in (339) below.

- (339) “Look at my new microwave,” Mrs. Dugan said. “If that’s not just the weirdest darn thing I ever laid eyes on.” [...] (Dancygier & Sweetser, 2005, p. 230)

This insubordinate construction must include a negation and ‘expresses the construal of the described situation as being at the far end of some pragmatic scale’ (Dancygier & Sweetser, 2005, p. 231). By selecting conditionals from the corpus with negation in the antecedent and no consequent, we indeed get a Dutch counterpart of this construction, as can be seen in (340), but only once in the specific use described by Dancygier and Sweetser.

- (340) Annemarie/Mariska, als jij straks *geen* borstvoeding gaat geven! (WR-P-E-A-0006074405)
Annemarie/Mariska, if you are not going to breastfeed later!

Although the insubordinate conditional in (340) seems comparable in terms of an implicature suggesting what the consequent would be were it expressed (i.e., *dan weet ik het ook niet meer* ‘then I’m at a loss’), the Dutch example appears to resist paraphrasing using *that* as in Dancygier and Sweetser’s ‘if that NEG construction’. Nevertheless, both examples are comparable to rhetorical conditionals (or ‘dracula conditionals’, as discussed in chapter 3), in which the consequent is clearly false and implicates that the antecedent is false as well (e.g., *dan eet ik m’n hoed op* ‘then I’ll eat my hat’; see also Boogaart and Verheij, 2013, p. 20).

Unless-clauses, i.e., ‘negative conditionals’, are analysed often in terms of ‘if not’ (see e.g., Comrie, 1986; Dancygier, 1985; Declerck & Reed, 2000). Quirk et al., for instance, argue that ‘the *unless*-clause is roughly similar to a negative

if-clause’, and they suggest that *unless* puts ‘greater focus’ on conditions as an exception, resulting in the incoherence of their example in (342), because ‘studying hard’ is not an exceptional condition for passing an exam.

(341) If you hadn’t studied hard, you’d have failed the exam. (Quirk et al., 1985, p. 1093)

(342) # Unless you had studied hard, you’d have failed the exam. (Quirk et al., 1985, p. 1093)

Dancygier (2002) and Dancygier and Sweetser (2005, pp. 183–187) analyse *unless* as ‘ Q ; [(not Q) if P]’ meaning that *unless* presents the consequent as the default situation, and then ‘adds the *If* P , $\neg Q$ scenario as an exceptional alternative’. We can thus see that ‘if not’ and *unless* are not the same, as also Fillenbaum’s (1975) experiments show (see also Wright & Hull, 1986). Promises, such as in (334) above, are ‘much less likely to be accepted’ when phrased as *unless*-statements than threats and warnings, as in (335) above. This can also be seen in Fillenbaum’s examples below.

(343) If you don’t give me a ticket I’ll give you \$20. (Fillenbaum, 1975, p. 259)

(344) # Unless you give me a ticket I’ll give you \$20. (Fillenbaum, 1975, p. 259)

Here, the paraphrase of the ‘if not’-clause in (343) into an *unless*-clause (344) ‘seems rather strange’, according to Fillenbaum. However, it seems that warnings, as in (335) repeated below, are also affected by *unless*-paraphrasing, as can be seen in (346) below.

(345) Je bent zo weer een week verder als je *niet* uitkijkt. (fn008327)
The week will pass by if you don’t watch out.

(346) # Je bent zo weer een week verder *tenzij* je uitkijkt.
The week will pass by if unless you watch out.

The warning in (346) seems to conflict to a degree with the supposed default-status of the consequent as discussed by Dancygier (2002).⁵⁶ This is compatible with Daalder’s (1994) analysis of Dutch *tenzij* ‘unless’ as ‘exceptive conditionals’ and Paardekooper’s (1986, pp. 442–443) remark that *tenzij* ‘unless’ combines a ‘facultative’ meaning aspect (i.e., conditional meaning aspect) with that of exception.

5.9.6 Conclusion

In this section, we saw that in most cases neither clause in conditionals contains negation. In conditionals that do feature negation, in either the antecedent, consequent, or both, the most common type is syntactic negation. Negated

⁵⁶For more studies on conditional promises and threats, see e.g., Beller (2002), Haigh et al. (2011).

consequents are more frequent than negated antecedents, and conditionals with negation in both clauses make up for only a small minority (4.37%) of all conditionals. With respect to mode and register, we see only a weak association to negation.

With respect to the implicatures of unassertiveness and connectedness central in this dissertation, we have discussed negation mostly with respect to its link with implicatures of counterfactuality. Because such conditionals are linked in the literature discussed to referencing situations that did not occur, it is expected that this feature may cluster together with other features linked to counterfactuals, most prominently tense (see section 5.4) and modality (see section 5.5). Furthermore, the literature discussed displays a focus on the logical fallacy of ‘denying the antecedent’ when the proposition in the antecedent is accepted to be false, or a focus on the negation *of* conditionals, rather than negation *in* conditionals, and, lastly, a focus on negative polarity as a coherence relation between two clauses (see section 3.3.8), either implicating that the situation expressed in the antecedent causes (or enables), or prevents the situation expressed in the consequent. In the next chapter, we will test to which extent negation indeed can be viewed as a factor in licensing specific implicatures of conditionals. First, however, we will discuss focus particles in section 5.10, which is the last feature included in this study.

5.10 Focus particles

5.10.1 Introduction

In English, the conditional conjunction *if* can be used in combination with focus particles (also called *focus adverbs*; see e.g., Hoeksema & Zwarts, 1991), most notably *even* and *only*, as in (347) and (348) below.

- (347) *Even if* nobody helps me, I’ll manage. (König, 1985, p. 3)
 (348) *Only if* the sun shines will we play soccer on Sunday. (von Fintel, 1994, p. 140)

These two particles have received more attention than other particles, because discourse and focus particles are often defined as having no bearing on truth-conditions (see e.g., Levinson, 1983; Blakemore, 2004; van der Wouden & Caspers, 2010, p. 54), while *even* and *only* do (for an overview of this specific discussion, see Foolen, 1993, pp. 13–23). As we can see, ‘adverb-like’ words (cf. van der Wouden, 2000) like *only*, *even* and *certainly* express additional meaning with respect to their appendix, here the antecedent of the conditional. The Dutch equivalents of the aforementioned particles are *zelfs* ‘even’ and *alleen* ‘only’, as in (349) and (350) below.

- (349) *Alleen als* hij meer dan 95 procent heeft kan hij het bouwbedrijf van de beurs halen en mag hij de resterende aandeelhouders via de rechter dwingen te verkopen. (WR-P-P-G-0000102546)

Only if *he has more than 95%* *he can remove the construction company from the stock market and sell the remaining shareholders through court.*

- (350) Vrijheid wordt vergroot door opties, *zelfs als* die opties niet bijzonder aantrekkelijk zijn [...]. (WR-X-A-A-journals-001)
Freedom is enhanced by options, even if those options are not particularly attractive.

In section 5.10.2, I will discuss types of focus particles used in Dutch conditionals, and their annotation in section 5.10.3. In section 5.10.4, I will present the distribution of focus particles in the corpus, after which I will compare the results with insights from the literature in section 5.10.5. In section 5.10.6, I will provide a brief conclusion.

5.10.2 Types of focus particles

Before discussing types of focus particles, I will define what I will treat as focus particles in this study. Although precise definitions of different types of particles are not available or agreed upon (cf. van der Wouden & Caspers, 2010, p. 56), König (1991, pp. 10–16) proposes a number of characteristics. I will briefly discuss those that are most relevant to conditional clauses.

The first property, and one of the most distinctive, as argued for by König (1991, p. 13), is *positional variability*. In fact, one of the problems of finding focus particles in the corpus, is that they do not have to precede the conditional conjunction – contrary to what examples in the literature suggest. For instance, van der Auwera (1985) provides examples like the one in (351), but there are no examples in which *only* does not directly precede *if*, as in (352).

- (351) The match will light only if you strike it. (van der Auwera, 1985, p. 71)

- (352) The match will *only* light *if* you strike it.

One could argue for *scope ambiguity* here (Hoeksema & Zwarts, 1991, pp. 57–58), as (352) has two possible readings, partly dependent on stress, namely first that only the act of striking the match will light it, and second that the match will light only, but do nothing else, when you strike it. Whether or not one finds the first reading the most accessible, it is, at least a possible reading, meaning that the focus particle does not have to directly precede the conjunction. In fact, von Stechow (1994) provides examples of positional variation of *only*, as in (353) below.

- (353) We will only play soccer if the sun shines. (von Stechow, 1994, p. 140)

Again, two interpretations are available, namely ‘only if the sun shines we will play soccer’, and ‘if the sun shines, the only thing we will do is play soccer’. In the former reading, *only* counts as focus particle for the antecedent, while in

the latter it does not. As can be seen, the focus particle can also be positioned in the consequent, while interacting with what is focused on elsewhere in the sentence. Searching the corpus for the pattern *only* directly followed by *if* does thus not suffice, and searching for sentences with *only* and *if* in any position results in many false positives, such as in the corpus example in (354).

- (354) Uuh 't gaat ten eerste om 't jaarvergaderrooster. Zorg dat BAS niet *alleen* BAS is *als* er een BAS-bijeenkomst is. (fn009207)
Ehm, first of all, it's about the annual meeting schedule. Make sure that BAS is not only BAS {if/when} there is a BAS meeting.

In this case, *alleen* 'only' does not add meaning to the antecedent of the conditional, but 'merely' to the noun phrase *BAS* in the consequent. In order to provide a clear comparison to (353), we will look at the constructed example in (355).

- (355) We will play only soccer (and no other sport) if the sun shines.

Here too, *only* does not add meaning to the antecedent of the conditional, but only to the noun phrase *soccer* in the consequent, consequently excluding the first interpretation of the example in (353) discussed above.

To exclude cases like (355), we need another property of focus particles discussed by König (1991), namely their semantic scope, i.e., the part of the utterance a focus particle contributes meaning to. This is related to Hoeksema and Zwarts's (1991, p. 52) distinction between focus particles with phrasal scope and those with sentential scope. So, the scope of *zelfs* 'even' in Hoeksema and Zwarts's example in (356) below is phrasal, as it is restricted to the noun phrase *Jaap* it is attached to. In (357), however, *even* scopes over the sentence, meaning that it expresses that even Dieter left East Germany, not that Dieter even left (while others only complained, for instance).

- (356) Zelfs JAAP vind ik leuk. [...] (Hoeksema & Zwarts, 1991, p. 55)
I find even JAAP nice.
- (357) DIETER has even left East Germany. (Hoeksema & Zwarts, 1991, p. 55)

Using this terminology, we can say for (355) that *alleen* 'only' has phrasal scope over a part of the consequent (*soccer*), and that it does not modify the antecedent. For the two interpretations of (353), in the first interpretation ('only if the sun shines we will play soccer'), the particle *only* takes wide scope over the conditional, whereas in the second interpretation ('if the sun shines, the only thing we will do is play soccer'), the particle *only* takes narrow scope over the noun *soccer* (for a related discussion of the scope of the additive particle *still* in conditionals, see Tellings, 2017). A test to see whether a focus particle in a conditional has phrasal or sentential scope, is to formulate a question concerning the condition. If the answer, but not the question includes *alleen*

‘only’, this is an indication that the particle scopes over the antecedent. For (353), the relevant question is ‘Will we play soccer?’ and the answer is ‘Only if the sun shines.’, while for (355) the relevant question is ‘Will we only play soccer?’ and the answer is ‘If the sun shines.’.

As with the other features, it is not possible to provide a detailed discussion of all the particles and analyses that have been proposed, especially for *even if* and *only if* (see the introduction to this section).⁵⁷ In the remainder of this section, I briefly discuss the two types of focus particles distinguished by König (1991, Chapters 4, 5), namely *additive* focus particles and *restrictive* focus particles. I will also propose a new type, *iterative focus particles*. I will discuss these briefly below, and I will discuss the most frequent Dutch particle in each respective group. In section 5.10.5, I will provide a more detailed discussion and an overview of the different particles used with conditionals in Dutch.

The first type of focus particle is the *additive* focus particle, of which the most prominent particle in Dutch is *zelfs* ‘even’ (for German conditionals with focus particles *auch* ‘as well, even’, *selbst* ‘even’, and *sogar* ‘even’, see Bücker, 2016). It focuses on the whole antecedent or on a part of it, but its scope ‘is invariably the whole conditional in these cases, irrespective of the exact location of the focus’ (König, 1991, p. 79), as can be seen in the examples in (358) and (359).

(358) The game will be on EVEN IF IT IS RAINING. (König, 1991, p. 79)

(359) I’ll manage even if EVERYBODY is against me. (König, 1991, p. 79)

In these examples, *even* turns the conditional into an ‘irrelevance conditional’ (i.e., a concessive conditional), signalling an incompatibility between the antecedent and consequent, i.e., normally, the antecedent (‘it is raining’) would lead to the negated consequent (‘the game will not be on’), but not now (cf. König, 1991, p. 3). The Dutch counterpart *zelfs* ‘even’ can be seen in the example below.

- (360) *Zelfs als er geen belastingverlaging moet worden gefinancierd, dient er al 15 miljard euro te worden bezuinigd om het begrotingstekort onder de 3 procent te drukken.* (WR-P-P-G-0000105269)
 Even if *there is no need to finance a tax cut, 15 billion euros must already be cut to keep the deficit below 3 percent.*

As Declerck and Reed (2001, p. 432) reflect on König’s (1991) analysis, the “‘if and only if” interpretation of *if* in *even if*-conditionals [...] is incompatible with the scalar meaning of *even* [...]’. *Even* is scalar in the sense that the relation between the antecedent and consequent holds even in the extreme or unexpected case presented, so it will hold for less unexpected cases too (cf. König, 1991, p. 80; see also Kay, 1990). In other words, its meaning is one of inclusion.

⁵⁷For a comprehensive list of English focus particles, see Quirk et al. (1985, p. 604).

The second type of focus particles is the *restrictive* particle, of which the most discussed particle is *only*, expressed by *alleen* ‘only’ in Dutch. It presupposes the conditional without the particle and entails that any alternative does not hold (cf. König, 1991, p. 94), creating an exclusivity reading (i.e., a biconditional reading). In contrast to *even*, *only* adds exclusivity meaning to a conditional. In the example in (361), *only* adds to the conditional meaning of ‘If the allowance is more favourable [...], she will be paid that allowance’ the aspect of presenting the antecedent as an extreme or unexpected case (cf. Athanasiadou & Dirven, 1997a, pp. 79–80). The same goes for (362), in which the interest by female elephants is the exclusive circumstance in which they will look for the male elephant.⁵⁸

(361) (*Only*) *If* the allowance is more favourable to a widow than the retirement pension, she will be paid that allowance.

(362) En *alleen als* de dames interesse in hebben dan zoeken ze de man op.
(fn007495)
And only if the ladies are interested, then they look for the man.

In (363) we see that while *alleen* ‘only’ does not directly precede *als* ‘if’, the focus particle still scopes over the complete antecedent.

(363) Ik wil hem *alleen* overkopen *als* jij hem nog niet gedragen hebt trouwens.
(WR-U-E-A-0000000157)
I only want to buy it if you haven’t already worn it by the way.

Athanasiadou and Dirven (1997a, p. 79) treat *only if* as a single complex conjunction with a ‘reinforcing meaning’. The importance of focus particles for conditional connections I focus on in this study can be seen in Athanasiadou and Dirven’s (1997a) account, as they argue that *only* is compatible with hypothetical (i.e., ‘cause-effect’, ‘condition’, and ‘supposition’) conditionals, because it narrows down the antecedent to a pure condition, which is incompatible with their ‘co-occurrence’ and ‘pragmatic’ types of conditionals.

Finally, there is a group of particles that does not add additive or restrictive meaning to the conditional, but adds the notion of recurrence or *iteration*. The most frequent particle in this group is *altijd* ‘always’, as in (364) below.

(364) *Altijd als* zij uit Kenya komt dan dan is ze depressief. (fn007979)
Whenever she comes from Kenya (then) she is depressed.

Here, the focus particle marks the conditional as what was discussed in chapter 3 as a recurrent, habitual or generic conditional. Dancygier and Sweetser (2005, p. 95) describe this use of conditionals as follows: ‘if P is known to obtain, then the eventuality with respect to Q will be predictable’. It seems that in English,

⁵⁸See Liu and Barthel (2021) for a recent discussion of the meaning contribution of *nur* ‘only’ in German, and an experimental study of biconditional reasoning with *wenn* ‘if’ and *nur wenn* ‘only if’.

these conditionals are expressed more often using the temporal conjunction *when* or *whenever*. In line with footnote 5.8.5 on page 304, one could argue here for a continuum that goes from a unique event via recurrence to conditionality. In English, *if* can be used for the conditional and recurrent part of the continuum, whereas *when* can be used for the temporal part. In Dutch, *als* ‘if’ can be used for the complete continuum, also those cases in which only a temporal meaning is intended, meaning that Dutch *als* ‘if’ and English *when* show considerable overlap. *Wanneer* ‘when’ can be used for most of the continuum, including the conditional part. Of course, such an account should be researched further, including a diachronic perspective, to be of use. See also section 4.4.4, and especially the discussion in chapter 7 on this issue.

5.10.3 Inter-rater reliability

For the annotation of focus particles, a number of particles was indexed using a custom Python-script as a first step to annotation. The automatic annotations were checked manually and used as aids for the manual annotation of focus particle type, based on the manual provided in Appendix A.11. Because all conditionals were manually annotated for the other features, particles that were not found in the (scarce) literature were added to the annotation when they were attested. As shown in section 4.5, the agreement score of this feature was very high (95%; $AC1=0.95$).

Sentences for which both annotators had provided different annotations were discussed in detail afterwards. As may be expected based on the discussion above, a number of the disagreements were due to the scope of the focus particle. In (365), for example, one annotator had marked the sentence as featuring the focus particle *altijd* ‘always’. After discussion, both annotators agreed that it did not scope over the conditional clause, but over the complete conditional, i.e., *altijd* ‘always’ scopes over *[het] was vroeger wel lekker makkelijk als ze op die zondag jarig was* ‘It was easy if it was her birthday on that Sunday’, instead of it being the case that always {if/when} she had her birthday on (that) Sunday, it was easy. As can be seen, this is a very subtle difference, and disagreement is therefore not surprising.

- (365) Was vroeger *altijd* wel lekker makkelijk *als* ze op die zondag jarig was.
(WR-P-E-A-0006592707)
It was always easy if it was her birthday on that Sunday.

The converse was the case for the example in (366), in which one of the annotators had not annotated *pas* ‘only’ as a focus particle, while it does scope over the antecedent, adding temporal-necessity meaning to the conditional. In other words, only after the moment the entrepreneur has made turnover and has built a client base, ‘they’ will pay.

- (366) Ze komen *pas* over de brug *als* de ondernemer zijn eerste omzet heeft gemaakt en al een kleine klantenkring heeft. (WR-P-P-G-0000043356)
They only pay if the entrepreneur has made his first turnover and already has a small client base.

In all cases of this type of disagreement the disagreement was resolved.

Another disagreement worth noting concerned whether or not *al* ‘already’ functions as a focus particle in (367) below.

- (367) Wij vinden het *al* irritant *als* we zo’n ding in de verte horen rinkelen, maar die gemzen en zwijnen horen dat echt van kilometers afstand. (WR-P-P-G-0000132135)
We already find it annoying if we hear such a thing ringing in the distance, but those chamois and swine really hear it being miles away.

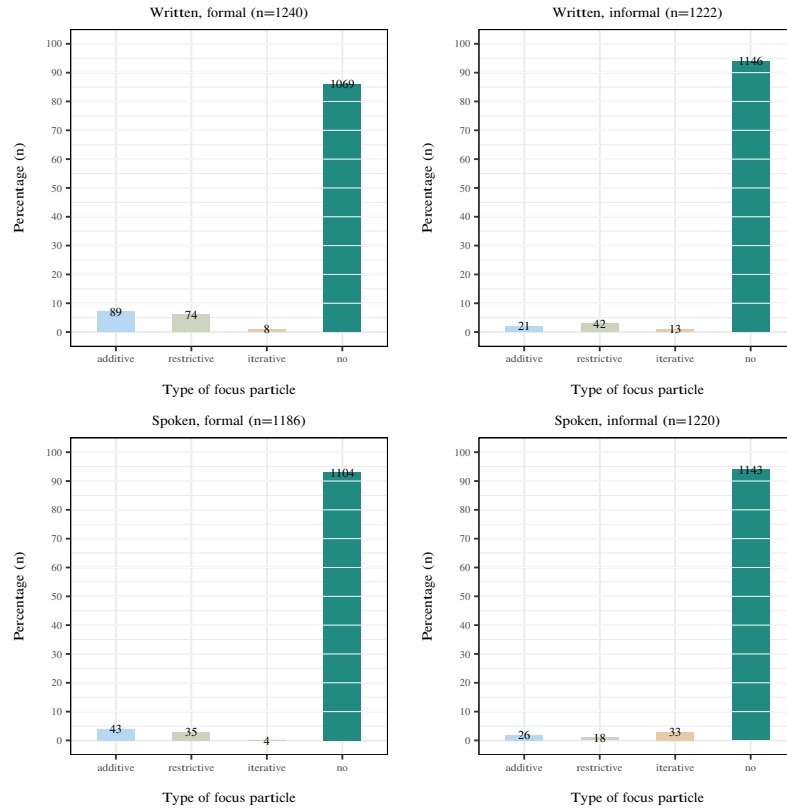
In a way, *al* ‘already’ seems to be the counterpart of *pas* ‘only’. Both particles are so-called ‘time particles’ (van der Wouden, 2002, p. 23) or ‘aspectual particles’ (Smessaert, 1999). Although I discuss these particles in terms of temporal scalarity, there is much more discussion on which types of use these particles allow.⁵⁹ Here, I suggest that *al* ‘already’ marks the condition as a ‘relatively early’ moment for the consequent to hold, while *pas* ‘only’ marks the condition as ‘relatively late’ (Smessaert, 1999, p. 37). As *al* ‘already’ seems to scope over the antecedent here, we found no reason not to consider it a focus particle.

5.10.4 Distribution of focus particle types

As all particles were grouped into restrictive, additive and iterative particles, the distributions of focus particles by mode and register are presented as types in Figure 5.9 below. For a more detailed view on the data, the reader is referred to page 483 in Appendix B.

⁵⁹See Vandeweghe (1992, p. 209), Smessaert (1999, pp. 35–39), and van der Wouden (2000, 2002) for Dutch, but also Löbner (1989, p. 193) and van der Auwera (1993) for discussions on these (types of) particles in other languages.

Figure 5.9:
Distribution of focus particle types by mode and register



As we can see in this figure, the overwhelming majority of conditionals (91.66%) is not accompanied by any focus particle. Please note that the frequencies of conditionals with a focus particle is around 7% in all mode-register combinations, except for written formal texts, in which 13.79% of conditionals is accompanied by a focus particle (7.18% additive, 5.97% restrictive, and 0.65% iterative), which are mostly found in newspapers and academic journals, as in (368) below.

- (368) Om deze conclusie te ontwijken, heb je logisch gezien de volgende drie opties: je kunt ofwel ontkennen dat proposities een discussie beslechten *alleen als* de discussies over die proposities beslecht zijn, ofwel ontkennen dat er ook maar een discussie beslecht is (de sceptische optie), ofwel toegeven dat er een oneindig aantal discussies beslecht zijn. (WR-X-A-A-journals-txt-antw-001)

To avoid this conclusion, you logically have the following three options: you can either deny that propositions settle a discussion only if the discussions about those propositions are settled, or deny that any discussion has been settled (the sceptical option), or admit that an infinite number of discussions have been settled.

A further general observation is that the iterative type of focus particle is least frequent overall, although it seems to be used most in spoken, informal texts, such as in the example below.

- (369) Heb je niet zoiets van nou ik wil eigenlijk liever gewoon vanavond uh niks doen?

Tuurlijk maar dat heb ik *altijd als* ik een dictaat ga lezen. (fn000417)

Wouldn't you rather do nothing tonight?

Of course, but I always feel like that {if/when} I start reading a dictation.

Here, we see *altijd* 'always' adds iterative meaning to the conditional, in the sense that the antecedent and consequent form a recurrent or habitual pattern.

A three-way loglinear analysis was performed on the data, which produced a final model that retained all effects, indicating that the highest order interaction (*mode* $\times$ *register* $\times$ *focus particle*) was significant ($\chi^2=13.73$, $df=3$, $p=0.003$). Comparing the two-way interactions against the model without the three-way interaction showed that the *mode* $\times$ *focus particle* interaction ($\chi^2=36.88$, $df=3$, $p<0.001$, Cramér's $V=0.07$, *Cramér's* $V=0.09$; $\Delta\chi^2=37.04$, $df=2$, $p<0.001$) and the *register* $\times$ *focus particle* interaction ($\chi^2=77.47$, $df=3$, $p<0.001$, Cramér's $V=0.13$; $\Delta\chi^2=80.12$, $df=3$, $p<0.001$) were significant but constituted only weak associations. Inspecting the residuals for the *mode* $\times$ *focus particle* association we see that additive particles occur more often than expected in written texts as compared to spoken texts ($z=2.05$, $p<0.05$; $z=-2.07$, $p<0.05$ respectively), which is also the case for restrictive particles ($z=3.30$, $p<0.001$; $z=-3.34$, $p<0.001$ respectively). The residuals for the *mode* $\times$ *focus particle* association show that formal texts feature more additive particles in comparison with informal texts ($z=4.53$, $p<0.001$; $z=-4.52$, $p<0.001$), and more restrictive particles ($z=2.70$, $p<0.01$; $z=-2.69$, $p<0.01$), but less iterative particles ($z=-3.14$, $p<0.01$; $z=3.13$, $p<0.01$).

As these associations are included in the higher-order interaction between *mode*, *register* and *focus particles*, it seems to be the case that both additive and restrictive particles are associated with written formal texts, whereas iterative particles are associated more with spoken informal texts, as can be seen in Figure 5.9. This might, on a somewhat speculative note, explain why iterative focus particles are largely neglected in the literature, as most data come from written texts or constructed examples, and as we will see below, a number of particles used in combination with Dutch *als* 'if' would likely be expressed using *when* or *whenever* in English. In order to get insight into the use of the types of particles discussed, the results are compared with insights from previous studies in the next section. Note, finally, that frequencies of focus particles are low overall, and as a result, associations must be interpreted with caution.

5.10.5 Comparison with previous studies

In this section, I analyse each type of focus particle in more detail, and I discuss the specific particles found for each type. Before doing so, however, it is important to remember that, as with the other features discussed in this chapter, focus particles were only analysed in conditionals, which means that the results may reflect general distributions. For instance, some focus particles can occur together with other conjunctions too, such as *alleen omdat* ‘only because’, as in (370), and *zelfs voordat* ‘even before’, as in (371).

- (370) Vanaf 13 Kilo hebben we een Roemer Prince, maar ook *alleen omdat* we die gratis bij onze nieuwe auto kregen. (WR-P-E-A-0005678029)
From 13 kilo we have a Roemer Prince, but also only because we got it for free with our new car.
- (371) Sterker nog, *zelfs voordat* Dols afstudeerde, was er al een hoogleraarspost voor hem geregeld in Estland. (WR-P-E-C-0000000249)
In fact, even before Dols graduated, a professor post was already arranged for him in Estonia.

In section 5.10.2, we already discussed the most frequent additive particle, *zelfs* ‘even’. Another additive particle found in the corpus is *bijvoorbeeld* ‘for example’, which marks the antecedent as an example of a condition for the consequent. In (372), for example, the antecedent is one of the possible causes of how a municipality can sustain damage from a bankruptcy.

- (372) Maar ook de gemeente kan de dupe worden van een faillissement, *bijvoorbeeld als* ze nog leningen heeft uitstaan. (WR-P-P-G-newspapers-16000)
But the municipality can also be the victim of a bankruptcy, for example if it still has loans.

The question is whether or not this is indeed a particle, because ‘positional variability’ seems limited here. Moving *bijvoorbeeld* ‘for example’ to the consequent removes its scope from the antecedent, as can be seen in (373) below. Moving it to another position in the antecedent seems possible, though, as can be seen in (374) below.

- (373) Maar ook *bijvoorbeeld* de gemeente kan de dupe worden van een faillissement, *als* ze nog leningen heeft uitstaan. (WR-P-P-G-newspapers-16000)
But for example the municipality can also be the victim of a bankruptcy, if it still has loans.
- (374) Maar ook de gemeente kan de dupe worden van een faillissement, *als* ze *bijvoorbeeld* nog leningen heeft uitstaan.
But the municipality can also be the victim of a bankruptcy, if for example it still has loans.

In (375) below, we see *ook* ‘also’, which seems to have a similar meaning as *zelfs* ‘even’ and *bijvoorbeeld* ‘for example’, because all three cancel the necessity implicature, although *ook* ‘also’ and *bijvoorbeeld* ‘for example’ do not express the scalar ‘extremity value’ of *even* ‘zelfs’, as discussed above.

- (375) Bepaalde aspecten vereisen een hoge accuratesse en concentratie, ook als er sprake is van tijddwang. (WR-P-P-F-legal-texts-1000)
Certain aspects require high accuracy and concentration, even if there is a time constraint.

The next set of additive particles adds focus to a value in the antecedent on a contextually provided scale. Discussed by van der Wouden (2000) are *vooral* ‘especially’, as in his examples in (376) and (378), and *zeker* ‘especially, certainly’, as in (377) and (379).

- (376) Italië is een fijn land, (vooral) als je van zon houdt.
Italy is a nice country, (especially) if you like the sun. (van der Wouden, 2000, p. 236)
- (377) Het wordt vast leuk, zeker als je van fietsen houdt.
It will be fun, especially if you like cycling. (van der Wouden, 2000, p. 242)

In the corpus, examples like (378) and (379) were found.

- (378) Het is voor mensen die slechthziend of blind zijn niet altijd even eenvoudig om een goede muzikleraar te vinden, *vooral als* je niet weet waar je moet zoeken. (WR-P-P-D-newsletters-006)
It is not always easy for people who are visually impaired or blind to find a good music teacher, especially if you do not know where to look.
- (379) *Zeker als* ze zo slim is kan dat een hele nare ervaring voor haar zijn. (WR-P-E-A-discussion-lists-427000)
Certainly if she is so smart it can be a very dismal experience for her.

In (378), the consequent expresses how hard it is for the blind to find a good music teacher. In (379) the antecedent presents a situation on a scale of conditions which make an experience a dismal one. For English, Declerck and Reed (2001, pp. 433–434) mention two particles seemingly equivalent in meaning, namely *especially* and *particularly*, which, like *even*, cancel the necessity implicature (see section 2.6.5 on conditional perfection). In their examples in (380) and (381), for instance, the focus particles contribute to the meaning that there are other situations that may function as conditions, but that the value in the antecedent is a particularly well-suited candidate.

- (380) An amateur video poses fewer problems, especially if it is done in addition to professional photographs. (Declerck & Reed, 2001, p. 433)

- (381) Marjorca has a wealth of well-kept secrets, particularly if you head inland.
(Declerck & Reed, 2001, p. 433)

Other particles that were found in the corpus and belong to the group of additive focus particles are *helemaal* ‘completely’, *juist* ‘exactly’, *met name* ‘in particular’, and *precies* ‘precisely’, as in (382) to (385) respectively, which all entail ‘the corresponding sentence without particle’ and presuppose that there is at least one other condition that would be satisfactory for the consequent’ (König, 1991, p. 60).

- (382) En dan is eigenlijk net of dat uh de wereld onder je vandaan zakt als je zoiets uh te horen krijgt. *Helemaal als* je dan weet van dat eigenlijk niks meer aan te doen is. (fn008727)
And then it is almost as if uh the world is coming down on you when you hear something like that. Especially if you know that nothing can be done about it anymore.
- (383) Met andere woorden: *juist als* sprake is van licht onrecht moet er niet gemoraliseerd maar beloond of gestraft worden. (WR-X-A-A-journals-001)
In other words: precisely if there is slight injustice not moralisation, but reward or punishment should be used.
- (384) Hieruit blijkt dat het valideren van dergelijke informatie een gecompliceerde taak is, *met name als* de wetenschappelijke evidentie over de te analyseren opvoedtechniek niet eenduidig en tamelijk beperkt is. (WR-X-A-A-journals-003)
This shows that validating such information is a complicated task, particularly if the scientific evidence about the parenting technique to be analysed is not unambiguous and fairly limited.
- (385) Dus het derde voorstel: je hebt een neutrale houding ten opzichte van de waarheid van *p precies als* je noch *p*, noch $\neg p$ gelooft [...]. (WR-X-A-A-journals-001)
So the third proposal: you have a neutral attitude towards the truth of p precisely if you believe neither p nor $\neg p$.

In each of these examples, the inclusion of a focus particle entails ‘the corresponding sentence without particle’ and presupposes that there is at least one other condition that would be satisfactory for the consequent (König, 1991, p. 60).

For restrictive particles, we have already briefly discussed the most frequent particle in Dutch, *alleen* ‘only’. Next to this particle, the temporal adverb *pas* ‘only {if/when}’, as in (386) below, is of this type, as it adds to a conditional the meaning that the consequent can only occur after the moment the antecedent

has been realised. As such, *pas als* ‘only {if/when}’ is on par with *alleen als* ‘only if’, because it marks the antecedent as a necessary condition for the consequent, but it also adds temporal information to this necessity.⁶⁰

- (386) *Pas als* dat probleem overwonnen is, komt de herschrijfbare dvd met dubbele capaciteit op de markt. (WR-P-P-G-newspapers-30000)
 Only {if/when} *that problem has been overcome, the double-capacity re-writable DVD will be available.*

Another restrictive particle is *behalve* ‘except’, which adds exceptive meaning, as in (387) below.

- (387) Zucht: ‘Nederlanders worden zelden emotioneel, *behalve als* het om artikel 23 gaat.’ (WR-P-P-G-newspapers-69000)
Sigh: ‘Dutch people rarely get emotional, except {if/when} it comes to Article 23.’

As may be expected, *behalve* ‘except’ adds to the conditional the meaning that the antecedent is the opposite of a condition, just like *tenzij* ‘unless’, i.e., ‘Q unless P’ is equivalent to ‘Q except if P’ (Declerck & Reed, 2001, pp. 21, 447–448).⁶¹ The last restrictive particles is *tenminste* ‘at least’, as in (388) and (389) below.

- (388) Gelukkig mag ik wel knuffelbeesten uit de speelgoedwinkel, *als ze tenminste* niet te stoffig zijn. (WR-P-P-G-0000032058)
Fortunately, I can get stuffed animals from the toy store, at least if they are not too dusty.
- (389) *Tenminste als* je je met stem ziek gemeld hebt dan denk dat ze je wel geloofden eigenlijk. (fn008359)
At least if you have reported sick by voice, then I think they actually believed you.
- (390) Nou chatter205, ik kan waarschijnlijk niet meteen aan werk komen, dus ik zou het niet erg vinden om tijdelijk hier wat te werken. *Als er tenminste* werk is :). (WR-U-E-A-0000000222)
Well chatter205, I probably can’t get work right away, so I wouldn’t mind working here temporarily. At least/that is if there is work:)

The English counterpart is mentioned by Quirk et al. (1985, p. 604) in the set of ‘restrictive-particularizing particles’. Like *al* ‘already’, *tenminste* ‘at least’ does not occur frequently directly before *als* ‘if’. It can be moved to directly precede *als* ‘if’ and it seems to scope over the conditional, and the question test

⁶⁰Relevant to this particle is its counterpart *al* ‘already’. See for the ‘only-already puzzle’ Löbner (1989, p. 193), Declerck (1994, p. 324), Smessaert (1999, p. 37). For reasons of space, I will not discuss this issue further here.

⁶¹This applies to conditionals in non-irrealis contexts, not for counterfactuals. See Declerck and Reed (2001, p. 435.).

does seem to work here, as in ‘Are you allowed to have stuffed animals from the play store? At least if they are not too dusty’, although it is questionable to which extent the answer is acceptable without the addition of an affirmative *yes* (i.e., ‘Yes, at least if they are not too dusty’). A possible explanation for this is that *tenminste* ‘at least’ seems to occur with sentence-final antecedents most of the time and in what Declerck and Reed (2001, p. 367) call ‘postscript-P conditionals’, in which the sentence-final antecedent ‘restricts the validity of Q “a posteriori”’, as in their example in (391) below.

- (391) I’ll drop in and see you at 10 tonight, if you will be alone. (Declerck & Reed, 2001, p. 367)

For the example in (388) too, the antecedent seems to restrict the validity of the consequent *a posteriori* and *tenminste* ‘at least’ puts focus on the fact that a condition is added to the sentence-turned-consequent, or, in case of (390), to a presupposition (i.e., ‘temporarily working here’ presupposes that there is work to be done, which is focused on by the antecedent). Compare (388) with (392) below.

- (392) Gelukkig mag ik wel knuffelbeesten uit de speelgoedwinkel(,) *als* ze niet te stoffig zijn. (WR-P-P-G-0000032058)
Fortunately, I can get stuffed animals from the toy store(,) if they are not too dusty.

The intonation pattern of these examples shows that *als* ‘if’ receives stress and appears after comma-intonation, whereas in the counterparts without *tenminste* ‘at least’ this is not necessary, i.e., these variants can be expressed as a single speech act.

Finally, a number of particles was found that, as was discussed in section 5.10.2, did not fit the characterisation of either additive or restrictive particles. However, all these particles seemed to add a similar type of meaning to the conditional, namely that of a recurrence of the situations expressed in the antecedent and consequent. These particles were, next to *altijd* ‘always’, which was already discussed, *elke/iedere keer* ‘everytime’, *telkens* ‘everytime’, and *meestal* ‘usually’, as in (393) to (395) respectively.

- (393) *Elke keer als* van een client de follow-up tijd eindigt, wordt hij statistisch gezien uit de onderzoeksgroep gehaald (gensored). (WR-X-A-A-journals-001)
Every time a client’s follow-up time ends, he is statistically speaking removed from the research group (censored).⁶²
- (394) Tweeëndertig maanden duurt de intifada, de gewapende Palestijnse opstand, al. *Telkens als* er enig teken is van zelfs maar de kleinste kans op een terugkeer naar de vredesonderhandeling, laait het geweld op. (WR-P-P-G-newspapers-98000)

⁶²Interestingly, *als* ‘if’ can be replaced with *dat* ‘that’ in this example.

The intifada, the armed Palestinian uprising, lasts thirty two months already. Every time there is any sign of even the slightest chance of a return to the peace negotiations, the violence flares up

- (395) *Meestal als* hij een spel wilde spelen vertelde ik bij voorbaat al dat hij ook kan verliezen. (WR-P-E-A-discussion-lists-492000)
 Usually {if/when} *he wanted to play a game I told in advance that he could lose.*

In each of these cases, the focus particle highlights the recurrent, generic or habitual nature of the connection between antecedent and consequent. In (393), from an academic journal, the method of dealing with participants in a study is explained by using a conditional to express that each time a the follow-up time of participant ends, he or she is removed from the group. The connection of this use to research articles was also observed by Carter-Thomas (2007) who calls such conditionals ‘factuals’. Her example in (396) below shows the similarity to the observation above.

- (396) Patients were defined as “downstaged” *if* the final pathologic stage was less than the preoperative ultrasound stage. [...] (Carter-Thomas, 2007, p. 164)

In contrast to *altijd* ‘always’, *elke/iedere keer* ‘everytime’, and *telkens* ‘everytime’, *meestal* ‘usually’, as in (395) does not mark the conditional connection as a certain co-occurrence, but as a frequent co-occurrence. In other words, a conditional without a particle, or with the particles just discussed express that the consequent always follows the antecedent, the latter particle expresses only a highly frequent co-occurrence.

5.10.6 Conclusion

Based on the discussion in this section and the results of the annotations, we can conclude that focus particles are found in a minority of circa 9% of Dutch conditionals. In most cases, they are used to add additive or restrictive meaning to conditionals and, as the definitions of focus particles discussed showed, they can appear directly before the conjunction *als* ‘if’, but they do not have to. Especially in spoken, informal texts, a number of what I called ‘iterative focus particles’ were found. These particles add the notion of co-occurrence of two situations expressed in the antecedent and consequent. Finally, I note here that the above is not to be understood as a complete list of focus particles used with Dutch conditionals. These particles were the ones occurring in the corpus of this study, but as the corpus is well-balanced (see section 4.4), I do think this section paints a reasonably complete picture.

5.11 Conclusion

The primary aim of this chapter was to inventory distributions of grammatical features that were linked to implicatures of unassertiveness and connectedness in chapter 3. I analysed the distributions of features of Dutch conditionals in a representative and balanced corpus, and tested for associations between modes, registers and these features. The analyses and discussions in this chapter complete the preliminary work for answering the second research question, namely to what extent grammatical features of conditionals contribute to specific implicatures of unassertiveness and connectedness, and thus to the constructional status of different uses of conditionals in Dutch. Although a number of features were related directly to certain implicatures, which I will summarise below, it is the collaborative distribution of features that will help us answer the remaining question.

A secondary aim of this chapter was to provide an overview of the grammar of conditionals in Dutch, which will hopefully serve future research, independent of the goals aimed for in this study. This overview was complemented by comparisons with insights from previous studies of the feature in question. This was done to both maximise understanding of each feature in its grammatical context, and to avoid overlooking known factors involved in their distributions. A note on this latter point is in order. The literature on most features is ample, but scarce when limited to their study in conditionals. This is the case even more for studies on Dutch. Distributions of features in the current corpus were compared to distributions reported on in the literature on conditionals in case it was available, but for a number of features, such studies were not found. As a consequence, the distributions presented may reflect their general distribution outside of conditionals. For person and number, for example, it may be the case that their distribution reflects the general feature distribution across constructions, and the figures presented may thus be representative, but not typical for conditionals. This poses no problem for analyses in the next chapter, however, because clustering is performed only on conditionals and the variance between clusters (see next chapter) can be assessed independently of variance in feature distributions outside conditionals. In other words, implicatures of conditionals can, if they are indeed generalised, be indicated by clusters of features without needing a baseline of non-conditional feature distributions.

For summaries of the results for each feature, the reader is referred to the conclusions at the end of each of the preceding sections. Here, I will provide a summary only of the findings in direct relation to the implicatures mentioned above. We saw in this chapter that sentence-initial clause order was the most frequent order, and that sentence-final clause order was not only more frequent than expected based on the literature, but also that it was linked to implicatures of connectedness, or more specifically, connections at speech-act (pragmatic, discourse) level. With respect to syntactic integration, the integrative word order was preferred in written texts, and the resumptive order was

preferred in spoken texts. Non-integrative word order takes up the margins in all modes and registers. Although the literature on syntactic integration patterns in conditionals is scarce, the studies available suggest a strong relation to implicatures of connectedness (or ‘semantic integration’). In terms of tense, an overwhelming majority of conditionals has simple present tense in both clauses. Tense in one clause is strongly influenced by tense in the other. Although associations between clauses were observed for several features, none was as strong as verb tense, which is largely due to the combination of past tenses in both clauses, either simple past-simple past, or past perfect-past perfect. These patterns were linked to implicatures of unassertiveness, and, more specifically, to epistemic distancing, as was the case with most uses of the past perfect and the past tense of *zullen* ‘will’ (*zou* ‘would’). Contrary to English conditionals, however, Dutch conditionals do not occur with this epistemic modal in present tense in the consequent frequently, which bereaves us of what is treated in the literature as possibly the strongest indicator of the causal implicatures of connectedness (i.e., direct, predictive conditionals). Lexical aspect was added to the corpus study, because the literature suggests that states in antecedents with past perfect tense are used to implicate counterfactuality, contrary to antecedents with event verbs. We saw that most clauses of Dutch conditionals refer to states, followed by achievements. The link to implicatures of unassertiveness should, if it exists, result from the analyses in the next chapter, as it is suggested to be a combined effect of tense and aspect. The distribution of person and number in subjects of conditionals seems to follow what is known from register differences in the literature, and as the person-number feature is only implicitly related to implicatures of connectedness, most notably in pragmatic or speech-act conditionals, it is not expected to be a strong predictor in the next chapter. Sentence types of consequents have been linked to implicatures of connectedness in the literature, and although we saw that more than 90% of consequents is declarative, sentence types of the remaining consequents may indeed be useful for identifying pragmatic uses of conditionals, such as antecedents marking negative politeness strategies to mitigate an imperative consequent. Negation was annotated because of its use in studies on coherence relations (in which it is discussed in terms of polarity), but also because the literature suggests it may work in unison with tense and modality to strengthen implicatures of counterfactuality. In most conditionals, neither of the clauses contain negation. Focus particles, finally, most frequently add additive or restrictive meaning, but based on corpus findings, a category of ‘iterative particles’ was added to types distinguished in the literature. As the literature suggests focus particles to occur mostly or only in direct and predictive conditionals, this feature was deemed relevant to the current study.

While the results presented in this chapter are valuable on their own, as such an overview was not available for (Dutch) conditionals before, they are particularly useful when combined in exploratory multivariate analyses, which take into account possible interactions between features. The ‘feature set’ will, as discussed in the previous chapter, serve as input for data-driven, unsuper-

vised analyses in order to explore to what extent features of Dutch conditionals cluster together and may be seen as grammatical contexts licensing (generalised) implicatures of unassertiveness and connectedness (i.e., constructions). This is what we will undertake next in chapter 6.

CHAPTER 6

Clusters of conditionals

6.1 Introduction

In chapter 2, I discussed two meaning aspects of conditionals, namely one of unassertiveness, and one of connectedness. Although both meanings were analysed as being conventionally attached to the form of conditionals, i.e., as conventional meanings, their more specific interpretations were analysed as (partly) contextually determined, i.e., as conversational implicatures. The literature discussed in chapter 3 provides suggestions for relations between these implicatures and grammatical features of conditionals, such as verb tense, modality, and clause order. Therefore, the types of unassertiveness and connectedness were hypothesised to be generalised to a certain extent, because generalised conversational implicatures are assumed to be default interpretations for a specific grammatical form. As Grice (1989, p. 37) argues, ‘the use of a certain form of words in an utterance would normally (in the absence of special circumstances) carry such-and-such an implicature or type of implicature’. Such generalised conversational implicatures are thus licensed in the majority of cases in which there is ‘an absence of information on the contrary’, i.e., a ‘default inference associated with specific kinds of linguistic expression’. (Levinson, 2000, p. 59; see also Birner, 2013, p. 37; Ariel, 2010, p. 20). As I argued for briefly already in section 4.3, this is the link between the pragmatic analysis in the first part of this dissertation, and the data-driven, constructional account in the second part. In this chapter, we will move beyond the conjunction *als* ‘if’ in isolation, and we will attempt to answer the question to what extent the linguistic fea-

tures of conditionals indeed license generalised conversational implicatures of unassertiveness and connectedness, and to which extent they can be viewed as grammatical constructions (i.e., pairings of meaning and form).

In this chapter, I address the question to what extent the linguistic features of conditionals license specific implicatures of unassertiveness and connectedness. To explore and assess systematic relations between grammatical features of conditionals, i.e., their form, and the more specific types of unassertiveness and connectedness, i.e., their meaning, we will subject the feature distributions of Dutch conditionals presented in chapter 5 to a number of bottom-up multivariate analyses. The features are analysed in order to determine whether underlying structures can be found, and if so, to what extent these features can be used to cluster conditionals into groups or classes of conditional constructions licensing specific implicatures of unassertiveness and connectedness. This, then, will not only add a more data-driven answer to the first research question (i.e., which specific implicatures are licensed through unassertiveness of and connectedness in conditionals?), but also to the second research question (to what extent does the grammatical form of conditionals license specific implicatures?).¹

In section 6.2, I will discuss the goal and types of classification. The reason for doing so is that the clustering approach chosen in this study is aimed at finding groups of conditionals that have similar feature distribution, which means that the nature of the approach is one of classification. In section 6.3, the data preparation for clustering is discussed, as are the necessary calculations and initial tests for assessing the ‘clusterability’ of the dataset.² In section 6.4, I will evaluate the results of the cluster analyses, and in sections 6.5 and 6.6, I will analyse the selected clustering solutions in light of the implicatures discussed throughout this dissertation. Finally, I will offer an interim conclusion in section 6.7, before moving on to the final conclusion and discussion in chapter 7.

6.2 Constructions and classification

6.2.1 Introduction

Before exploring the possibilities of grouping Dutch conditionals based on their features, and evaluating to what extent the resulting groups relate to implicatures of unassertiveness and connectedness, I deem it necessary to elab-

¹See section 2.7 for research questions.

²The approach to data analysis presented in this chapter involves many technical and statistical choices. Although, to some, the term ‘algorithm’ may have connotations of objectivity, choices by the analyst can have big effects on the results. As I acknowledge that the technical details might not be of interest to all linguists, I have redirected a number of the more detailed technical arguments for the choices made in Appendix C, to which I will refer throughout this chapter.

orate on the construction grammar approach to conditionals opted for here, as discussed preliminarily in section 2.7, and its relation to the classification methodology used in this chapter.

In section 6.2.2, I will discuss the framework of construction grammar in relation to the form and meaning of conditionals central in this dissertation. In section 6.2.3, I will discuss the relation of this approach to classification, both as a scientific endeavour and in everyday life. The two main types of classification, i.e., intensional and extensional classification, will be discussed in section 6.2.4. In section 6.2.5, I will briefly iterate the arguments for the approach chosen in this study, in order to discuss the evaluation of classifications available in this study. In section 6.2.6, I will offer a brief conclusion, before moving on to the preparation for the actual analysis of the data discussed in the previous chapter.

6.2.2 Conditionals as constructions

From the perspective of construction grammar (see e.g., Fillmore, Kay & O'Connor, 1988; Goldberg, 1995; Croft & Cruse, 2004, chapters 9-11; Verhagen, 2005), we are not only interested in the meaning of *if*, whether or not it is considered to be truth-conditional or not (see chapter 2), but also in other types of non-truth-conditional meaning, which we analysed in the chapter mentioned in terms of conventional meanings of unassertiveness and connectedness connected to *als* 'if', and generalised conversational implicatures hypothesised to be attached to the linguistic form of conditionals as grammatical constructions. This means that we will look beyond the conjunction *if* in isolation, and analyse conditionals as grammatical constructions or pairings of form and meaning, i.e., as 'complex signs' (cf. Verhagen, 2009), in which form refers to the grammar of the complete complex conditional sentence.

To be clear on terms, and to reiterate the standpoint defended in chapter 2, I use the term 'meaning' here to include both 'encoded and inferred' meanings (cf. Ariel, 2010, pp. 114–115), including both conventional meaning and context-dependent implicatures. Note, however, that the term 'meaning' itself deserves clarification (see also Cappelle, 2017; Leclercq, 2020). Clark (1996) (cited in Verhagen, 2019, p. 62) offers the following observation.

It is odd to have to explain the difference between speaker's meaning and signal meaning. In German, they are called *Gemeintes* and *Bedeutung*, in Dutch, *bedoeling* and *betekenis*, and in French, *intention* and *signification*. For theorists working in German, Dutch, and French, they are as different as apples and oranges. (Clark, 1996, p. 127)

Clark continues by arguing that because speaker's meaning and signal meaning are both referred to by the term 'meaning' in English, i.e., the term is used to refer to both encoded (or *conventional*) meaning and to inferred meaning, it remains a 'chronic source of confusion' for theorists (for further discus-

sion and references, see Verhagen, 2019). Encoded or conventional meaning is, by definition, tied to linguistic form, whereas inferred meaning is, at least to some degree, context-dependent. The picture becomes more complex however, as ‘meaning’ and ‘intention’ do not coincide with truth-conditional meaning (semantics), and non-truth-conditional meaning (implicatures, pragmatics) respectively, because, as discussed in chapter 2, conventional implicatures are encoded, but non-truth-conditional, and conversational implicatures can be strongly generalised and therefore said to be ‘default inferences’ (or ‘default interpretations’; see Levinson, 2000, pp. 11–12), which further blurs the distinction.³ As the analyses presented in this chapter are aimed at finding conditional constructions defined as form-meaning pairings, it is important to make explicit that the ‘meaning’ part of constructions refers to both types of meaning.

It is, in general, hard to draw an exact line between what is encoded and what is inferred meaning, especially when conventionalisation of implicatures is taken into consideration. The moment at which an implicature can be considered conventionalised is hard to define, which we saw already in section 2.5. Although Grice (1989, p. 39) also mentions this issue, he does not analyse it in detail when he discusses his distinction between conventional and conversational implicatures.⁴ As Croft and Cruse (2004, p. 258) remark in their discussion of different versions of construction grammar, they use the term ‘meaning’ to ‘represent all of the **conventionalized** aspects of a construction’s function, which may include not only properties of the situation described by the utterance, but also properties of the discourse in which the utterance is found’. Although I will present analyses which are in line with Dancygier and Sweetser’s (2005, p. 8) remark that they include formal aspects of conditionals such as verb tense, clause order and intonational patterns in their analysis of conditionals, I will continue to use the distinctions drawn in the analysis presented in chapter 2. In summary, two conventional, non-truth-conditional meanings of conditionals were distinguished, i.e., their unassertiveness and connectedness, which are general, and further specified by the conversational (non-truth-conditional) implicatures they license in collaboration with the two clauses of a conditional. Distinctions between conventional and conversational aspects of meaning are made not because they are separated easily, or because of a theoretical predisposition on such an account, but, as argued before, for sake of clarity. As we saw earlier chapter 2, the distinction provides clear starting points for further analysis and can, as long as one is explicit about such a choice, clarify the discussion at hand.⁵

³See Ariel (2008, chapters 1–4), and Ariel (2010, chapter 4) for overviews and discussion of code-inference distinctions.

⁴On the notion of conventionalisation of implicatures, see Levinson (1979), Levinson (2000, pp. 262–263), Traugott and König (1991), Ariel (2010, p. 164), Schmid (2020, chapter 14).

⁵For a proposal on combining formal-semantic and pragmatic analyses of conditionals using Verhagen’s (2005) intersubjectivity approach to grammatical constructions, see Boogaart and Reunecker (2017, p. 204), and the discussions in chapter 7.

Now that we have a clearer picture of what is meant by ‘meaning’, the question is how to analyse it. I will follow Boogaart (2009, p. 232), who shows, in his analysis of the meaning of the Dutch verb *kunnen* ‘can’, that there is an option beyond pure monosemy and polysemy by analysing various uses of a linguistic form in its specific grammatical context, i.e., as a grammatical construction or ‘pairing of form and meaning’.⁶ On the one hand, adopting a monosemous approach, one would analyse conditionals as having one general meaning that is further specified in context, as is done for instance by van der Auwera (1986, p. 200) in his ‘Sufficiency Hypothesis’, in which the conditionals mean that ‘*p* is a sufficient condition for *q*’ (i.e., *p* enables *q*). More specific interpretations, such as causal or inferential connections between antecedents and consequents, are then more specific instances of this meaning. The meaning of *if* is, in these terms, essentially vague and pragmatically enriched by context. Adopting a polysemous approach, on the other hand, one would argue for various distinct meanings of *als* ‘if’, as is done, for instance, for indicative and subjunctive conditionals (see section 2.5.4 for discussion and references). In this view, the meanings of *if* are distinct ‘senses’ which are, for instance, related through metaphorical extension, but there is no one ‘core meaning’ which is common to all those senses. Although the analysis presented in this dissertation is closest to a monosemous approach, I opted here for the approach of construction grammar (see also section 4.3.2), as it explicitly includes the linguistic form in the analysis of, in this case, conditionals. This means that the essentially abstract meanings of unassertiveness and connectedness are indeed enriched pragmatically, but explicitly in terms of the ‘grammatical context’ that, to a certain degree, licenses these implicatures. In case there is a clear relation between grammatical context and an implicature, we view the implicature as generalised. In case there is no such relation, and no default inference is triggered, the implicature ‘remains’ particular (see Levinson, 2000, p. 16) [37]Grice. In the current approach, ‘contextual enrichment’ is thus substantiated by investigating systematic relations between grammatical features and implicatures. This ties in with the preliminary discussion in chapter 1, in which I described constructions as symbolic units which represent both ‘lexical and grammatical structure’ (cf. Langacker, 1987, p. 58) as small as morphemes and as large as complete clauses (cf. Croft & Cruse, 2004, p. 257).⁷ Constructions require careful and combined analysis of both their formal characteristics and their meaning aspects. This, then, as opposed to a purely monosemous analysis, includes the grammatical features of conditionals beyond the *als* ‘if’, including the characteristics of the two clauses. Meaning can then be seen as conventionalised ‘usage events’ (cf. Langacker, 1987, p. 66; Verhagen, 2005, p. 24) tied to differences in the linguistic context in which the conjunction occurs. This is

⁶I will not consider an homonymous approach here. See Boogaart (2009, pp. 215–217) for discussion.

⁷See Boogaart, 2009, p. 230 for a summary of Croft and Cruse’s ‘essential principles of construction grammar’.

not fundamentally incompatible with the monosemous or the polysemous view, although it leans more towards a monosemous approach. Crucially, however, it adds an explicitly grammatical dimension to the analysis.

When we return to the topic of this dissertation, the benefits of the approach discussed above can be observed. The ‘linguistic context’, which is important in licensing conversational implicatures, is now defined as the combined grammatical features of conditionals, and different meanings of conditionals as conversational implicatures licensed by the conventional meanings of *als* ‘if’ and this linguistic context. In case there are patterns of grammatical features that occur frequently and that can be linked to specific implicatures, these can be seen as generalised conversational (or even conventional) implicatures (as opposed to particularised conversational implicatures), and in turn as the meaning part of the form-meaning pairings of construction grammar. This is, however, not uncontroversial, and as we saw in sections 1.3 and 2.4, Leclercq (2020) argues that in construction grammar, it is often unclear what the ‘meaning’ part precisely consists of. The question at hand here is thus whether (strongly) generalised implicatures can be viewed as part of the meaning of the construction. On the one hand, one can argue, this is the case, as the meaning is clearly linked to linguistic form, and as Goldberg (1995, p. 7) argues, a ‘notion rejected by Construction Grammar is that of a strict division between semantics and pragmatics. Information about focused constituents, topicality, and register is represented in constructions alongside semantic information’. Cappelle (2017, p. 145) further argues that ‘apart from semantic information, we also make use of pragmatic information in interpreting a construction in use, but not everything that is pragmatic about this interpretation is necessarily to be considered unpredictably context-dependent. There is much pragmatics that is conventionally linked to constructions’. An example of this is Stefanowitsch’s (2003) inclusion of the ‘pragmatic function’ of indirect speech-acts into certain constructions used to perform them. In so-far ‘default meanings’ (cf. Levinson, 2000) go, however, they can still, given the right context, be cancelled. Once again, this points towards the discussion concerning conventionalisation of implicatures. While I acknowledge that this issue deserves more discussion, in this chapter, I take meaning to include implicatures (see above), and I will follow the line by Goldberg mentioned above, holding open the option that patterns of grammatical features in conditionals may license generalised implicatures, and that their combination may be viewed as constructions. In order to identify such patterns from the bottom up, it is needed to elaborate the methods used, and as the clustering approach is a specific form of classification, I will start by discussing the basic tenets of classification in the next section.

6.2.3 Classification, analysis, and cognition

The main benefit of classification is a reduction of complexity. In case of this dissertation, numerous uses of conditionals will be brought down to a limited number of groups, which may then – to a certain degree – be analysed as homo-

geneous phenomena, i.e., grammatical constructions with identifiable meaning aspects. The basic tenet of classification is the grouping of phenomena in such a way that ‘within-group variance’ is minimised and ‘between-group variance’ is maximised. Consider Bailey’s example below.

Imagine that we throw a mixture of 30 knives, forks, and spoons into a pile on a table and ask three people to group them by “similarity.” Imagine our surprise when three different classifications result. One person classifies into two groups of utensils, the long and the short. Another classifies into three classes – plastic, wooden and silver. The third person classifies into three groups – knives, forks and spoons. Whose classification is “best”? (Bailey, 1994, p. 2)

All three people in the example used some criterion to determine similarity between the pieces of cutlery – size, material and use, respectively. By doing so, they reduced the complexity from 30 individual objects to two or three groups. The benefit is that all cutlery can now be understood or described by referring to a limited number of groups. Because of this reduction of complexity, classification is seen by many as a central aspect of science, cognition and general learning processes. As Slater and Borghini (2011, p. 1) reflect, ‘Plato famously employed [a] “carving” metaphor as an analogy for the reality of Forms (Phaedrus 265e): like an animal, the world comes to us predivided. Ideally, our best theories will be those which “carve nature at its joints”’.⁸ The current use of this metaphor in modern science, however, is to refer to discovering or identifying new species, types or particles. As Slater and Borghini put it: ‘we humans love to draw lines around different portions of the world, so there should be no shortage of fascinating possibilities to consider when we ask whether we are, in so doing, carving nature at its joints’. With respect to cognition, Harnad (2017, p. 21) even goes as far as to argue that our categories consist of the different ways we behave towards different *kinds* of things, such as things we do or do not eat, flee from or do not flee from. For Harnad, therefore, ‘that is all that cognition is for, and about’. The idea of which classification is best or most natural also has its place in the clustering literature, in which ‘realistic clustering’ aims to uncover truly existing groups of data, whereas ‘constructive clustering’ aims to find informative, but not necessarily pre-existing groups of data.⁹

An analyst can use classification as a technique to describe and explain data. As such, classification is seen as a tool ‘for conferring organization and stability on our thoughts about reality’ (Marradi, 1990, p. 154) and as a ‘special kind of

⁸In discussing principles of definition, Socrates offers two principles, of which the following is the relevant principle here.

The second principle is that of division into species according to the natural formation, where the joint is, not breaking any part as a bad carver might. (Plato’s *Phaedrus* (265e), in Jowett’s 1892, p. 439 translation)

See Jowett (1892) for the complete dialogue between Socrates and Phaedrus.

⁹For discussion, see Hennig (2015).

scientific concept formation' (Hempel, 1965, p. 139). The analyst may conform to the 'basic rule' of classification: classes formed must be both *exhaustive* and *mutually exclusive* (cf. Greenberg, 1957, p. 69; Lakoff, 1987, p. 162; Marradi, 1990; Bailey, 1994, p. 3). For a classification to be *exhaustive*, the collective of classes must provide room to all objects assumed under the extension of the classification. *Mutual exclusivity* amounts to assigning one type only to an individual object. Sweetser (1990, pp. 124–125), for instance, as we have seen in chapter 3, explicitly mentions this for her analysis of conditionals in the content, epistemic and speech-act domain: 'A given example may be ambiguous between interpretations in two different domains, [...], but no one interpretation of an *if-then* sentence [...] simultaneously expresses conditionality in more than one domain'. The assumption is that a classification is necessarily *monothetic*, meaning that a type is defined by one or a few necessary properties (cf. Marradi, 1990, p. 132).

Many authors emphasise the importance of classification in everyday experience. Bailey (1994, p. 1) argues that 'classification is a very central process in all facets of our lives', for Feger (2001, p. 1967) its 'fundamental purpose [...] is to find structure', and Lakoff (1987, pp. 5–6) argues that, without categorisation, 'we could not function at all'. Kaufman and Rousseeuw (1990, p. 1) argue that 'a child learns to distinguish between cats and dogs, between tables and chairs, between men and women, by means of continuously improving subconscious classification schemes'. Divjak and Fieller (2014, pp. 405–406) argue that categorisation is as fundamental to language as it is to the rest of life. This is not to say that these authors all refer to the classical notion of classification, which has indeed received substantial criticism. Lakoff (1987, pp. 5–7) argues that the rules of exhaustivity and exclusivity do not hold for 'categories of the mind', because groupings are more likely to be *polythetic*, meaning that a member of a class has 'some of the [sufficient] properties of a specified total set, not necessarily the same for every object' (Feger, 2001, p. 1969), i.e., there does not need to be a 'single set of defining attributes that conform to the necessity-cum-sufficiency requirement' (Geeraerts, 2006, p. 143). This criticism has shifted the focus to another model of classification, namely *prototype theory* (cf. Rosch, 1978; Mervis & Rosch, 1981).

In prototype theory, categories are organised around '(cognitively and perceptually) salient representatives' (van der Auwera & Gast, 2010). These representatives are *prototypes* of a *radial category*, with some category members being closer to this representative member than others. As van der Auwera and Gast (2010) exemplify, 'we do not primarily think of a set of features that a bed necessarily exhibits; rather, we associate with that notion specific perceptual experiences like comfort and rest'. The traditional, 'classical', 'objectivist' or 'Aristotelian' model of necessary and sufficient conditions (see Lakoff, 1987; van der Auwera & Gast, 2010) is, then, at most an idealisation, because real objects resist what is called a 'checklist approach' (cf. Fillmore, 1975). In prototype theory, an object is related, as a whole, to experiences with that object,

instead of as a collection of features.¹⁰ In a range of experiments, Rosch (1973; 1975) showed that categories form cognitive structures with an internal organisation based on resemblance. Whereas traditional classes are based on a small set of defining characteristics, Rosch showed that people take into account characteristics that are not necessary and that some objects are better examples of categories than others. In other words, a category is primarily understood in terms of its most representative examples (cf. Taylor, 2001, p. 287). The internal structure of a category has been linked to Wittgenstein's (1958, pp. 31–32) notion of 'family resemblance'. As an example from the domain of conditionals, Athanasiadou and Dirven (1997a, p. 89) show that 'hypothetical conditionals' are the most prototypical in their corpus,¹¹ because they are the most frequent type of conditional, they have interdependent clauses, internal variation in three sub-types with an internal prototypicality range (the *causal* sub-type being the most prototypical hypothetical conditional, followed by *condition* and *supposition*), they all express epistemic attitudes towards the situations expressed, they can be marked and unmarked, and from hypothetical to other types of conditionals, the causal dependency between the antecedent and the consequent decreases. The idea that class members can be more or less central to the prototype(s) of that class means that there is an internal organisation based on similarity and predicts that there will be border-line cases; those objects that are far away from the prototype will be worse examples of the category, resulting in so-called 'fuzzy boundaries' (see Löbner, 2002, pp. 186–189; cited in van der Auwera & Gast, 2010; see also Mervis & Rosch, 1981, p. 109), providing room for examples that seem to resist clear-cut assignment to one of the classes, because, as Hempel (1965, p. 151) puts it, empirical data often resist 'tidy pigeonholing'. We will take up this point later on in this chapter, and in the discussion in chapter 7. Before doing so, however, we will look at another relevant distinction made in the classification literature, namely that between intensional and extensional classification.

6.2.4 Intensional and extensional classification

Marradi (1990, pp. 130–148) distinguishes between intensional classification and extensional classification.¹² In linguistic classifications of conditionals, these differences are usually not explicitly mentioned. Intensional classification,

¹⁰While classification based on necessary and sufficient conditions may be preferred by some analysts, and classification based on family resemblance may be considered a more adequate model of cognition by others, the two ways of classifying discussed do not coincide with the claims made about either analysis or cognition. Although proponents of classical classification may project their analyses onto cognition, and proponents of prototype theory may use their theory of cognition to provide analyses, they do not have to do so.

¹¹Dancygier (1998, p. 184) argues the same for her closely related class of 'predictive conditionals'.

¹²The activity of *classing* is omitted here, as it comes down to the process of assigning individual observations to *previously defined* classes. The process is, among other terms, also known as categorical assignment (Scheffler, 1982, p. 49) and (class) identification (Capecchi & Möller, 1968, p. 63; Feger, 2001, p. 1967).

also called qualitative classification (Bailey, 1994, p. 6), is the deductive process of forming classes on the basis of a main or fundamental parameter. When this is done at the highest, most general level, a different parameter can be chosen to further differentiate between sub-classes. These sub-classes inherit the properties of their parent classes, except when a more specific parameter ‘overwrites’ them. This type of classification is most common and, indeed, most classifications of conditionals discussed in chapter 3 are of this type. For instance, Quirk et al. (1985, p. 1091) suggest *directness* as main parameters to define the main types, i.e., direct and indirect conditionals. The sub-classes are based on different parameters. Within the class of direct conditionals, Quirk et al. (1985) use what could be termed ‘epistemic distance’ as expressed by tense to distinguish between *open* and *hypothetical* conditionals. Because the parameters work on basis of exhaustivity and mutual exclusivity, the main risk of this type of classification is that it encourages strict placement in categories for observations that may not belong to one category necessarily, and, related, that it often includes some kind of ‘residual category’ (Marradi, 1990, p. 141), which, in the best cases, can be made sense of *a posteriori* on theoretical grounds. A clear example is Dancygier and Sweetser’s (2005, p. 136) residual class of *meta-spatial conditionals* in which conditionals juxtapose two mental spaces in a domain (their main parameter) that is not *content*, *epistemic*, *speech-act* or *metalinguistic* and concerns the very act of comparing two spaces itself (see section 3.3.7). Forming classes on logical grounds may run into problems when applied to empirical findings. The rigid combination of criteria lead to what Weber (1949) calls an ‘ideal type’, which are idealised examples that may, but do not have to exist in this pure form. We have seen examples of this in previous chapters, such as the tense pattern ‘present perfect, past perfect’ and the reverse, which are logical possibilities of combining the tenses of the two clauses in conditionals, although they did not occur in the corpus (see section 5.4). Accordingly, Sandri (1969, pp. 86–87) argues that ‘those kinds of classification, in which the fundamental requirements are satisfied on purely logical grounds, say very little in the field of the empirical sciences’.

Extensional (*quantitative*, *natural*) classification works on the basis of empirical data, which cannot always be neatly divided into classes and their logical complements. Instead of *deducing* classes from criteria, in an *extensional classification* the classes are *induced* from patterns of properties in an actual population of objects. Classification here is an inductive process and works on basis of perceived similarities between phenomena instead of theoretical constructs.¹³ This type of classification works with properties that seem relevant for the study of the phenomena concerned. The multidimensional combination of all properties (the ‘logical product’, cf. Hempel & Oppenheim, 1936) is called an *attribute space*, *property space* or *feature space* (cf. Greenberg, 1957, pp. 72, 76; Marradi, 1990, p. 143; Bailey, 1994, p. 9). An example of this type of classification is Declerck and Reed’s (2001) study of conditionals, in which each

¹³Other common terms are *empirical classification*, *typology* or *numerical taxonomy*.

systematic difference between exemplars results in a new class. A major benefit of extensional classification is the identification of previously unattested types, as can be seen in the remark Mauck and Portner (2006, p. 1336) make in their review of Declerck and Reed (2001): ‘the book showed us kinds of conditionals (and conditional-like sentences) which we would not have thought about otherwise’. The main downside of this approach is that the various types are not logically and/or explicitly linked to each other, resulting in a *typology* that is exhaustive, but does not lend itself easily to generalisations, as the concluding remark in Dancygier’s (2003, p. 322) review of Declerck and Reed’s study makes clear: ‘The trees have been described in all their plenitude and variety, but the forest has been overlooked’.

The type of classification I will present in this chapter is of the extensional kind, as the combined features will be used to explore possible structures underlying distributions of grammatical features of conditionals. This avoids the risk involved to intensional classification mentioned above, namely that of forcing conditionals into categories that should theoretically exist, but may not be found empirically due to overlapping boundaries. It is however prone to the risk of ending up with theoretically unmotivated residual categories, and to the main risk discussed with respect to extensional classification, namely that generalisations are not easily made, although they are desirable. We may thus end up with groups of conditionals that lack theoretical importance. Both problems are addressed here. First, most clustering algorithms require, as we will see in the sections to come, a number of clusters as parameter. While this does introduce the risk of forcing all conditionals in a small number of classes, it does eliminate the risk of high numbers of classes resisting generalisation and it decreases the risk of small residual classes. Additionally, in one of the types of clustering presented in section 6.4, the resulting hierarchical structure may preserve differences between conditionals in classes as sub-types of those classes. Furthermore, I will carefully evaluate the optimum number of clusters to address the issue mentioned. Second, the risk of theoretically unmotivated classes was already addressed by carefully using a large body of literature to identify features of importance. We do not wish, however, to eliminate the risk of coming up with classes lacking a clear theoretical motivation, as one of the possible outcomes of this study may be that the features in fact do not support the hypothesis that the grammatical form of conditionals licenses implicatures of unassertiveness and connectedness. In sum, then, we cannot avoid all risks, but I hope to have shown that the relevant risks were identified and anticipated as much as possible.

Before moving on to the data preparation in section 6.3, it is needed to discuss a related and important, but often overlooked aspect of classification, namely its evaluation. We will address this issue in the following section.

6.2.5 Evaluation of classifications

In the field of machine learning, there is particular interest in the extensional type of classification. A large number of algorithms exists which take a collection of variables or ‘feature space’ and try to determine underlying structures. Although other types of machine learning approaches exist, the two main approaches are *supervised* and *unsupervised machine learning*, and the difference has a large impact on the evaluation of the results, which we will discuss in this section.

As discussed already in chapter 4 (see section 4.6), the term *classification* as used in the computational literature usually refers to *supervised* machine learning. In this type of machine learning, the target labels (or *classes*) for objects are known for at least a number of observations. In contrast, unsupervised algorithms deal with data that lack such labels and are used to identify clusters of features inherent in the data, without any preconception of the nature of these clusters. In summary, Marsland (2015) describes both types of machine learning as follows.

Supervised learning A training set of examples with the correct responses (targets) is provided and, based on this training set, the algorithm generalises to respond correctly to all possible inputs. This is also called learning from exemplars.

Unsupervised learning Correct responses are not provided, but instead the algorithm tries to identify similarities between the inputs so that inputs that have something in common are categorised together. The statistical approach to unsupervised learning is known as density estimation. (Marsland, 2015, pp. 5–6)

Whereas in supervised machine learning an algorithm tries to predict the correct label for an observation based on the distribution of features, aiming at maximum accuracy, in unsupervised machine learning, no such target labels are available, which means that an algorithm has to resort to minimising within-group variance and maximising between-group variance. Although this might be seen as a definite disadvantage of the unsupervised approach, and an advantage of the supervised approach, I provided three arguments against a supervised approach in this study in section 4.3, which I will briefly reiterate here. The first argument was that a supervised approach presupposes that labels can be applied to the data beforehand, which turned out to be highly unreliable for the classifications discussed in chapter 3. The second argument was that a non-trivial selection of classifications used as ‘gold standard’ has to be made in order to evaluate the results, i.e., which types of conditionals is an algorithm supposed to predict based on grammatical features? This would introduce a theoretical bias, which unsupervised machine-learning does not suffer from. The third argument was that an unsupervised approach offers ways of grouping conditionals which can be interpreted along the lines of prototype theory, i.e., these techniques are able to provide detailed insights into category structure and rep-

representativity of conditionals. I used these arguments to support the choice for an unsupervised approach to the multivariate analysis of the data described in chapter 5. This, however, does leave us with the question of evaluation, which is much more complex for unsupervised algorithms, as the ‘true types’ are not known *a priori*. In the following sections, I will focus on statistics available to assess the reliability of clustering (i.e., unsupervised classification). First, in the remainder of this section, I will review the ideas behind evaluation and we discuss existing evaluation criteria for classifications in general.

Some scholars argue that classifications should ‘faithfully portray the inner structure of reality’ (Marradi, 1990, p. 148), while others argue that the objective of classification is instead an increase of our understanding of reality (e.g., Feger, 2001, p. 1972; van der Auwera & Gast, 2010). In this latter sense, classifications are not to be judged *true* or *false*, but more or less *fruitful* for understanding reality (cf. Tiryakian, 1968, p. 5; Kemeny, 1959, p. 195).¹⁴ Given the importance researchers attribute to classification, one would expect its evaluation to be a common theme in research. Surprisingly, Feger (2001, p. 1967) notes that this critical aspect is frequently neglected. Indeed, classifications usually do not offer an explicit measure of quality, beside (implicit) claims of completeness (exhaustivity) and mutual exclusivity. There are, however, heuristics that can be used to evaluate the result of a classification activity. Because the nature of different types of classifications is different, not all heuristics apply to all classifications.

According to Feger (2001, p. 1968), a classification should have a *theoretical foundation* and the parameters provided by this foundation should be central to the purpose of the research (cf. Tiryakian, 1968). The theoretical foundation is the basis for deduction through which classes and their order are formulated. In this study the theoretical foundation is provided by the fact that the features to be included are based on the extensive literature review in chapter 3. Because the feature inventories come from what is known from the literature on conditionals, the analysis presented below forms a test for their ability to discriminate between different implicatures of unassertiveness and connectedness in Dutch conditionals. Next, a classification should be *objective*, in the sense that anyone familiar with the matter should be able to apply it to real data (Feger, 2001, pp. 1968–1971). This means that criteria or dimensions must be explicitly stated. With respect to conditionals, and especially implicatures of connectedness, we already saw that this proved problematic (see section 4.5). Although it may be clear from the previous chapter that I have tried to provide maximal transparency with respect to features that form the basis for the clustering, the algorithm itself involves many choices made by the analyst, which

¹⁴ Apart from this difference, the terms *classification* and *categorisation* are used interchangeably throughout the literature. For instance, van der Auwera and Gast (2010) use the term *category* to refer to ‘a set of entities that share one or more properties and that are thus to some extent similar’ and trace the term back to Aristotle’s *Categories*, who used the term to refer to what is called *classes* here: groupings based on necessary and sufficient conditions. See also Bloomfield (1984, p. 270).

I will elaborate with the same transparency in the remainder of this chapter in order to maximise objectivity. A classification should furthermore be *exhaustive*, i.e., all elements should have a place in the resulting classification. Especially in the case of intensional classifications, this leads, in many cases, to a *residual category* (Marradi, 1990, p. 141) in which all objects that do not fit neatly into one of the theoretically motivated classes are placed. What can be seen in the classifications discussed in chapter 3, is that it sometimes remains unclear whether or not they adhere to what McEnery and Hardie (2012, pp. 14–18) call the ‘principle of total accountability’: explicitly taking the responsibility to account for all corpus data present in the corpus or sample, including ambiguous, border-line or unclear exemplars. We already saw in section 6.2.4 that some accounts of conditionals include residual categories. Together with *exhaustivity*, *mutual exclusivity* is one of the classic criteria of classifications. When *mutual exclusivity* is used as a criterion, all cases must fall into one class only, as a consequence of the exclusivity of the parameters used. This is similar (although not identical) to for instance Sweetser’s (1990) remark cited in in section 6.2.3 that a conditional may be ambiguous between interpretations, but it can only have one interpretation at a time and thus should be assigned to one type, given the specific context is taken into account. As some algorithms are able to provide so-called ‘soft’ or ‘fuzzy’ cluster assignments, meaning that one observation can be placed in multiple groups of data by assigning a numerical indication of the fit, I will reflect explicitly on this issue when using this type of clustering algorithm (see section 6.4.5). Next, according to Feger (2001, p. 1968), a classification should be *simple*, in the sense that a ‘small amount of information is used to establish the system and identify objects’. A ‘minimal set of variables’ should be sufficient to discriminate between classes. This is called *parsimony* by Tiryakian (1968), referring to ‘the fewest meaningful or significant major types possible to cover the largest number of observations’. Finally, a classification should be able to generate predictions. In Tiryakian’s (1968) terms, ‘a “good” typological classification would include the criterion of fruitfulness (the typology may have heuristic significance in facilitating the discovery of new empirical entities)’. In section 6.2.4, this quality was addressed directly by Mauck and Portner’s (2006) review of Declerck and Reed’s (2001) account. Ideally, the results of the clustering should provide insight into the feature-combinations that are most typical for a certain cluster, in turn enabling the placement of new observations into the generated clusters.

6.2.6 Conclusion

In this section, I provided arguments for analysing conditionals as form-meaning pairings, i.e., constructions, in order to investigate relations between grammatical features and implicatures of conditionals. As the features are expected to ‘work together’ in licensing implicatures of unassertiveness and connectedness, a clustering approach to the data was chosen. Clustering is a type of classification, and in order to explain the choice for and evaluation of this un-

supervised clustering approach, I discussed its advantages and disadvantages in this section. Although no target labels are available for the data, which excludes direct implementation of supervised techniques, a cluster analysis upholds the basic tenet of classification, namely forming groups that exhibit the smallest amount of within-group variance and the largest amount of between-group variance, which will be used to investigate to what extent specific implicatures of unassertiveness and connectedness can be viewed as generalised conversational implicatures. A major benefit of the unsupervised approach taken is that no preconception about these implicatures has to be made beyond the selection of variables. As these variables form the input for the clustering algorithms, the data preparation needed will be elaborated in the next section.

6.3 Data preparation, variable selection, and distance calculation

6.3.1 Introduction

Before we can select suitable clustering approaches, and subsequently subject the data to the corresponding algorithms, the collective features of conditionals discussed extensively in the previous chapter (the ‘feature space’) demand a number of preparatory conversions and evaluations. These steps are the subject of this section. As we are dealing with data preparation here mainly, I find it important to remind the reader here why such data preparation and discussion thereof are important. As we are looking for clusters of grammatical features in relation to implicatures of unassertiveness and connectedness, it is vital to assess to what extent these features combined actually indicate the presence of clusters. As remarked throughout chapter 5, it may also be the case that the implicatures are not generalised or conventionalised, and that meaningful clusters cannot be found. The preparatory steps discussed in this section are meant to enable such assessments, and to enable the clustering algorithms to process the data (see section 6.4).

In section 6.3.2, I will discuss the preliminary variable selection. In section 6.3.3, I will discuss the basics of distance calculation, and more advanced distance calculation will be discussed in section 6.3.4. Then, in section 6.3.5, the selection and evaluation of distance measures (and resulting matrices) is elaborated. In section 6.3.6, the final variable selection, based on this evaluation, will be presented. In section 6.3.7 I will use the results of the evaluations to identify the most and least representative conditionals in Dutch, and, finally, in section 6.3.8, I will offer a brief conclusion before moving on to the actual clustering in section 6.4.

6.3.2 Initial variable selection

In chapter 5, the features identified in the linguistic literature on conditionals were annotated in a corpus that was balanced on the dimensions *mode* (spoken, written) and *register* (formal, informal). The annotation followed conventional labels in the field of linguistics. This does not, however, necessarily lead to optimal coding for further quantitative data analysis. For example, a feature like *verb tense* is already prone to discussion in linguistics (see section 5.4 on future tenses). I have chosen to use the two-way binary tense system (cf. Broekhuis, Corver & Vos, 2015a) for annotation, and the name already suggests that each possible value or *level* of this feature can be further decomposed into two binary features, namely $\pm$ *past* and $\pm$ *perfect*. This implies a choice of how to code the feature as a variable for further analysis: either a clause is annotated for verb tense as *simple past* (one feature), or as having the features $+$ *past* and $-$ *perfect*. As one may imagine, there is no simple wrong or right way to go about this. I chose to code the variables with minimal deviation from the levels used in chapter 5, mostly for reasons of interpretability of results. However, variables with skewed distributions and low-frequency values may have negative impact on dimension reduction of the data, and as we saw in the previous chapter, a number of features indeed suffered from this issue. Before performing any analyses, I took a number of steps to ensure optimal coding. First, I performed a check on feature independence, resulting in 12 features, for instance, by combining clause order and syntactic integration into one feature (see Appendix C for details).¹⁵ Second, the dispersion of the feature values (i.e., the distribution and possible skewedness) was evaluated, which we will turn to next.

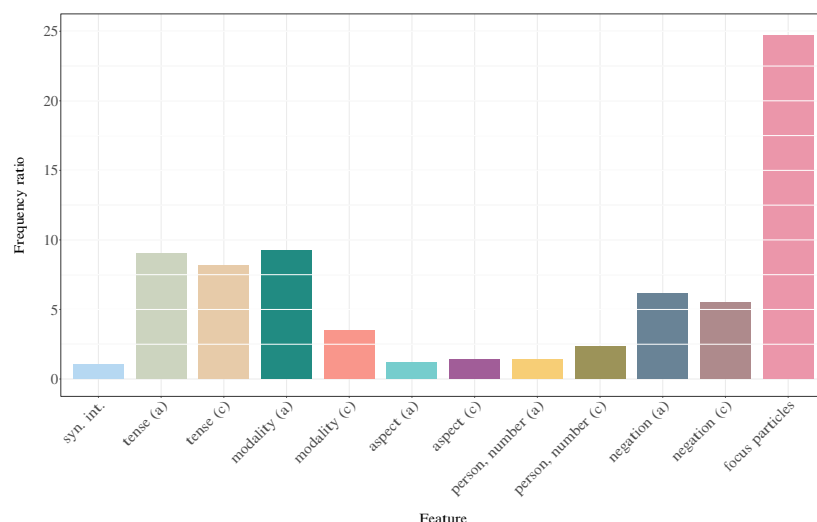
In the clustering literature, *feature or variable selection* is gaining attention, but it lags behind the amount of work done in classification literature (cf. Liu & Zhang, 2016, p. 100; Solorio-Fernández, Carrasco-Ochoa & Martínez-Trinidad, 2020). Many studies simply use all variables available, without critically assessing ‘clusterability’ and the contribution of the individual variables. Levshina (2011, pp. 60–61), for instance, uses no less than 35 variables, which were chosen ‘only by practical methodological reasons (although some variables have proven to be useful in the previous studies)’. However, the ‘inclusion of unnecessary variables’ may have a negative impact on clustering results (see Raftery & Dean, 2006, p. 168). Fowlkes, Gnanadesikan and Kettenring (1988, p. 205) provide clear examples of how clustering algorithms ‘can completely fail to identify clear cluster structure if that structure is confined to a subset of the variables’. At the other end of the spectrum, Gabrielatos (2010, pp. 52–53; 2021) uses only two (correlated) variables, ‘modal density’ (MD) and ‘modalisation spread’ (MS) in his hierarchical cluster analysis. As was shown in the previous chapter, the

¹⁵The original features were recoded into the following variables *syntactic integration* (including clause order), *tense (a)* and *tense (c)*, *modality (a)* and *modality (c)*, *aspect (a)* and *aspect (c)*, *person and number (a)* and *person and number (c)*, *negation (a)* and *negation (c)*, and *focus particles*.

number of variables in this study lies in between: the 12 variables were chosen explicitly for their relation to implicatures of unassertiveness and connectedness as discussed in the literature in chapter 3. This does not mean, however, that a critical perspective on the informativeness of each of these variables is not needed. In this study, I used ‘Deviation from the Mode’ or *DM* (cf. Wilcox, 1973, p. 325) as an initial measure of dispersion. *DM* takes on a value between 0 and 1 and the higher the value, the more evenly spread the values of a variable are, whereas a low value indicates an uneven spread of the values. The calculation and results are discussed in detail in section C.2 of Appendix C. The *DM* values were only used for the initial inspection of feature distributions, as it enabled identifying variables with skewed distributions. In itself, such a distribution need not be problematic, but a *DM* value near zero may indicate a non-informative distribution. The *DM* values (see Table C.1 on page 485 in Appendix C) indicate that tense in antecedents and consequents, modality in antecedents, negation in antecedents and consequents and particularly focus particles have prevalent values that skew the distributions.

To further assess which variables may have non-informative value distributions, the frequency-ratio of each of the variables was calculated. The idea behind this step is that a large ratio between the frequency of the most frequent value and the second-most frequent value indicates that it may be better to remove the variable from the model (see Kuhn & Johnson, 2013, p. 45). From the results of this analysis, presented in Figure 6.1 below (for technical details, see section C.4 of Appendix C), we can see that the feature *focus particles* has a frequency ratio that is more than twice as high as that of any other feature.

Figure 6.1:
Frequency ratio per feature



This can be explained by the fact that an overwhelming majority of conditionals does not have a focus particle, making the absence of a focus particle a largely uninformative feature in isolation. Furthermore, the results indicate a relatively high frequency ratio for tense in both clauses, because of the prevalence of the simple present, and, interestingly, a higher frequency ratio for modal marking of the antecedent, but not the consequent, as the number of modalised consequents is much higher than the number of modalised antecedents.

Next to these internal measures of dispersion, I will informally rank the variables based on their theoretical relevance, as discussed at length in both chapter 3 and chapter 5. With respect to implicatures of unassertiveness and connectedness, it became clear that tense and modality are the most prominent features in the literature. Note that these classifications concerned English conditionals mainly, whereas in Dutch conditionals other features may prove more informative.¹⁶ For Dutch, however, Reuneker (2016) already showed that modality was of influence on the conditional interpretation of prepositional phrases, which indicates a certain importance of this feature. In section 5.3, I showed that clause order, and, for Dutch, syntactic integration (see Reuneker, 2020) are other important features in relation to implicatures, mainly those of

¹⁶See also section 4.3.2 and the discussion in chapter 7 on the arguments for and consequences of the choice for a Dutch corpus in relation to the literature that has focused mainly on English conditionals.

connectedness. Next, negation proved an important parameter in the coherency approach to conditionals discussed in section 3.3.8, which deals mainly with implicatures of connectedness, and in Declerck and Reed’s classification discussed in section 3.3. As we saw in section 5.9, negation was also suggested to play a role in cooperation with tense in licensing implicatures of unassertiveness, or, more specifically, implicatures of counterfactuality. The feature of aspect and the combined feature of person and number were only weakly linked to conditionals (see sections 3.2.7 and 3.3.9), although, in section 5.7, I discussed how first-person and second-person subjects were related to the use of conditionals to tone down the force of directive speech acts. Focus particles, finally, have been linked to restrictions on connections between antecedents and consequents (see sections 3.3 and 5.10). To conclude, the ranking based on the literature reviewed in chapter 3 suggests the following order of feature importance: verb tense, modal marking, syntactic integration (including clause order and occurrence of resumptive *dan* ‘then’), sentence type of the consequent, negation, focus particles, aspect and person and number.

The results in this section suggest that focus particles should be excluded from the final analyses due to a high frequency-ratio, and relatively low theoretical relevance. Theoretical relevance also suggests that special attention needs to be paid to aspect and person and number in subsequent analyses, as the literature review in chapter 3 suggests low theoretical importance. These suggestions will be taken up in the final feature selection discussed in section 6.3.6, but first, as a necessary step, the distance calculation will be discussed.

6.3.3 Basic distance calculation

After coding features as variables, evaluating their dispersion, and composing an initial list of contributing variables, the dataset consisted of 4109 observations (i.e., conditionals) of the 12 variables shown in Figure 6.1, resulting in $4109 * 12 = 49.308$ data points. From this dataset, the next step was the calculation the (dis)similarity between each conditional in terms of its features. This was done because clustering, in basic terms, works on the basic principles of classification discussed in section 6.2 above, as it groups observations in such a way that within-group differences are minimised, while between-group differences are maximised (see Cichosz, 2015, chapter 11 for an introduction on similarity and dissimilarity calculation). ‘Distance’ in ‘distance calculation’, then, is the operationalisation of difference.¹⁷

In some cases, the calculation of distance is straightforward. Two people with different heights have a distance on that variable equal to their difference in height. When we add a variable, like weight, the difference between their weights is incorporated into the distance calculation. As height and weight are measured on different scales, before calculating the distance, such variables should be normalised, for which multiple strategies are available. However,

¹⁷For technical details of the distance calculations, see section C.5 of Appendix C.

if yet another variable is taken into account, such as gender or eye-colour, distance calculation becomes much more complex, even with normalisation, because numeric variables (height, weight), and categorical variables (gender, eye-colour), are fundamentally different. It is therefore a non-trivial task to use such variables in any distance calculation, yet categorical variables are what most corpus linguists deal with. The use of categorical variables severely limits the choices in distance measures. A common approach to dealing with problem in clustering is to first perform a binary transformation of categorical variables into so-called ‘dummy variables’, meaning that each variable is coded into variable-value pairs. For instance, the variable ‘modality’ with values ‘epistemic’ and ‘deontic’ is coded into the binary variables ‘modality-epistemic’, ‘modality-deontic’, which each then receive 0 for absence and 1 for presence of the value. After this transformation, the more widely available distance measures for binary variables can be applied. However, this can introduce both significant decrease computing speed and a loss of information (for a recent experiment and discussion, see Cibulková et al., 2019). This may be the reason why most corpus-linguistic literature in which clustering techniques are applied use Gower’s distance or another, indirect approach, such as clustering through ‘behavioural profiles’ (see e.g., Divjak & Gries, 2006; Divjak, 2010; Levshina, 2011; Divjak & Fieller, 2014). Although Gower’s distance has important limitations, it is readily available for categorical data and can serve for introductory purposes below.

A *distance matrix* reflects the dissimilarity of one observation compared to another in terms of all of its features. In most corpus-linguistic studies, distances are calculated using *Gower’s General Similarity Coefficient* (Gower, 1971, p. 861), often abbreviated to *Gower’s Distance*, mostly because it is presented as the default option for non-numerical variables. The formula and details for calculation of Gower’s distance are presented in section C.5.1 of Appendix C. Here, it will suffice to discuss the measure in more general terms. As, in calculating a distance matrix, all observations are compared to each other, the product rapidly becomes very large. Therefore, I will introduce a small and fictitious data set to clarify the workings of Gower’s Distance, and to discuss its importance for this study. The illustrative dataset consists of just four conditionals, exemplified in (397) to (400) below. For each of these conditionals, three features were annotated, namely clause order (sentence-initial, sentence-medial or sentence-final), person and number of the antecedent (1ps, 1pp, 2ps, 2pp, 3ps or 3pp), and modal marking of the consequent (epistemic, evidential, deontic, dynamic or none).

- (397) If you flick the switch, the light will go on.
- (398) If he attacks the enemies, they strike back.
- (399) The water is not cold, if it is boiling.
- (400) Even if we work hard, we may not leave early today.

The examples in (397), (398), and (400) have sentence-initial antecedents, whereas the example in (399) has a sentence-final antecedent. The grammatical subject in the antecedent is second-person singular in (397), third-person singular in (398) and (399), and first-person plural in (400). With respect to modality in the consequent, we see that (397) is marked for epistemic modality by the auxiliary *will*, (398) and (399) are not marked for modality, and (400) is marked for deontic modality by means of the modal auxiliary *may*. In the data structure employed in this study, this looks like Table 6.1.

Table 6.1:
Data structure for examples in (397) to (400)

Example	Clause order	Person & Number (a)	Modality (c)
(397)	initial	2ps	epistemic
(398)	initial	3ps	no
(399)	final	3ps	no
(400)	initial	1pp	deontic

Assuming no custom weights (see Appendix C.5.1), Gower's distance is the number of features shared between two conditionals, divided by the number of features. The resulting distance matrix is presented in Table 6.2 below.

Table 6.2:
Distance matrix for examples in (397) to (400)

	Ex. (397)	Ex. (398)	Ex. (399)	Ex. (400)
Ex. (397)	0.00			
Ex. (398)	0.67	0.00		
Ex. (399)	1.00	0.33	0.00	
Ex. (400)	0.67	0.67	1.00	0.00

Before looking at the distances in Table 6.2, please note that there is a diagonal line of zeros, which is expected, as these numbers represent the distance from one conditional to itself. As the table is symmetrical, the lower-left diagonal is identical to the upper-right diagonal, and by convention only the lower triangle is presented. Looking at the conditionals in (397) and (398), we can see the distance is 0.67, because they share only one out of three features (clause order), as can be seen in Table 6.1. The distance is then simply 1 minus the number of features shared (1) divided by the total number of features (3), i.e., $1 - (1/3) = 0.67$. We can also see that (397) and (399) share no features, resulting in a distance of 1, i.e., $1 - (0/3) = 1$. The distance between (397) and (400) is $1 - (1/3) = 0.67$, because they share only the feature clause order. Looking at

(398) and (399), we see they share person and number, and the non-occurrence of modal marking, resulting in a distance of $1 - (2/3) = 0.33$. The distance between (398) and (400) is 0.67, because they only share clause order. Finally, the distance between (399) and (400) is 1, because no features are shared. We thus see that the more similar conditionals are in terms of their features, the smaller their distance is.¹⁸

Even with categorical variables only, the calculation of distance is not devoid of problems. Before discussing the problem of missing values, I will discuss another problem, which, as we will see, may provide the key to solving the missing values problem in the first place. In the case of modal marking in the example above, most consequents are not marked for modality. If we were to treat these *no*-values as genuine features of conditionals, their prevalence may introduce problems, as I discussed with respect to focus particles above. While this may look like an isolated problem, it is comparable to another problem encountered already, namely that of highly skewed distribution for features like verb tense. As we saw in section 5.4, around 80% of all clauses in conditionals have simple present verb tense. In default metrics for nominal features, this is not taken into consideration, which means that the similarity measure of two clauses is impacted exactly the same when they both have the highly frequent verb tense *simple present*, as when they have the much less frequent verb tense *simple past*. Are two conditionals that share the simple present tense as equal as two conditionals that share the simple past tense, given that the former tense is much more likely to occur than the latter? As we can see, the relatively straightforward calculation of (dis)similarity has now become a more complex problem involving probability. Intuitively, the following makes sense: the probability of a feature occurring in both conditionals should have as large an impact as the probability of both conditionals not sharing the feature. This idea has already been suggested in very general terms by Anderberg, but at the time computation was too slow to implement such a metric.

The desire to give rare classes extra weight appears frequently in the biological literature though systematic methods for assigning such weights are not offered. [...] Since rare events have low probabilities, the probability of an event is not a suitable weight; however any inverse function of the probability is potentially interesting. (Anderberg, 1973, pp. 124–125)

In recent years, however, a number of ‘probability-based’ distance metrics have been implemented, which we will discuss in the next section, and in doing so, we will return to the problems of missing values and skewed distributions.

¹⁸While similarities may be preferred for interpretation, distances or *dissimilarities* are frequently used in several kinds of machine-learning and dimension-reduction algorithms. The measure for similarity is simply 1 minus distance.

6.3.4 Probability-based distance calculation

The general idea of probability-based distance measures is that the distribution of the variable levels is taken into account in the calculation of distance. Let us look at another simplified example.¹⁹ Suppose we have five conditionals, annotated for two features, as presented in Table 6.3 below.

Table 6.3:

Example data for probability-weighted distance calculation

Example	Clause order	Modality (c)
(1)	initial	epistemic
(2)	initial	epistemic
(3)	initial	no
(4)	final	deontic
(5)	final	deontic

We can see that there are two clause orders present. The probability of a conditional having a sentence-initial antecedent is the number sentence-initial antecedents divided by the total number of conditionals, i.e., $3/5=0.6$. The probability of a sentence-final antecedent is $2/5=0.4$. Necessarily, the sum of both probabilities is 1. The probabilities of the variables *modality (c)* are $2/5=0.4$ for epistemic modality, $1/5=0.2$ for no modal marking and $2/5=0.4$ for deontic modality. Let us now look at examples (1) and (2). They are identical, and using Gower's distance, as discussed in the previous section, they would receive a dissimilarity of 0. The same goes for examples (4) and (5). They are identical and thus have a dissimilarity of 0. However, the chance of a zero distance is higher for (1) and (2) than for (4) and (5), because the sentence-initial clause order in the former pair is more likely to occur in both conditionals than the sentence-final clause order in the latter pair. Although I endorse the view that examples (1)-(2) and (4)-(5) are both identical in Table 6.3, given the skewedness of a number of features in the dataset (see chapter 5), it would be advantageous to set the weight not per feature (i.e., a constant weight, see Appendix C.5.1), but to make weight dependent on the probability of the feature's values, in order to 'give status to rare classes' (Anderberg, 1973, pp. 124–125). In other words, examples (4)-(5) receive a slightly higher similarity, and examples (1)-(2) a slightly higher dissimilarity, because the probability of a match on sentence-initial clause order is higher than a match on sentence-final clause order.²⁰

¹⁹The technical details for the application of probability-based distances measures to the actual corpus data can be found in Appendix C.

²⁰Expressed exclusively in terms of dissimilarity, examples (1)-(2) would receive a slightly higher dissimilarity than examples (4)-(5).

It turns out that this problem has been addressed in the biological and statistical literature on similarity measurements already, although it does not, to my knowledge, seem to have found its way into (corpus) linguistics. Goodall (1966) proposed a measure that captures the exact nature of the probability measure proposed above by adding variable weights based on probability. Such a strategy seems particularly suitable for the current dataset, as a number of features have highly skewed distributions. For instance, as we saw in section 5.4 in the previous chapter, roughly 84% of antecedents, and 88% of consequents have simple present verb tense. Such a similarity should contribute less to the overall similarity between two conditionals, than for instance a correspondence on the simple past verb tense, which occurs in roughly 9% and 11% of antecedents and consequents respectively. In more general cognitive terms this too makes sense, i.e., a low-frequency value is a more informative clue for processing than a high-frequency value, because it is ‘marked’, somewhat comparable with the argument for Levinson’s (2000, p. 39) M-principle discussed in section 2.4. In terms of ‘markedness’, the simple present in this example would be the unmarked member, whereas other tenses are marked (see Comrie, 1996). Although there is significant criticism on the notion of markedness (see Haspelmath, 2006), here it is used in the same terms as, for instance, Comrie (1996) and Holleman and Pander Maat (2009, p. 2209): when a feature has a skewed distribution, the high-frequent value(s) will be used in a wider variety of contexts (i.e., the *unmarked* values) than the low-frequent value(s) (i.e., the *marked* values). We can see this general idea come to fruition when we calculate the distances between the conditionals in the example data in Table 6.3 using Gower’s measure on the one hand and Goodall’s measure on the other. First, the distance matrix using Gower’s metric was calculated. The results of the calculations using Gower’s measure are presented in Table 6.4 below.

Table 6.4:*Distance matrix using Gower’s distance on Table 6.3*

	Ex. (1)	Ex. (2)	Ex. (3)	Ex. (4)	Ex. (5)
Ex. (1)	0.00				
Ex. (2)	0.00	0.00			
Ex. (3)	0.50	0.50	0.00		
Ex. (4)	1.00	1.00	1.00	0.00	
Ex. (5)	1.00	1.00	1.00	0.00	0.00

As expected, we see here that examples (1) and (2) have a distance of 0, as have examples (4) and (5). Examples (1) and (2) share only clause order with the example in (3), resulting in a distance of 0.5. The other combinations share no

features, resulting in the maximum distance of 1.0. To reiterate, we see that the distributional difference between sentence-initial and sentence-final antecedents is not taken into account.

Now, we will use Goodall's probability-weighted measurement on the same dataset. As the formula can be insightful at this point, I include and discuss it below, instead of referring to the appendices. Goodall's measurement is presented in (401) below.

$$(401) \ S_c(x_{ic}, x_{jc}) = \begin{matrix} 1-p_c^2(x_{ic}) & \text{if } x_{ic}=x_{jc} \\ 0 & \text{otherwise} \end{matrix}.$$

Here, x is the dataset, i and j are the individual observations (here conditionals), ranging from 1 to n (the number of observations), and c stands for the feature to be compared, ranging from 1 to m , m being the total number of features. Finally, $p_c(x)$ is the relative frequency of value x for feature c . In case of a match, a similarity based on this relative frequency (the probability of the value) is calculated, whereas in case of a mismatch, 0 is added to the similarity. For each comparison of two conditionals, similarities are summed and subtracted from 1, resulting in their final distance.²¹ Applying this measure on the example dataset in 6.3 results in the data presented below in Table 6.5.

Table 6.5:

Distance matrix using Goodall's probability-weighted measure on Table 6.3

	Ex. (1)	Ex. (2)	Ex. (3)	Ex. (4)	Ex. (5)
Ex. (1)	0.00				
Ex. (2)	0.26	0.00			
Ex. (3)	0.68	0.68	0.00		
Ex. (4)	1.00	1.00	1.00	0.00	
Ex. (5)	1.00	1.00	1.00	0.16	0.00

What we see here, is that the examples in (1) and (2) are not as similar as those in (4) and (5), reflected in distances of 0.26 and 0.16 respectively, because the chance of similarity is greater in the former pair than in the latter pair. The advantage of this result is that the distribution of the variables is clearly weighted in the calculation.

There are, however, two main disadvantages. The first, as already mentioned by Anderberg (1973, pp. 124–125), is that the computation of such a probability-weighted metric is highly inefficient. For an example such as the above with only five observations of two variables, this poses no problem, but one can imagine that the current dataset of more than 4000 observations of 12

²¹See Goodall (1966) for the original probability-based similarity index. The equation here is based on a later implementation, which assigns higher similarity for infrequent matches without using the frequencies of other categories (Šulc & Řezanková, 2015; Šulc, 2016).

variables requires significant calculation time. The second disadvantage is more fundamental, although the algorithm producing the distance matrix in 6.5 takes care of it in a practical way. The problem is that, because the distribution of variables plays a role, the distance between an observation and itself is not necessarily 0. The example in (1), for instance, would, by implication of the metric, have a slightly higher distance from itself than the example in (4) due to the distribution of clause orders. This is unwanted, and while it formally excludes the formula in (401) as a proper metric (see e.g., Deza & Deza, 2013, chapter 1), the algorithm excludes comparisons on the 0-diagonal and simply returns 0 in those cases.²²

In conclusion, then, the results in Table 6.5 reflect what is required, given the inherent structure of the dataset. The calculation is not biased by *a priori* assumptions used for constant feature weights, but based on the internal distribution of features, which takes into account any skewedness. In the following section, we will evaluate a number of distance measures which implement probabilities, enabling the selection of the most promising calculations for further steps in the clustering approach.

6.3.5 Selection and evaluation of distance measures

The way distributional differences are used for probability-weighting can be implemented in various ways, of which Goodall's (1966) proposal discussed above is an early example. As various datasets tend to respond differently to different distance measures, choosing an appropriate measure varies per dataset (see e.g., Boriah, Chandola & Kumar, 2008, p. 253; Ladds et al., 2018). To deal with this issue, I have selected eight measures, ranging from tested and evaluated measures to state-of-the-art measures to be calculated and compared, in order to evaluate which produces the most promising basis for further data analyses.²³ For the selected measures, I will include a short description of its workings with a focus on the weighting scheme, and I will refer to the publications their published in for details on calculation, considerations and assumptions. Further note that the data visualisations in this section reflect clusterability of the data (i.e., to what extent do the feature distributions indicate *underlying* structures), but not yet actual clustering results (i.e., the structures themselves), which I will present in section 6.4.

The first measure is Gower's (1971) coefficient,²⁴ discussed already in section 6.3.3, and it was selected because of its widespread use and easy and transparent interpretation. The second measurement is Goodall's (1966) similarity

²²Please note that this is one of the main reasons I use the terms *measure(ment)* or *index* instead of *metric* here, as the zero assignment fails to adhere to the strict definitions of metrics (see Schweizer & Sklar, 1960, p. 315). The measures are, however, suitable and well-tested for many datasets, as we will see below.

²³These measurements were calculated using the *nomclust*-package for R (Šulc & Řezanková, 2015).

²⁴Gower's coefficient is also called 'Simple Matching'.

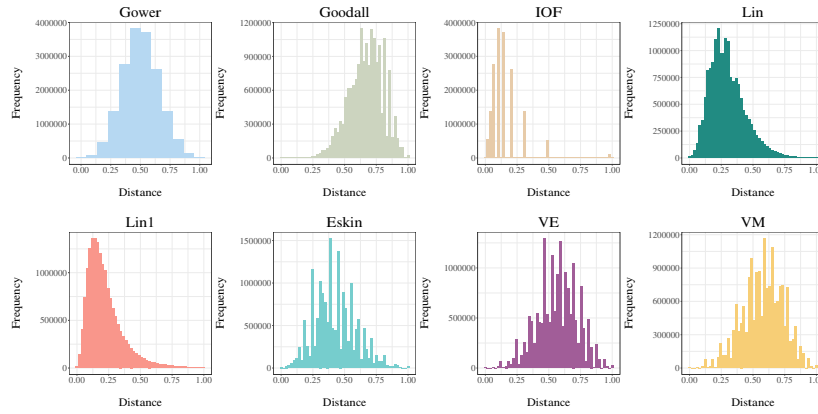
index, discussed in section 6.3.4. The third measure is Spärck Jones's (1972) *Inverse Occurrence Frequency (IOF)*, which adds more weight to non-matching pairs on less frequent values and less weight to non-matching pairs on more frequent values (see also Boriah, Chandola & Kumar, 2008; Šulc, Cibulková & Řezanková, 2020). The fourth measure is *Lin's similarity measure* (Lin, 1998), which adds more weight to matches on frequent categories and less weight to non-matching pairs on less frequent categories. The fifth measure is the *Lin1 measure*, which is a modification of the previous measure. While it is based on the same definition and assumptions (see Boriah, Chandola & Kumar, 2008, p. 249), it has a more complex weighting system (cf. Šulc & Řezanková, 2015), in which lower weight is given to mismatches if the mismatching values are frequent, or if the values have a frequency in between the frequency of the mismatching values, whereas higher weight is given to mismatches on infrequent values when there are only a small number of other infrequent values. In case of matching pairs, lower weight is given to matches on frequent values and to matches that have other values with corresponding frequencies, whereas higher weight is given to matches on infrequent values. The sixth measurement is the *Eskin* measure (Eskin et al., 2002), which adds more weight to non-matching pairs on variables with more categories. The seventh measure is the Variable Entropy (VE) measure, which was recently introduced by Šulc and Řezanková (2019, pp. 63–64). A match of two conditionals on a certain feature is weighted by the variability in the feature, resulting in more weight in case of matches on rare (i.e., infrequent) values. Variability in this measure is defined in terms of entropy (a measure of the randomness of the data) using the relative frequencies of all categories. The eight and last measure, the Variable Mutability (VM) measure, was also introduced by Šulc and Řezanková (2019, pp. 63–64) and differs from Variable Entropy in its operationalisation of variability, for which not entropy, but mutability is used, which is the nominal variance or 'Gini coefficient' of the data (see e.g., Gastwirth, 1972; Han et al., 2016).

In the remainder of this section, I will evaluate the results from each of the measures briefly discussed above. First, the distributions of distances will be used to check for multimodality, and second, I will use dimension-reduction techniques to see whether the variance in the dataset can be described by a limited number of components.²⁵ Both methods indicate to what extent the dataset has an underlying structure (see Adolfsson, Ackerman & Brownstein, 2019), in order to decide whether subsequent clustering of the data is eligible. Testing a distance matrix for multimodality assumes that the data come from a unimodal distribution. This assumption constitutes the null hypothesis. If the actual distribution differs strongly enough from the assumed unimodal distribution, this indicates that there is evidence for multiple modes in the data,

²⁵Note that 'multimodality' is used here as a statistical term referring to probability distributions with more than one mode, which is the most frequent value.

which could reflect multiple clusters (see Adolfsson, Ackerman & Brownstein, 2019, pp. 6–7). The distributions of the distance matrices are presented below in Figure 6.2.

Figure 6.2:
Distribution of distances per measure



Note. Measures are presented in consistent colours throughout this chapter.

In case of multimodality, the (multiple) modes suggest multiple clusters, as cluster will have conditionals with similar distances. In other words, we would like to see distributions with clearly identifiable ‘peaks’ in the distribution. The histograms in Figure 6.2 do not show clear multimodal distributions, however. This becomes especially clear when comparing the distance distributions in Figure 6.2 to truly multimodal distance distributions, such as the examples by Ackerman, Adolfsson and Brownstein (2016, p. 5). Unfortunately, the multimodality tests do not provide conclusive results, which is likely due to the categorical nature of the data.²⁶ Therefore, a second type of evaluation was performed on the distance matrices to select the most promising one for clustering.

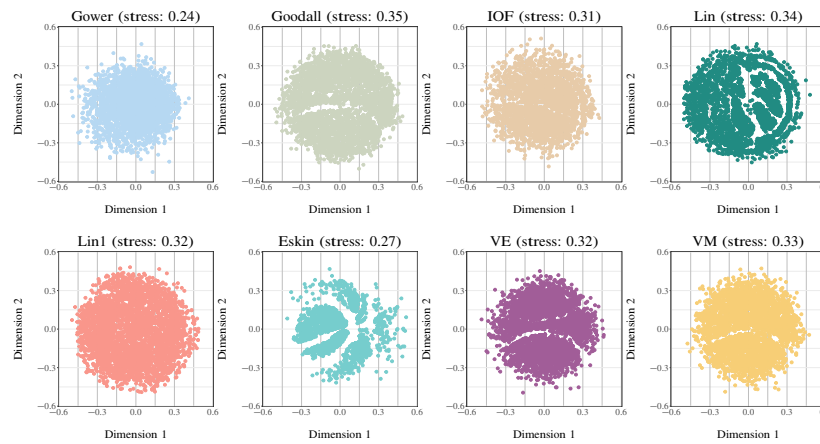
Because the evaluation of multimodality does not provide clear indications of clusterability, as they may be ambiguous between showing an effect the categorical data used, or indeed an indication of low clusterability, the evaluation of distance matrices was supplemented with an evaluation based on dimension reduction. Reducing the number of dimensions in the dataset aids finding out whether there are inherent structures present in the data. Dimension reduction was performed using *non-metric multidimensional scaling (NMDS)*, which is

²⁶See Appendix C.5.2 for technical details, references, tests, results and a discussion on the relation of this finding to clustering categorical data.

comparable to the more familiar *Principle Component Analysis (PCA)* (see e.g., Hay & Baayen, 2003; Levshina, 2015, chapter 18 for examples). I chose NMDS because it works with any distance measure, not just Euclidean distances. NMDS is a so-called ‘ordination technique’, as it orders observations, placing similar observations close and dissimilar object further apart (for an introduction and explanation, see Cox & Cox, 2001, chapter 3; see Kruskal & Wish, 1978, for origins; see also Borg & Groenen, 2005, chapter 1). Furthermore, an index of *stress* is calculated, which indicates the level of distortion introduced by reducing the set of variables into a low number of dimensions (cf. Kruskal, 1964). In general terms, dimension reduction techniques try to group observations using a smaller number of variables by combining those variables. As this introduces a decrease in information, the groups of data will be less detailed, but more efficiently described. This stress level is thus a ratio between the fit of a model, which should be as high as possible, and the information needed to produce the model, which should as low as possible. The lower the stress, then, the less distortion the dimension reduction introduces, consequently indicating that there are groups to be discovered in the data. The results of the NDMS calculations are plotted below in Figure 6.3.²⁷

Figure 6.3:

NMDS configurations and stress levels for distance matrices (full feature set)



Note. All configurations are based on two-dimensional ordination.

There are at least two important observations to be made regarding Figure 6.3. First, Gower’s measure, which is the only measure that is not probability-based, results in the lowest stress score, i.e., it results in the least distortion

²⁷For technical details and discussion, see section C.5.3 of Appendix C.

of the data. This is remarkable, given that a number of features with skewed distributions were ranked high based on theory (see section 6.3.2 above), which would suggest better results for measures that incorporate this skewedness. Furthermore, all stress levels are above the threshold of 0.20, which means the results are ‘dangerous to interpret’ (cf. Clarke, 1993, p. 126; see also Appendix C.5.3 for an important and more detailed discussion of this interpretation). I suggest three possible causes. First, there may be a possible influence of mode and register. As we saw in chapter 5, a number of features showed associations with mode or register, or both. The different distributions of these features on those dimensions may introduce unwanted variance that prohibits clustering the complete data as a whole (i.e., without distinguishing between modes and registers). This influence was critically assessed for each mode-register combination, and multimodality tests and dimension reduction produced roughly the same results as reported above for each individual combination (for details, see section C.5.3 of Appendix C). Second, the dataset used here is much larger than usual in experiments with stress levels of dimension reduction techniques on real data, which only relatively recently started to gain access to samples with sizes above 100 observations (see e.g., Bollens et al., 2014; Hassett et al., 2017). Dexter, Rollwagen-Bollens and Bollens (2018, p. 437) show how ‘stress increases with increasing sample size and decreases with increasing ordination dimensionality [...] essentially irrespective of the underlying data’ (i.e., by increasing the number of dimensions resulting from the reduction), which is in line with early studies on the subject (see Kruskal & Wish, 1978; McCune, Grace & Urban, 2002, p. 132). A third possible cause, which was already discussed in section 6.3, is that clustering algorithms may suffer from datasets including variables that are not relevant to the set of variables that indeed do show signs of underlying structure. In other words, variables that do not contribute to forming clusters, or variables that point towards different clusters may have a negative impact on the results. Therefore, we will return to variable selection next in order to investigate whether clusterability can be improved by removing uninformative or distorting variables from the dataset. We will then evaluate the distances matrices again and compare results to choose the optimal set of variables for finding clusters of grammatical features in conditionals.

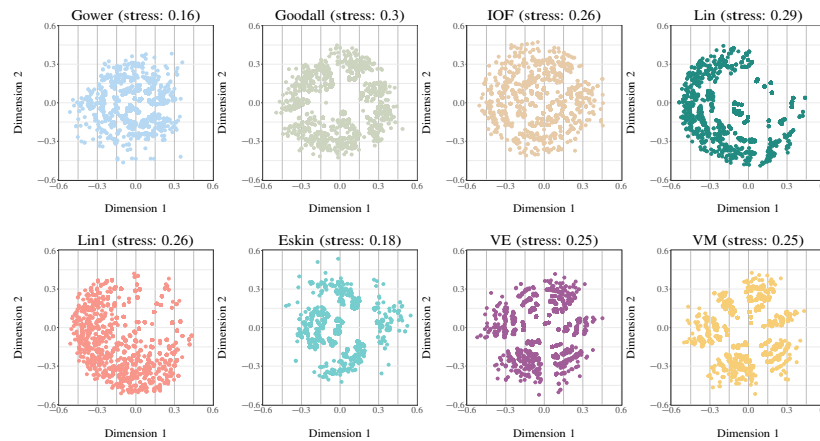
6.3.6 Final variable selection

As we saw earlier in this section, feature selection for unsupervised machine-learning tasks, especially with non-numerical variables, is non-trivial, because the observations do not have labels that can be used for evaluation. The NMDS configurations and stress levels, however, provide arguments to improve the dataset before clustering. The insights from the initial variable selection discussed in section 6.3.2 can now be used to pursue the aim of ‘selecting the minimum number of variables while preserving as much information for the interest variable of the system to be modelised’ (cf. Bouhamed, Lecroq & Rebaï,

2012, p. 10). For the initial variable selection I only used univariate insights, and I will complement these analyses with dimension reduction as a multivariate method to assess and improve the clusterability of the dataset.

Removing features that were indicated as problematic by either a high frequency ratio (focus particles) or low theoretical relevance (aspect, person and number) improved the NMDS configurations (for details, see Appendix C.6). Therefore, only the remaining features (clause order and syntactic integration, verb tense, modality, sentence type, and negation) will be considered in the analyses in the remainder of this chapter. The results of dimension reduction on these remaining features in the dataset are presented in the NMDS-configurations in Figure 6.4 below.

Figure 6.4:
NMDS configurations and stress levels for distance matrices (reduced feature set)



Note. All configurations are based on two-dimensional ordination.

In Figure 6.4 the stress levels are lower for all metrics, and lowest for Gower and Eskin, which both indicate ‘usable ordination’, albeit with a risk of misinterpretation (see the guidelines listed on page 501 in section C.5.3 of Appendix C). As was the case with the results in Figure 6.3, Gower’s measure continues to perform well despite its lack of any probability information processing (see previous section). At this point, however, it seems warranted to conclude that the degree in which the distance matrices indicate possible underlying structure in the dataset has been enhanced, with the important remark in order that stress levels are used here as indices of possible underlying structures only, and that these measures, as mentioned above, are not flawless. For example, Dexter, Rollwagen-Bollens and Bollens (2018, p. 440) show how simulation data that

were designed to be ‘moderately structured’ failed to reach stress levels below 0.20. Therefore, evaluation procedures in subsequent steps of the exploration will be used to minimise the aforementioned risk of misinterpretation, and to monitor the performance of Gower’s measure in subsequent steps.²⁸ Before doing so, however, we will inspect the distances in a more qualitative manner to find out which conditionals in the corpus are most representative of all conditionals, and which are least representative.

6.3.7 Identification of representative conditionals

In most studies (see references above) distance matrices are only used as input for further analyses. Levshina (2011, pp. 71–72), however, shows how a distance matrix can be insightful in itself (see also Levshina, 2015, chapter 15). More specifically, a distance matrix can be used to calculate the representativity of what will be clustered, i.e., conditionals in this study. Please note that this is overall representativity, as the data has not yet been clustered. As this step is not needed for clustering, neither directly addresses any of the research questions in this dissertation (see section 2.7), I will present the most and least representative conditionals in the complete dataset as an *intermezzo*. The reason for doing so is that having an overview of how the features are collectively distributed in the corpus does provide us with a picture of the grammatical form of conditional constructions in Dutch, which is relevant to the study as a whole. Furthermore, as the previous evaluations were all primarily quantitative, this step provides an opportunity to return to the a more qualitative look at the object of this study before moving on to the actual clustering.

In line with Levshina (2011), who reports on the minimum, maximum and mean distances in her dataset, we will inspect the distribution of distances for the current dataset. Although in subsequent steps all the distance matrices discussed will be used for evaluative purposes, we need to answer the question which distance matrix to use for the identification of the most and least representative conditionals. The results of Gower’s measure introduced the least amount of stress (see discussion above), but its NMDS configurations did not show clear and separable groups of data, and the histogram was, even given the categorical data used, most reflective of a unimodal distribution. For these reasons, the Eskin measure was used for identifying the most and least representative conditionals, as it did show some signs of a multimodal distribution, resulted in the lowest stress level after Gower’s measure, and it showed clearly separated groups in the NMDS configurations, all indicating possibilities of detecting structures underlying the data.

Calculating the average distance from every conditional to every other conditional provides an index of representativity (or ‘prototypicality’; cf. Levshina, 2011, p. 72), which can then be used to inspect the most and least representative conditionals in the corpus, which correspond to conditionals with the lowest

²⁸This will, of course, also be done for the other measures.

and highest average distance respectively. Using the Eskin distance matrix, the minimum and maximum mean distances are 0.21 and 0.88 (on a scale of 0-1), and the average mean distance was 0.33 with a standard deviation of 0.12.²⁹ All conditionals were ranked based on their average distance to all other conditionals. As a number of conditionals have equal average distance, which is not surprising given the number of conditionals in the corpus, the five representative conditionals in (402)-(406) below are a random selection from the conditionals with the lowest average distance (i.e., highest representativity).

- (402) Nederland is voor werkgevers goedkoop als het gaat om loonkosten.
(fn006272)
The Netherlands is cost-effective for employers when it comes to labour costs.
- (403) De overlevingskans van een baby wordt kleiner als de moeder rookt.
(fn006645)
A baby's survival rate decreases if the mother smokes.
- (404) Voor de nieuw toegetreden verzekeraar ligt dat anders als de gemelde omstandigheid tegelijkertijd dateert van voor het oversluiten naar hem.
(WR-X-A-A-journals-nthr-008)
This is different for the newly joined insurer if the reported circumstance simultaneously dates from before the transfer.
- (405) Nederland staat nog steeds bij de top drie in de wereld als [het] gaat ook om kwaliteit van bulkproducten.
(fn000221)
The Netherlands is still among the top three in the world {if/when} [it] also comes to the quality of bulk products.
- (406) De Noren komen terug als de regering en de president hun ruzie bijleggen.
(WR-P-P-G-0000116371)
The Norwegians return {if/when} the government and the president settle their quarrel.

Looking at these examples, the question may rise why these examples are considered representative conditionals. Here, ‘representativity’ is a purely quantitative notion, based on the difference between conditionals in terms of their features. What we see in the examples in (402) to (406) is that these conditionals all agree on the features selected in the previous section: they have simple present tense in both clauses, no modal marking and no negation in either clause, declarative consequents, and, more surprisingly, sentence-final antecedents. This is surprising because the sentence-initial order is presented as the default clause order throughout the literature (see section 5.2). What this

²⁹Please note that this does not mean that no conditionals had a distance lower than 0.31 or higher than 0.84, as these summary data represent mean distances.

shows, is that conditionals with sentence-final antecedents show stronger agreement on the other features than conditionals with sentence-initial or sentence-medial antecedents.

Having carried out the same procedure on the distances calculated using all variables, we can see that a small amount of variation indeed only occurs in person and number of subjects in antecedents (23% 2ps, 77% 3ps; variation occurring in the bottom of the top-100), and no variation in person and number of subjects in consequents (100% 3ps). None of the clauses contain any form of negation, and all have simple present tense in both clauses. Modal marking is absent too from the top-100 in both clauses. Aspect does show some variation in the antecedent (15% achievement, 85% state), but none in the consequent (100% state). There was considerable variation in syntactic patterns (comprised of clause order and syntactic integration, see section C.2 in Appendix C), with 58% sentence-final antecedents, 33% integrative conditionals and 9% resumptive patterns.³⁰ What this suggests, is that the selected variables do not vary for the most similar conditionals and provide the most robust basis for similarity measuring in the dataset, and that the variables showing variation have less impact on the similarity between conditionals. This does not hold for syntactic integration, which, as we have seen before, may introduce unused variation in the dataset. From these results, we can already observe that only (403) and (406) are of the ‘prototypical’ predictive (i.e., causal) type. We should not draw strong conclusions from this, however, although it might indicate that the features used are not able to differentiate between the types discussed in the literature. This will point will be taken up later on in this chapter.

Next, we will look at the least representative examples, i.e., those conditionals which, on average, share the least features with all other conditionals, presented in (407)-(411).

- (407) Als we dit niet hadden gewild dan hadden we er maar niet moeten gaan wonen. (WR-U-E-A-0000000078)
If we hadn't wanted this we shouldn't have decided to live there.

- (408) Ik zou van [mevrouw] Van Gent willen vragen of zij dan niet juist zou vinden dat als je verlof zou betalen tegen een bepaald percentage van het wettelijke minimumloon juist dat niet meer uh nivellerend zou werken dan wanneer je het zou betalen tegen een percentage van het salaris. (fn000167)
I would like to ask Ms Van Gent whether she would agree that if you paid leave at a certain percentage of the statutory minimum wage, it would work more levelling than if you paid leave at a percentage of the salary.

³⁰Please note that the distribution of these 100 conditionals is evenly spread over mode (47% spoken, 53% written) and somewhat less evenly over register (61% formal, 39% informal).

- (409) En als we ergens mee kunnen helpen zou al uh ongepast zijn als je dan niet zou doen. (fn008220)
And if we can help with anything, uh, it would be inappropriate if you didn't.
- (410) De Franse president Chirac en de Duitse kanselier Schröder zouden Prodi bij wijze van spreken om de nek zijn gevlogen als hij Solbes – de man die met ijzeren hand regeert over de begrotingstekorten in de lidstaten – in deze economisch zware tijd onschadelijk zou hebben gemaakt.³¹ (WR-P-P-G-0000105269)
The French President Chirac and the German Chancellor Schröder would have hugged Prodi, so to speak, if he would have defused Solbes – the man who rules the budget deficits in the Member States with iron – in this economically difficult time.
- (411) Met de afspraak van als niet zou lopen dat we dan meteen vrij snel zouden gaan zakken. (fn008261)
With the agreement that if it were not to work out, we would immediately go down rather quickly.

What we see here is variation across features in these examples. Although all features show variation, I focus here on the most notable difference with respect to the representative examples in (402) to (406). As we can see in (407) to (411), all examples license an implicature of unassertiveness, which we discussed in terms of ‘epistemic distancing’ in section 2.5.4, and which corresponds mostly to a counterfactual interpretation. This implicature seems to be licensed by past verb tenses in combination with modal marking, as all examples except the conditional in (407) feature the past tense of the modal auxiliary *zullen* ‘will’ (*zou* ‘would’). More specifically, there is a higher percentage for simple past in both clauses (49% and 48%), and lower frequencies for simple present (22% and 35%), past perfect (20% and 16%), and present perfect (9% and 1%). With respect to modality, we see that antecedents are most frequently unmarked for modality (40%), followed by marking of epistemic, dynamic, deontic and evidential modality (39%, 12%, 5% and 4% respectively), whereas consequents are most frequently marked for epistemic modality (49%), followed by no modal marking, marking of dynamic, deontic and evidential modality (27%, 12%, 9% and 3% respectively). Another indication of the counterfactuality of these examples can be observed in the high frequency of negation, which was already hypothesised by Wierzbicka (1997) as discussed in section 3.2.10, as most of the clauses feature syntactic negation (72% for antecedents, 63% for consequents), with lower frequencies for non-negated clauses (15% and 21% respectively) and morphologically negated clauses (13% and 16%). These distanced or counterfactual conditionals thus differ from other conditionals on the features mentioned, with the strongest deviations in tense, modality and negation patterns.

³¹This example is repeated from page 269.

In other words, as most conditionals have simple present tense in both clauses, and no modal marking or negation in either clause, diverging tense, modality and negation patterns quickly add up to the average distance, and it is therefore expected that these least representative conditionals will form a group in consequent clustering results in section 6.4. To complete the description of the least representative set of conditionals, I note here that there is more variation in clause order and syntactic integration too. Whereas the representative examples showed an exclusive preference for sentence-final antecedents, non-representative examples also have a preference for this clause order, but less strongly so (33%), followed by the integrative pattern (26%), resumption (25%), sentence-medial antecedents (9%) and, finally, non-integration (7%).

The inspection of the most and least representative examples, and especially the latter, give but an indication of how conditionals are ranked by means of their average dissimilarity to the other conditionals in the corpus. Nevertheless, the fact that the least representative examples all appear to be clearly marked for epistemic distance or counterfactuality is an interesting result in itself, because it suggests that this specific implicature of unassertiveness is indeed marked by grammatical means, and it is expected that this result will be reflected in the clustering results, which we will discuss next.

6.3.8 Conclusion

Based on literature discussed in chapter 3, I selected features of conditionals that were suggested to be related to implicatures of unassertiveness and connectedness. As discussed in terms in the previous section, it is expected that the repeated use of certain patterns of these features has conventionalised into grammatical constructions, i.e., pairings of form and meaning. While the literature does indeed suggest incorporating the grammatical form of the conditional as a complete complex sentence, it is of course possible that the implicatures central in this dissertation remain particular instead of generalised or conventionalised, and cannot in fact be analysed as grammatical constructions. In that case, the dataset is not expected to show signs of underlying structures. To address this very issue, I evaluated the clusterability of the dataset in this section. Both the theoretical and statistical assessment of the distance matrices suggested removing aspect, person and number, and focus particles from the dataset to improve clusterability. The evaluations of the final feature set indicate Gower's measure and the Eskin measure to be the most promising for the current dataset, as they produce stress levels indicating reasonable levels of clusterability. The distance matrices also allowed for the identification of the most and least representative conditionals in the corpus, and the especially the latter group showed clear signs of patterns of features related to implicatures of unassertiveness. None of the tests provided definitive grounds for definitive conclusions on clusterability, however. A likely reason for this is that the available tests and evaluations used originate from the field of machine learning and are tested mainly on numerical data, whereas the current linguistic dataset

consists of categorical data. The results were therefore treated as preliminary evaluations, rather than definitive assessments clusterability. Consequently, all distance measures will be included in the final clustering analyses, which we will turn to in the next section.

6.4 Clustering and evaluation

6.4.1 Introduction

Now we have performed all preparatory steps, we can finally turn to the clustering of conditionals to explore and assess relations between the form and meaning of conditionals. In more specific terms, we will explore the extent to which the grammatical features of Dutch conditionals selected systematically license implicatures of unassertiveness and connectedness, and thus can be seen as grammatical constructions.

In this section, the distance matrices presented in the previous section function as input for two types of cluster analysis. In section 6.4.2, I will discuss the main clustering algorithms used, and in section 6.4.3, the evaluation methods of clustering solutions will be introduced. In section 6.4.4 I will present, evaluate and discuss the results of the hierarchical clustering approach used, and in section 6.4.5, I will do the same for the partitional approach. By means of a choice for the optimal clustering solution, a conclusion is presented in section 6.4.6, before moving on to the analysis of the clusters in section 6.5, in which I will focus on the relation between the clusters and the implicatures of unassertiveness and connectedness central in this dissertation.

6.4.2 Clustering algorithms

While there exist many clustering algorithms, the most notable types are *partitional*, *hierarchical* and *model-based* or *density-based* clustering algorithms (for overviews, see Aggarwal, 2014, chapter 1; Ester, 2014). I discuss each of these algorithms briefly, before selecting the appropriate algorithms to use in the remainder of this section.³²

Partitional algorithms such as *K-means clustering* (MacQueen, 1967; Kaufman & Rousseeuw, 1990, pp. 113–114) and *K-medoids clustering* or *Partitioning Around Medoids (PAM)* (Kaufman & Rousseeuw, 1990, chapter 2) simultaneously attempt to divide a dataset into k groups, with k set to a constant value by the researcher. While setting k to a constant value may seem

³²Model-based clustering assumes the data come from a number (k) of Gaussian distributions (see Fraley & Raftery, 2002, p. 612), as is discussed in section C.4 of Appendix C. Important limitations exist, however, including the aforementioned assumption of Gaussian-distributed data, and problems with high-dimensional and large datasets (cf. Fraley & Raftery, 2002, pp. 625–628). This type of clustering was therefore discarded for use in this study, and will not be discussed further.

problematic, as the number of groups is not always known beforehand, an often used solution is to generate clustering solutions for a range of k -values and then selecting the best solution from the results. Partitional algorithms search for partitions in which the within-cluster variance is minimised, while the between-cluster variance is maximised. Although this might be said to be the aim of all types of clustering algorithms, the difference with hierarchical clustering (see below), is that partitional algorithms do not work by step-wise grouping or dividing pairs of (clusters of) observations, and it therefore does not suffer from ‘the defect that it can never repair what was done in previous steps’ (Kaufman & Rousseeuw, 1990, p. 44; see also Oyelade et al., 2016), which is the case for hierarchical algorithms. On the other hand, it does not provide a hierarchy of clusters, which is sometimes wanted, for example when uncovering evolutionary trees in biological studies (Rohlf, 1970; Sneath & Sokal, 1973; Murtagh & Contreras, 2017, for a recent overview). A partitional clustering algorithm ‘simply’ divides the dataset into non-overlapping subsets. The requirements are that there cannot be empty clusters, and each observation must belong to exactly one cluster (cf. the concept of ‘mutual exclusivity’ discussed in section 6.2.3). This latter requirement is loosened somewhat in a special type of partitional algorithms, namely *fuzzy partitioning*, implemented in algorithms such as *Fuzzy c-means clustering* or *FCM* (cf. Bezdek, Ehrlich & Full, 1984), and *Fuzzy Analysis* or *FANNY* (see Kaufman & Rousseeuw, 1990, chapter 4). These algorithms do not provide so-called ‘hard clustering’ solutions, in which each observation must belong to one cluster only, but they provide ‘soft clustering’ solutions, in which each observation is scored on ‘degree of belonging’ for each cluster, quantified as membership coefficients between 0 and 1 (see Kaufman & Rousseeuw, 1990, p. 164). The advantage of this ‘fuzzy approach’ is that it takes into account that real data do not always contain clear-cut cases only. The disadvantage is that computation times are considerably longer for large datasets and that the results are harder to interpret, because many observations may belong to multiple clusters.

In contrast to partitional algorithms, hierarchical clustering algorithms work incrementally, either top-down or bottom-up (for an accessible introduction, see Andritsos & Tsaparas, 2010). Top-down or *divisive* algorithms divide the data into two clusters recursively until all data are clustered, implemented in divisive algorithms such as *Divisive Analysis* or *Diana* (see Kaufman & Rousseeuw, 1990, chapter 6). This algorithm starts off from one cluster in which all data are gathered, and then splits it until every observations forms its own cluster. At each step, the observation with the largest distance to the other observations is treated as a cluster, and all other observations closer to this cluster than to the rest of the observations are added to the cluster. Bottom-up or *agglomerative* algorithms such as *Agglomerative Nesting* or *Agnes* (see Kaufman & Rousseeuw, 1990, chapter 5), begin with a cluster for each observation and combine nearest clusters until the top of the hierarchy is reached, i.e., until the number of clusters k is 1. Divisive and agglomerative clustering algorithms produce a hierarchical clustering solution, which can be represented in a tree-structure, known as a

dendrogram. As mentioned above, depending on theoretical foundations, such tree-structures can be interpreted as ‘a sufficiently accurate model of underlying evolutionary progression’ (Murtagh & Contreras, 2017, p. 3). In contrast to partitional algorithms, the number of clusters k is thus not pre-defined and rather refers to the moment (or ‘height’ in the tree-structure) at which groups are defined.

Choosing an algorithm depends on the nature of the data and theoretical considerations.³³ Theoretically, and with respect to cognitive theories, the choice for both a partitional or a hierarchical approach can be defended. As discussed by Divjak (2010, pp. 9–10), on the one hand, Langacker (1987, pp. 369–371) argues complex categories are best viewed as ‘(hierarchical) schematic networks of interrelated senses’, in which a schema is an abstraction compatible with all (more concrete) members it defines, while, on the other hand, Lakoff (1987, pp. 83–84) views categorisation as a radial structure, in which no hierarchy exists, but categories are built around a ‘central case’ and conventionalised (i.e., non-rule generated) variations on this central case. Langacker’s view would promote a hierarchical approach, whereas Lakoff’s view would promote a partitional approach. With respect to conditionals, given the arguments by Dancygier (1998, pp. 184–185) and Athanasiadou and Dirven (1997a, p. 89), already briefly discussed in section 6.2 and in sections 3.3.7 and 3.3.9 before, hierarchical clustering is favoured because less prototypical conditionals can be seen not as part of distinct subsets, but as specifications of the properties of conditionals in general. In both clustering approaches, prototypes can be identified by measuring how well they fit or define their cluster, for instance by calculating the ‘silhouette widths’ of clusters, as we will see below. Another, more methodological consideration is that hierarchical methods have been tested more extensively on categorical data, especially in corpus linguistic studies (Faure & Nédellec, 1998; Gries & Stefanowitsch, 2010; Divjak & Gries, 2006; Divjak & Gries, 2008; Berez & Gries, 2008; Hilpert & Gries, 2009; Gries, 2010; Gries & Otani, 2010; Gabrielatos, 2010, pp. 52–53; Levshina, 2011, chapters 4, 5; see also Tang, 2017). A downside is that this is a form of ‘hard clustering’, and it may be said that conditionals may exhibit less clear-cut boundaries and membership should be expressed in probabilistic instead of deterministic terms.

Both hierarchical and partitional approaches have their theoretical merits. While the hierarchical approach is more frequently applied in linguistic studies, this is not a reason to discard the partitional approach to clustering. As this study can be seen as both an exploration of Dutch conditionals as grammatical constructions, and as an exploration of applying advanced data analysis methods to linguistic data, I will subject the dataset to both types of clustering, and I will use several indices to evaluate their results. We will discuss these measures of cluster evaluation in the next section.

³³The choice for an algorithm also depends on available implementations, and although this should, of course, not be the primary reason for algorithm choice, in a practical sense, it is an important factor.

6.4.3 Measures of cluster evaluation

As is suggested in most of the literature on unsupervised machine-learning techniques (see section C.4 of Appendix C), the most common strategy for choosing a type of clustering, a specific algorithm and determining its parameters, such as number of clusters k , is to try different solutions and evaluate the results, both internally and comparatively. As we discussed in section 6.2, direct validation using external labels is not possible for unsupervised machine-learning, and Jain and Dubes (1988) provocatively describe the nature of cluster validation as follows.³⁴

The validation of clustering structures is the most difficult and frustrating part of cluster analysis. Without a strong effort in this direction, cluster analysis will remain a black art accessible only to those true believers who have experience and great courage. (Jain & Dubes, 1988, p. 222)

As no class labels are available, the question remains how to evaluate outcomes of clustering algorithms. I will validate the results of both hierarchical clustering (section 6.4.4) and partitional clustering (section 6.4.5) using a number of indices of cluster validity. The reason for multiple indices is that each index measures another aspect (or combination of aspects) of the quality of a particular clustering solution, for instance a measure of how well clusters are separated, or how consistently conditionals have been assigned to clusters. Unfortunately, this means that no single index can answer the question of what grouping of data is best, somewhat like the example of cutlery discussed at the start of this chapter. I will describe the indices used in general terms here, but they are discussed in (technical) detail, including references, in section D.2 of Appendix D.

For cluster homogeneity, Within-Cluster Entropy (WCE) (Šulc & Řezanková, 2019) was used. A low WCE value indicates low within-cluster variability and high homogeneity. For cluster separation, the Pseudo F Coefficient based on Entropy (PsFE; Sevcik, Rezankova & Husek, 2011; Šulc, 2016) was used. A high PsFE value indicates strong cluster separation. For cluster consistency, the Silhouette Coefficient (Kaufman & Rousseeuw, 1990) was used. A high Silhouette Coefficient indicates strong cluster structures. For dispersion over clusters, Deviation from the Mode (DM ; Wilcox, 1973) was used. Low values indicates extreme differences in cluster size, i.e., the risk of ending up with clusters of only one or two conditionals. Finally, for cluster stability, the Jaccard Coefficient (Hennig, 2007) was used. A high coefficient indicates stable clustering.

³⁴There exist alternative approaches, such as ‘semi-supervised’ algorithms which evaluate classification based on a small number of labels. See e.g., Chapelle, Schölkopf and Zien (2006).

As mentioned, there is no one value that will indicate ‘the best’ clustering solution, and therefore I will combine these indices and compare them between solutions. This will be the topic of the following two sections, starting with the evaluation of hierarchical clustering solutions in 6.4.4, followed by the evaluation of partitional clustering solutions in 6.4.5.

6.4.4 Hierarchical clustering

As discussed in section 6.4.2 above, hierarchical cluster algorithms can be either of the *agglomerative* or *divisive* kind, although most studies only mention ‘hierarchical cluster analysis’ in referring to agglomerative clustering. Because computation for agglomerative clustering is both more efficient than divisive clustering (Kaufman & Rousseeuw, 1990, p. 253) and used more widely in various fields, including corpus linguistics (Gries & Stefanowitsch, 2010, see e.g., Divjak, 2010; Levshina, 2011), I used agglomerative cluster analysis as well. The most important parameters of hierarchical algorithms are the number of clusters k , as discussed above, and *linkage*. Linkage determines how an algorithm calculates the distance between two clusters, i.e., how the ‘closeness’ of two clusters is defined (see Kaufman & Rousseeuw, 1990, pp. 45–48). Using single linkage, the similarity between two clusters is defined as the distance between their two most similar members, and consequently, this local approach merges the two clusters with the smallest distance between their most similar members. Using complete linkage, the similarity of two clusters is defined as the distance between their two most dissimilar members. The complete linkage criterion is non-local, as it is influenced by complete clusters, which lie in between the most dissimilar members of each cluster, instead of only their closest areas. Average linkage is a compromise between single and complete linkage, and it measures the distance between two clusters in terms of the difference between the average of the dissimilarities of all their respective members. Finally, there is Ward’s *Minimum Variance Method* (cf. Ward, 1963), which calculates the distance from each observation to the centroid (the mean distance) of the cluster it is assigned to. All combinations of k and linkage were systematically evaluated using the evaluation criteria discussed. A detailed account of the results can be found in section D.3 of Appendix D.

After evaluating clustering solutions in terms of homogeneity, separation, consistency, dispersion, and stability, the next step was to select the optimal solution. This was, as discussed, not a trivial task, as the evaluation measures mentioned all reflect different qualities of the solutions generated, and no one combination of linkage methods and distance measures proves uniformly superior. As a first step, I have discarded solutions with low dispersion values. Dispersion allowed for discarding solutions that score high on the other measures, but in reality propose one very big cluster and a small number of clusters with only a small number of conditionals. Second, unstable solutions were discarded, as low stability indicates that the results are highly dependent on sampling. This excluded solutions with single and complete linkage, and thus left solu-

tions generated using average and Ward's linkage (see section D.3 in Appendix D for details). Third, using Silhouette Coefficients, we see relatively high and stable consistency values for 4- to 6-cluster solutions for the Lin measure. Most solutions, however, should be interpreted with caution, as the structures found have consistency values mostly between 0.4 and 0.5 on a scale from 0 (no structure) to 1 (perfect structure). As the Lin measure produced solutions with Silhouette Coefficients just below 0.5, this suggests that somewhat reasonable structures were found. It must be noted, however, that these clustering results are not in line with the evaluation of clusterability by dimension reduction in discussed in section 6.3.5.³⁵ Fourth, evaluation of within-cluster variation shows lowest values for solutions using the Lin measure, average linkage and k 4-6, which means that these solutions hold the most homogeneous clusters. After discarding remaining solutions based on low Silhouette Coefficients (VE, VM) or low dispersion values (IOF), cluster separation was measured in terms of PsFE. This, again, was highest for 2- to 6-cluster solutions using the Lin measure with average linkage, which means that these solutions not only hold homogeneous clusters, but also that these clusters are more clearly separated than in other solutions. These combined evaluations suggest the 4- to 6-cluster solutions based on the Lin measure with average linkage to be the optimal hierarchical solutions for the current dataset.

In Table 6.6 below, the membership distributions of the selected hierarchical clustering solutions are presented. These figures show the sizes of the clusters for the 4, 5 and 6 k solutions. We can, for instance, see that the third cluster is the biggest, followed by cluster 1 and 2, whereas clusters 4, 5 and 6 are relatively small.

Table 6.6:

Membership distributions of Lin average-linkage solutions (4-6 clusters)

	Cl. 1	%	Cl. 2	%	Cl. 3	%	Cl. 4	%	Cl. 5	%	Cl. 6	%
4 cl.	597	14.53	546	13.29	2774	67.51	192	4.67				
5 cl.	597	14.53	546	13.29	2401	58.43	373	9.08	192	4.67		
5 cl.	597	14.53	546	13.29	2021	49.18	373	9.08	192	4.67	380	9.25

The solutions are stable in their membership distributions in the first two clusters, and in the fourth cluster of the 4-cluster solution, which is the fifth cluster in the 5- and 6-cluster solutions. This is due to the hierarchical nature

³⁵Note that this should not have large repercussions for the discussion of representative conditionals in section 6.3.7, as the the average Eskin distances used there and the Lin measure selected here are positively correlated, as indicated by a Spearman's correlation test ($R_s = 0.90$, $p < 0.001$). This test was chosen over Pearson's Correlation Coefficient because it does not require normally distributed variables (see section 6.3.5).

of the clustering. The added clusters in these latter solutions all come from the biggest cluster (cluster 3), which was split into a new cluster in the 5-cluster solution and into two new clusters in the 6-cluster solution.

While a possible next step is to review the actual contents of these clusters, we will first review the evaluations of clustering solutions using partitional algorithms, which then can be compared to the results of hierarchical clustering, before analysing the results with respect to implicatures of unassertiveness and connectedness, and their possible relations to the feature distributions in each cluster.

6.4.5 Partitional clustering

As discussed in section 6.4.2 above, partitional algorithms do not incrementally build a structure in either top-down (*divisive*) or bottom-up (*agglomerative*) fashion, but they consider all distances at once. In general, partitional algorithms first select the k most representative observations from the dataset (*centrotypes*, or *medoids*), and then k clusters are formed around these representative observations by choosing the closest representative object for each of the other observations. The two main parameters are the specific algorithm used, and the number of clusters k . Two algorithms were used in this study, of which the first was ‘Partitioning Around Medoids’ (PAM), described in section 6.4.2. This algorithm was selected because of its widespread application, also to categorical datasets (see e.g., Ladds et al., 2018; for linguistics-oriented studies using *PAM*, see Douven, 2017a; Wälchli, 2018). The algorithm works in two steps. First, in the so-called ‘build phase’, the algorithm selects k ‘medoids’ (i.e., most representative points) and it allocates each observation to the nearest medoid. Second, in the ‘swap phase’, changes are made to the allocation of observations to medoids and the average dissimilarity per cluster is calculated. This is done until the average dissimilarity no longer decreases. As an observation can only be member of one cluster, this is a form of hard-clustering. The second algorithm used was ‘Fuzzy Analysis’ (FANNY), which is a form of soft-clustering, as it assigns to each object a membership coefficient indicating how well that particular object fits within each cluster. In contrast to PAM, this approach does not choose representative observations as medoids, but it minimises the dispersion over all clusters for each observation. The algorithm is also capable of hard-clustering by simply selecting the cluster with the highest membership coefficient for each object. The second parameter is the number of clusters k , which should be defined on a theoretical basis, and/or, as was done in this study, evaluated for a range values for k . Note that linkage is not relevant for these algorithms, because each membership assignment is determined by comparison of two objects only: the cluster-representative and the observation to assign membership to. The results of the combinations of algorithm and number of clusters were systematically evaluated using the same evaluation criteria as discussed in the previous section. A detailed account of the results can be found in section D.4 of Appendix D.

As was the case with the evaluation of hierarchical clustering solutions, no single combination of algorithm and distance measures proved uniformly superior to other solutions, and selecting the optimal solution remains a non-trivial, to some degree interpretive task of the researcher. First, I discarded solutions with low dispersion values, and second, those with low stability values. These evaluations allowed discarding all solutions using the Goodall and VE measures, and in case of the FANNY algorithm, solutions generated using the VM measure. Third, using Silhouette Coefficients, I identified relatively high and stable values for 2- to 4-cluster solutions for the Lin and Lin1 measures. These solutions have Silhouette Coefficients around 0.5, which is around the lower bound of what Kaufman and Rousseeuw (1990, p. 88) call ‘reasonable structure’. Fourth, within-cluster variation was similar for most measures in the PAM solutions, but, again, for FANNY the lowest values, reflecting the most homogeneous clusters, were found for 2- to 4-cluster solutions for the Lin and Lin1 measures. Cluster-separation, measured in terms of PsFE, was high and most stable for these solutions too. While PAM seems to produce better on average, we can see here that the FANNY algorithm using the Lin1 measure produced the highest Silhouette Coefficients for 2- to 4-cluster solutions, while having low within-cluster variability, highest between cluster separation values, average to high dispersion values, and high stability values. The combined evaluations suggest the 2- to 4-cluster FANNY solutions based on the Lin1 measure to be the optimal partitional solutions for the current dataset.

In Table 6.7 below, the membership distributions of the selected partitional solutions are presented. These figures show that partitional solutions involve more evenly distributed cluster memberships in contrast to the hierarchical solutions selected in the previous section.

Table 6.7:

Membership distributions of Lin1 FANNY solutions (2-4 clusters)

	Cl. 1	%	Cl. 2	%	Cl. 3	%	Cl. 4	%
2 cl.	1638	39.86	2471	60.14				
3 cl.	1337	32.54	1633	39.74	1139	27.72		
4 cl.	1058	25.75	658	16.01	1394	33.93	999	24.31

In all three solutions, there is one larger cluster and one or a number of smaller cluster, which, however, are still sizeable. Please note that, for reasons of comparison to the results of hierarchical clustering, Table 6.7 presents the hard-clustering results. See section D.4 of Appendix D for membership coefficients for each of the solutions above.

6.4.6 Conclusion

In the previous two sections, we discussed the evaluations of a large number of systematically generated clustering solutions, using both hierarchical and partitional algorithms. For both approaches, one set of solutions (comprised of a small range of cluster numbers k) was selected. For the hierarchical approach to clustering, this was the Lin measure using average linking and k 4-6. For the partitional approach to clustering, the FANNY algorithm using the Lin1 measure and k 2-4 was selected. As the Silhouette Coefficients for these solutions were around 0.5 (the minimum for ‘reasonable structure’ cf. Kaufman and Rousseeuw, 1990, p. 88), and only quantitative measures were used to arrive at these two sets of solutions, the real test is, of course, to interpret the results in qualitative terms, i.e., can the data-driven clusters be motivated theoretically with respect to grammatical features and implicatures? This will be the main question in the next section.

6.5 Analysis of hierarchical clusters

6.5.1 Introduction

In this section, I analyse the clusters present in the hierarchical solutions in terms of their distributions of grammatical features and possible implicatures of unassertiveness and connectedness. I will discuss these implicatures, introduced at the start of this dissertation in chapter 2, in relation to the types distinguished in the accounts discussed in chapter 3 and the features distilled from these accounts and inventoried in chapter 5. For each cluster, I will first discuss its internal feature distribution, and I will present conditionals representative of that cluster. Next, the conditionals in the cluster are analysed in term of the implicatures discussed in chapter 2, and these are compared to possible matches on types of conditionals from the accounts discussed in chapter 3.

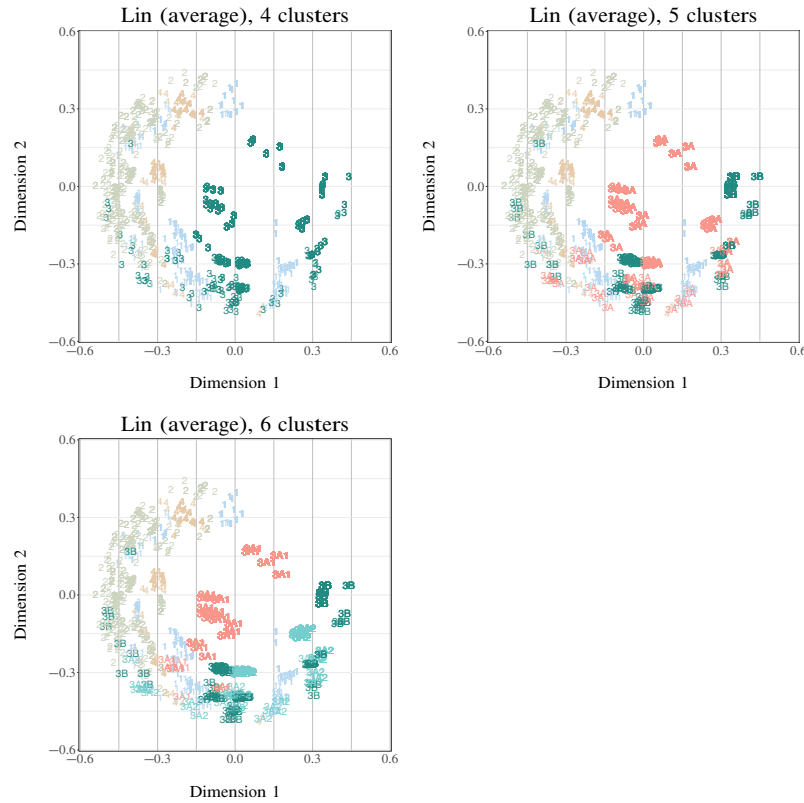
In section 6.5.2, I will present an overview of the hierarchical clustering solution and the feature distributions for each cluster. Then, in section 6.5.3, I will offer a preliminary remark with respect to the comparison of clusters and types of conditionals, which is needed before we can move on to sections 6.5.4 to 6.5.7, in which I will discuss each cluster in the fashion outlined above. As the evaluations in section 6.4.4 did not provide definitive arguments for a 4-, 5- or 6-cluster solution, the additional clusters will be discussed in section 6.5.8. In section 6.5.9 I will provide a brief conclusion on the results of hierarchical clustering, before moving on to the analysis of the partitional clusters in section 6.6.

6.5.2 Clusters and feature distributions

In section 6.4, I selected the 4- to-6 cluster solutions that were generated using the Lin measure and average linkage. In this section, I inspect the characteristics of each cluster. In order to visualise the clusters, the same dimension reduction technique as in section 6.3.5 was used, i.e., non-metric dimensional scaling (NMDS). As the clustering has been performed at this point, however, it is possible to add cluster memberships to the existing configuration to see whether memberships are systematically placed on the ordination axes, as can be seen in Figure 6.5.³⁶

³⁶Due to the large number of observations, the traditional visualisation of hierarchical clustering solutions, i.e., a dendrogram, provides a less insightful, and harder to read overall picture. As it is the standard, however, a dendrogram is included in section D.5 of Appendix D.

Figure 6.5:
NMDS configurations with memberships from hierarchical clustering



Note. All configurations are based on two-dimensional ordination.

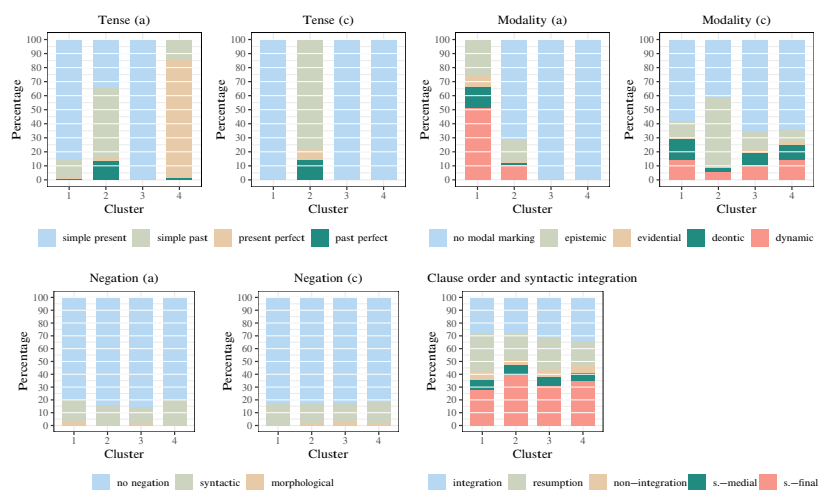
As a reminder of what was already observed in sections 6.3 and 6.4, in terms of stress levels and separation in the NMDS configurations (see Figure 6.4 in section 6.3.6), Lin did not perform as well as other measures. The measure did, however, perform best with respect to the cluster evaluations presented in section 6.4. As these evaluations are more specific to the clustering aim in this study, they are well-tested on categorical data, and the provided converging evidence, Lin was chosen over the other measures.

What we see in the left panel of Figure 6.5, which presents the results of the 4-cluster solution, is that the largest cluster, cluster 3 (67.51%), is positioned towards the lower-right corner of the configuration. The second largest cluster, cluster 1 (14.53%), is not well-separated from the other clusters, whereas cluster

2 (13.29%) is, being positioned at the upper-left hand of the configuration. The smallest cluster, cluster 4 (4.67%), finally, is positioned at the left, with most of the observations on the upper-half of the configuration. In the middle panel of Figure 6.5, we can see how cluster 3 is sub-divided into clusters 3A (middle) and 3B (lower-right), and in the right panel we see that, when a 6-cluster solution is selected, cluster 3A from the middle panel is sub-divided into clusters 3A1 and 3A2, which show clear separation occupying the groups of conditionals in the middle of the panel, and, predominantly, the lower-right respectively. In summary, we can see that clusters 2 and 4 overlap strongly, but combined they are clearly separated from the largest cluster, cluster 3. Cluster 1 shows overlap with virtually all other clusters.³⁷

Before discussing each cluster in more detail, their feature distributions are presented in Figure 6.6 below.

Figure 6.6:
Feature distributions for the hierarchical 4-cluster solution



Note. These distributions represent clusters generated using the Lin measure and average linkage. Numbers on the horizontal axes correspond to cluster numbers reported in this section.

In sections 6.5.4 to 6.5.7, we will review the clusters in the 4-cluster solution.

³⁷Any hierarchical information is lost in these two-dimensional NMDS configurations. Therefore, see also the dendrogram in section D.5 of Appendix D.

6.5.3 A note on comparing clusters and types

Before discussing the clusters in the next sections, a remark on the comparison between these clusters and types of conditionals proposed in the literature is in order. As discussed in chapter 4, there were several reasons not to annotate each conditional in the corpus for the type of conditional (see section 4.3.3). In short, I provided the following three arguments. First, annotating types of conditionals based on language-specific features of English conditionals may not be applicable to Dutch conditionals, as it would assume universal or non-language specific types to exist. Second, choosing a number of classifications to apply would introduce theoretical bias, possibly discarding useful classifications. Third, and most pressing for the remainder of this chapter, applying theoretical classifications to actual corpus data revealed low reliability. Therefore, comparing the conditionals in the clusters found to types from classifications, as I will do below, is not without problems, and I will briefly discuss this point here.

The comparison between types and clusters of conditionals must be seen as an attempt to interpret the results in light of the theory, not as applying a ‘gold standard’ and thereby reintroducing the problems addressed above (see also section 6.2.5). Although, of course, not all conditionals will equally likely resist clear-cut classification (for an elaborate discussion, see section 4.2), and there will undoubtedly be conditionals that do constitute clear types from the literature, the comparisons in what follows must be seen as what could be called a ‘silver standard’ approach,³⁸ akin to Beekhuizen, Watson and Stevenson’s (2017) approach in comparing clusters of indefinite pronouns to their semantic function in terms of Haspelmath’s (1997) account. To be clear on terms, note that multiple uses of the concept of ‘silver standard’ annotations can be found in the literature on evaluating clustering results. Kang, van Mulligen and Kors (2012) for instance, use the term to refer to part-of-speech tags that are ‘automatically generated by combining the outputs of multiple chunking systems’ in order to circumvent the expensive and time-consuming creation of a gold standard. Estiri, Klann and Murphy (2019) on the other hand define their silver standard in terms of expert judgement, literature search and data distributions. Ménard and Mougeot (2019) use the term, in line with Rebholz-Schuhman et al. (2010), to refer to annotations of lower quality than gold standards, as they are not produced by ‘expert annotators’, but ‘manually by human agents’ or ‘automatically by tools or trained prediction models’. In what follows, I use the term to refer to judgements based on a thorough discussion of the theory, as reflected in chapters 3 and 5, with the notable difference that the ‘standard’ here involves inspection of representative examples of each cluster, instead of a complete label set, for which the aforementioned arguments against attempting to construct a gold standard would apply. This approach takes into account

³⁸Suggested by B.F. Beekhuizen (personal communication, July 8, 2020).

those arguments, while utilising the insights the extensive literature provides. With this remark in place, we can continue by discussing the first cluster of conditionals in the next section.

6.5.4 Unmarked or default conditionals (cluster 3)

The largest cluster, cluster 3 in Figure 6.5 and Figure 6.6, holds 2774 or 67.51% of all conditionals in the corpus. It is therefore expected that this cluster can be described as the unmarked type of conditional. Indeed, as we can see in Figure 6.6 above, this cluster is the one least marked in terms of verb tense, as it adheres mostly to the prevalence of the simple present tense in both clauses as discussed in section 5.4. With respect to modality, antecedents rarely contain any modal marking, as expected, whereas consequents are marked for modality in 34.35%, mostly for epistemic modality (12.83%), as in (412), followed by dynamic modality (10.56%) and deontic modality (8.69%), as in (414). In a minority of cases, antecedents and consequents in this cluster contain negation, and as Figure 6.6 suggests, this in line with the other clusters formed. Representative examples of this cluster are presented in (412) to (414) below.³⁹

- (412) En ja als ik de alinea goed lees dan slaat dat op uh parallelimporten na vierennegentig en de mogelijke betrokkenheid van invuele [internal] overheidsfunctionarissen daarbij. (fn000142)
And yes, if I read the paragraph correctly, it refers to uh parallel imports after ninety-four and the possible involvement of internal government officials.
- (413) Door deze ziekte kan hij maar drie vingers gebruiken en dat is lastig als je piano speelt. (WR-P-P-G-0000098919)
Because of this disease, he can only use three fingers and that is difficult if you play the piano.
- (414) Als je dat gelooft zal het zeker zo lopen. (WR-P-E-A-0005330763)
If you believe that, it will certainly work out that way.

Cluster 3 thus looks like a cluster of default conditionals, which corresponds to its dominance in size. In terms of implicatures, these default conditionals do not share specific implicatures of unassertiveness or connectedness, although, as was argued for in chapter 2, they remain unassertive and they do implicate a connection between antecedent and consequent.

³⁹These examples were selected not based on highest silhouette widths per se, but based on a combination of high-ranking silhouette widths and variation in features. The reason for this is to show some of the distributional differences occurring within the cluster. In example (414), for instance, the consequent is marked for epistemic modality, although conditionals with unmarked consequents have higher silhouette widths, as they resemble the rest of the members in the cluster more closely. These examples are thus relatively representative of the cluster and its variance.

With respect to implicatures of unassertiveness, the cluster largely holds what could be called neutral conditionals, i.e., those conditionals without an implicature of, for instance, certainty or ‘actuality’, epistemic distance or counterfactuality. In terms of the accounts discussed in chapter 3 (see section 3.2), the conditionals in this cluster would be classified as present conditionals (Goodwin, 1879; section 3.2.2), undetermined conditionals (Gildersleeve, 1882; section 3.2.3), present non-implicative conditionals (cf. Sonnenschein, 1892; section 3.2.4), real and future conditionals (Kaegi, 1905; section 3.2.5), open, non-past conditionals (cf. Funk, 1985; section 3.2.6), and open conditionals (Huddleston & Pullum, 2002; section 3.2.9).

The cluster of unmarked conditionals includes those conditionals in which the uncertainty often ascribed to conditionals occurs (see section 2.5), but, with respect to implicatures of connectedness, this cluster does not differentiate between these (uncertain) predictive conditionals on the one hand, as in (414), and, speech-act conditionals as in (412), or evaluative (epistemic) conditionals, as in (413). In terms of the accounts discussed in chapter 3, the conditionals in this cluster would be classified mostly as performance conditionals (Davies, 1979; see section 3.3.3), direct-open conditionals (Quirk et al., 1985; see section 3.3.4), partially determined conditionals (Johnson-Laird, 1986; see section 3.3.5), and now conditionals (Nieuwint, 1992; see section 3.3.6). The distinction between the actualising and inferential sub-types of case-specifying conditionals from Declerck and Reed’s (2001) classification is not found in this cluster, and the distinction between predictive (content) and epistemic conditionals (Dancygier & Sweetser, 2005; see section 3.3.7) is not found in this cluster either, nor is the distinction between event and premise conditionals from Haegeman’s (2003) account (see section 3.3.10). This can be explained by the fact that the former type is defined by *will*-deletion in antecedents of English conditionals, whereas in Dutch conditionals, the simple present without *zullen* ‘will’ is used most frequently for future reference, also outside the domain of conditionals (see sections 5.4 and 5.5). With respect to future reference in consequents, the example in (414) is part of a minority of conditionals in this cluster, as the non-modalised type of consequent (i.e., a consequent without *zullen* ‘will’) found in the example in (415) below is much more frequent.

- (415) Als die niet tevreden is over de afhandelingen wordt de betrokken politie-
man daarop aangesproken. (fn005684)
*If he is not satisfied with how the case is dealt with, the police officer
involved will be approached.*

This can also be seen in the distributions of epistemic modality in Figure 6.6, which shows that the majority of conditionals in this cluster features consequents that are not marked for modality.

Although the characterisation of this largest cluster is only general, the main use of this largely unmarked cluster of what could be called default conditionals lies in its contrast with the other, smaller, and as we will see, more specialised clusters. Furthermore, this cluster does already show that a number of main

types of conditionals found in the literature were not detected by the hierarchical clustering algorithm. In the discussion in chapter 7 we will come back to the implications of this observation for the relation between grammatical features and implicatures of unassertiveness and connectedness.

6.5.5 Conditionals with antecedents marked for modality (cluster 1)

The second largest cluster holds 597 or 14.53% of all conditionals and is represented as cluster 1 in Figures 6.5 and 6.6. It has a strong preference for the simple present in the antecedent (85%), which reflects the overall distribution of that feature (see section 5.4). Consequents in this cluster have simple present verb tense exclusively, which also reflects most other clusters. Negation in both clauses too reflects the general trends reported in section 5.9. These reflections may explain why this cluster is not well separated in Figure 6.5, as was observed earlier. What differentiates this cluster from the other clusters is mostly that all of the conditionals have antecedents marked for modality, with the highest frequency for dynamic modality, as in (416) below, followed by epistemic modality and accompanied by simple past tense, as in (417), consequently followed by deontic modality, as in (418).

- (416) Als ik een proefrit wil maken dan regelen ze dat. (fn007730)
If I want to take a test drive, they will arrange that.
- (417) Als je zou versnellen dan moet het CLB in principe eerst schoolrijpheidstesten afnemen. (WR-P-E-A-0004834951)
If you were to speed up, the CLB should in principle first conduct school readiness tests.
- (418) Als wij, gynaecologen, jonge zwangere vrouwen niet mogen aanbieden te testen of hun ongeboren kind een verhoogde kans op een afwijking heeft, dan verzinnen we daar wel wat op. (WR-P-P-G-0000076619)
If we, gynaecologists, are not allowed to offer young pregnant women a test to determine whether their unborn child has an increased risk of an abnormality, we will come up with a solution.

Consequents have a higher frequency of modalisation than the first cluster (42.21%), which is largely due to higher frequencies of deontic modality (15.41%) and dynamic modality (14.07%). The relative frequency of epistemic modality (12.40%) is comparable to that in the first cluster (12.83%). With respect to syntactic integration, we see a higher frequency of sentence-final antecedents (39.93%), almost solely at cost of the resumptive pattern (19.41%).

When we try to connect the features of the conditionals in this cluster to implicatures of unassertiveness and connectedness, there is no clear unified meaning aspect to be found, apart from the fact that their antecedents are marked for *event modality* (Palmer, 2001, cf.) and express ability or willingness

mostly (i.e., dynamic modality). In a minority of cases, epistemic modality (i.e., propositional modality) is expressed by means of modal verbs in past tense, used by the speaker to distance herself from *p* in the antecedent. In terms of the literature discussed in chapter 3, we can interpret this cluster as double decision conditionals from Davies (1979) account, which, according to her, contain a ‘decision modal’ and are mostly used for making polite requests, purely case-specifying conditionals from Declerck and Reed’s (2001) account, which ‘just specify[...] the case(s)’ in which the consequent actualises, potential conditionals from Kaegi’s (1905) account, in which both the antecedent and consequent are presented as ‘purely imaginable’, conceivable situations, and the condition sub-type of hypothetical conditionals from Athanasiadou and Dirven’s (1996) account, which expresses desirable outcomes in the antecedent. Again, it is clear that there is no perfect overlap between this cluster and the types and sub-types of conditionals discussed.

6.5.6 Past tense conditionals with modalised consequents (cluster 2)

The third largest cluster holds 546 or 13.29% of all conditionals and is represented as cluster 2 in Figures 6.5 and 6.6. It is characterised, as can be seen in the examples below, by simple past (49.08%) and past perfect tense (13.92%) in the antecedent, and a strong preference for simple past tense in the consequent (78.39%), followed by past perfect (14.29%). This readily shows how strong this cluster is focused on past tense. In comparison to the unmarked cluster 3, we see a higher frequency of modalised antecedents (29.49%), with epistemic modality being most frequent (15.93%), followed by dynamic modality (10.07%). Consequents, however, have an even higher frequency of modal marked clauses (59.34%), largely marked for epistemic modality (50.55%), which can be seen in the representative examples of this cluster in the examples in (419) to (421) below.

- (419) Ik zou toch wel vaker fietsen als ik op Vossenveld woonde. (fn000573)
I would cycle more often if I lived on Vossenveld.
- (420) Als de rijkswachters eind 95 beter zijn gruwelhuis in Marcinelle hadden doorzocht, hadden zij de meisjes nog levend uit zijn kelder kunnen halen. (WR-P-P-G-0000045321)
If the gendarmes had searched his horror house in Marcinelle in late 95 better, they would have been able to get the girls out of his basement alive.
- (421) Een val in het ziekenhuis werd vastgesteld als deze in het dossier vermeld stond of bij de valincidentenregistratie was gemeld. (WR-X-A-A-journals-001)
A fall in the hospital was registered if it was mentioned in the file or was reported in the fall incident registry.

With respect to negation, the cluster does not differ from the other clusters, with a minority of 15% to 20% of antecedents and consequents containing negation. In terms of clause order, this cluster has a slightly higher percentage of sentence-final antecedents than the other clusters (39.93%), mainly at the cost of resumptive conditionals (19.41%), but otherwise, syntactic integration is comparable to the other clusters.

In contrast to the previous cluster, this cluster can be connected to a specific implicature, namely that of epistemic distancing. As can be seen in the examples in (419) and (420), the conditionals in this cluster are used to express distance, disbelief, or, depending on theoretical predisposition, counterfactuality (see section 2.5). For this, tense is instrumental, as is, to a lesser degree, modal marking. This would make a case for a what some would call a counterfactual conditional construction, but, as can also be seen in the example in (421) above, past-tense conditionals, especially of the recurrent or ‘course-of-event’ type (cf. Athanasiadou & Dirven, 1996; see section 3.3.9), are also present in this cluster. This means that the clustering algorithm did not readily differentiate between the past tense being used for epistemic distance or temporal distance. Although the algorithm has, of course, no internal knowledge of concepts like time and belief, it was expected that this distinction could have been identified based on the combination of tense and modality distributions, as epistemic distancing would have been more frequently marked by modals. I expected to see higher frequencies for negation in this cluster, as implicatures of counterfactuality are often supported by negation (see section 2.5 and especially section 3.2.10), and the least representative conditionals discussed in section 6.3.7 showed both past tense and negation. However, antecedents are negated in only 16.22% of all cases in this cluster, and consequents in 17.03%. As in the previously discussed clusters, these numbers seem to reflect the general distribution of negation mostly, which means that negation has probably not played a large role in the clustering. As already discussed in section 3.2, the ambiguity between remoteness and past time as expressed by the past tense is an issue in many accounts, for instance those by Funk (1985; see section 3.2.6), and Huddleston and Pullum (2002; see section 3.2.9). Whereas, for instance, past conditionals and ‘future conditionals with less vivid form’ as distinguished by Goodwin (1879) are not differentiated in this cluster, the cluster does reflect Funk’s (1985) category of closed conditionals, which involve both neutral and hypothetical or marked conditionals.

In terms of the accounts discussed in section 3.2, the conditionals in this cluster would be classified as conditionals implying non-fulfilment (cf. Goodwin, 1879; section 3.2.2), unreal conditionals (cf. Gildersleeve, 1882; section 3.2.3), implicative non-fulfilment conditionals (cf. Sonnenschein, 1892; section 3.2.4), unreal conditionals (cf. Kaegi, 1905; section 3.2.5), closed hypothetical conditionals (cf. Funk, 1985; section 3.2.6), imaginative conditionals, both hypothetical and counterfactuals (cf. Celce-Murcia & Larsen-Freeman, 1999; Wierzbicka,

1997; sections 3.2.7 and 3.2.10), theoretical conditionals (cf. Declerck & Reed, 2001; section 3.2.8), and remote conditionals (cf. Huddleston & Pullum, 2002; section 3.2.9).

In terms of implicatures of connectedness, the representative conditionals in this cluster all implicate a causal connection between the antecedent and consequent. This is likely to be related to the implicature of epistemic distance discussed above, as, for instance, pragmatic conditionals are not frequently distanced (see section 3.3.4). However, content or predictive conditionals (cf. Dancygier & Sweetser, 2005; section 3.3.7) or hypothetical conditionals (cf. Athanasiadou & Dirven, 1997a; section 3.3.9) have been argued to be the most frequent and prototypical type of conditionals. In terms of the accounts based on connections between antecedents and consequents, discussed in section 3.3, the conditionals in this cluster are most comparable to what direct-hypothetical conditionals (cf. Quirk et al., 1985; section 3.3.4), not-now conditionals (cf. Nieuwint, 1992; section 3.3.6), unreal conditionals (cf. Gildersleeve, 1882; section 3.2.3, cf. Kaegi, 1905; section 3.2.5), implicative conditionals (cf. Sonnenschein, 1892; section 3.2.4), and imaginative conditionals (cf. Celce-Murcia & Larsen-Freeman, 1999; section 3.2.7).

In conclusion, this cluster is marked by means of the combination of past tense in antecedents and especially consequents, and epistemic modality in consequents. These features support an implicature of unassertiveness, and more specifically, epistemic distance towards the situations expressed.

6.5.7 Conditionals with present perfect antecedents (cluster 4)

The fourth and smallest cluster holds 192 or 4.67% and is represented as cluster 4 in Figures 6.5 and 6.6. It can be characterised by the high frequency of present perfect tense in the antecedent (84.90%), followed by the simple past (13.54%) in the antecedent. Consequents in this cluster feature simple present tense exclusively, which largely reflects tense in consequents of clusters 1 and 3. Negation does not deviate from the general trend reported in section 5.9 and seen in the other clusters. Antecedents are not modalised in this cluster, and consequents are marked for modality in 36.46% of the cases, which is largely in line with clusters 1 and 3, although this cluster is marked for dynamic modality more often (14.06%) than cluster 3, followed by deontic modality (10.94%), epistemic modality (9.90%) and, in a minority of cases, evidential modality (1.56%). In terms of syntactic integration patterns, the cluster is comparable to the other clusters, with slightly more sentence-final antecedents (34.90%), slightly more integrative conditionals (34.90%), and less resumptive conditionals (17.71%). Examples of representative conditionals in this cluster are presented in (422) to (424) below.

- (422) Als je nog nooit op de HCC geweest bent, is het erg moeilijk om overzicht te bewaren. (WR-X-B-A-discussion-lists-tweakers-63565)
If you have never been to the HCC, it is very difficult to keep an overview.
- (423) Als 'ie de aanklacht goed heeft begrepen moet 'ie zeggen of 'ie zich schuldig vindt. (fn004379)
If he has understood the charges correctly, he must say whether he is guilty.
- (424) Als er toen fouten in zaten die niet door klanten gemeld zijn, zullen die fouten er ook nu nog zijn. (WR-P-P-D-0000000006)
If there were errors back then that were not reported by customers, those errors will still be there today.

As we see in the feature distributions and these examples, this cluster is based mostly around verb tense in the antecedent.

As with the conditionals in cluster 1 (see section 6.5.5), there does not appear to be a clear specific implicature of either unassertiveness or connectedness licensed by the conditionals in this cluster, or, to be more specific, by the divergent verb tense in the antecedent. Using the accounts discussed in chapter 3 as a guide, the cluster could be said to reflect Davies's (1979) knowledge conditionals (section 3.3.3), Johnson-Laird's (1986) completely determinate conditionals (section 3.3.5), and Dancygier and Sweetser's (2005) epistemic conditionals (section 3.3.7), although the degree to which the exemplars in this cluster are truly of these types is debatable. As explicitly discussed with respect to Gildersleeve's (1882) logical conditionals (see section 3.2.3), whether or not the antecedents here are 'accepted as true' is largely a matter of context. Furthermore, although the examples in (423) and (424) could be interpreted as such, their causally-reversed counterparts (cf. Sweetser, 1990, p. 123; section 3.3.7) show the actual inference-chain that would be present in epistemic conditionals.

- (425) Als moet 'ie zeggen of 'ie zich schuldig vindt, heeft 'ie de aanklacht goed begrepen.
If he must say whether he is guilty, he has understood the charges correctly.
- (426) Als ze er nu ook nog zijn, zaten ze die fouten die niet door klanten gemeld zijn er toen ook in.
If they are still in there, those errors that were not not reported by customers were in there back then.

A large number of conditionals in this cluster involve dynamic and deontic modality in consequents, expressing a 'true condition' (cf. Athanasiadou & Dirven, 1997a; see section 3.3.9) in the antecedent, and a resulting necessary action to be undertaken, as in (422) and (423). Again, these are informal comparisons, and, given the small size of the cluster, they should be interpreted with caution.

6.5.8 Additional clusters

As the cluster evaluations did not clearly indicate a preference for a 4-, 5- or 6-cluster solution, I will also inspect the additional clusters in the latter two solutions. As a feature of hierarchical clustering, this does not mean a completely different clustering solution, but a sub-clustering of, in this case, the largest cluster, which held the most general, unmarked kind of conditionals. In the 5-cluster solution, cluster 3 discussed above is divided into two clusters, cluster 3A and 3B. The largest sub-cluster, cluster 3A, holds 86.6% of cluster 3, whereas cluster 3B holds 13.4%. Cluster 3A roughly adheres to the characterisation of cluster 3 in section 6.5.4, except for negation in the antecedent, which is used by the algorithm to create cluster 3B. Representative examples for the latter cluster are provided in (427) to (429) below.

- (427) De NOS krijgt overigens geen korting als Oranje zich niet voor het WK plaatst. (fn002418)
By the way, the NOS will not receive a discount if the Dutch soccer team does not qualify for the World Cup.
- (428) Het is ons probleem niet als je het niet haalt. (WR-X-A-A-journals-003)
It's not our problem if you don't make it.
- (429) Geen idee, ik ga eerst lekker F1 kijken:-) Duurt nog een uur als er geen doden vallen. (WR-U-E-D-000000030)
No idea, I'm going to watch F1 first:-) It will take another hour if there are no casualties.

The only difference between the conditionals in the two sub-clusters is the presence of negation, which rose to 86.33% of antecedents being syntactically negated, and 13.67% of antecedents being morphologically negated (all antecedents thus contain negation), and 24.66% of consequents being syntactically negated and 1.61% of consequents being morphologically negated, compared to 14.74% and 2.67% in cluster 3. Tense, modality, and syntactic integration remained stable mostly. This cluster reflects what we discussed in terms of ‘negative polarity’ in section 3.3.8, i.e., it presents a relation between the non-fulfilment of the situation in the antecedent and the situation expressed in the consequent, which may be, but does not have to be negated itself.

When we look at the 6-cluster solution, cluster 3B discussed above remains the same, and cluster 3A is split into two sub-clusters, clusters 3A1 and 3A2, which hold 84.17% and 15.83% percent of the conditionals in cluster 3A respectively. As cluster 3A1 resembles cluster 3A closely, we will focus on cluster 3A2. Representative examples are presented in (430) to (432) below.

- (430) Als gmail een POP 3 of IMAP server heeft is het niet zo moeilijk. (WR-U-E-A-0000000301)
If Gmail has a POP 3 or IMAP server, it is not that difficult.

- (431) Uh als je toch doodgaat maakt ook niet uit als je verslaafd bent.
(fn000559)
Uh if you will die anyway it doesn't matter whether you are addicted.
- (432) Als het aan de regeringspartijen ligt komen er geen verschillende tarieven.
(fn003811)
If it is up to the government parties, there will be no different rates.

This new cluster is formed mainly on basis of negation in the consequent instead of the antecedent, which was the case for cluster 3B discussed above. The other features show distributions comparable to the main cluster, namely simple present in both clauses, non-modalised antecedents and consequents modalised in 36% of the cases. Syntactic integration also showed a distribution comparable with the first cluster. What we see in (430) to (432) is the denial of the situation expressed in the consequent, as ‘caused’, either in content or epistemic terms (cf. Dancygier & Sweetser, 2005) by the situation in the antecedent.

As may be expected by the discussion and examples above, there appear to be no clear, specific implicatures of unassertiveness or connectedness licensed by these sub-clusters, beyond the addition of negation to either the antecedent (cluster 3B) or the consequent (cluster 3A2). The meaning aspect contributed by negation of the antecedent (cluster 3B) can be explained in terms of negative conditions in the Cognitive approach to Coherence Relations (cf. Sanders, Spooren & Noordman, 1992; see section 3.3.8), i.e., the non-fulfilment of the condition in the antecedent, such as there being no casualties in (429) causes taking the race (just) another hour. As discussed in section 3.3.8, polarity is independent of ‘source of coherence’, and consequently, no more specific implicatures of connectedness, such clear preference for causal or inferential implicatures, were found in this cluster. Conditionals in cluster 3A2 appear to implicate that the situation in the consequent can be prevented by the situation in the antecedent. In (430), for example, the antecedent (Gmail has a POP 3 or IMAP server) ‘causes’, in an epistemic sense, (cf. Dancygier & Sweetser, 2005) the denial of it being difficult expressed in the consequent, which is comparable to the preclusive conditionals (‘*P* prevents *Q*’) discussed by Declerck and Reed (see section 3.3.11).

6.5.9 Conclusion

In the analysis of hierarchical clusters presented in this section, I aimed to provide insights into groups of conditionals that can be formed based on their grammatical features, and I attempted to interpret the resulting clusters with respect to implicatures of unassertiveness and connectedness. From the results and analyses, a number of conclusions can be drawn.

First, it became clear that the clusters, with the exception of cluster 2 (past tense conditionals with modalised consequents), did not license clear implicatures of unassertiveness or connectedness discussed in chapter 3. In short,

there never appeared to be a clear agreement between (theoretical) types distinguished in the literature and (data-driven) clusters of conditionals. The influential distinction between content, epistemic and speech-act conditionals (cf. Sweetser, 1990; Dancygier & Sweetser, 2005), for instance, was not reflected at all by any of the clusters discussed in this section. It is important to remark that the expectation of an agreement between meaning and form is warranted, given the suggestions of links between types of conditionals and their grammatical features in the literature (see chapters 3 and 5). Furthermore, as Gabrielatos (2010, 2021) shows, a clustering approach is viable to uncover types of conditionals of theoretical distinction, as his results show how modality can be used to differentiate between direct and indirect conditionals (Quirk et al., 1985). The current results, however, show why this is not the case for Dutch conditionals, as consequents of Dutch direct and indirect conditionals are not marked by the presence or absence of the modal verb *zullen* ‘will’ respectively, whereas English conditionals are. We will discuss these points in more detail in the next chapter.

Second, the clustering solution produced a large, unmarked cluster, cluster 3, which consists mostly of conditionals in the present tense, with a minority of consequents marked for modality, mostly of the epistemic kind. This cluster, then, can be seen as the default type of conditional in Dutch. In terms of prototype theory, this ‘type’ has the highest frequency (as shown by the cluster size), the highest number of shared attributes and an internal prototypicality range consisting of a limited number of deviations from the default verb tense and modality, although clear characterisations of these deviations in functional terms, as Athanasiadou and Dirven (1997a) do in terms of *cause*, *condition*, and *supposition* sub-types of hypothetical conditionals (see section 3.3.9), cannot be given. Whereas Athanasiadou and Dirven’s prototypical type of conditional expresses the strongest (i.e., causal) dependency between antecedent and consequent, alike Dancygier’s prototypical predictive conditional (see section 3.3.7), types of dependency such as causality, epistemic inference, pragmatic or speech-act relations, analysed as implicatures of connectedness in this study, were not identified by the clustering algorithm, i.e., the features included in this study do not seem to differentiate clearly between such types of degrees of dependency.⁴⁰ The three remaining main clusters are less prototypical, reflected in their lower overall frequency, and smaller number of cases sharing features such as tense and modality. These clusters thus have a less stable, but more specific set of defining features. Whereas the second main cluster, cluster 1, can be described as expressing either willingness, ability or epistemic distance in the antecedent, cluster 2 is perhaps most identifiable, as

⁴⁰To be clear, these types of conditionals do occur in the corpus. Speech-act conditionals, for instance, although not found among the representative examples of any cluster, can be found in multiple clusters, such as the example in (a) from the unmarked cluster, cluster 3.

(a) Ik zie dat toch echt anders hoor als ik het wetsvoorstel lees. (fn000152)
I really see that differently if I read the bill.

it consists mostly of conditionals that express epistemic distance by means of modal auxiliaries and past tense in antecedents and especially consequents. The fourth and smallest cluster holds mostly conditionals in which the antecedent presents a proper condition and the consequent an action to be undertaken, or in a smaller number of cases, a conclusion to be drawn.

Third, the feature distributions of the clusters show that one of the most promising features for Dutch conditionals in relation to implicatures of connectedness, namely syntactic integration, does not contribute clearly to the formation of clusters, whereas the literature on Dutch conditionals suggests otherwise (see section 5.3). The degree of syntactic integration was hypothesised to be reflective of the degree of semantic integration in terms of Dancygier and Sweetser's (2005) distinction between *content*, *epistemic* and *speech-act conditionals*. This, however, does not mean that the literature is wrong on this point, as it might be the case that the contribution of tense and modality, as reflected in Figure 6.6, is stronger, or points towards different dimensions on which clusters are formed. The assumption of clustering is that certain features go together ('cluster') to form groups that have theoretical, empirical or practical importance. As applied to linguistics, this means that certain linguistic features cluster together to support a certain (range of) interpretation(s), analysed here as implicatures. This does, at least for the results in this section, not seem to be the case, which does not exclude the possibility that in Dutch, syntactic integration is the only feature of importance, or a feature that operates in relative isolation of the other features.⁴¹ Furthermore, there is, as discussed in chapter 4, the question of language specificity (see section 4.5 especially). These points will be taken up further in the discussion in the next chapter. Before doing so, however, we will look at the results of the partitional clustering next.

6.6 Analysis of partitional clusters

6.6.1 Introduction

In this section, I analyse the clusters present in the partitional solutions in terms of their distributions of grammatical features, and possible implicatures of unassertiveness and connectedness. As the aims of the partitional approach are equal to those of the hierarchical approach discussed in the previous section, I will use the same steps in the analysis by discussing the internal feature distribution of each cluster, representative examples, their implicatures, and a comparison to possible matches on types of conditionals from the classifications discussed in chapter 3.

⁴¹Note that this explanation is not in conflict with the results by Gabrielatos (2010, 2021) mentioned earlier, as he distinguished between modal load and modal spread as separate features.

In section 6.6.2, I will present an overview of the clustering solutions. As the evaluations in section 6.4.5 did not provide definitive arguments for a 2-, 3- or 4-cluster solution, I will first select the most promising solution, after which I will present its feature distributions per cluster. Then, in sections 6.6.3 to 6.6.5, I will discuss each cluster in the fashion outlined above. In section 6.6.6 I will provide a brief conclusion on the results of partitional clustering, before moving on to conclusion to this chapter in section 6.7.

6.6.2 Clusters and feature distributions

In section 6.4, I selected the 2- to-4 cluster solutions that were generated using the Lin1 measure and the FANNY algorithm. In this section, I will inspect the characteristics of each cluster. As in the previous section, NMDS was used to visualise the clusters, and I added the cluster memberships to the configurations to see how they are distributed on the ordination axes, as can be seen in Figure 6.7.

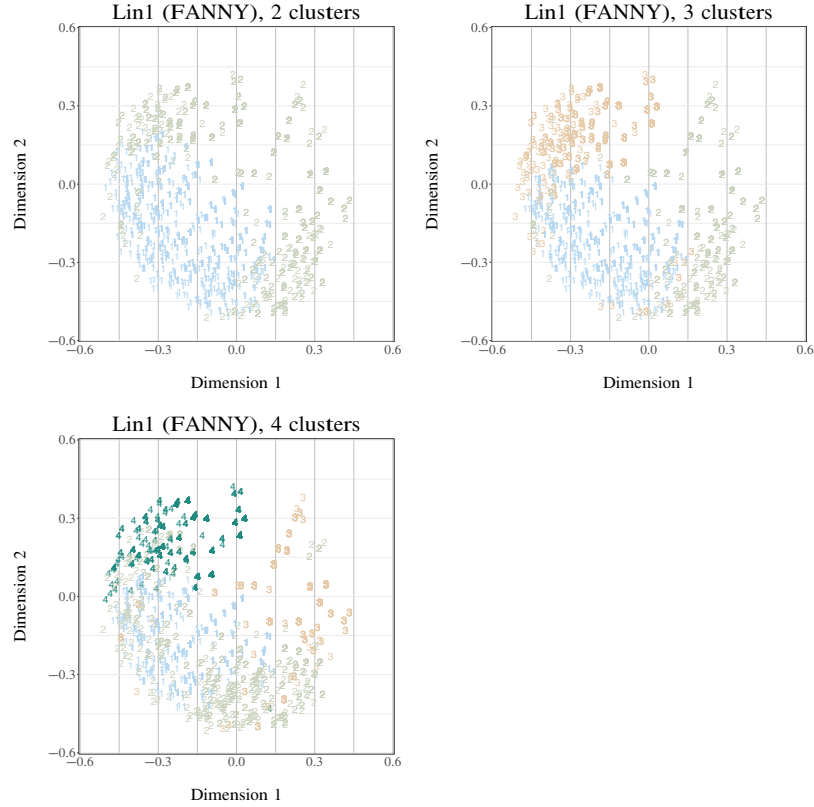


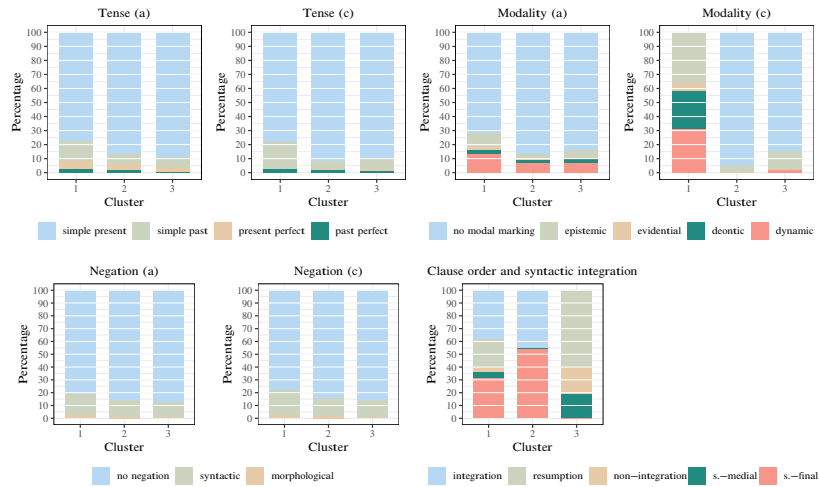
Figure 6.7: NMDS configurations with memberships from partitional clustering

As partitional clustering does not embed clusters (see section 6.4.5), the clustering itself can change depending on the given number of clusters. The consistency of the clusters, in terms of their average silhouette widths, is relatively stable: 0.52 and 0.50 for the 2-cluster solution, 0.40, 0.51, and 0.55 for the 3-cluster solution, and 0.42, 0.36, 0.60, 0.56 for the 4-cluster solution. Increasing the number of clusters introduces less consistent clusters. For instance, a fifth cluster with an average silhouette width of 0.21 and in the 6-cluster solution a cluster with an average silhouette width of 0.09 is introduced. The configurations in Figure 6.7 resemble those resulting from the Lin measure in the previous section, but show slightly less separation. In the 2-cluster solution, we see all conditionals from cluster 1 are in the bottom-left corner. Cluster 2 is scattered around the first cluster on the left and right. In the 3-cluster solution in the middle panel we see dimension reduction is able to preserve the difference between clusters 2 and 3, which are on the bottom-right and the top-left

respectively. The 4-cluster solution does not differentiate groups well in the right panel. We see more overlap between the first two clusters, and while the third cluster is somewhat concentrated in the top-right of the configuration, we see that the fourth cluster largely overlaps with the second cluster. Based on the evaluations in section 6.4, the average silhouette widths and the configurations in Figure 6.7, I will discuss the 3-cluster solution in the remainder of this section.

In terms of cluster membership, the 3-cluster solution shows a relatively even distribution. Cluster 1 holds 32.54% of all conditionals, the second and largest cluster holds 39.74%, and the third cluster holds 27.72% of all conditionals in the corpus. As we can see, the memberships are more evenly distributed compared to the hierarchical clusters. The feature distributions of each cluster are presented in Figure 6.8 below.

Figure 6.8:
Feature distributions for the partitional 3-cluster solution



Note. These distributions represent clusters generated using the Lin1 measure. Numbers on the horizontal axes correspond to cluster numbers reported in this section.

In sections 6.6.3 to 6.6.5, we will review the clusters in the 3-cluster solution.

6.6.3 Unmarked conditionals (cluster 2)

As with the discussion of the selected hierarchical clustering solution, we will start by inspecting the largest cluster, cluster 2, which holds 1633 conditionals (39.74%).⁴² As we can see in Figure 6.8, this cluster holds conditionals with present tense in antecedents and in consequents mostly (86.47%, 91.43% respectively), followed by simple past (6.92%, 5.57%), present perfect (4.72%, 1.22%), and past perfect (1.90%, 1.78%). Negation reflects the overall frequencies with 85.85% non-negated antecedents and 84.63% non-negated consequents. Antecedents contain modal marking in 13.29% of all cases, mostly of the dynamic kind (6.61%), as in (434), followed by epistemic, deontic, and evidential modality (3.06%, 2.33% and 1.29% respectively). Modal marking is mostly absent in consequents (94.49%), and consequents that are marked for modality are marked exclusively for epistemic modality (5.51%). Finally, we see sentence-final antecedents in the majority of cases (54.44%), followed by the integrative pattern (45.56%). The other patterns of syntactic integration are not found in this cluster, which is reflected below in the representative examples in (433) to (435).⁴³

- (433) Tijddwang treedt op als er klanten wachten. (WR-P-P-F-0000000012)
Time constraints occur {if/when} customers are waiting.
- (434) Als je toch nog wilt komen lever ik graag een bijdrage. (WR-U-E-D-0000000307)
If you still want to come I [would] like to contribute.
- (435) Mogelijk zijn de verbanden tussen privacyschending en conflict heel anders als het een kwestie betreft die jongeren privé vinden [...]. (WR-X-A-A-journals-003)
Possibly the links between privacy violation and conflict are very different if it concerns an issue that young people consider private [...].

It appears that this largest cluster mostly holds the unmarked conditionals discussed in the previous section. Accordingly, in terms of implicatures, these default conditionals do not seem to share specific implicatures of unassertiveness or connectedness. Although the examples above may suggest that the conditionals in this cluster license implicatures of causal connections between antecedent and consequent, this is an effect of the frequency of such implicatures, as, for instance, inferential (i.e., epistemic) and pragmatic (i.e., speech-act) implicatures of connectedness can also be found, as in the examples in (436) and (437) from this cluster.

⁴²The reason for this order is that the largest cluster can be used in comparison to smaller, more specialised clusters, although, in this particular solution, cluster sizes are more similar than in the hierarchical solution discussed in the previous section.

⁴³Note that silhouette widths were used for consistency in selection of representative examples.

- (436) Oke als ik het goed begrijp heeft Arsenicem een systeem voor mij wat er voor gemaakt is, dat zoek ik ook maar het hoeft niet zo profesioneel te zijn. (WR-X-B-A-discussion-lists-tweakers-980460)
Okay if I understand correctly Arsenicem has a system for me that is made for it, I am looking for that too, but it does not have to be that professional.
- (437) Europarlementarier Max van den Berg weet duidelijk niet waar hij het over heeft als hij zegt dat een koe in Nederland omgerekend drie euro subsidie per dag krijgt. (WR-P-P-G-0000024358)
Member of the European Parliament Max van den Berg clearly does not know what he is talking about {if/when} he says that a cow in the Netherlands receives a three euro subsidy per day.

With respect to implicatures of unassertiveness, this cluster largely holds conditionals without any marking of certainty, uncertainty or counterfactuality. Alike the conditionals in the unmarked cluster in the hierarchical solutions presented in the previous section, the conditionals in this cluster would be classified as present conditionals (cf. Goodwin, 1879; section 3.2.2), undetermined conditionals (cf. Gildersleeve, 1882; section 3.2.3), present non-implicative conditionals (cf. Sonnenschein, 1892; section 3.2.4), real and future conditionals (cf. Kaegi, 1905; section 3.2.5), open, non-past conditionals (cf. Funk, 1985; section 3.2.6), and open conditionals (cf. Huddleston & Pullum, 2002; section 3.2.9). These conditionals thus present the antecedent and consequent mostly in a neutral fashion, without implication of fulfilment.

As with the cluster of unmarked conditionals in the hierarchical solution, this cluster does not include conditionals with implicatures of epistemic distancing. The characterisation of this cluster is comparable to that of the unmarked conditionals discussed in the previous section, which is not surprising, given their distributions of features, and their overlap, as most of the conditionals in this unmarked partitioned cluster were members of the unmarked hierarchical cluster in the previous section.⁴⁴ This comparison extends not only to the lack of shared implicatures of unassertiveness, but also to implicatures of connectedness, as this cluster also does not differentiate between ‘uncertainty’ implicatures of unassertiveness on the one hand, as in (435), and recurrent or iterative implicatures on the other, as in (433). The same goes for implicatures of connectedness, as no distinction is made between, for instance, direct and indirect conditionals (cf. Quirk et al., 1985; see section 3.3.4), actualising and inferential conditionals (cf. Declerck & Reed, 2001; see section 3.3.11), or predictive, epistemic and speech-act conditionals (cf. Dancygier & Sweetser, 2005; see section 3.3.7). We can conclude that the main types of conditionals found in the literature based on connections between antecedents and consequents

⁴⁴1211 of 1633 members (74.16%) of this partitioned cluster are part of the unmarked hierarchical cluster. Note that this percentage is lower for the reverse perspective (43.66%), as the unmarked hierarchical cluster is larger.

are not detected by the partitional clustering algorithm. We will continue by inspecting the two remaining clusters to find out whether their feature distributions do give rise to more specific implicatures.

6.6.4 Conditionals with modalised consequents (cluster 1)

The second largest cluster, cluster 1, holds 1337 conditionals (32.54%). This cluster is similar to the first cluster in most respects. A difference can be observed in clause order and syntactic integration, as this cluster holds less sentence-final antecedents, and, in contrast to unmarked cluster, a relatively large number of resumptive conditionals. The clearest difference, however, is that all of the consequents in this cluster are marked for modality, as can be seen in the representative examples in (438) to (439) below.

- (438) En als de VUT in klap wordt afgeschaft zou zelfs de spanning op de arbeidsmarkt in keer zijn opgelost. (fn000242)

And if the early retirement fund is repealed, even the tension on the labor market would be resolved in one go.

- (439) Ik vind als ik uh ga kijken naar een stripper dan wil ik ook alles zien en uh toen zei Catherine maar mevrouw dat u dat durft te zeggen. (fn000578)

I think if I uh look at a stripper then I also want to see everything and uh then Catherine said but madam how dare you say that.

- (440) Als de aanvraag op tijd is ingediend en de panelen tijdig zijn geïnstalleerd moet het geld worden uitgekeerd aan de energiebedrijven. (WR-P-P-G-0000160102)

If the application is submitted on time and the panels are installed in time, the money must be paid to the energy companies.

Simple present is frequent in both clauses (77.64% and 77.71% respectively). In most cases, thus, these conditionals are not the counterfactual types found in cluster 3 in the previous section, but rather conditionals in which the consequent is marked for epistemic modality, dynamic and deontic modality (36.13%, 30.67%, and 27.75% respectively), as in (438) to (440). In the case of epistemic modality, as in (438), in a minority of cases epistemic distance is expressed, but in most cases, the modal marking expresses future reference and promise (see section 5.4.5), as in (441) and (442) below.

- (441) Als dat het geval is zullen al om deze reden de effecten van plaatsgebonden maatregelen op verschillende plaatsen verschillend uitpakken. (WR-X-A-A-journals-001)

If this is the case, the effects of site-specific measures will have different effects for different reasons.

- (442) Als dat niet lukt, zullen wij ons niet aan onze taak onttrekken. (WR-P-P-G-0000134919)

If that does not work, we will not evade our task.

Conditionals in this cluster show integrative (38.52%), sentence-final (31.94%) and resumptive patterns mostly (22.44%), followed by a minority of sentence-medial antecedents (4.41%) and non-integrated conditionals (2.69%).

Inspecting the conditionals in this cluster, and the feature distributions, there does not appear to be a clear relation to any of the types of conditionals discussed in chapter 3, neither with respect to implicatures of unassertiveness, nor with implicatures of connectedness. Whereas in the hierarchical clustering solution, modal marking and verb tense clearly clustered together, especially in case of epistemic modality and past tense, to license implicatures of epistemic distance (see hierarchical cluster 2 in section 6.5.6), such an identifiable feature combination was not found in this cluster.

6.6.5 Resumptive, non-integrated and sentence-medial conditionals (cluster 3)

The third and last cluster holds 1139 conditionals (27.72%). Whereas the previous cluster was clearly formed by modal marking of the consequent, the third cluster only deviates from the other clusters in terms of syntactic integration. The cluster shows a prevalence of simple present tense in both clauses (88.67% and 89.73% respectively), as in the examples in (443) to (445) below, followed by simple past (7.11%, 7.55%), present perfect (3.25%, 1.23%) and past perfect (0.97%, 1.49%). Frequencies of negation in antecedents and consequents are comparable with the previous clusters too (12.99%, 14.57%). Antecedents are marked for modality in a minority of cases (16.33%), mostly for dynamic modality (7.11%), followed by epistemic, deontic and evidential modality (5.09%, 2.81%, 1.32%). Consequents show a comparable frequency of modal marking (15.36%), but with a much more pronounced preference for epistemic modality (13.35%), as in (444), followed by dynamic modality in only 2.02% of cases. Below, representative examples of this cluster are presented.

- (443) Als het iets later op de middag wordt, dan melken we vanavond ook maar iets later:- (WR-P-E-A-0004240623)

If it gets a little later in the afternoon, then we will milk a little later tonight too:-

- (444) Zal ik, als de wegen droog zijn, het zonnetje schijnt en er geen regen voorspeld wordt naar jou toe komen? (WR-U-E-D-0000000007)

Shall I, if the roads are dry, the sun shines and no rain is predicted, come over to you?

- (445) En als je toch een kwalitatief uh goed besluit wilt nemen en draagvlak wil dan heb je daar veel maatschappelijke organisaties bij nodig. (fn000162)
And if you still want to make a good quality decision and want support, then you need a considerable number of social organisations.

As mentioned above, the largest difference between this cluster and the other clusters can be found in syntactic integration patterns. Whereas the previous clusters, clusters 2 and 1 discussed in sections 6.6.3 and 6.6.4 respectively, both had high frequencies of integrated (sentence-initial) antecedents (45.56%, 38.52%) and sentence-final antecedents (54.44%, 31.94%), this cluster has a higher frequency of resumptive conditionals (60.32%), followed by non-integration (21.07%), and sentence-medial antecedents (18.53%). The latter two patterns are largely absent from the other clusters. The high frequency of non-integrative conditionals is to a large extent a consequence of including interrogative and imperative consequents in this category (see sections 5.3, and 5.8, and section C.2 of Appendix C), as can be seen in the examples below.

- (446) Zou Geert Wilders 7 of 18 zetels halen als er nu verkiezingen waren?
 (WR-P-P-G-0000049699)
Would Geert Wilders get 7 or 18 seats if there were elections now?
- (447) En Johan als jij toevallig een pijp krijgt wat doe je dan? (fn007858)
And Johan if you happen to get a pipe what do you do then?
- (448) Als er iets is, bel me. (WR-U-E-D-0000000050)
If anything is wrong, call me.

Whereas syntactic integration seems to be ignored largely in the hierarchical clustering, we see its influence in these partitional results. It does not seem to interact with the other features, however.

In terms of implicatures, the conditionals in this cluster do not seem to share implicatures of unassertiveness. We must be careful, however, and refrain from concluding that the conditionals in any of the three clusters do not license implicatures of unassertiveness. The reason for this is that, on the whole, conditionals licensing implicatures of epistemic distance by means of past tense and modal marking, which were identified by the hierarchical clustering algorithm (see section 6.5.6), are distributed over different clusters in the partitional solutions. The consequence of this is that it is not possible to identify types of conditionals in terms of the accounts discussed in section 3.2, which were largely based on implicatures of epistemic distancing.

With respect to implicatures of connectedness, as we discussed in section 3.3, this cluster seems to hold a large number of conditionals licensing an indirectness implicature, as can be seen in examples (447) and (448) above. This is not surprising, as almost all non-integrated conditionals (86.96%) are in this cluster, and low degrees of syntactic integration were linked to low degrees of semantic integration in section 5.3. Add to this the fact that many conditionals in this cluster have non-declarative consequents, which partly explains

the number of non-integrated conditionals, and it becomes clear why the examples above are ranked high on representativity for this cluster. We do see, however, that no distinction is made between speech acts about conditionals, as in (446), and conditional speech acts (i.e., questions), as in (447) (cf. van der Auwera, 1986; for details and discussion, see section 3.3.7). So while this cluster holds, in terms of the classifications discussed in section 3.3, the largest number of telling conditionals (cf. Davies, 1979; section 3.3.3), indirect conditionals (cf. Quirk et al., 1985; section 3.3.4), non-determinate conditionals (cf. Johnson-Laird, 1986; section 3.3.5), speech-act conditionals (cf. Dancygier & Sweetser, 2005; section 3.3.7), pragmatic conditionals (cf. Athanasiadou & Dirven, 1997a; section 3.3.9) and rhetorical conditionals (cf. Declerck & Reed, 2001; section 3.3.11), the algorithm does not distinguish between conditionals licensing an indirectness implicature and those that do not license such an implicature. This can be seen in the examples in (443) and (445) above, which do not license any implicature of indirectness, but of rather of directness or causality, and inferential reasoning.

Next to causal implicatures of connectedness, a considerable number of resumptive conditionals in this cluster appear to license an implicature of inferential connection, as in (449) and (450).

- (449) Als de muren om ons heen instorten – ‘en onze oude maatschappij morgen vervangen kan zijn door een nieuwe maatschappij’, zoals Smalbrugge stelt – dan is dat omdat we in weerwil van alle lessen van de geschiedenis, opnieuw in zwart-wit tegenstellingen zijn gaan geloven, en op basis daarvan een tweedeling in de maatschappij in de hand werken. (WR-P-P-G-000012571)

If the walls around us collapse – ‘and our old society may be replaced by a new society tomorrow,’ as Smalbrugge states – it is because, despite all the lessons of history, we have again started to believe in black-and-white contradictions on the basis of which we promote a dichotomy in society.

- (450) En als die vakantie echt tegenvalt, dan zal dat bij jullie allebei zo zijn, waarschijnlijk of niet [...]. (WR-U-E-A-0000000171)

And if that vacation is really disappointing, it will be for both of you, probably or not [...].

These conditionals are comparable to logical conditionals (cf. Gildersleeve, 1882; section 3.2.3), knowledge conditionals (cf. Davies, 1979; section 3.3.3), epistemic conditionals (cf. Dancygier & Sweetser, 2005; section 3.3.7), subjective conditionals (cf. Sanders, Spooren & Noordman, 1992; section 3.3.8), and premise conditionals (cf. Haegeman, 2003; section 3.3.10). Although this cluster includes different types of connections, the inclusion of inferential conditionals in the representative examples may reflect the relation between resumptive *dan* ‘then’ and inferential conditionals in Dutch. Recall from section 5.3 that Renmans and van Belle (2003, p. 148) observed a considerably higher frequency

of inferential relations between antecedent and consequent in their set of resumptive conditionals as compared to non-resumptive conditionals (see also Verbrugge & Smessaert, 2011; Reunecker, 2020).

In contrast to the remark made at the end of the previous section regarding the lack of influence of syntactic integration on the cluster formation, the partitional algorithm has singled out the feature of syntactic integration to form a cluster, but in doing so, it did not include other feature distributions. This suggests the importance of syntactic integration for clustering, but the cluster does not clearly reflect a construction formed by a relation between this single feature and implicatures of connectedness. The number of indirect conditionals, as far as they can be reliably identified (see chapter 4), is high, but next to these uses, the cluster includes a considerable number of conditionals that do not license any implicature indirectness, but rather of causality and inferential reasoning. Another indication that syntactic integration is, in this solution, not a sufficient predictor for implicatures of connectedness is the size of the cluster. While it is the smallest cluster (27.72%), it is much larger than the relative frequencies or mentioned low frequencies of indirect (pragmatic, speech-act) conditionals reported in other studies. Reunecker (2017b, p. 142) reports that only 6.1% of conditionals in his corpus license speech-act implicatures of connectedness, while 90% of all conditionals license causal implicatures of connectedness. Even sentence-medial conditionals show such a strong preference for causal implicatures (83.90%). Renmans and van Belle's (2003, pp. 152, 154) figures show that even though conditionals with resumptive patterns license an inferential implicature of connectedness in 41% of their 155 cases, the remaining 59% licenses other implicatures of connectedness, most notably causal implicatures (22%).⁴⁵ This corroborates the observation that the resumptive, non-integrated and sentence-medial patterns in this cluster are used frequently to license implicatures of connectedness beyond those of indirectness. Even though syntactic integration was singled out by the algorithm, it does not seem a strong predictor for implicatures of connectedness.

6.6.6 Conclusion

As with the the analysis of hierarchical clusters presented in the previous section, I aimed to provide insights into groups of conditionals formed by the partitional algorithm in this section. I attempted to interpret the resulting clusters with respect to both feature distributions, and implicatures of unassertiveness and connectedness. From the results and analyses, a number of conclusions can be drawn.

The partitional clusters did not, or only very weakly reflect types based on relations between antecedents and consequents as discussed in chapter 3. The 3-cluster partitional solution reflects one main category of unmarked conditionals (cluster 2), but in contrast to the hierarchical results, in which conditionals

⁴⁵Renmans and van Belle's (2003) corpus did not contain any non-integrated conditionals.

seem to be clustered based on the interplay between a number of features, most notably tense and modality, this seems not to be reflected in the results of the partitional clustering. With respect to prototypicality, we see unmarked conditionals here too, but prototypicality is not clearly reflected in frequency, as the largest cluster is far less dominant in terms of membership frequency than in the hierarchical results. Also, the degree in which the conditionals in this cluster share attributes is lower, making their attribute spaces less clearly identifiable. Looking at the second largest cluster (i.e., cluster 1), we can see it is formed almost exclusively on the basis of modal marking in the consequent, and the last cluster (i.e., cluster 3) is based on syntactic integration and non-declarative consequents. Although these clusters thus have clear defining and identifiable characteristics, they do not seem to be connected to the characteristics of the other clusters, which may be due to the non-hierarchical nature of the clustering algorithm. Contrary to expectation for this approach to clustering, which was linked in section 6.4.2 to a more radial type of categorisation, inspecting the conditionals in the clusters did not reveal clear links to implicatures of either unassertiveness or connectedness. A noticeable exception was cluster 3, which holds many conditionals licensing indirect (i.e., pragmatic, speech-act) implicatures of connectedness in cluster 3. However, this cluster also holds conditionals licensing implicatures of, for instance, causality and inferential connections too, and it is likely that the high number of indirectness implicatures is a direct reflection of the high number of non-integrated conditionals in the cluster.

6.7 Conclusion

The primary aim of this chapter was to test the extent to which the feature distributions of Dutch conditionals presented in the previous chapter can be used to identify grammatical contexts licensing (generalised) implicatures of unassertiveness and connectedness. To do so, a number of data-driven, unsupervised machine learning techniques were used, and the results were analysed and evaluated.

In the first part of this chapter (sections 6.2 to 6.4), I provided arguments for analysing conditionals as form-meaning pairings, i.e., constructions, in order to investigate relations between grammatical features and implicatures of conditionals. As the features are expected to ‘work together’ in licensing implicatures of unassertiveness and connectedness, a clustering approach to the data was chosen to form groups that exhibit the smallest amount of within-group variance and the largest amount of between-group variance. Based on the literature, it was expected that the repeated use of certain patterns of grammatical features would have conventionalised to some extent into grammatical constructions, and together with a number of quantitative indices of feature distributions, I selected those features which maximised the chance of finding such structures underlying the data. As became apparent in this chapter, applying

standard procedures to categorical features, especially those with skewed distributions, proved problematic. While this is not uncommon in the literature, as a number of references in this chapter attest to, it did show that clustering is not a simple and objective ‘go-to approach’ for all datasets, especially in fields such as linguistics in which most features are of categorical nature. Because of this, a wide array of measures, algorithms and evaluations was used to select the most promising basis for further clustering, and to maximise the chance of finding structures. Both a combination of proven and state-of-the-art machine learning techniques, and theoretical evaluation were used to solve these problems, and to assess the clusterability of the dataset, enabling the selection of the most promising features for clustering. Evaluations of the distance matrices suggested removing aspect, person and number, and focus particles from the dataset to improve clusterability. None of the tests provided definitive grounds for conclusions on clusterability, however, which was linked to the focus in the clustering literature on numerical data, whereas the current dataset involves categorical data only. Two main approaches of clustering, hierarchical and partitional clustering, were selected based on their applicability to the data, and their theoretical relation to prototype theory. I evaluated the clusterability of their various implementations and parameters in detail, to arrive at the most promising clustering solutions. The selected solutions indicated ‘reasonable structure’ (cf. Kaufman & Rousseeuw, 1990, p. 88), which, although not uncommon in clustering applied to real data as opposed to controlled, generated data, already suggests not a very strong basis was found for grouping the conditionals in this study.

In the second part of this chapter (sections 6.5 and 6.6), I analysed the results of the cluster analyses. It became clear that most clusters did not license clear implicatures of unassertiveness or connectedness discussed in chapters 2 and 3. In short, there never appeared to be a clear agreement between (theoretical) types distinguished in the literature and (data-driven) clusters of conditionals. Types found in influential accounts of conditionals, such as direct and indirect conditionals (cf. Quirk et al., 1985), or content (predictive), epistemic and speech-act conditionals (cf. Dancygier & Sweetser, 2005), were not identified in the data, although the former was found earlier by Gabrielatos (2010, 2021) using only modal marking as input for clustering. The features of Dutch conditionals included in this study thus do not seem to differentiate clearly between types of conditionals based on unassertiveness and connectedness distinguished in the literature. We can compare this observation to Verhagen’s (2021) analysis of translating Latin into English, in which the English language ‘forces’ one to make a choice between different modal verbs to present a dilemma as a moral one or as of various options (*should* or *must*, and *shall* or *can* respectively), whereas in Latin, the subjunctive does not require such a choice, leaving ‘the interpretive possibilities open, including the option of complete irrelevance of a choice’. In the same vein, consequents of direct and indirect conditionals in Dutch are not marked by the presence or absence of the modal verb *zullen* ‘will’ respectively, as they are in English, which points towards the importance of lan-

guage specificity in this study. Whereas the hierarchical solutions did provide interpretable groups, most prominently a large unmarked group of conditionals, which was analysed as the prototypical type of conditional in Dutch, and a group of distanced conditionals, the partitional solution did not offer much basis for interpretation of the groups, with the exception of a cluster of conditionals licensing indirect implicatures of connectedness. This cluster, however, was formed almost exclusively on the basis of syntactic integration, a feature deemed of theoretical importance for the current purposes, but neglected mostly by the hierarchical algorithm, and the large number of conditionals licensing indirectness implicatures was explained by the large number of non-integrated conditionals, including those with non-declarative consequents. Although this suggests the importance of a single feature for clustering (i.e., syntactic integration), the cluster does not strongly indicate construction status, i.e., a pairing of this specific form to a clear meaning, because the conditionals in this cluster license various implicatures of connectedness beyond indirectness, such as causality and inferential reasoning, without a strong preference for one specific implicature.

As discussed in this chapter, reasonable structures were found in terms of quantitative evaluations. Closer inspection, analysis, and comparison of clusters to the literature on conditionals, however, indicated that none of the solutions directly or strongly reflected any of the implicatures discussed in chapter 2 and the types discussed in chapter 3. The question now is what implications these results have. Not finding a systematic relation between grammatical features and implicatures after all does not prove there is no such relation. Or, put differently, 'absence of evidence is not evidence of absence' (cf. Wright, 1888, p. 59; Sagan, 1977, p. 6). In the next and final chapter, I will take the liberty to discuss this issue and related issues raised in this study in more detail.

CHAPTER 7

Conclusion and discussion

7.1 Introduction

At the start of this dissertation in chapter 1, we saw how conditionals enable us to express our thoughts about possible states of the world, and how they form an integral part of human reasoning, decision making and communication. Even seemingly simple examples such as in (3), repeated below, show how the use of conditionals in natural language differs from their use in logic and formal reasoning.

- (3) Maybe you will have to help me. We're not running our lives according to some account book. *If you need me, use me.* Don't you see? Why do you have to be so rigid? (Murakami, 1987a, p. 10, *Norwegian Wood*)

Whereas many studies on conditionals focus on specific types, or limit conditionals to those instances in which some form of formal reasoning is involved, in this dissertation, I set out to provide a corpus-based account of conditionals in terms of their use in natural language, and I opted for a combined approach of pragmatics and construction grammar to do so, focusing on two aspects of the meaning of conditionals that are apparent in the example in (3) above, but are not present in most logical analyses, namely their unassertiveness (the speaker neither asserts a need, nor, in consequence, an offer for help) and their connectedness (the speaker intends to connect the need and offer for help). This dissertation focused on the various uses of conditionals and their relation to grammatical form, and has attempted to answer the question how conditionals are used in everyday language.

This final chapter first discusses the main findings of this study by briefly summarising the results of each chapter in section 7.2, including an evaluation of the envisioned contributions discussed in chapter 1. Then, in section 7.3, I will discuss issues raised by clustering conditional constructions, and I will focus on the results of this study in terms of classifications, constructions, implicatures, and language specificity. Third, I will offer prospects for further research on conditionals by discussing the merits of combining logical and pragmatic analyses of natural language phenomena in an argumentative approach to language use. In section 7.5, finally, I will offer some final, concluding remarks to complete this dissertation.

7.2 Overview of main findings

7.2.1 Introduction

In this section, I present a brief overview of the main findings of this study, and I evaluate the envisioned contribution to the study of conditionals, and to the field of linguistics.¹ In section 7.2.2, the results of the pragmatic analysis of conditionals in natural language are summarised, leading to a specification of the main aim of this study described above into two research questions: one on the specific implicatures licensed by conditionals, and one on their relation to the grammatical form of conditionals. In section 7.2.3, then, the answers to the first research question, concerning the various meanings of conditionals, are summarised. In section 7.2.5, a brief overview of the features of Dutch conditionals is provided, and in section 7.2.6, the answers to the second research question, concerning the relation between the meaning and form of conditionals, are summarised, before drawing a final conclusion in section 7.2.7.

7.2.2 Semantics and pragmatics of conditionals

In chapter 2, I introduced the concept of conditionals and identified the characteristics of conditionals in natural language. In the chapter, I compared the meaning of conditionals in truth-conditional analyses of conditionals to their meaning in natural language. From this comparison, two non-truth-conditional, but conventional meaning aspects of conditionals, i.e., aspects in which the logical operator $\supset$ differs from the linguistic conjunction *if*, were identified.²

The first of these meaning aspects is their unassertiveness. Conditionals cannot be used to assert p or q . Related concepts common in the literature on conditionals, such as ‘uncertainty’ and ‘hypotheticality’, were analysed as specific implicatures licensed by the unassertiveness of conditionals. The second

¹For the introduction of these envisioned contributions, see section 1.5.

²See section 2.4 for a discussion of the notions ‘conventional meaning’ and ‘conventional implicature’. The two meaning aspects discussed in the current section are viewed as conventional meanings of conditionals.

non-truth-conditional aspect of conditionals is their connectedness, i.e. conditionals present p and q as connected. As with uncertainty or counterfactuality as conversational implicatures derived in part from the conventional meaning of unassertiveness of conditionals, connectedness is conventional and further specified in context by conversational implicatures of, for instance, causality or epistemic inference. The analysis of these non-truth-conditional aspects of conditionals led to the specification of the general question into two specific research questions, which suggested analysing both the meaning and the form of conditionals, as well as their relation. These questions, presented in section 2.7, are repeated below in (115a) and (115b). By offering a detailed account of conditionals in which a truth-conditional analysis and a non-truth-conditional analysis were combined, chapter 2 identified two main meaning aspects of conditionals in natural language, which were further explored in the classifications discussed in chapter 3. This part of the dissertation focused on the research question in (115a), which is accompanied by a brief answer (in italics) below. Then, in chapters 4 to 6, a corpus study was presented to answer the second research question on empirical grounds. This part of the dissertation addressed the research question in (115b), which too is accompanied by a brief answer.

- (115a) What specific implicatures are licensed through unassertiveness of and connectedness in conditionals?

Conditionals license neutral and non-neutral implicatures of unassertiveness, which may be sub-divided into implicatures of, amongst others, factuality and counterfactuality. With respect to connectedness, conditionals license implicatures of direct and indirect connections, which may be sub-divided into more specific types, such as causal and inferential connections.

- (115b) To what extent do the grammatical features of conditional *if* constructions determine the more specific implicatures?

The grammatical features included in this study do not or only weakly license specific implicatures of unassertiveness and connectedness. Although a number of interpretable groups resulted from the cluster analyses, these groups did not clearly reflect the types of specific implicatures of unassertiveness or connectedness that are distinguished in the literature.

In the following sections, the answers above are elaborated by discussing the main findings of this study, starting with the overview of classifications of conditionals in the next section.

7.2.3 Classifications of conditionals

In chapter 3, I presented an overview of classifications of conditionals, pursuing two goals. The first goal was aimed at the research question in (115a) above, namely to explore which types of conditionals are postulated in the literature with respect to the two implicatures argued for in chapter 2. The second goal

was to provide a basis for answering the research question in (115b) by creating an inventory of grammatical features of conditionals related to types of conditionals as suggested in the literature.

The first aim was to create an overview of types of conditionals distinguished in the literature, using the two implicatures as a structuring principle. With respect to implicatures of unassertiveness, most accounts of conditionals distinguish between neutral and non-neutral conditionals, with the latter further sub-divided into those conditionals implicating some type and degree of factuality, uncertainty, hypotheticality, and counterfactuality. These latter two implicatures were analysed in this dissertation in terms of epistemic distancing. With respect to implicatures of connectedness, most accounts distinguish between direct and indirect conditionals, with the former sub-divided into causal and inferential connections, whereas the latter type includes sub-types such as pragmatic and meta-linguistic conditionals.

The second aim of the chapter was to inventory the grammatical features that may license the conversational implicatures under discussion. Implicatures of unassertiveness seem related most strongly to verb tense and modality, although we have seen ample debate on the ambiguity of tense as referring to either a temporal or a modal dimension. Implicatures of connectedness seem to have a weaker link to specific grammatical features, although we have seen the influence of verb tense and modal marking here too, complemented by features such as clause order, negation, sentence type, (lexical) aspect, the use of focus particles, and, for Dutch conditionals, syntactic integration. In chapter 3, I emphasised that conversational implicatures are, by definition, non-conventional, which means that it was not expected that any of the grammatical features would fully determine the implicatures focused on, not in the least because in chapter 2 it was shown that they are always cancellable in specific contexts.

With respect to the envisioned contributions to the study of conditionals, chapter 3 offered an extensive overview of classifications of conditionals. As the body of literature on conditionals is vast, chapter 3 provides a valuable overview of types of conditionals and their grammatical features.

7.2.4 Data selection and methodology

Chapter 4 is, in many respects, a preparatory chapter for the chapters following it. First, I critically assessed the (top-down) application of existing, mostly theoretically motivated classifications of conditionals to natural language data, and I showed that this could not be done at a sufficient level of reliability for conditionals in corpus data. This result has determined to a great extent the choice for a bottom-up, unsupervised approach to the second research question in this dissertation. Furthermore, the chapter provided a detailed account of the data selection, representativeness and balance of the corpus, annotation procedures, and discussions of enhancing annotation quality for the individual features. Fi-

nally, chapter 4 identified problems one may encounter during automated and manual annotation, most pressingly missing data, and it offered suggestions for systematically dealing with these issues.

7.2.5 Features of conditional constructions in Dutch

As in chapter 3, a dual goal was pursued in chapter 5. First, the chapter provides an extensive overview of the grammatical features of Dutch conditionals. I analysed the distributions of these features in a representative and balanced corpus, and tested for associations with mode (spoken, written), and register (formal, informal). Second, the resulting overview served as input for the data analyses in the following chapter. With respect to the second research question, the goal was to systematically test pairings between meaning and form of Dutch conditionals, and therefore, chapter 5 constitutes a necessary, yet in itself insightful overview of the grammar of Dutch conditionals. The overview was complemented by comparisons with previous studies of the features under inspection, in order to maximise understanding of each feature in its grammatical context, and to avoid overlooking known factors involved in their distributions. As the results presented in chapter 5 are extensive, the reader is referred to the summaries at the end of each of the sections of the chapter.

Chapter 5 contributes to the study of conditionals an extensive overview of the grammar of Dutch conditionals. As such, this chapter and the chapters following it add a language-specific analysis of Dutch conditionals to the study of conditionals in general, and as the inventory of classifications mentioned above discusses grammatical features of conditionals in English largely, this dissertation also offers a contrastive analysis of the grammar of Dutch and English conditionals. Furthermore, the inventory was based not only on written corpus data, but also on spoken data, balanced on the dimension of register, which is relatively uncommon in the literature on conditionals.

7.2.6 Clusters of conditionals

In chapter 6, I provided arguments for analysing conditionals as form-meaning pairings, i.e., constructions, in order to investigate relations between grammatical features and implicatures of conditionals. The primary aim was to test the extent to which the feature distributions of Dutch conditionals would be informative as grammatical contexts licensing conventional or generalised implicatures of unassertiveness and connectedness, thereby answering the last part of the second research question in (115b). The secondary aim was to explore the merits of novel machine-learning techniques on linguistic datasets.

With respect to the primary aim, it became clear that the results of the cluster analyses did not clearly reflect the implicatures of unassertiveness or connectedness discussed in chapters 2 and 3. In other words, there never appeared to be clear agreement between the types distinguished in the literature and the clusters found. Even types from highly influential accounts, such

as Quirk et al.'s (1985) direct and indirect conditionals, or Dancygier and Sweetser's (2005) content (predictive), epistemic and speech-act conditionals were not identified by the clustering algorithms. With respect to the second research question, this suggests a negative answer mostly, as the grammatical features included in this study do not seem to cluster on features to license implicatures of unassertiveness and connectedness. Whereas the partitional solution proved difficult to interpret in terms of shared implicatures, and seemed to grant high levels of influence for individual features per cluster, the hierarchical solution did combine features of conditionals to form interpretable groups. It indicated a large unmarked group of what could be seen as prototypical conditionals, namely those with present tense in both clauses, no modal marking of antecedents, and a minority of consequents marked for epistemic modality. This underlined the observation that in Dutch, consequents of direct and indirect conditionals are not marked by the presence or absence of the modal verb *zullen* 'will' respectively, which further pointed towards the importance of language specificity in this study. Another interpretable cluster was formed by the hierarchical algorithm, namely a group of past tense conditionals with modalised consequents. This cluster was interpreted as containing distanced conditionals, but the algorithm did not differentiate between temporal and epistemic distance, which reflects a common debate in the literature on the ambiguity of tense and modality. It remains thus the question whether epistemically distanced or even counterfactual conditionals should be analysed as separate constructions.

With respect to the secondary aim, which was to explore the merits of applying a number of data-driven, unsupervised machine-learning techniques to linguistic datasets, the results were mixed. On the positive side, this part of the study contributed a bottom-up, corpus-based approach to the study of conditionals, in which most accounts (see chapter 3) tend to be top-down, theory-driven. It uses an original combination of in-depth pragmatic analysis to construct hypotheses about conditionals constructions, and applies both proven and state-of-the-art machine-learning techniques for clustering data on a carefully balanced corpus of Dutch conditionals. As such, it was a promising methodological approach to investigating the relation between grammar and meaning. Based on theory and quantitative analyses, I selected features that maximised the chance of finding structures underlying the data. These evaluations suggested removing aspect, person and number, and focus particles from the dataset to improve clusterability. Two main approaches of clustering, hierarchical and partitional clustering, were selected based on their applicability to the data, and their theoretical relation to prototype theory, and I evaluated the clusterability of their various implementations and parameters in detail, to arrive at the most promising clustering solutions. The selected solutions indicated reasonable underlying structures, but these were not found to be strongly related to the implicatures of interest.

On the negative side, the results as described above are indicative, but inconclusive on the question to what extent links between the grammatical features and implicatures of unassertiveness and connectedness can be observed. As this study systematically investigated the contribution of grammatical properties of conditionals suggested to be of influence in the literature (see chapter 5), and the results suggested only weak links between the form and meaning of conditionals, and the types suggested in the literature, it is probable that the types in the literature are not coded into the grammar of Dutch conditionals. As this result sheds light on the relation between form and meaning of conditionals, it is a point worthy of further discussion, and it will be taken up in detail in section 7.3 below.

7.2.7 Conclusion

The analyses of conditionals presented in chapter 2 showed how a logical analysis of conditionals may provide clear starting points for the pragmatic analysis of conditionals in language use, as their contrast provided the grounds for recognising two conventional meanings of conditionals, unassertiveness and connectedness, which license further, more specific implicatures. In chapter 3, these meaning aspects proved to be useful guides in structuring the extensive literature on classifying conditionals, and in sorting out which grammatical features should be taken into account when researching the non-truth-conditional meaning aspects of conditional constructions. After presenting the data preparation in chapter 4, the overview of the grammar of Dutch conditionals in chapter 5 not only provided insights into the grammar of conditionals in different modes and registers of natural language, but also provided the input for two (bottom-up) cluster analyses of Dutch conditionals in chapter 6. As these analyses formed the final step of this study, and answers to the research questions were provided and summarised above, what is left is the discussion of unresolved issues, and the implications of the main findings presented in this dissertation.

7.3 Discussion: clusters and constructions

7.3.1 Introduction

The primary aim of chapter 6 was to perform and evaluate a data-driven, unsupervised analysis on the data presented in the previous chapter, in order to find out whether feature distributions can be used to identify grammatical contexts licensing (generalised) implicatures of unassertiveness and connectedness. As has become apparent, applying standard procedures to the multivariate categorical dataset proved problematic. Both proven and state-of-the-art

machine-learning techniques were used to solve these problems, but the results did not show clear reflections of the types of conditionals distinguished in the literature.

In this section, I address the issue of finding clusters that can only weakly be interpreted as constructions with identifiable meaning aspects. I will discuss three issues related to these findings. In section 7.3.2, I will discuss top-down and bottom-up classification, in section 7.3.3 I will discuss an issue of construction meaning and pragmatics, and in section 7.3.4, I will reflect on language specificity, before offering a brief conclusion of this discussion in section 7.3.5.

7.3.2 Top-down and bottom-up classification

Although, as discussed in chapter 6, reasonable structures were found in terms of quantitative evaluations, with comparable results for hierarchical and partitioned clustering, the results showed that none of the solutions directly or strongly reflected any of the implicatures discussed in chapters 2 and 3. Apart from the fact that the hierarchical solution included a large cluster of unmarked or default conditionals (see section 6.5.4), and a cluster of past tense conditionals with modalised consequents, comparable to neutral and closed conditionals (i.e., hypothetical, counterfactual, or epistemically distanced conditionals; see section 6.5.5), the results did not provide clearly separated groups of conditionals ready for theoretical interpretation.

As I hope to have demonstrated throughout this dissertation, the literature suggests relations between grammatical features of conditionals on the one hand, and meaning aspects on the other hand. I analysed these meaning aspects as conversational implicatures licensed by the conventional meaning aspects of conditionals in chapter 2. This made testing the hypothesis that features cluster as grammatical constructions with their own meaning aspects not only viable, but also promising, as implicatures can be more or less generalised (see section 6.2), and a clustering approach is able to identify such probabilistic clues for implicatures. In other words, the fact that features or combinations thereof may form means of licensing implicatures of unassertiveness and connectedness fits with the methodology used in this study. Other studies involving clustering (see section 6.3) yielded promising results without thorough theoretical motivation for the variables chosen, applying a more opportunistic approach to the data exploration. It was therefore to be expected that the current approach, which did involve theoretical motivation for the initial and final selection of variables, would maximise the chance of finding clusters related to the implicatures the features were linked to in the literature. The current results suggest that, if the types of conditionals discussed in chapter 3 indeed exist, they are probably not strongly marked by grammatical means (see also section 7.3.3).

From the results, we should not, and cannot, conclude that the types proposed in the literature do not exist as cognitive constructs. Let us take, for example, Sweetser's (1990) account (and the subsequent account in Dancygier & Sweetser, 2005; see section 3.3.7), which, to my knowledge, are most com-

monly used in corpus studies and experimental studies on conditionals. The studies referred to in sections 3.3 and 4.2 do indicate that content, epistemic and speech-act connections between antecedents and consequents can be found in Dutch conditionals. Although corpus studies using existing classifications as top-down means for categorising language data run the risk of projecting those theoretically motivated types onto the data at hand, I take this as an indication that it is unlikely that such types do not exist as cognitive categories. This is corroborated by Verbrugge et al.'s (2007) experiments, which show processing differences between content (i.e., predictive) and epistemic (i.e., inferential) conditionals, in turn providing an argument for their psychological reality (see section 4.3). Rather, it is more likely that these categories are not manifested as *linguistic* categories in Dutch, as they appear not to be marked by grammatical means (see section 7.3.4 for a discussion of language specificity). This is further corroborated by low reliability scores, which were reported not only in the experiment in section 4.2, but also mentioned by linguists applying the same classification to coherence relations (Renmans & van Belle, 2003; Spooren & Degand, 2010; see also Levshina & Degand, 2017, pp. 146–147). Such low reliability scores may, as Spooren and Degand (2010, p. 259) argue, be ‘inevitable’ for annotation tasks ‘where interpretation (as opposed to formal characteristics) of the phenomenon under scrutiny is central’.

The question what the current study tells us about the categorisation of conditionals then resurfaces, and with it, the question how (cognitive) linguistics should incorporate these insights. The current results should not be taken as proof that certain classifications of conditionals discussed in chapter 3 are wrong, and other ones are right, or that account A is right in positing a type of conditional B, and account C in positing type D. More fundamentally, I believe the results suggest the foundation of categorising conditionals needs to be reconsidered. While it is theoretically insightful to define general categories of conditionals, it is at least as important to test such cognitive constructs on empirical grounds. It may be the case that we, as language researchers, have a desire and eagerness to postulate global categories of meaning in order to most efficiently explain language use, while, as language users, we group similar interpretations of language patterns at a much lower level, in which case, only more specific categories exist. If that is the case, categories should be defined lower down the ‘classification tree’, as more specific instances of patterns of use. This, however, would mean sacrificing, to a certain extent, the simplicity criteria for classification results (see section 6.2), and the generalisations current accounts offer. Future cognitive linguistic research on conditionals and other constructions could therefore benefit from exploring a new balance between accountability for all data on the one hand, and explanatory power on the other.

While most classifications discussed in chapter 3 are not bottom-up accounts, they are based on thorough research and analysis, and as such, they are rooted in observations and the analysis thereof. Therefore, I take the results of this study as a strong indication that the grammatical features of Dutch

conditionals do not correspond to those in English in licensing implicatures of unassertiveness and connectedness, apart perhaps from verb tense and modal marking of distanced conditionals. Note, however, that an equivalent of the cluster analysis in this dissertation is not available for English conditionals, which leaves open the possibility that for English too the specific implicatures of unassertiveness and connectedness are underspecified by grammatical means, and perhaps are connected to other, for instance, lexical-semantic means. We will turn to this issue in the following section.

7.3.3 Constructions and implicatures

While the current results do not prove that the grammar of Dutch conditionals does not license conventional or generalised conversational implicatures of unassertiveness and connectedness, irrespective of any classification discussed in chapter 3, they do, in my view, make such a relation unlikely. With respect to the expectation formulated in chapter 6, namely that the features of Dutch conditionals are expected to ‘work together’ in licensing implicatures of unassertiveness and connectedness, i.e., functioning as form-meaning pairings or constructions, the cluster analyses did not provide strong indications that clusters of features could be connected to clearly identifiable generalised implicatures.

The results may be taken as a suggestion to include other features in the analysis. However, given the extensive overview of the literature, I deem it unlikely that any relevant grammatical features were missed in this study. Another interpretation of the results is that, in licensing more specific implicatures of unassertiveness and connectedness, grammar does not play a large role. In other words, such implicatures are not, or only weakly generalised. In this view, the results point towards a larger role for pragmatics than for grammar (or inference and code respectively; see Ariel, 2008, Chapter 1). The measures taken to ensure optimal clustering exceed what is normally attempted and reported in studies applying clustering techniques. The current approach may thus be expected to have produced clusters if there were any. As I hope to have shown in the respective chapters, the relation between the number of features and observations in the corpus was sufficient, the features were theoretically motivated, as was the choice of clustering approaches and algorithms. Furthermore, all results were thoroughly evaluated. The absence of a clear relation between groups of grammatical features and identifiable meaning aspects does not permit a more radical conclusion, but the extensive testing of each step in the data preparation and clustering does, in my view, warrant the more cautiously formulated conclusion that, apart from the unmarked conditionals and conditionals marked by past tense and modality in the consequent identified by the hierarchical clustering algorithm, the extent to which grammatical features of conditionals license implicatures of unassertiveness and connectedness is very limited. In other words, the implicatures appear not as generalised as was hypothesised. It is important to note here that I have adopted a construction grammar ap-

proach in this study, and explicitly selected *grammatical* features for inclusion in the cluster analyses. After all, construction grammar revolves around pairings between grammatical form and meaning. Furthermore, the classifications of conditionals discussed in chapter 3 suggest such an approach, as they focus on grammatical features in determining types of conditionals. The deliberate choice for grammatical features did however prohibit the inclusion of lexical-semantic features in the bottom-up approach adopted, while it is possible, and for certain types may even be expected, that lexical semantics plays a large role in licensing implicatures of connectedness and the constructional status of certain uses of conditionals. For instance, conditionals such as ‘If you’re not busy...’ or ‘If I’m not mistaken...’ are clearly identifiable as pragmatic conditionals based on not only person and number, but also on the lexical-semantic contents of, in this case, the antecedents. Therefore it is suggested that future attempts at classifying conditionals using bottom-up approaches include features beyond the grammatical realm (for examples, see e.g., Levshina, 2011, 2016, on distributional semantic maps for causative constructions).

With respect to the relation between construction grammar and pragmatics, generalisation and conventionalisation of implicatures are gradual phenomena. Examples of conditionals with comparable grammatical form but different implicatures of unassertiveness or connectedness are not counter examples to a generalised state of implicatures per se. Note furthermore that there is a complicating, partially terminological factor in this discussion. As Leclercq (2020, p. 226) argues, ‘constructionists often steer clear of using these terms [i.e., *semantics*, *pragmatics*], to which they prefer the wider label *function*. This is largely due to the assumption in cognitive approaches that there is no clear distinction between semantics and pragmatics [...]’, as we discussed earlier in chapters 1 and 2. In other words, the term ‘meaning’ (*function*) within the concept of ‘form-meaning pairings’ is often used loosely. Leclercq (2020, p. 227) furthermore argues for clarity by adopting a constructional view in which semantics is defined in truth-conditional (i.e. ‘propositional’) terms, and, in line with Cappelle (2017, p. 122), pragmatics in terms of ‘those aspects of a speaker’s knowledge of a linguistic expression that are treated as falling outside the domain of [...] propositional semantics’. As we have discussed explicitly already in chapter 1 (see section 1.3), this may be seen as being at odds with the non-modular nature of construction grammar (cf. Fillmore, 1985; Lakoff, 1987; Langacker, 1987; Goldberg, 1995, 2013). I do not believe this to be the case, however, and I think separating truth-conditional and non-truth-conditional meaning contributions of grammatical constructions adds clarity to an analysis, without necessarily positing separate modules and with it, a modular view of cognition. Although one may, of course, disagree with such a view, in the analysis presented in this dissertation, I hope to have shown how discussing grammatical constructions in explicit and specific (Gricean) terms of truth-conditionality (i.e., truth-conditional and non-truth-conditional mean-

ing) and conventionality (i.e., conventional and non-conventional meaning) aids the identification of similarities and differences between logic and natural language, and ultimately benefits linguistic analysis.³

Conditionals are used frequently in both spoken and written language, and the conventional meanings of unassertiveness and connectedness is constant. They are, however, also general. As we saw in chapter 2, a speaker uses a conditional not because she is necessarily uncertain on the truth of p , but because she cannot or does not want to assert p . Further specification of this unassertiveness, such as uncertainty or counterfactuality, is necessary (see section 2.5). In addition, a speaker uses a conditional to present two situations in connection. This connectedness is further specified in context, and may be of a causal or another nature (see section 2.6). As both these specifications of the general conventional meaning of conditionals are as frequent as the use of conditionals, and the literature suggests the number of specifications (or type) to be fairly limited (see chapter 3), one may expect grammatical clues have become ‘attached’ to these more specific inferences, in turn developing into generalised implicatures, and into constructions. This view is comparable to Ariel’s (2008, p. 306) conclusion that ‘codes commonly develop out of (salient, recurrent) speaker-intended inferences associated with specific forms’, because salient patterns of form and meaning ‘bring into being new forms and new form-function correlations, a new grammar, in other words’ (see also Schmid, 2020 on ‘entrenchment’ of implicatures; for further references, section 6.2). Again, the current results are not conclusive on this issue, but suggest, at least within the domain of conditional *als* ‘if’ constructions in Dutch, that more specific implicatures resulting from the conventional and still general (abstract, vague) meanings of unassertiveness of and connectedness in conditionals have so far not grammaticalised, and largely remain inferences instead of code.

7.3.4 Language specificity

A last and related issue is that of language specificity, which already introduced itself in the previous sections. While some might find it regrettable that a detailed analysis of data such as presented in this dissertation did not produce results readily interpretable in terms of the accounts of conditionals available in the literature discussed in chapter 3, the results presented in chapter 5 do

³See chapter 2, and especially sections 2.4 and 2.8 for discussion of this issue, and the next section for prospects on an integrative approach. See also Depraetere (2019), who argues that ‘if [the term] *pragmatic* is used whenever we are referring to meaning in context, then it becomes a commonplace that is generic at the risk of becoming relatively void of meaning’. She therefore suggests to distinguish between ‘meaning in context’ as a formal environment including linguistic and extra-linguistic context, and ‘contextual meaning’, a functional category including (context-dependent) semantics and pragmatics (both context-dependent implicatures and other types of context-dependent meaning). For reasons of space, we will not discuss this issue further here.

provide a picture of the collaborative features of Dutch conditionals. These features paint, in part, a different picture than what is known for English conditionals.

Conditionals in English have been clustered before into direct (i.e., predictive, causal, inferential) and indirect (e.g., pragmatic, speech-act) conditionals using only modal marking (Gabrielatos, 2010, 2020, 2021). The presence of *will* indicates prediction in English conditionals (see e.g., Dancygier, 1998, p. 43; sections 3.3.7, 3.2.7 and 5.4.2), but future reference in Dutch is, in general, less frequently expressed by its counterpart *zullen* ‘will’. In contrast, reference to future situations is most frequently expressed using the regular simple present verb tense lacking any modal auxiliary (see section 5.4 for details and discussion). I expect the current results, which do not clearly discriminate implicatures of connectedness such as those in the direct-indirect distinction mentioned above, to reflect this absence of marking of future reference. This may have led the algorithms to pick up on other features for clustering, resulting in a stronger reflection of classifications distinguishing between neutral and distanced conditionals based on past tense and modality (i.e., implicatures of unassertiveness).

The problem of language specificity is one that has already surfaced a number of times in this dissertation, and a parallel can be observed to Croft’s (2001, pp. 29–31) discussion of language specificity and universality of parts of speech. In short, he argues that upholding language universality and language specificity at the same time leads ‘cross-linguistic methodological opportunism’. This term denotes the use of language-specific criteria where they do not exist as general criteria in the language, or provide the “wrong” results according to one’s theory’. Applied to conditionals, this would suggest that using the inventory of grammatical features related to types of conditionals mainly in English, as was done in chapter 3, and then using those features as criteria for finding types in Dutch conditionals, is in fact an instantiation of the cross-linguistic methodological opportunism mentioned. While this may not necessarily be problematic in itself, Croft (2001, pp. 31–32) mentions it results in two ‘interrelated and fatal problems’.

The first problem is that there is no principled way to decide which criteria to take into account to find cross-linguistic or universal types of conditionals. For parts of speech, Croft argues the following.

One might propose that inflection for agreement and tense-mood-aspect will be the criterion for the category Verb across languages. But why? No reason has been given to do so. And if one does so, then one will have to conclude that all words are Verbs in Makah and no words are Verbs in Vietnamese, which is hardly a savory conclusion for a theory that posits Verbs as a part of Universal Grammar.
(Croft, 2001, p. 31)

Applied to the current study, one could argue that using accounts of English conditionals for informing the decision on which features to include in the cluster analyses aimed at finding types of conditionals, or implicatures of unassertiveness and connectedness in Dutch conditionals, would indeed amount to the problem sketched above. This ‘opportunism’, however, was in my view warranted in order to construct an informed dataset. First, most of the literature on conditionals is based on the English language, and although even the category of conditionals itself may not overlap perfectly in different languages, I have attempted to formulate characteristics of conditionals that exclude as little uses as possible (see section 2.2.4). Second, and more specifically, the available classifications are based on English. Not taking into account these accounts would amount to ignoring valuable insights, and as mentioned in section 7.3.2, certain types of conditionals have been attested in Dutch corpus data and experimental studies. Third, by not limiting the feature set to those directly related to types of conditionals in English, but including other, less directly related features (e.g., aspect, person and number), and directly related features not present in English conditionals (syntactic integration), I hope to have, perhaps not in a theoretical, but at least in a practical sense, prevented unconscious opportunism.

The second problem is that cross-linguistic methodological opportunism introduces ‘*a priori* theoretical assumptions’ about the phenomena to be distinguished. In Croft’s discussion, these phenomena concern the categories of parts of speech, such as verbs and nouns, fundamental to linguistic analysis. These categories, however, need to be distinguished on basis of distributional patterns that require the same categories as terms to begin with. To address this point, I would like to discuss two different conceptions of corpus linguistics. In doing corpus linguistics, one can choose between what is called a ‘corpus-based’ approach, and a ‘corpus-driven’ approach (cf. Tognini-Bonelli, 2001; McEnery & Hardie, 2012, p. 6). In short, in a corpus-based approach, a corpus is used not as a ‘determining factor with respect to the analysis’, but only as an inventory of ‘pre-existing categories’ (Tognini-Bonelli, 2001, p. 66) (i.e., it is in principle a deductive process), which the analyst may refine, but these categories can not be challenged by the data. Conversely, in a corpus-driven approach, recurrent patterns and frequency distributions of examples ‘taken verbatim’ are used to form the ‘basic evidence for linguistic categories’ (Tognini-Bonelli, 2001, p. 84) (i.e., an inductive process). McEnery and Hardie (2012, p. 147) argue against the strongest form of corpus-driven linguistics, in which the ‘*corpus itself* (and not just corpus linguistics as a field) is the theory’, as Tognini-Bonelli (2001, p. 84) argues. McEnery and Hardie (2012, p. 148) argue this would imply that, besides the corpus data, nothing should be used as to generate knowledge about language, because the corpus then would represent ‘at one and the same time the phenomenon in need of explanation and the set of postulates intended to explain it’. However, by taking corpus data seriously while maintaining that ‘data is data and theory is theory’, we can use corpora as sources of data to provide evidence in favour or in contrast with theories of language. Using the

features derived from previous accounts of conditionals to test whether they indicate the presence of types of conditionals in the corpus data does, in my view, exactly that. We do not have to throw away existing part-of-speech categories or, in this case, grammatical features of conditionals to try and find meaningful patterns in corpus data, as long as we are aware of the pitfalls, such as those discussed by Croft (2001) discussed above.

The implications of the above for this study are as follows. Conditionals, like other constructions, are language-specific and consist of components (words, phrases, clauses). Constructions cannot be defined without references to their components, and their components cannot be defined without reference to the construction they are part of. Constructions, in this sense, are theoretical primitives, which need to be described in terms of categories of the language they exist in, and in relation to the larger construction itself. In this sense, ‘grammar is a dynamic system of emergent categories and flexible constraints that are always changing under the influence of domain-general cognitive processes involved in language use’ (Diessel, 2015, p. 296). Although this discussion, like Croft’s above, concerns the very fundamentals of linguistic analysis, as a radical approach to construction grammar would reject presupposed primitive categories like subject and noun (for discussion, see e.g., Jackendoff, 2002, pp. 74–77), for the current study, it implies that features defined in terms of such and higher-level categories should at least be used with caution. Illustrative is Fortuin’s (2019, p. 47) cross-linguistic study of performatives, in which he concludes that ‘many languages employ different types of TA(M)-marking [Tense, Aspect, Modality; AR] for different types of performatives’. This relates to the focus of this dissertation on constructions with the conjunction *als* ‘if’. As in other languages, Dutch provides other means of expressing conditional thoughts, such as *mits* ‘provided that’ (Daalder, 2006, 2009), *tenzij* ‘unless’ (Paardekooper, 1986, pp. 442–443; Daalder, 1994), V1-conditionals (see e.g., Boogaart, 2007a; Breitbarth, Delva & Leuschner, 2016), pseudo-imperatives (see e.g., Clark, 1993; Fortuin & Boogaart, 2009), the conditional use of prepositional phrases such as *zonder* ‘without’ (Reuneker, 2016), and the conditional use of *wanneer* ‘when’ (van Belle, 2003, p. 67; Duin, 2011). The latter example is illustrative for the current discussion, as in Dutch, the primarily temporal conjunction *wanneer* ‘when’ can, in contrast to English *when*, be used as a conditional conjunction easily, and, vice versa, *als* ‘if’ is frequently used as a temporal conjunction (see section 4.4.4 for an elaborate discussion). This shows that the meanings of constructions with either one of these conjunctions overlap, and it is advised here that these (and other) constructions be included in future research on conditionals in Dutch. By doing so, it can be tested to what extent their respective conditional and temporal meanings overlap, and how this relates to the classifications of conditionals. However, as clear cases of non-conditional *als* ‘if’, including purely temporal uses, were explicitly excluded from the corpus study, resulting in a corpus of conditionals in Dutch most reminiscent of English *if*, I deem it unlikely that the current study of conditional constructions in Dutch has created a blind spot with re-

spect to the types of conditionals proposed in the literature. In fact, the choice to select only the conditional use of *als* ‘if’ in this study was based on the premise of construction grammar that a word such as *als* ‘if’ takes on specific (in this case, conditional) meaning only within a larger unit or construction. If, from a purely form-driven perspective, all uses of *als* ‘if’ had been included, it would have been even less likely than in the current approach that their types of uses of the conditional conjunction proposed in the literature were found. This brings us back to the suggestion that in future research on conditionals in Dutch, constructions beyond *als*-conditionals should be included, because, as discussed earlier in Verhagen’s (forthcoming) terms, it is not warranted that corresponding conceptual meanings in different languages have similar or comparable formal features, and it is neither said that they have the same meaning boundaries. This, according to Verhagen, leads theorists to continuously redefine the categories, and/or to introduce additional ones. For example, the partitioned results in section 6.6 did show signs of resumption being related to conditionals used for epistemic inferences (i.e., consequents presenting conclusions based on information in antecedents), but the overall results suggest that the grammatical features of conditionals distilled from the literature on English conditionals provide insufficient means for discovering implicatures of unassertiveness and connectedness in Dutch conditionals.

7.3.5 Conclusion

In this study, I attempted to refrain from projecting top-down classifications on corpus data (see section 7.3.2), accepting pre-defined types of conditionals (see section 7.3.3), and from accepting universal categories in a language-specific corpus study (see section 7.3.4). By using a bottom-up corpus analysis, I sought a balance between (‘opportunistically’) using features defined on the basis of another language on the one hand, and not taking those features at face value on the other. This has, in my opinion, provided, among the results summarised in section 7.2, the valuable insight that *als*-conditionals, like their English counterparts, conventionally express meanings of unassertiveness and connectedness, while their distributions of grammatical features appear to provide limited grounds only for licensing of more specific generalised implicatures. The implication for future research on conditionals, both in Dutch and in other languages, then, is, in my view, to investigate what features other than, or in cooperation with the grammatical features included in this study, play a role in enabling language users to interpret the stance towards the situations referred to in antecedents and consequents of conditionals, and the connection between those situations.

7.4 Prospects: an argumentative approach

7.4.1 Introduction

In this section, I offer prospects on combining logical and usage-based analyses of natural language phenomena.⁴ As I hope to have shown, combining truth-conditional and non-truth-conditional analyses of conditionals enabled the identification of clear meaning aspects to be studied in detail. Of course, both types of analyses are not new, and have been studied in tandem since at least the introduction of Grice's (1975) framework of implicatures. However, having discussed a large number of studies on conditionals, many studies swiftly dismiss one of the approaches by either suggesting the non-applicability of truth-conditional analyses to actual language use, or by implicitly or explicitly discarding types of use of conditionals *a priori*. In short, the two types of analyses are often presented as fundamentally different and incompatible. Although, in chapter 2, I chose to focus on the non-truth-conditional meaning of conditionals, in turn reducing the attention for their truth-conditional aspects in the analyses in later chapters, these latter aspects were discussed in detail and explicitly used for identifying the implicatures of unassertiveness and connectedness, and the conventional meanings licensing them. In this section, therefore, I would like to suggest and explore an approach which does not presuppose the aforementioned incompatibility. In section 7.4.2, I will outline the general approach, and in section 7.4.3, the approach is applied to conditionals. In section 7.4.4, a brief conclusion is drawn, before offering some final remarks in section 7.5.

7.4.2 An argumentative approach to language

In chapter 2, it was shown how, on the one hand, a number of philosophical, pragmatic and linguistic studies of conditionals often quickly dismiss of truth-conditional analyses of conditionals, as do, for example Edgington (1986), Bennett (2003, Chapter 3), Akatsuka (1986), Mayes (1994, pp. 451–452), Sweetser (1990, Chapter 5), Wierzbicka (1997), Cruse (2000, p. 9). In the same chapter, we saw how, on the other hand, formal semantic studies often do not incorporate results from usage-based studies, and discard certain uses of conditionals *a priori*, such as pragmatic or metalinguistic conditionals (e.g., von Stechow, 2011, p. 1517; Sanford, 1989, p. 5). In this dissertation, I combined both types of analyses to arrive at two clearly identifiable meaning aspects of conditionals, namely their unassertiveness and connectedness. Here, I would like to address the merits of combining formal and functional approaches by offering further thoughts in terms of an argumentative view on language use.

⁴Parts of this section were previously published in Boogaart and Reuneker (2017).

Boogaart and Reunecker (2017) offer a discussion and an application of Verhagen's (2005) argumentative approach to grammatical constructions. This argumentative approach views language, and communication at large, in terms of the cognitive coordination between two subjects of conceptualisation.⁵ In the approach, three dimensions of language use are distinguished: a descriptive dimension, a subjective dimension, and an intersubjective dimension. On the descriptive dimension, at the level of 'objects of conceptualisation', language is analysed as a referential tool, i.e., language is seen as a linguistic means for exchanging information about the world. Ducrot's (1996) example below (cited by Verhagen, 2005, p. 11) is, in this sense, a purely descriptive expression, which can be described truth-conditionally, i.e., knowing the meaning of [(1)] equals knowing under which conditions the sentence is true (see section 2.3), i.e., knowing when there are indeed seats in the room.

- (1) There are seats in the room. (Ducrot, 1996, p. 42)

As Jackendoff (2002, p. 294) argues, such an approach sets out to 'explain how linguistic expressions say things about the world'. While it cannot be denied that this is an important function of language, cognitive linguists have questioned whether the descriptive dimension can truly provide the semantics of linguistic items. Moreover, describing the world may not be the primary function of language use.

Cognitive linguists starting with Lakoff (1987) have pointed out that, instead of expressing 'things about the world', linguistic utterances tell us how the speaker conceives of, or construes, the world. Taking into account this subjective dimension of language use, i.e., the level of 'subjects of conceptualisation', one and the same situation in reality, such as that of seats being in a room, may be presented in different ways, using different words or grammatical constructions, as in (2) and (3), presenting only two of many alternatives.

- (2) Seats are standing in the room.
(3) The room has seats.

It is hard to see how these alternative phrasings of (1) correspond to different truth-conditions, and yet one would like to be able to represent the semantics of the presentative *there*-construction in (1), the effect of adding a progressive construction and a posture verb in (2), and the effect of taking the room rather than the seats as a 'starting point' for the sentence in (3). In the words of Langacker (2008, p. 55), 'every symbolic structure construes its content in a certain fashion'. In line with the account presented in chapter 2, we can see how such meaning aspects can be described in terms of conventional, albeit non-truth-conditional meanings. Such meanings of linguistic elements, then, are to be identified with different construals of the world rather than with

⁵For an extension of the approach incorporating multiple viewpoints of speaker, hearer and other relevant agents, see van Duijn and Verhagen (2019).

references to that world (Langacker, 1991, pp. 1–2). This type of analysis thus shifts from focusing on reference and truth-conditions at the level of objects of conceptualisation, to construal and subjectivity at the level of subjects of conceptualisation.

When one thinks about the reasons for spending cognitive effort on producing linguistic expressions, however, neither a descriptive, nor an exclusively subjective analysis will suffice. Why would a speaker present her description or conceptualisation of (a) reality, as in (1), to a hearer in a linguistic utterance, if not to achieve certain effects with that utterance? This was also the point made by Ducrot (1996) in his discussion of the example in (1), and in view of this question, Verhagen (2005) proposes a modified version of Langacker's account, in which, next to the descriptive and the subjective dimension of language, an intersubjective dimension is included. On this dimension, a linguistic usage event consists of the speaker inviting the hearer to change his cognitive system by drawing inferences evoked by the linguistic utterance used, and to adjust the common ground accordingly. This 'cognitive coordination', in other words, views uttering a linguistic expression as an invitation from a speaker to a hearer to construe an object of conceptualisation in a certain way (cf. Langacker, 1987), and consequently offers an incentive to update the common ground with the inferences that follow from this specific conceptualisation of reality. Such inferences at the subjective level (S), rather than the linguistically coded, descriptive content of the utterance, at descriptive or objective level (O), constitute the point of the utterance. In the argumentative approach to language as developed most notably by Anscombe and Ducrot (1989) and Ducrot (1996), the intersubjective relation between speaker and hearer is said to be of an argumentative nature, because utterances are meant primarily to invite the hearer to draw certain conclusions. Utterances are thus conceived of as arguments for conclusions, or as means to invite the discourse participant to draw certain inferences. Intersubjectivity, in this view, relates to the participants in linguistic communication and consists of the mutual influence they exert on each other's cognitive systems (cf. Verhagen, 2005, p. 26).

Verhagen (2005) adds to this view a specific linguistic perspective, and shows how grammatical phenomena such as negation and complementation can operate directly on the intersubjective dimension (i.e., 'constructions of intersubjectivity'). When language is seen as a social instead of an informational tool, the focus of analysis automatically shifts from its referential properties and its subjective, perspectival properties to its intersubjective dimension: a speaker expresses (1) not to describe a room containing seats, or only subjectively to construe this situation, as exemplified in (2) and (3), but to invite an interlocutor to draw inferences about, for instance, the comfort provided in the room. Many grammatical constructions exhibit an argumentative orientation restricting the inferences the hearer is supposed to make, and an argumentative strength providing weaker or stronger arguments for these conclusions, an idea prominent also in the stylistic approach to language and argumentation (see e.g., van Leeuwen, 2012; Stukker & Verhagen, 2019; Boogaart,

Jansen & van Leeuwen, 2021; van Haaften & van Leeuwen, 2021). Boogaart and Reuneker (2017) show how this approach can be extended to modality and conditional constructions, and with respect to the latter, we can now fill in some of the details, to see how this could come to fruition in future research.

7.4.3 An argumentative approach to conditionals

In the analysis of conditionals in terms of material implication as discussed in chapter 2, the truth value of proposition q expressed in the consequent depends on that of proposition p expressed in the antecedent. In example (4) from chapter 2 repeated below, this warrants logically valid conclusions like *modus ponens*, as in (5), and *modus tollens*, as in (6).⁶

- (4) If it rains, the road is wet.

$$p \rightarrow q$$

- (5) ‘It rains. Therefore, the road is wet.’

$$p \therefore q$$

- (6) ‘The road is not wet. Therefore, it does not rain.’

$$\neg q \therefore \neg p$$

This truth-conditional analysis concerns the descriptive or objective dimension of language as discussed above. However, as the analysis in chapter 2 showed, it prohibits any conclusions for which additional information is needed, i.e., information beyond the information expressed in propositions p and q . The conclusions in (5) and (6) must therefore be seen in terms of the dependence of the truth value of q on that of p (p is sufficient and non-necessary for q), i.e., as purely logical conclusions. As this dependency does not concern any connection between p and q , such as a causal connection between rain and the road being wet, one can readily infer from the example in (4), the argument would be equally valid for an example in which p stands for ‘Paris is the capital of France’, and q stands for ‘two is an even number’ (cf. Sweetser, 1990). Limiting an analysis to this level results, as we saw in chapter 2, in discrepancies between what conditionals mean from a logical perspective, and how they are used in natural language.

By using a conditional, a speaker conventionally expresses unassertiveness and connectedness, and licenses further, more specific implicatures. Implicatures of unassertiveness, such as uncertainty in (7) below, or counterfactuality in (8), are used in reference to situations in the world, but the stance towards these situations is implicated by the speaker, which shifts these meaning aspects from the sole level of objects of conceptualisation, towards the subjective level of language use.

⁶For a recent experimental account showing that people make significantly more *modus tollens* inferences in case of conditionals whose consequents appear obligatory rather than ‘factual’ (i.e., not obligatory), see Cramer, Hölldobler and Ragni (2021).

- (7) If it rains, the road is wet.
 $\approx p$ is not asserted.
 $+>$ 'It may or may not be raining.'
- (8) If it were raining, the road would be wet.
 $\approx p$ is not asserted.
 $+>$ 'It is not raining.'

Whereas the uncertainty implicature in (7) is still closely related to the O level, it can be argued that the counterfactual implicature licensed by *were* in (8) may be more closely situated at the S level, as it expresses epistemic distancing of the subject from the objects described or construed.

Implicatures of connectedness can be analysed in a similar fashion. For example, in (9), we see a temporal ($M_4+>$) and a causal implicature ($R+>$), and an implicature of conditional perfection ($+>$).

- (9) If it rains, the road will be wet.
 $\approx p$ is not asserted.
 $+>$ 'It may or may not be raining.'
 $\approx p$ and q are connected.
 $M_4+>$ 'Rain precedes the road getting wet.'
 $R+>$ 'Rain causes the road to get wet.'
 $+>$ 'Only rain causes the road to get wet.'

These implicatures are licensed by grammatical form, world-knowledge and context, and therefore, they rely on the shared knowledge of the subjects of conceptualisation (i.e., the common ground; see above). The connection itself, however, still directly concerns the O level, or the world referred to. When compared to, for instance, an inferential connection, as in (10), we see how the implicature of connectedness is less directly related to the objects of conceptualisation.

- (10) If he is a bachelor, he must be male.
 $\approx p$ is not asserted.
 $+>$ 'He may or may not be a bachelor.'
 $\approx p$ and q are connected.
 $M_4+>$ 'Knowing he is a bachelor precedes knowing he is male.'
 $R+>$ 'Knowing he is a bachelor enables the conclusion that he is male.'

In this type of conditional, described as the 'true type' of conditional in accounts by the ancient Greeks (cf. Kneale & Kneale, 1962; see section 2.3), as the 'ideal conditional' or 'completely determinate conditional' (cf. Gildersleeve, 1882; Johnson-Laird, 1986; see section 3.2), the consequent necessarily follows from the antecedent. On a purely descriptive level, as was the case with the examples above, the connection between p and q is one of sufficiency, (i.e., p is sufficient, but not necessary for q), but in terms of the construction used, lexical meaning and shared world knowledge, the speaker presents the antecedent

as connected to the consequent, and implicates that knowing an individual being is a bachelor is an argument for concluding that he must be male. In such epistemic conditionals, the relation between antecedent and consequent is less direct, and primarily construed at the level of subjects of conceptualisation. The degree of intersubjectivity is higher in this case, as the speaker construes a train of thought by construing one object of conceptualisation (knowledge of the concept ‘bachelor’) as an argument for another object construed as a conclusion (‘he must be male’), and, consequently, the connection depends on shared knowledge to a greater extent. Comparing (9) and (10), then, shows how implicatures of connection between antecedent and consequent can be situated at different levels of intersubjectivity. Not only causal and inferential implicatures of connectedness can be accounted for this way, but also those types ‘getting short shrift’ in formal analyses (see references above and in section 2.2), such as the speech-act conditional in (11) below.

- (11) If you need any help, my name is Ann. (Dancygier & Sweetser, 2005, p. 113)
 $\approx$ p is not asserted.
 $+>$ ‘You may or may not need any help.’
 $\approx$ p and q are connected.
 $M_4+>$ ‘Needing help precedes the relevance of (indirectly) offering help by mentioning my name.’
 $R+>$ ‘Needing help provides the context for the indirect offer of help.’

As this example implicates a pragmatic connection between the antecedent and the consequent, which is concerned with the discourse situation by definition, the connection depends strongly on the intersubjective level, that is, relating a felicity condition in the antecedent to a speech act in the consequent or commenting on the linguistic form of an utterance.⁷

The example in (11) also shows how, at the intersubjective level of language use, it may be feasible to include in the model not only the individual propositions p and q , and the implicatures of unassertiveness and connectedness already mentioned, but also entirely context-dependent particularised implicatures such as in (12).

- (12) A: (looking out of the window) It is raining!
 B: If it rains, the road is wet.
 ...
 $+>$ ‘Let’s drive home now before the road gets too slippery.’

The implicature in (12) depends strongly on context, and constitutes, as discussed above, the very goal of uttering the conditional, i.e., B’s utterance is seen, at the speech-act level, as an invitation to the discourse participant to draw the inference that ‘driving home now’ is the desired action. In this respect, all examples of conditionals in this section operate on this dimension.

⁷Note, however, that boundaries between dimensions of language use should be drawn with caution; see also section 6.2.

When conditionals are seen as complete utterances, they form arguments for drawing certain conclusions, i.e., they are seen in light of what the speaker is trying to communicate. In line with the hypothesis by Mercier and Sperber (2011, 2019), the evolutionary roots of reasoning, including the use of conditionals, may be primarily argumentative in this sense. This also reflects the findings by Fillenbaum (1986) and Evans (2005), who show that conditionals are often interpreted as inducements or advice, and as such are understood primarily by their perlocutionary effect (cf. Austin, 1962). Moreover, from the perspective of theories of argumentation, the conditional used by speaker B in (12) clearly has the status of a ‘connecting premise’ (see e.g., van Eemeren and Snoeck Henkemans, 2017, pp. 50–51; see also section 1.1 and references therein), motivating why ‘it rains’ counts as an argument for driving home now. This suggests that further integration of semantic, pragmatic and argumentative approaches to conditionals may not only be possible, but also beneficial for our understanding of these crucial devices in human reasoning and argumentation.

The argumentative approach to grammatical constructions proposed by Verhagen (2005) may, in future research, enable us to combine the truth-conditional with the non-truth-conditional analyses discussed in chapter 2 by taking into account both the descriptive and the subjective dimension of language use. Whereas the truth-conditional analysis of conditionals pertains to the object level, the generation of implicatures of unassertiveness and connectedness resides at different positions on the subjective dimension, given the specific types of unassertiveness and connectedness implicated. Furthermore, as the subjective dimension is expanded into the intersubjective dimension of language use, this approach includes not only the construal of objects of conceptualisation by the subjects, but also the interactional relation between subjects of conceptualisation, at which implicatures are licensed by the uttering of a conditional as whole. This approach can only be sketched here as a possible, yet promising approach for future research on conditionals, of which the first step should be, in line with this dissertation, to test its merits on actual language data.

7.4.4 Conclusion

What I attempted to show in this section is an illustration of an approach in which it is possible to move beyond the descriptive and the subjective dimension of language by adding an intersubjective dimension. This may in turn be fruitful in reconciling fundamentally different analyses by combining the levels of both objects and subjects of conceptualisation. As we saw before in section 1.3, Israel (2011, p. 19) argues that formal semantics may have paid too little attention to non-truth-conditional meaning aspects, whereas cognitive linguistics may have done the same with objective and referential aspects of meaning, while ‘both perspectives may benefit from the insights of the other’. As such, an intersubjective approach to conditionals may, in future research, include both truth-conditional contributions, and pragmatic notions such as ‘desirability’

(Akatsuka, 1986), the speaker's control over the consequent (Newstead, 1997; Ohm & Thompson, 2004; Verbrugge et al., 2004), causal notions of consequence (Schulz, 2011), various speech acts, such as promises and threats, performed using conditionals (Fillenbaum, 1986; Haigh et al., 2011), persuading and dissuading (Thompson, Evans & Handley, 2005), conditional probability (Evans, Handley & Over, 2003), and the overall 'social and communicative function of conditional statements' (Evans, 2005). Different conditional constructions, from *if* and *unless* (Declerck & Reed, 2000) to conditional pseudo-imperatives (Clark, 1993; Fortuin & Boogaart, 2009) and conditional use of prepositional phrases (Reuneker, 2016), may, in these terms, form their own 'communicative niches' specialising in certain implicatures on various levels of the intersubjective dimension of language use. In contrast to focusing solely on antecedents, consequents, and their connections, this approach enables the analysis of a conditional construction as a whole, including their functions in discourse.

Given that this section provided only a rough sketch of an argumentative approach to conditionals, several questions remain. It remains unclear for instance whether and at what level of the model the notion of different types of implicature can be accommodated exactly. Furthermore, I suggested placing the types of connections on a continuum between objects and subjects of conceptualisation, and it deserves further attention to what extent the degrees of what was called 'semantic integration' in chapter 3 can indeed be mapped onto these dimensions. I hope, however, that this tentative outlook may serve as a starting point for further analysis, and I hope to have at least made plausible that, rather than viewing truth-conditional and usage-based or functional analyses as separate and incompatible accounts, the proposed approach to conditionals may accommodate both. Although subfields will undoubtedly continue in their own directions, such a combined perspective may enable a next step in the analysis of conditionals as constructions used in actual linguistic communication.

7.5 Final remarks

This dissertation focused on conditionals in Dutch, and the relation between their grammatical form and implicatures of unassertiveness and connectedness. It provided insights not only into the form and meaning of conditionals, but it also provided a usage-based account of conditionals as used in spoken and written language from different registers. The annotation of language data was discussed in detail and the resulting guidelines and procedures contribute to corpus linguistics in general, and to the data-driven study of conditional constructions in particular. Furthermore, this dissertation has provided overviews of classifications of conditionals into several types, and of the feature distributions of conditionals in Dutch. Finally, this dissertation has presented a novel approach to researching conditionals as grammatical constructions by using and evaluating several types and implementations of cluster analysis.

As mentioned at the start of this dissertation, and repeated at the start of this chapter, conditionals are important means for expressing our thoughts about possible states of the world. They enable us to look ahead, plan actions, think back and formulate alternative scenarios. Further study of conditionals is important for increasing our understanding of these cognitive and communicative abilities. With this study, I hope to have contributed to this pursuit by providing insight into the ways language users express conditional thoughts, and into the role of semantics, pragmatics and grammar.

Appendices

APPENDIX A

Annotation guidelines (features)

A.1 Introduction

This appendix includes the annotation guidelines that were written for interns in the project. The guidelines aim to provide clarity about both the technical procedure and the (linguistic) criteria for feature annotation.

In section A.2 general instructions are provided. In sections A.3 to A.11, the guidelines for the annotation of clause order, syntactic integration, tense, modality, aspect, person and number, sentence type, negation, and focus particles are provided respectively.

A.2 General instructions

Before presenting the annotation instructions, some remarks are in order. Make sure to read these instructions carefully before beginning your annotation work. In case of questions, send an email. It is better to ask a question than to provide incorrect or imprecise annotations. For contact details, see section A.2.5 below.

A.2.1 Natural language data are messy

The instructions below are readily applicable to non-problematic cases, but when dealing with natural-language data, utterances do not always adhere to clearly defined patterns. Do not panic, as each feature is presented with known problem cases. If these instructions do not clarify the issue at hand, you can

always use the general label ‘NA’, which stands for ‘not available’ or ‘non-applicable’. In such cases, write down the reason you used this label in the available comment column.

A.2.2 Interpretational features

Not all features are created equal. Some features are explicit and grammatical, such as clause order, and differences in coding will most likely be the result of temporary loss of attention. Other features, such as type of modality, are more interpretative. Still, try to be as consistent as possible in assigning labels for those features, because reliability will be calculated and problem cases will be discussed.

A.2.3 Practical advice

Some practical advice is to annotate one feature at a time. It is not efficient, nor beneficial for consistency to code one item at a time for all features. Make sure you schedule your annotation work in blocks of a fixed time span (20 or 30 minutes). Take a small break in between and repeat. For a specific implementation of such a time-management technique, see for instance the *Pomodoro* technique (Cirillo, 2009). Mostly, coding for more than half a day is not only extremely repetitious, but also bad for the quality of your annotations.

A.2.4 File format

The data are presented in a spreadsheet in so-called ‘wide format’, meaning that each row in the spreadsheet represents one observation (here: one conditional sentence) and multiple properties of that sentence, such as the metadata (source, mode, genre, register et cetera), and the features to be annotated (see Gries, 2013, pp. 20–26). You can add your annotations using any spreadsheet software compatible with CSV files (Comma Separated Values), such as *LibreOffice Calc* (free, see <https://www.libreoffice.org/discover/calc>) or *Microsoft Excel* (paid, available on University computers). Each sentence is presented with its preceding and following sentence. Only the sentence itself is to be annotated. The co-text is provided to be able to interpret the sentence in context. The data are prepared for you and the order is randomised. Please do not re-order the data, as this will make combining annotations more tedious.

A.2.5 Contact

In case of questions or comments, please contact Alex Reunekeer at a.reunekeer@hum.leidenuniv.nl.

A.3 Clause order

A.3.1 Introduction

The feature *clause order* represents the order of the antecedent and consequent of conditional sentences. In canonical conditionals, the antecedent is introduced by *als* (*if*). The coding uses the position of the antecedent only. Four values for this feature are possible: sentence-initial antecedent, sentence-final antecedent, sentence-medial antecedent and insubordinate antecedent. These four options are exemplified below.

(1) **Sentence-initial antecedent**

Als je op de knop drukt(,) gaat het licht aan.

If you press the button, the light will switch on.

(2) **Sentence-final antecedent**

Het licht gaat aan(,) als je op de knop drukt.

The light will switch on(,) if you press the button.

(3) **Sentence-medial antecedent**

Dat is, als ik het zo mag zeggen, nogal een flauwe opmerking.

That is, if you'll excuse me, a rather dull comment.

(4) **Insubordinate antecedent**

Als jij nou even koffie zet (...)

If you make some coffee (...)

A.3.2 Instructions

For each item, determine the position of the antecedent with respect to the consequent. Annotate using the appropriate label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the numerical labels after the semicolon. They will be converted to their full counterparts after you are done annotating.

Sentence-initial (si; 1)

The antecedent precedes the consequent.

- (a) Als er genoeg water bij Lobith binnenkomt, staat de stuw open.

If enough water enters Lobith, the weir is open.

Sentence-final (fi; 2)

The antecedent follows the consequent.

- (a) Gemeenten kunnen de witte scholen niet uitbreiden met extra lokalen, als die schooluitbreiding een gevolg is van witte vlucht.
Municipalities cannot expand the white schools with extra classrooms, if the school expansion is a result of 'white flight'.

Sentence-medial (sm; 3)

The antecedent is inserted into the consequent.

- (a) Vervolgens neemt de verzekeraar dan, als de aankoopnota in orde lijkt, de koopprijs als waarde in de polis over.
Subsequently, the insurer will then, if the purchase invoice appears to be in order, adopt the purchase price as value in the policy.

Insubordinate (in; 4)

The antecedent is used without expressing a consequent.

- (a) Als u uzelf even kort introduceert en uw vraag stelt...
If you introduce yourself briefly and ask your question...

A.3.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance ('NA')

If the utterance is incomplete, use the 'NA' label. For instance, an incomplete consequent such as below is not an instance of insubordination. Do check the available co-text for possible parts of the conditional.

- (a) Als Nicolaas en Jacobien uh als ik die uitnodig.
If Nicolaas and Jacobien uh if I invite them.

Running astray ('NA')

Especially in spoken data, utterances can run astray. Use the 'NA' label in such cases.

- (a) Voorzitter zou ik de heer De Wit mogen vragen stel nou dat of jee als de uitkomsten van de evaluatie of die nou tweeduizend plaatsvindt of eerder wat uw verzoek is stel nou dat daaruit komt dat een onderdelen wellicht na een redelijk goed uitvoerende goed werkende uh wet is?
Chairman, could I ask Mr De Wit now that whether or if the results of the evaluation whether it takes place in 2000 or earlier what your request is, suppose that a part may be after a reasonably well executed, well-functioning uh law?

Embedded conditionals

Conditionals are sometimes embedded in matrix clauses. In such cases, treat the embedded conditional as an autonomous sentence and code accordingly. In the example below, the annotation should thus read *si* for a sentence-initial antecedent.

- (a) Het CDA vindt dat als hij eenmaal koning koning is rol moet blijven spelen bij kabinetsformaties.
The CDA believes that if [when] he finally is king, he should continue to play a role in cabinet formations.

Non-declarative sentences

If the conditional has a non-declarative consequent, such as an interrogative consequent, or is embedded in a question or command, please annotate according to the regular instructions above. In the example below, the annotation should thus read *si* for a sentence-initial antecedent.

- (a) En als ze het doen hoe doen ze het?
And if they do it how do they do it?

Co-construction

If parts of the conditional are produced by different authors, please use the regular instructions.

Crossing sentence-borders

All conditionals are presented with the preceding and following co-text. If one of the parts of the conditional is in the co-text, treat it as if it were in the regular item-slot.

A.4 Syntactic integration

A.4.1 Introduction

The feature *syntactic integration* represents the type of syntactic dependency between the consequent and the antecedent. Syntactic integration is reflected in the word order of the consequent and the occurrence of the resumptive particle *dan* ‘then’. It is important to keep in mind that syntactic integration is not independent of clause order. This feature should therefore only be annotated in case of sentence-initial antecedent in combination with a declarative consequent. Furthermore, embedded and insubordinate conditionals are excluded from the annotation of this feature. The possible values of this feature are exemplified below.

(5) Integrative

Als je op de knop drukt, gaat het licht aan.
If you press the button, the light will switch on.

(6) **Resumptive**

Als je op de knop drukt, dan gaat het licht aan.

If you press the button, then the light will switch on.

(7) **Non-integrative**

Als je op de knop drukt, het licht gaat aan.

If you press the button, the light will switch on.

A.4.2 Instructions

For each item, determine the type of syntactic integration. Annotate using the appropriate label. Below, the coding instructions are presented, together with examples from the corpus. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the numerical labels after the semicolon. They will be converted to their full counterparts after you are done annotating.

Integrative (int; 1)

The consequent follows the antecedent and features subject-verb inversion.

- (a) Als de regering-Schroder daartoe inderdaad besluit, komt de regering-Balkenende met haar bezuinigingsbeleid in Europa nog meer alleen te staan.

If the Schroder government does indeed decide to do so, the Balkenende government stands alone even more with its economic policy in Europe.

Resumptive (res; 2)

The consequent follows the antecedent, is introduced by the resumptive particle *dan* ‘then’ and features subject-verb inversion.

- (a) Als iemand werkelijk gelukkig is dan moet deze persoon in het bezit zijn van het goede.

If someone is really happy then this person must be in possession of the good.

Non-integrative (non; 3)

The consequent follows the antecedent and does not feature subject-verb inversion or a resumptive particle.

- (a) Als je kijkt wat er de laatste zes, zeven jaar over ons is geschreven: ik ben niet anders gewend.

If you look at what has been written about us in the last six or seven years: I am not used to anything else.

A.4.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

A.5 Tense

A.5.1 Introduction

The feature *tense* represents the grammatical tense of the verb phrase in a clause. For this feature, Broekhuis, Corver and Vos’s (2015a, p. 157) adaptation of te Winkel’s (1866) and Verkuyl’s (2008) *Binary Tense Theory* is used (see chapter 5), in which two binary features determine tense: $\pm$ past (*present*, *past*) and $\pm$ perfect (*perfect*, *imperfect*), which results in four basic tenses: simple present (present, imperfect), present perfect (present, perfect), simple past (past, imperfect), and past perfect (past, perfect). Please keep in mind that in this perspective on tense, *zullen* ‘*will*’ is a modal auxiliary, not a future auxiliary. It will be treated as a modality marker in the annotation guidelines for modality. This means that for a sentence such as in example (8), the tense is *simple present*, not, as is common in traditional grammar, *present future*.

- (8) Ik *zal* wandelen
I will walk.

The four tenses are exemplified by examples below. Observe that both the antecedent and consequent can have the same tense, but do not have to.

(9) **Simple present**

Als er genoeg water bij Lobith *binnenkomt*, *staat* de stuw open.
If enough water enters at Lobith, the weir is open. (simple present, simple present)

(10) **Present perfect**

Als Li dit inderdaad *heeft gezegd*, wat *bedoelde* hij dan?
If Li indeed has said this, what did he mean? (present perfect, simple past)

(11) **Simple past**

De leraren *maakten* bezwerende gebaren als de uitbundigheid binnen of buiten te groot *werd*.

The teachers made bewildering gestures if there was too much exuberance inside or outside. (simple past, simple past)

(12) **Past perfect**

De Amerikanen zelf *zouden* nooit akkoord *gaan* als Europa een dergelijk voorstel *had gedaan*.

The Americans themselves would never agree if Europe had made such a proposal. (simple past, past perfect)

(13) **Infinitival phrase**

Rationeel zou zijn om te geloven dat Socrates gestorven is (of om je *te onthouden van* een oordeel, als het je niets *kan interesseren*).

It would be rational to believe that Socrates died (or to refrain from judgement if you are not interested). (simple present, infinitival)

An important point of attention with respect to verb tense is the combination of the verb *zijn* with a participle, in which case it can either be a copular verb or an auxiliary verb. In the first case, the predicate describes what the subject *is*, in the latter, what the subject *does*. The difference is not always easy to tell and is interpretative. The difference is important for the classification of verb tense, because in case of a copula, the verb tense is present or simple past, in case of an auxiliary, it is present or past perfect.

The first test to use is to reformulate, if necessary, the predicate into a subordinate clause and testing for the acceptability of the so-called ‘red and green word order’ (cf. Pauwels, 1953; Haeseryn et al., 1997; de Sutter, 2005) (examples adapted from Haeseryn et al., 1997).

(14) Ik heb je toch gezegd dat mijn moeder al jaren {dood is/*is dood}.

I have told you that my mother has been dead for years.

(15) Ik heb je toch gezegd dat mijn moeder al jaren {overleden is/*is overleden}.

I have told you that my mother died years ago.

(16) Ik heb je toch gezegd dat mijn moeder in 1981 {overleden is/is overleden}.

I have told you that my mother died in 1981.

What can be seen in the subordinate clause in (14) is that the adjective has to precede the finite verb – the reverse order is not available. The finite verb in (15) is used as a copula and the participle acts as an adjective, which is reflected in the availability of one word order only – the participle has to precede the finite verb. In (16), however, both the order finite verb-participle – the ‘red order’ – and participle-finite verb – the ‘green order’ – is possible, indicating the status of the finite verb as an auxiliary. Consequently, the verb tense in

(15) is *simple present*, while in (16), the verb tense is *present perfect*. Other tests that help, although not determine, are the presence or possibility to add duration to the clause, which indicates that the ‘being’ interpretation is more prominent, consequently viewing the verb *zijn* ‘be’ as copula and classifying the clause as ‘simple present’. Conversely, when the clause has a prepositional phrase indicating an actor or the possibility to add such a phrase, such as ‘... by her nephew’, the most prominent interpretation is that of ‘doing’ instead of ‘being’. Remember that these are only aids in determining the right label, they are by no means perfect tests.

Another complexity is formed by embedded clauses, as in the corpus examples below.

- (17) Mohammed is van plan om zijn opleiding op te pakken als hij weer beter is en zich goed voelt.
Mohammed is planning to resume his education if [when] he is well and feels good again.
- (18) De lowbudget-maatschappij Ryanair dreigt het populaire vliegveld Charleroi te verlaten als de Europese Commissie haar een boete geeft.
The low-budget airline Ryanair threatens to leave the popular Charleroi airport if the European Commission hands out a fine.

Both in (17) and (18) the question is what the consequent of the conditional is. Is it the full complex clause, or only the embedded clause? In (17), it seems to be the case that Mohammed is planning to get back to school if or when he feels better. It does not seem plausible that he starts planning at the moment he feels better. The same goes for (18). Does the airline company threaten {to leave if the European Committee fines the company}, or does the airline company threaten to leave if the European Committee fines the company? Here too, the former seems more plausible, as it is the fining and leaving between which the conditional connection holds, not between fining and threatening. This results in the extra label ‘infinitival’ for the tense in the consequent, as the subordinate clause is an infinitival clause.

A.5.2 Instructions

For each item, determine the verb tense of the verb phrase. Annotate the according label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the numerical labels after the semicolon. They will be converted to their full counterparts when you are done annotating.

Simple present (spr; 1)

The situation takes place during the present-tense interval including speech time. This tense is realised by the finite verb in present tense

and an optional participle. Default time is speech time, but adverbial modification can cancel this. This imperfect tense includes the (simple) future, as can be seen below.

- (a) Ik *wandel*.
I {walk/am walking}.
- (b) Ik *zal wandelen*.
I will *walk*.
- (c) Ik *ben* aan het *wandelen*.
I am walking.

Simple past (spa; 2)

The situation takes place during the past-tense interval. This tense is realised by the finite verb in past tense and an optional participle. Default time is speech time in the past. This imperfect tense includes future in the past, in which the situation takes place in the non-actualised part of the past-tense interval.

- (a) Ik *wandelde*.
I walked.
- (b) Ik *zou* vandaag/morgen *wandelen*.
I would *walk today/yesterday*.
- (c) Ik *was* aan het *wandelen*.
I was *walking*.

Present perfect (prp; 3)

The situation takes place in the actualised part of the present-tense interval. This tense is realised by one of the auxiliaries *hebben* ‘have’ or *zijn* ‘be’ in present tense and a past participle. The situation is completed before speech time, but this default interpretation can be cancelled by adverbial modification, as in (c). This tense includes the future perfect. The focus of this tense is on the completion of a situation.

- (a) Ik *heb gewandeld*.
I have walked.
- (b) Ik *zal hebben gewandeld*.
I will have walked.
- (c) Ik *heb* je paper morgen zeker *gelezen*.
I will *certainly* have read *your paper tomorrow*.
- (d) Ik *heb* dat niet *durven doen*.
I have *not* dared doing *that*.

Past perfect (pap; 4)

The situation takes place before the speech-time in the past and is completed within this time span. This tense is realised by the one of the

auxiliaries *hebben* ‘have’ or *zijn* ‘be’ in past tense and a past participle. This tense includes the future perfect in the past, in which the situation takes place and is completed in the non-actualised part of the past-tense interval. The focus of this tense is on the completion of a situation.

- (a) Ik *had gewandeld*.
I had walked.
- (b) Ik *zou hebben gewandeld*.
I would have walked.
- (c) Ik *had dat niet durven doen*.
I had *not* dared doing *that*.

Infinitival phrase (inf; 5)

In case of an embedded clause with an infinitival phrase (*te* ‘to’ + infinitive), determine whether the full complex clause or only the embedded clause forms the consequent. In (a) below, the consequent is ‘zijn opleiding op te pakken’ (‘to resume his education’), not ‘Mohammed is van plan om zijn opleiding op te pakken’ (‘Mohammed is planning to resume his education’).

- (a) Mohammed is van plan om zijn opleiding *op te pakken* als hij weer beter is en zich goed voelt.
Mohammed is planning to resume his education if [when] he is well and feels good again.

A.5.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Copula or auxiliary, simple or perfect

In case the finite verb *zijn* ‘be’ is combined with a participle, it can either be a copula or an auxiliary. See the introduction of this section for instructions.

Incomplete utterance (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

A.6 Modality

A.6.1 Introduction

The feature *modality* represent the type(s) of modality expressed in the antecedent and consequent. Modality, is hard to define (see section 5.5), but the following working definition will suffice as a starting point. Modality is the view a speaker presents on the situation expressed, either in relation to reality, or in relation to her attitude.

In this study, we distinguish between four categories of modality, which are somewhat easier to define. The categories are *epistemic*, *evidential*, *deontic* and *dynamic modality*. It is important to remember that modality can be expressed by modal auxiliaries, as well as modal adverbs/adverbial phrases. The four types of modality are exemplified below.

(19) **Epistemic modality**

Als ik erachter *zou* komen dat een school regels stelt om groepen leerlingen te weren, *zou* ik onmiddellijk ingrijpen.

If I were to find out that a school sets rules to exclude groups of students, I would intervene immediately.

(20) **Evidential modality**

Als *blijkt* dat het geen Sars is, dan wordt er toch veelal een rekening ingediend en dat kunnen boeren onmogelijk betalen.

If it turns out not to be Sars, then a bill is usually submitted and farmers cannot afford that.

(21) **Deontic modality**

Als dat zo is *moeten* de depots worden gesloopt.

If that is the case the depots must be demolished.

(22) **Dynamic modality**

Als mijn man over mijn buik aait, *wil* ik braken.

If my husband rubs my belly, I want to vomit.

A.6.2 Instructions

For each item, identify the antecedent and consequent. For both the antecedent and the consequent, first determine whether or not there modal marking occurs. In case of modal marking, annotate the dominant interpretation of the modal markers in the clause, choosing from the types listed below. The labels are presented between parentheses. The parentheses are not to be included in your annotation.

When you are not sure of the correct label for a certain clause, for instance when the modal marking is ambiguous, please include a short description of the trouble you run into in the comment column. Remember that, in most cases, this is part of the annotation process and the under-specifying nature of language.

Epistemic (epi; 1)

The clause is marked for expressing the speaker's judgement of the factual status of the proposition.

- (a) Jan *kan/moet* in zijn kantoor zijn.
John may/must be in his office.
- (b) Jan is *waarschijnlijk* in zijn kamer.
John is probably in his office.

Evidential (evi; 2)

The clause is marked for expressing the speaker's direct or indirect evidence for the factual status of the proposition.

- (a) Ik *kan* zien dat Jan in zijn kamer is.
I can see John is in his office.
- (b) *Volgens Willem* is Jan in zijn kamer.
According to William, John is in his office.

Deontic (deo; 3)

The clause is marked for directive meaning, trying 'to get others to do things'.

- (a) Jan, je *kan/moet* naar je kantoor gaan.
John, you can/must go to your office.

Dynamic (dyn; 4)

The clause is marked for expressing ability or willingness.

- (a) Jan *kan* naar zijn kantoor gaan.
John can go to his office.
- (b) *Hopelijk* gaat Jan naar zijn kantoor.
Hopefully, John will go to his office.

A.6.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Ambiguity of *mogen* 'may'

The modal verb *mogen* 'may' can be used to express deontic modality, epistemic modality (especially in past tense, i.e. *mochten* 'should', and sometimes evidential modality), as in the examples below respectively. Please take the whole clause into account when deciding on the most appropriate type of modality.

- (a) Als ik dezelfde achternaam had, met al een site op die naam, dan *mocht* je echt iets anders gaan verzinnen.
If I had the same last name, with a site already under that name, then you should you really come up with something else.
- (b) Alleen als de Arnhemmers onverhoopt *mochten* degraderen, gaat de reddingsplan op de helling.
Only if the Arnhemmers were to be relegated unexpectedly, the rescue plan will be overruled.
- (c) Als ik Kelly *mag* geloven ga ik het feest van het jaar missen, maar ik heb 't er maar mee te doen.
If I may believe Kelly I am going to miss the party of the year, but there's nothing I can do about it.

Double modal marking

Sometimes, one clause contains more than one marker of modality, as in the consequent of the conditional in the example below, in which *moeten* 'must' marks deontic modality (i.e. obligation), but combined with *waarschijnlijk* 'likely' clearly concerns knowledge.

- (a) Als ik bijvoorbeeld evenveel reden heb om te denken dat mijn kat in Doos 1 kroop dan dat het Doos 2 was, dan *moet* ik het even *waarschijnlijk* achten dat de kat in Doos 1 zit, als dat ze in Doos 2 zit.
If I for example have as much reason to think that my cat crawled into box 1 as into box 2, then I must consider it as likely that the cat is in box 1 as it is in box 2.

The most appropriate annotation here is thus to use the label for epistemic modality.

Isolating clauses

A problem that may arise in annotation of modality is that it 'spills over' from one clause to another. Yet, the task at hand is to look at modal marking in isolated clauses. So, in the example below, one could argue that the consequent is marked for dynamic modality, as 'making the trading' is dependent on the ability referred to in the antecedent.

- (a) Als we *konden* ruilen, *zou* ik het doen.
If we could trade, I would do it.

However, when viewed in isolation, the consequent is marked for epistemic modality by means of the auxiliary *zou* ‘would’. Therefore, the most appropriate annotation for the consequent is here to use to label for epistemic modality.

A.7 Aspect

A.7.1 Introduction

The feature *aspect* concerns the internal-temporal characteristics of the situations presented in the antecedent and in the consequent.¹ The type of aspect to be annotated is also known as *actionality*, *lexical aspect*, *situational aspect*, and *Aktionsart*. It is not marked formally, but part of the lexical semantics of the verb (phrase). The grammatical part of aspect consists of perfective and imperfective aspect and is not considered here.

In this study, we distinguish between four main categories (‘Vendler classes’) of aspect: *states*, *activities*, *achievements* and *accomplishments*. The category is based on the combination of three binary properties. First, a situation is stative (no change over time) or dynamic (change over time). Second, a situation has a duration, i.e. it is durative (extends in time) or it is punctual (one point in time). Third, a situation has a telicity value, i.e. it is bounded (natural endpoint) or unbounded (no natural endpoint). The features of all four types are summarised in the table below.

Table A.1:
Characteristics of situation types (aspect)

	Change	Duration	Telicity
State	Stative	Durative	Atelic
Activity	Dynamic	Durative	Atelic
Accomplishment	Dynamic	Durative	Telic
Achievement	Dynamic	Punctual	Telic

The four types of aspect are exemplified below. In (23) both the antecedent and the consequent express stative situations referring to characteristics (liking jazz, being a fan of Sonny Clark). In (24), both clauses express activities, as both running and being distracted are durative, change over time, but

¹This guideline is based on collaborative work with M.P.M. Bogaards, who, as part of a research internship, annotated a number of features and developed an extensive guideline for annotating aspect. This section presents a practical, somewhat shortened version of this extensive guideline.

have no inherent endpoint. In (25), both clauses express accomplishments, as running is an activity with an inherent endpoint. In (26), finally, both clauses express achievements, as winning and losing involve a change of states and refer to an inherent endpoint, but are not durative.

- (23) Als je van jazz houdt, dan ben je vast fan van Sonny Clark.
If you like jazz, then you will appreciate Sonny Clark.
- (24) Als ik aan het hardlopen ben, wil ik niet worden afgeleid.
If I am running, I do not want to be distracted.
- (25) Als zij een kilometer rent, rent hij er twee.
If she runs for a kilometre, he runs for two.
- (26) Als zij de wedstrijd wint, heeft hij verloren.
If she wins the game, he will have lost.

A.7.2 Instructions

For each item, identify the antecedent and consequent. For both the antecedent and the consequent, indicate the type of event expressed by the *main verb*, its direct object (if the verb is transitive), and the grammatical subject. In case of non-main verbs, make sure not to identify the correct main verb. In the consequent of the conditional in (27) below, the main verb is *halen* ‘get’, not *kan* ‘can’, a modal auxiliary.

- (27) [...] We hebben brood in huis maar je kan nog wat brood bij halen als je wilt.
We have bread at home, but you can get some more bread if you want.

Choose from *state*, *activity*, *achievement* or *accomplishment*. In (27), the antecedent expresses a state (you want bread), and the consequent express an accomplishment (you get some more bread). Below the coding instructions are presented, together with examples from the corpus. The labels are presented between parentheses. The parentheses are not to be included in your annotation.

When you are not sure of the correct label for a certain clause, for instance when the type of event is ambiguous or there are multiple states in one clause, please include a short description of the trouble you run into. Remember that, in most cases, this is part of the annotation process and the under-specifying nature of language.

State (sta; 1)

The event does not change over time (stative), extends over time (durative) and has no natural endpoint (unbounded). The event cannot be expressed with a present progressive (‘I am V-ing’) as an answer to the question ‘What are you doing?’, e.g., ‘What are you doing? I am loving

Mary’. The event can be used in the question ‘For how long has Subject already Vpart?’, as in ‘For how long has John already loved Mary?’ The present tense cannot be interpreted habitually, e.g., ‘John is ill’ cannot mean that John is ill often or recurrent. Adverbially modifying the verb by ‘in an hour’ leads to incoherence, e.g., ‘John was ill in an hour’. Finally, the event cannot be a complement of ‘to finish’, e.g., ‘John finished being ill’.

Examples of verbs that typically denote states are *begrijpen* ‘to understand’, *bezitten* ‘to own’, *haten* ‘to hate’, *hebben* ‘to have’, *horen* ‘to hear’, *geloven* ‘to believe’, *houden van* ‘to love’, *kennen* ‘to know’, *leven* ‘to live’, *verlangen* ‘to desire’ and *weten* ‘to know’ (cf. Broekhuis, Corver & Vos, 2015a, p. 37).

- (a) Als je nou een heel kaal huis hebt dan is dat wel leuk.
If you have a very empty house then that is nice.

Activity (act; 2)

The event changes over time (dynamic), extends over time (durative) and has no natural endpoint (unbounded/non-telic). Adverbially modifying the verb by ‘almost’ or ‘in an hour’ leads to incoherence, e.g., ‘John almost ran’, ‘John ran in an hour’. The event cannot be a complement of ‘to finish’, e.g., ‘John finished looking for a restaurant’. The event cannot be used with ‘within an hour’, as in ‘John ran within an hour’, but it can be used with ‘during an hour’, as in ‘John ran during an hour’.

Examples of verbs typically denoting activities are *bibberen* ‘to shiver’, *denken (over)* ‘to think (about)’, *dragen* ‘to carry’, *duwen* ‘to push’, *hopen* ‘to hope’, *eten* (intransitive) ‘to eat’, *lachen* ‘to laugh’, *lezen* (intransitive) ‘to read’, *luisteren* ‘to listen’, *praten* ‘to talk’, *rennen* ‘to run’, *schrijven* (intransitive) ‘to write’, *sterven* ‘to die’, *wachten (op)* ‘to wait (for)’, *wandelen* ‘to walk’, *zitten* ‘to sit’ (cf. Broekhuis, Corver & Vos, 2015a, p. 37).

- (a) Als jij een spelletje doet, ga ik maar tegelijk even pokeren.
If you play a game, I will play poker at the same time.

Accomplishment (acc; 3)

The event changes over time (dynamic), extends over time (durative) and has a natural endpoint (bounded/telic). The event cannot be used in the question ‘For how long did ... V?’, as in ‘For how long did John run a kilometre?’ The event cannot be used with ‘during an hour’, as in ‘John ran a kilometer during an hour’, but it can be used with ‘within an hour’, as in ‘John ran a kilometer within an hour’.

Examples of verbs typically denoting accomplishments are *bouwen* ‘to build’, *eten* (transitive) ‘to eat’, *koken* (transitive) ‘to cook’, *lezen* (transitive) ‘to read’, *opeten* ‘to eat up’, *schrijven* (transitive) ‘to write’, *oversteken* ‘to cross’, *verbergen* ‘to hide’, *verorberen* ‘to consume’ and *zingen* (transitive) ‘to sing’ (cf. Broekhuis, Corver & Vos, 2015a, p. 37).

- (a) En als we dan toch de computer gaan halen bij Gertie en Jeroen dan kunnen we misschien gelijk ik weet niet of je dat vandaag lukt om de computer van ouders af te maken.
And if we do go and get the computer from Gertie and Jeroen then we might be able to, I don't know if you can do that today, finish the parents' computer.

Achievement (ach; 4)

The event changes over time (dynamic), does not extend over time (punctual) and has a natural endpoint (bounded/telic). Adverbially modifying the verb by ‘for an hour’ leads to incoherence, e.g., ‘John ran a mile for an hour’. Adverbially modifying the verb by ‘almost’ leads to ambiguity, e.g., ‘John almost ran a mile’ may mean either ‘John almost started running a mile’ or ‘John ran a distance close to a mile’. The event cannot be a complement of ‘to finish’, e.g., ‘John finished reaching the top’. Adding the verb ‘stop’ leads to incoherence (e.g., ‘John stopped reaching the top’). The event cannot be used in the question ‘For how long has Subject already Vpart?’, as in ‘For how long has John already reached the top?’

Examples of verbs typically denoting achievements are *aankomen* ‘to arrive’, *beginnen* ‘to start’, *bereiken* ‘to reach’, *botsen* ‘to collide’, *herkennen* ‘to recognize’, *ontploffen* ‘to explode’, *ontvangen* ‘to receive’, *overlijden* ‘to die’, *zich realiseren* ‘to realize’, *stoppen* ‘to stop’, *opgroeien* ‘to grow up’, *vinden* ‘to find’, *winnen* ‘to win’ and *zeggen* ‘to say’ (cf. Broekhuis, Corver & Vos, 2015a, p. 37).

- (a) Als mijn wifi dan een keer niet overschakelt, wil ik zelf kunnen overrulen.
If my WiFi does not switch for once, I want to be able to overrule it myself.

A.7.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Incomplete utterance (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Non-literal use of verbs

Sometimes, verbs are used non-literally to refer to a situation, as in the figurative use of *slepen* 'to drag' below.

- (a) 'Iedere bezoekende buitenlandse delegatie dreigt Beshir en Taha dat ze voor een internationaal gerechtshof *worden gesleept* als ze de Janjaweed in Darfur niet ontwapenen', zegt hij met genoegen. (WR-P-P-G-0000096092)
'Every visiting foreign delegation threatens Beshir and Taha to be dragged before an international court if they do not disarm the Janjaweed in Darfur', he says with delight.

Here, 'to drag' does not refer to a physical activity, but to a decision and thus an achievement. Another example is the durative verb *to say* being used to express a (punctual) decision, as in the example below.

- (b) En als dan *gezegd wordt* ja maar dan hoeven we de lasten niet nog meer te verhogen voorzitter dan denk ik dat een gemeente welke dat ook is want dan denk ik dat een gemeente ook moet kijken wat hun ambitieniveau kost. (fn000151)
And if it is said yes but then we do not have to increase the burden even more, chairman, then I think that a municipality whichever that is, because then I think that a municipality should also look at what their level of ambition costs.

As the intended interpretation is one of decision, annotate such examples as achievements.

(Semi-)aspectual non-main verbs

Non-main verbs may express aspectual information. Such semi-aspectual non-main verbs are the following posture auxiliaries: *zitten* 'sitting', *staan* 'standing', *liggen* 'lying', *lopen* 'walking' and *hangen* 'hanging' plus *te* 'to' and an infinitive, as in the example below.

- (a) Kijk als ik hier avonds zo effe *zit te lezen* of *TV zit te kijken* joh dan hoor ik ze lachen of weet ik veel wat maar da niet erg.
Look if I sit here and read or watch TV then come on I hear them laughing or I don't know but that's OK.

In such cases, include 'semi-aspectual non-main verb' in the comment column and annotate the main predicate, here *zit te lezen* of *TV zit te kijken* 'sit and read or watch tv', i.e. an activity. The same goes for the

aspectual non-main verbs *gaan* ‘going’, *komen* ‘come’, *blijven* ‘stay’ + infinitive, *bezig zijn te* + infinitive, and *aan het* + infinitive + *zijn*, as in the following example.

- (b) Je moet goed uitkijken als je *aan het schommelen bent*.
You should be very cautious if [when] you’re playing on the swings.

In this example, the main verb *schommelen* ‘playing on the swings’ refers to an activity.

A.8 Person and number

A.8.1 Introduction

In this study, the feature *person and number* is defined by the combination of the person and number of the grammatical subject, i.e. the noun phrase congruent with the finite verb. The feature *person* represents the grammatical distinction between speaker (first person), addressee (second person) and other entities talked about (third person). The feature *number* represents the grammatical category that refers to quantity in a binary fashion, either *singular* or *plural*. The six combinations of person (first, second, third) and number (singular, plural) are exemplified by corpus examples below.

- (28) **First-person singular**
 Als *ik* een pistool of mes had gehad, had *ik* dat gebruikt. (1ps, 1ps)
- (29) **First-person plural**
 Als *we* dat weten, kunnen *we* besluiten het wel of niet te doen. (1pp, 1pp)
- (30) **Second-person singular**
 Als *je* te weinig rendement toont, word *je* eruit gegooid.
 Als *je* niet doet wat ik zeg, rot dan maar op. (2ps, 2ps)
- (31) **Second-person plural**
 Als *jullie* dan ook nog op of andere frommelmatras liggen dan volgens mij doet dan *niemand* een oog dicht. (2pp, 3ps)
- (32) **Third-person singular**
 Als *mijn broertje* een paar blauwe plekken had, dacht *ze* meteen aan leukemie. (3ps, 3ps)
- (33) **Third-person plural**
 Als *het* drukker wordt, gaan *vader en moeder* gewoon wat harder werken. (3ps, 3pp)

As can be seen in (32), both the grammatical subject *ze* ‘she’ and the finite verb *dacht* ‘thought’ are used to distinguish between singular and plural subjects.

A.8.2 Instructions

For both the antecedent and consequent in each item, find the grammatical subject and finite verb and determine the person and number of the grammatical subject. Annotate the according label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the numbers after the semicolon. They will be converted to their full counterparts when you are done annotating.

First-person singular (1ps; 1)

The subject is a noun phrase with the pronoun *ik* ‘I’ as its head and refers to the speaker in singular form.

- (a) *Ik* zal heel blij zijn als *ik* dit altijd uit mijn mouw schud.
I will be very happy if I always do this easily.

First-person plural (1pp; 2)

The subject is a noun phrase with either the pronoun *we* ‘we’ or *wij* ‘we’ as its head and refers to the speakers or speaker and associated entities in plural form.

- (a) We zouden wel een inconsistentie krijgen als we ook het volgende zouden aannemen.
We would have an inconsistency if we also assumed the following.

Second-person singular (2ps; 3)

The subject is a noun phrase with either the pronoun *je* ‘you’, *jij* ‘you’ or *u* ‘you’ (polite) as its head and refers to the addressee or to an unspecified entity (‘generic or impersonal *you*’, only with *je* and *u*) in singular form.

- (a) Als *je* de nieuwste features niet belangrijk vindt, verdien *je* hier geld mee en kun je een klasse groter krijgen.
If you do not deem the latest features important, you will earn money with this and you can increase the class

Second-person plural (2pp; 4)

The subject is a noun phrase with the pronoun *jullie* ‘you’ as its head and refers to the addressees or addressee and associated entities in plural form.

- (a) Laten *jullie* het even weten als *jullie* klaar zijn met praten over voetbal?
Will you let us know if [when] you have finished talking about football?

Third-person singular (3ps; 5)

The subject is a noun phrase with a noun or pronoun as its head and refers to an entity that is not speaker or addressee in singular form. The subject can also be an infinitival construction or a subject clause.

- (a) Als *een oplichtend natriumatoom* als een soort trillend elektrisch deeltje kan worden opgevat, zal *een magneet* die beweging opsplitsen in twee iets verschillende trillingen.
If a glowing sodium atom can be seen as some sort of vibrating electrical particle, a magnet will split that movement into two slightly different vibrations.

Third-person plural (3pp; 6)

The subject is a noun phrase with a noun or pronoun as its head and refers to an entity that is not speaker or addressee in plural form. The subject can also be an infinitival construction or a subject clause.

- (a) En als *varkens* eenmaal bloed hebben geproefd, willen *ze* meer.
 And if [once] *pigs* have tasted blood, *they* want more.

A.8.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Incomplete utterance ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Embedded infinitival clauses

If the conditional is embedded in a clause introduced by implicit or explicit *om*, frequently introduced by communicative or mental verbs, as in the example below, and the consequent is an infinitival clause, use the 'NA' label.

- (a) Wij adviseren u dan ook [om] cd 1 pas terug te sturen als *u* het hele boek uit heeft. (2ps, NA)
We therefore advise you [to] only return CD 1 if [when] you have finished the entire book.

Covert grammatical subject

In case a sentence does not include an overt subject, try to use the finite verb to determine person and number. If the finite verb allows for multiple interpretations, use 'NA', as would be the case in the corpus example in (a) below, in which the finite verb *opzijzet* 'sets aside' can be congruent with a first-person, second-person or third-person singular subject.

- (a) Dus als dat *opzijzet* dan is dat goed.
so if that sets aside then that's good.

Imperative consequent

In case of imperative clauses, no subject is overtly present. In line with the literature on imperatives, the implicit subjects of imperatives are annotated here as second-person singular.

- (a) Als *een verslaafd kind* je alles van je weg heeft geroofd en een psychisch wrak van je heeft gemaakt, okee, bekijk dan nog eens opnieuw wat de opties zijn. (3ps, 2ps)
If an addicted child has stolen everything from you and turned you into a psychic wreck, okay, check out the options again.

Embedded clauses

If the antecedent and/or consequent have embedded clauses, only the subject and finite verb of the matrix clause are to be considered.

- (a) Als *ik* denk dat zij dat al weten, dan heb *ik* er geen zin meer in. (1ps, 1ps)
If I think that they already know, I don't feel like it anymore.

A.9 Sentence type

A.9.1 Introduction

The feature *sentence type* represents the illocution of a sentence, which is reflected mainly in the word order of the consequent. In this feature, four types are distinguished, exemplified below: *declarative*, *imperative*, *interrogative* and *exclamatory* sentences.

- (34) **Declarative sentence**
 Als het mooi weer is, (*dan*) *gaan we wandelen*.
If the weather is nice, we will go for a walk.
- (35) **Imperative sentence**
 Als het mooi weer is, *pak (dan) je wandelschoenen*.
If the weather is nice, get your hiking boots.
- (36) **Interrogative sentence**
 Als het mooi weer is, *gaan we (dan) wandelen?*
If the weather is nice, will we go for a walk?
- (37) **Exclamatory sentence**
 Als het mooi weer is, *hoe mooi kan het leven (dan) zijn!*
If the weather is nice, how wonderful can life be!

A.9.2 Instructions

Determine the most appropriate sentence type. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the numbers after the semicolon. They will be converted to their full counterparts after you are done annotating.

Declarative sentence (dec; 1)

A declarative consequent makes an assertion of a proposition. As we are dealing with conditionals, the assertion is dependent on the antecedent. The word order of the consequent can be that of a regular declarative sentence (i.e. a main clause with subject, verb, object (svo) order, as in the second example below), but it can also have an integrative word order with subject-verb inversion (vso), as in first example below, and a resumptive element featuring *dan* ‘then’ and integrative word order.

- (a) Als je de baby neerzet, *gaat ze schreeuwen*.
If you put the baby down, she'll scream.
- (b) Als je tijd hebt, *Marie staat te wachten*.
If you have time, Mary is waiting.

Imperative sentence (imp; 2)

An imperative consequent gives a command or makes a request. There is no overt subject, as in (a), or there is a second-person subject. Next to the standard form of the imperative, there are three other possibilities: infinitival, participial, and adverbial imperatives, as in the examples below respectively.

- (a) Als u de aangifte nog niet heeft verstuurd, *doe dat dan zo snel mogelijk*.
If you haven't already sent in the tax return, do so as soon as possible.
- (b) Als de bakplaat heet is, *afblijven!*
If the baking tray is hot, hands off!
- (c) Als je geen virusscanner hebt, *opgepast!*
If you haven't got an antivirus programme, be warned!
- (d) Als jullie nu nog niet weg zijn, *naar buiten!*
If you still haven't left, outside!

Interrogative sentence (int; 3)

An interrogative consequent presents a question. The question begins with a *wh*-word (*wat* ‘what’, *wie* ‘who’, *wanneer* ‘when’, *waarom* ‘why’ et cetera), as in the first example below, or a finite verb, as in the second example.

- (a) Als je op de knop drukt, *wat gebeurt er dan?*
If you press the button, what will happen?
- (b) Als je op de knop drukt, *gaat dan het alarm af?*
If you press the button, will the alarm go off?

Exclamatory sentence (exc; 4)

An exclamatory consequent expresses an emotion. It can begin with a *wh*-word, a subordinate conjunction or a qualification of the addressee. Note that the term *exclamation* here refers to a functional category. The term is not as strict as with ‘pure exclamatives’ see, Broekhuis and Corver (2016, pp. 1481–1486).

- (a) Als ik in je kamer kijk, *wat een stof ligt daar!*
If I look into your room, what an amount of dust!
- (b) Als ik in je kamer kijk, *dat je daar kunt leven!*
If I look into your room, that you live there!
- (c) Als ik in je kamer kijk, *sloddervos die je bent!*
If I look into your room, you slob!

A.9.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray (‘NA’)

See the instructions for dealing with incomplete utterances in section A.3.3 above.

One-word consequent (wrđ; 5)

In some cases, the consequent consists of only one word or word group, like the adverb *jammer* ‘pity’ in (a). The first step in these cases is to whether or not we are dealing with an imperative, as in (b), or an exclamation, as in (a), or an interrogative consequent, as in (c). If any of these options is available, annotate accordingly. If this is not the case, as in the first example below, we use label the sentence type ‘one-word consequent’, although the consequent can also consist of more than one word or constituent, as in the last example below.

- (a) Als je dan niet kunt, *jammer!*
If you can't make it then, pity!
- (b) Als de politie komt, *stop!*
If the police comes, stop!

- (c) Als je een van die relschoppers bent, *waarom?*
If you are one of those hooligans, why?
- (d) *Ja*, als je tenminste bedoelt dat ik dan mee mag.
Yes, if at least you mean that I can come too.
- (e) Als je denkt dat ik een processor kan overklokken, *nee man*.
If you think that I can overclock a processor, no man.

A.10 Negation

A.10.1 Introduction

The feature *negation* represents the *polarity* of the antecedent and the consequent. In this feature, three types of negation are distinguished: *morphological*, *syntactic*, and *implicit* or *lexical* negation, as exemplified below.

- (38) **Morphological negation**
Als de deur dicht is, is het *on* mogelijk om binnen te komen.
If the door is closed, it is im possible to enter.
- (39) **Syntactic negation**
Als de deur dicht is, is het *niet* mogelijk om binnen te komen.
If the door is closed, it is not possible to enter.
- (40) **Lexical negation**
Als de deur dicht is, ben je *buitengesloten*.
If the door is closed, you are locked out.

A.10.2 Instructions

Determine whether or not a clause contains negation and if so, which type is the most appropriate. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the letters after the semicolon. They will be converted to their full counterparts after you are done annotating.

Morphological negation (mor; 1)

The clause has an element with one of the following prefixes: *anti-*, *de-*, *on-*, *dis-*, *mis-*, *non-*, *niet-*, *in-*, *a-*, *ir-*, or *wan* or one of the following suffixes: *-loos*, *-arm*, or *-vrij*.

- (a) Als het piept, moet je het *de* monteren.
If it squeals, you must disassemble it.
- (b) Als je dat denkt, zeg ik je dat het *on* waar is.
If you think so, I'll tell you it's untrue.

- (c) Als je zo werkt, noemen we dat *dis* functioneren.
If you work like that, we call that dysfunctional.
- (d) Als je het zo aanpakt, zal het *mis* lukken.
If you do it like that, it will fail.
- (e) Als je de aantallen bekijkt, zie je dat een van de soorten *non-existent* is.
If you look at the numbers, you'll see that one of the species is non-existent.
- (f) Als je de foto's ziet, word je vanzelf een *niet-roker*.
If you see the pictures, you'll automatically become a non-smoker.
- (g) Als je net begint, ben je waarschijnlijk *in* capabel.
If you are just starting out, you're probably incapable.
- (h) Als je dat op straat gooit, vind ik dat *a sociaal*.
If you throw that on the street, I find that unsocial.
- (i) Als zelfs jij dat denkt, is het misschien *on* waar.
If even you think so, it might be untrue.
- (j) Als het niet rationeel is, is het *ir* rationeel.
If it is not rational, it is irrational.

Syntactic negation (syn; 2)

The clause includes one of the following explicit negations: *niet*, *geen*, *niets*, *nooit*, *niemand*, or *nergens*. In cases of double negation, take the negation with widest scope.

- (a) Als u de aangifte nog *niet* heeft verstuurd, doe dat dan zo snel mogelijk.
If you have not yet sent the declaration, do so as soon as possible.
- (b) Als u *geen* oven heeft, gebruik dan de magnetron.
If you do not have an oven, use the microwave.
- (c) Als je *niemand* wilt zien, verstop je dan.
If you do not want to see anyone, then hide.
- (d) Als je alles opeet, is er *niets* meer over.
If you eat everything, there will be nothing left.
- (e) Als zij *nooit* naar buiten gaat, is ze misschien wel ziek.
If she never goes out, she might be sick.
- (f) Als je *geen* landkaart hebt, kom je *nergens*.
If you do not have a map, you will get nowhere.

Lexical negation (lex; 3)

The clause includes a lexical item expressing a negative meaning. The following list provides a guideline of what counts as lexical negation, but

no exhaustive set of negative items: *achterwege laten*, *aflopen*, *afstaan*, *alleen* (*maar*), *allerminst*, *amper*, *anders*, *behalve*, *behoeden* (*voor*), *buiten*, *enkel*, *evenmin*, *gebrek* (*aan*), *het minst*, *hoogstens*, *maar*, *minder*, *missen*, *moeilijk*, *nauwelijks*, *negatief*, *niemendal*, *niettemin*, *niks*, *nimmer*, *noch*, *onthouden* (*van*), *ophouden*, *opraken*, *opschorten*, *pas*, *slecht*, *slechts*, *stoppen*, *stopzetten*, *tegen*, *tegenvallen*, *ternauwernood*, *twijfelen*, *uitsluiten*, *verbieden*, *verbreken*, *verdwijnen*, *vergeten*, *verliezen*, *vervallen*, *verwerpen*, *voorkomen*, *weghalen*, *wegnemen*, *wegvallen*, *weinig*, *zelden*, *zinloos*, *zomin*, and *zonder*. Please use the space in the comments section to mark unclear cases.

- (a) Als Petra zoveel werkt, heeft ze *amper* tijd voor iets anders.
If Petra works so much, she hardly has time for anything else.
- (b) Je verdient *allerminst* een bonus als je zo tekeergaat.
You least of all deserve a bonus if you go berserk like that.
- (c) Als er geen uitnodigingen worden verstuurd, komen er maar *weinig* bezoekers.
If no invitations are sent, there will be few visitors.
- (d) Hij kon het maar *moeilijk* verwerken als zij hem weer eens bedroog.
He could hardly handle it if she deceived him once again.
- (e) De computer hoeft *slechts* het pad te berekenen als op de knop wordt gedrukt.
The computer only needs to calculate the path if the button is pressed.

A.10.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Delimiting lexical negation

Once one starts annotating lexical negation, the boundary between what is and what is not negation may start to shift, as can be seen in the example below.

- (a) Er gaat pas een significante stroom lopen als de kring *gesloten* is.
A significant current will only start if the circuit is closed.

In (a), one can interpret ‘a circuit being closed’ as the negation of ‘a circuit being open’. The question then arises where such ‘negation’ ends. In this case, discussion led to removing the label for negation, but there is no principled boundary. In cases like (a) therefore, document your decision in the comments column.

A.11 Focus particles

A.11.1 Introduction

The feature *focus particle* represents whether or not the conditional is in scope of a focus particles like *alleen* ‘only’, *zelfs* ‘even’ and *altijd* ‘always’, as exemplified below.

- (41) {*Zelfs/ook/behalve*} als de deur dicht is, tocht het.
 {Even/also/except *if the door is closed, there is a draft.*
- (42) {*Alleen/altijd/zeker/slechts/vooral/enkel/pas/met name*} als de deur open is, tocht het.
 {Only/always/certainly/only/especially/only/.../especially} *if the door is open, there is a draft.*
- (43) Hij benut elke kans, *bijvoorbeeld* als hij iets met winst kan verkopen.
 He uses every opportunity, for example if can sell something with a profit.
- (44) Daar heeft hij helemaal gelijk in, als je *tenminste* naar de consumptievoetafdruk kijkt.
 He is absolutely right about that, if at least you look at the consumption footprint.

Although there are three types of focus particles (restrictive, additive and recurrent), it is sufficient to annotate the particle itself.

A.11.2 Instructions

This is a lexical feature and it has been automatically indexed. The following particles were included: *al* ‘already’, *alleen* ‘only’, *altijd* ‘always’, *behalve* ‘except’, *bijvoorbeeld* ‘for example’, *elke keer* ‘every time’, *enkel* ‘only’, *helemaal* ‘completely’, *iedere keer* ‘every time’, *juist* ‘especially’, *meestal* ‘mostly’, *met name* ‘especially’, *ook* ‘also’, *pas* ‘only’, *precies* ‘precisely’, *slechts* ‘only’, *telkens* ‘every time’, *tenminste* ‘at least’, *vooral* ‘especially’, *zeker* ‘certainly’ and *zelfs* ‘even’. However, the script used may result in a number of false positives, especially because the scope of the particle is not assessed. As it is often, but not always the case that the focus particle directly precedes the conjunction *als* ‘if’, the main instruction is to remove annotations for sentences in which the lexical item indexed does not function as a focus particle.

A.11.3 Problem cases

Please take note of the following known problem cases and annotate accordingly.

Incomplete utterance ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Running astray ('NA')

See the instructions for dealing with incomplete utterances in section A.3.3 above.

Scope

In certain cases, the focus particle does not (directly) precede the conditional conjunction. See (44) for an example. Determine whether or not the conjunction is in scope of the particle by placing the particle in front of the conjunction. In case of (44), this is the case, as can be seen below.

- (a) Daar heeft hij helemaal gelijk in, *tenminste als* je naar de consumptie-voetafdruk kijkt.
He is absolutely right about that, at least if *you look at the consumption footprint*.

APPENDIX B

Feature distributions

B.1 Introduction

In this appendix, the distributions of features (clause order, syntactic integration, verb tense, modality, aspect, person and number, sentence type, negation and focus particles) are presented for detailed ‘table look-up’ (see section 4.6). See chapter 5 for discussion of the features.

B.2 Feature distributions by mode and register

Table B.1:
Distribution of clause orders by mode and register

Mode	Register	Clause order						
		Initial	%	Medial	%	Final	%	Insub.
Spoken	Formal	710	63.68	63	5.65	329	29.51	13
	Informal	660	59.57	28	2.53	312	28.16	108
	Total	1370	61.63	91	4.09	641	28.83	121
Written	Formal	655	53.89	23	1.86	553	44.81	3
	Informal	676	55.87	23	1.90	481	39.75	30
	Total	1331	54.46	46	1.88	1034	42.31	33
Total		2701	57.87	137	2.94	1675	35.89	154

Note. Percentages are row-based.

Table B.2:
Distribution of degrees of syntactic integration by mode and register

Mode	Register	Degree of integration				
		Integration	%	Resumption	%	Non-int.
Spoken	Formal	230	38.02	348	57.52	27
	Informal	155	25.62	431	71.24	19
	Total	385	31.82	779	64.38	46
Written	Formal	463	75.65	144	23.53	5
	Informal	449	77.55	1191	20.55	11
	Total	912	76.57	263	22.08	16
Total		1297	54.02	1043	43.40	62

Note. Percentages are row-based.

Table B.3:
Distribution of verb tenses by mode and register

Mode	Register	Tense (a)	Simple present	%	Present per- fect	%	Simple past	%	Past per- fect	%	Infinitive	Total
Spoken	Formal	Simple present	839	91.10	11	1.19	52	5.65	3	0.33	16	921
		Present perfect	36	85.71	4	9.52	1	2.38	0	0.00	1	42
		Simple past	42	39.62	0	0.00	58	54.72	3	2.83	3	106
	Informal	Past perfect	0	0.00	0	0.00	4	21.05	14	73.68	1	19
		Simple present	787	95.74	9	1.09	22	2.68	1	0.12	3	822
		Present perfect	27	87.10	2	6.45	2	6.45	0	0.00	0	31
		Simple past	20	25.64	0	0.00	53	67.95	3	3.85	2	78
		Past perfect	0	0.00	0	0.00	0	0.00	13	100	0	13
		Total	1751	86.17	26	1.28	192	9.45	37	1.82	26	2032

Note. Percentages are row-based. Due to size, this page presents part 1 of 2 parts of the full table.

Mode	Register	Tense (a)	Simple present	%	Present per- fect	%	Simple past	%	Past per- fect	%	Infinitive	%	Total
Written	Formal	Simple present	884	93.35	6	0.63	38	4.01	0	0.00	19	2.01	947
		Present per- fect	73	96.05	1	1.32	1	1.32	0	0.00	1	1.32	76
	Informal	Simple past	41	28.08	2	1.37	98	67.12	3	2.05	2	1.37	146
		Past perfect	3	7.89	0	0.00	9	23.68	26	68.42	0	0.00	38
		Simple present	890	91.47	7	0.72	56	5.76	0	0.00	20	2.06	973
		Present per- fect	44	97.78	0	0.00	1	2.22	0	0.00	0	0.00	45
		Simple past	13	17.81	0	0.00	54	73.97	4	5.48	2	2.74	73
		Past perfect	3	21.43	0	0.00	2	14.29	9	64.29	0	0.00	14
	Total		1951	84.39	16	0.69	261	11.29	42	1.82	44	1.90	2312
	Total		3702	85.22	42	0.97	451	10.38	79	1.82	70	1.61	4344

Note. Percentages are row-based. Due to size, this page presents part 2 of 2 parts of the full table.

Table B.4:
Distribution of modality by mode and register

Mode	Register	Modality (a)	Modality (c)							No	%	Total	
			Epistemic%	Evidential%	Deontic	%	Dynamic	%					
Spoken	Formal	Epistemic	37	40.22	1	1.09	10	10.87	7	7.61	37	40.22	92
		Evidential	4	17.39	1	4.35	1	4.35	2	8.70	15	65.22	23
		Deontic	5	21.74	0	0.00	0	0.00	0	0.00	18	78.26	23
		Dynamic	9	11.54	1	1.28	13	16.67	10	12.82	45	57.69	78
		No	151	17.34	16	1.84	92	10.56	85	9.76	527	60.51	871
	Informal	Epistemic	15	34.88	0	0.00	2	4.65	5	11.63	21	48.84	43
		Evidential	0	0.00	0	0.00	1	20.00	2	40.00	2	40.00	5
		Deontic	1	4.76	1	4.76	2	9.52	6	28.57	11	52.38	21
		Dynamic	9	9.18	0	0.00	24	24.49	17	17.35	48	48.98	98
		No	91	11.79	14	1.81	67	8.68	79	10.23	521	67.49	772
Total		322	15.89	34	1.68	212	10.46	213	10.51	1245	61.45	2026	

Note. Percentages are row-based. Due to size, this page presents part 1 of 2 parts of the full table.

Mode	Register	Modality (a)	Modality (c)							No	%	Total	
			Epistemic%	Evidential%	Deontic %	Dynamic %							
Written	Formal	Epistemic	38	42.70	3	3.37	8	8.99	5	5.62	35	39.33	89
		Evidential	7	26.92	0	0.00	2	7.69	3	11.54	14	53.85	26
		Deontic	9	21.43	0	0.00	6	14.29	2	4.76	25	59.52	42
		Dynamic	17	20.99	2	2.47	11	13.58	8	9.88	43	53.09	81
		No	166	17.53	23	2.43	66	6.97	97	10.24	595	62.83	947
	Informal	Epistemic	17	45.95	1	2.70	2	5.41	3	8.11	14	37.84	37
		Evidential	0	0.0	0	0.00	1	12.50	0	0.00	7	87.50	8
		Deontic	7	18.92	2	5.41	1	2.70	4	10.81	23	62.16	37
		Dynamic	26	20.47	1	0.79	16	12.60	16	12.60	68	53.54	127
		No	146	16.35	12	1.34	56	6.27	97	10.86	582	65.17	893
Total		433	18.93	44	1.92	169	7.39	235	10.28	1406	61.48	2287	
Total		755	17.51	78	1.81	381	8.83	448	10.39	2651	61.47	4313	

Note. Percentages are row-based. Due to size, this page presents part 2 of 2 parts of the full table.

Table B.5:
Distribution of aspect by mode and register

Mode	Register	Aspect (a)	State	Aspect (c)				Total
				%	Activity	%	Accomplishment	
Spoken	Formal	State	175	47.17	59	15.90	27	7.28
		Activity	93	40.97	51	22.47	12	5.29
		Accomplishment	45	48.91	8	8.70	10	10.87
	Informal	Achievement	175	47.81	40	10.93	21	5.74
		State	170	49.13	54	15.61	37	10.69
		Activity	84	44.68	41	21.81	15	7.98
		Accomplishment	30	38.96	11	14.29	17	22.08
Written	Formal	Achievement	15	50.16	42	13.42	22	7.03
		Total	929	46.92	306	15.45	161	8.13
		State	198	45.21	76	17.35	32	7.31
	Informal	Activity	92	41.26	52	23.32	8	3.59
		Accomplishment	34	36.56	13	13.98	17	18.28
		Achievement	179	41.72	68	15.85	27	6.29
		State	170	35.27	101	20.95	51	10.58
	Total	Activity	100	44.64	48	21.43	15	6.70
		Accomplishment	28	33.33	11	13.10	21	25.00
		Achievement	123	42.27	37	12.71	20	6.87
		Total	924	40.81	406	17.93	191	8.44
Total			1853	43.67	712	16.78	352	8.29
								31.27

Note. Percentages are row-based.

Table B.6:
Distribution of person and number by mode and register

Mode	Register	Person & number	Person & number (c)												
			1ps	%	1pp	%	2ps	%	2pp	%	3ps	%	3pp	%	Total
(a)															
Spoken	Formal	1ps	42	41.58	3	2.97	7	6.93	0	0.00	44	43.56	5	4.95	101
		1pp	9	13.04	28	40.58	2	2.90	0	0.00	24	34.78	6	8.70	69
		2ps	16	6.23	9	3.50	112	43.58	0	0.00	102	39.69	18	7.00	257
		2pp	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
		3ps	46	9.91	32	6.90	41	8.84	1	0.22	275	59.27	69	14.87	464
		3pp	6	3.43	8	4.57	9	5.14	0	0.00	69	39.43	83	47.43	175
Informal		1ps	89	59.73	2	1.34	12	8.05	0	0.00	42	28.19	4	2.68	149
		1pp	5	8.93	20	35.71	8	14.29	0	0.00	15	26.79	8	14.29	56
		2ps	37	8.98	11	2.67	210	50.97	0	0.00	128	31.07	26	6.31	412
		2pp	0	0.00	0	0.00	0	0.00	0	0.00	2	100.00	0	0.00	2
		3ps	53	20.31	13	4.98	42	16.09	1	0.38	129	49.43	23	8.81	261
		3pp	14	19.44	2	2.78	9	12.50	2	2.78	22	30.56	23	31.94	72
	Total		317	15.71	128	6.34	452	22.40	4	0.20	852	42.22	265	13.13	2018

Note. Percentages are row-based. Due to size, this page presents part 1 of 2 parts of the full table.

Mode	Register	Person & number	Person & number (c)												
			1ps	%	1pp	%	2ps	%	2pp	%	3ps	%	3pp	%	Total
Written	Formal	1ps	46	62.16	0	0.00	0	0.00	0	0.00	23	31.08	5	6.76	74
		1pp	1	1.59	24	38.10	2	3.17	0	0.00	32	50.79	4	6.35	63
		2ps	5	3.05	3	1.83	89	54.27	0	0.00	61	37.20	6	3.66	164
		2pp	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
		3ps	18	2.86	22	3.49	19	3.02	0	0.00	486	77.14	85	13.49	630
		3pp	4	1.53	7	2.67	3	1.15	0	0.00	135	51.53	113	43.13	262
	Informal	1ps	136	55.97	2	0.82	19	7.82	2	0.82	79	32.51	5	2.06	243
		1pp	10	21.28	18	38.30	2	4.26	0	0.00	15	31.91	2	4.26	47
		2ps	42	10.69	10	2.54	187	47.58	2	0.51	136	34.61	16	4.07	373
		2pp	0	0.00	0	0.00	4	44.44	1	11.11	4	44.44	0	0.00	9
Total	3ps	85	25.45	16	4.79	68	20.36	1	0.30	152	45.51	12	3.59	334	
	3pp	16	24.24	2	3.03	10	15.15	0	0.00	23	34.85	15	22.73	66	
	Total	363	15.89	104	4.55	403	17.64	6	0.26	1146	50.15	263	11.51	2285	
Total		680	15.80	232	5.39	855	19.87	10	0.23	1198	46.13	528	12.27	4303	

Note. Percentages are row-based. Due to size, this page presents part 2 of 2 parts of the full table.

Table B.7:
Distribution of sentence types by mode and register

Mode	Register	Sentence type (c)					
		Declarative	%	Imperative	%	Interrogative	%
Spoken	Formal	1051	95.03	2	0.18	44	3.98
	Informal	926	92.23	4	0.40	43	4.28
	Total	1977	93.70	6	0.28	87	4.12
Written	Formal	1171	95.13	3	0.24	49	3.98
	Informal	991	83.91	43	3.64	93	7.87
	Total	2162	89.64	46	1.91	142	5.89
Total		4139	91.53	52	1.15	229	5.06

Note. Percentages are row-based.

Table B.8:
Distribution of types of negation by mode and register

Mode	Register	Negation (a)	Syntactic	%	Morphological	%	No	%	Total
Spoken	Formal	Syntactic	35	22.73	6	3.90	113	73.38	154
		Morphological	3	17.65	3	17.65	11	64.71	17
		No	128	14.00	11	1.20	775	84.79	914
	Informal	Syntactic	18	19.57	2	2.17	72	78.26	92
		Morphological	0	0.00	0	0.00	0	0.00	0
		No	104	12.11	7	0.81	748	87.08	859
Total		288	14.15	29	1.42	1719	84.43	2036	
Written	Formal	Syntactic	49	25.00	14	7.14	133	67.86	196
		Morphological	12	27.27	3	6.82	29	65.91	44
		No	143	14.71	37	3.81	792	81.48	972
	Informal	Syntactic	41	25.95	2	1.27	115	72.78	158
		Morphological	3	37.50	0	0.00	5	62.50	8
		No	141	14.78	7	0.73	806	84.49	954
Total		389	16.68	63	2.70	1880	80.62	2332	
Total		677	15.50	92	2.11	3599	82.39	4368	

Note. Percentages are row-based.

Table B.9:
Distribution of types of focus particles by mode and register

Mode	Register	Focus particle							
		Additive	%	Restrictive	%	Iterative	%	No	%
Spoken	Formal	43	3.63	35	2.95	4	0.34	1104	93.09
	Informal	26	2.13	18	1.48	33	2.70	1143	93.69
	Total	69	2.87	53	2.20	37	1.54	2247	93.39
Written	Formal	89	7.18	74	5.97	8	0.65	1069	86.21
	Informal	21	1.72	42	3.44	13	1.06	1146	93.78
	Total	110	4.47	116	4.71	21	0.85	2215	89.97
Total		179	3.68	169	3.47	58	1.19	4462	91.66

Note. Percentages are row-based.

APPENDIX C

Data preparation

C.1 Introduction

In this appendix, the data preparation for clustering is elaborated. In section C.2, features are tested on feature independence and skewedness of value distributions. The (re)coded variables, their distributions, and their deviations from the mode (DM) are presented in section C.3. Then, in sections C.4 to C.6, the technical details of the initial variable selection, distance calculation, and final variable selection are discussed, and the results of these preparatory steps are presented. For the main discussion of data preparation for clustering, see chapter 6.

C.2 Feature independence and skewedness

Before processing the data, feature independence and possible skewedness of value distributions were checked. Both steps are discussed in this section. For a general discussion of these pre-processing steps, see section 6.3.2.

First, it was inspected whether all features are, in theory at least, independent of each other. For most of the features discussed in the previous chapter, this poses no problems. Negation, for instance, is not dependent on other features, as any type of negation can, in theory, be used in combination with any tense, clause order or other feature. There was, however, one set of three features that showed internal dependency, namely clause order, syntactic integration and sentence type. A feature like syntactic integration can, as was discussed in section 5.3, only be annotated for sentence-initial antecedents. A resumptive

pattern, for example, is not available for sentence-final antecedents, meaning that the features clause order and syntactic integration are dependent. To solve this problem, clause order, syntactic integration and sentence type were merged into the new variable ‘syntactic pattern’, which was comprised of the levels ‘integration’, ‘resumption’, ‘non-integration’, ‘sentence-medial’, and ‘sentence-final’. The low-frequent group of embedded conditionals were grouped together with sentence-medial conditionals, and conditionals with non-declarative consequents were grouped together with non-integrative conditionals, because their word order does not allow for the other patterns in this variable.

Second, the distribution of some features was skewed, either showing signs of trait prevalence, or a large number of values and low frequencies per value. Focus particles are an example of this problem. Conditionals with a focus particle were initially annotated with the different particles as values, which led to a large number of values with low frequencies i.e., the different particles in the corresponding variable (see section 5.10). To retain the information while bringing down the number of levels, the values were classified into the categories discussed, namely *additive*, *restrictive* and *iterative particles*. To inspect the balance between the number of levels in a variable, and the distribution of these values, dispersion was measured for each variable. The measurement of dispersion is common for numerical data, for which all sorts of well-known measures of statistical dispersion are available, such as *range* and *standard deviation*. It is less common for qualitative data (nominal, ordinal), which is the type of data frequently encountered in corpus linguistic studies, such as this study. Wilcox reflects as follows on this problem.

All standard statistics texts discuss the measurement of variation in a univariate distribution when the variable under consideration satisfies the requirements of an ordinal, interval, or ratio scale. [...] However, a discussion of the measurement of variation with nominal-scale data is usually conspicuous by its absence. (Wilcox, 1973, p. 325)

Wilcox (1973) therefore proposes a number of measurements of ‘qualitative variation’, among which ‘Deviation from the Mode’ or *DM*, presented in (1).

$$(1) \quad DM = 1 - \frac{\sum_{i=1}^k (f_m - f_i)}{N(K-1)}$$

The basic principle is that (1) stands for an index of deviation from the modal frequency, ‘analogous to the variance as a measure of deviation from the mean’ (Wilcox, 1973, p. 325). This measure was therefore used to assess the dispersion of each variable over all conditionals in the corpus. For a detailed overview of the (re)coded variables, their distribution and DM-values are included in table C.1 in Appendix B on page 488. Please note that the deviation from the mode was calculated twice for features which suffered from the ‘missing data-problem’ discussed in section 4.5: once with without ‘NA’-values, and once

with those values as ‘no’-values.¹ What we see in the results is that a number of tense in the antecedent and consequent, modality in antecedents, negation in antecedents and consequents and particularly focus particles have low DM-values. For modality, negation and focus particles this is especially the case when absence of those features is considered a level (‘no’). To deal with this, we will implement variable selection in the next section.

C.3 Coded variables and deviation from the mode

In table C.1, the (re)coded variables, their distributions, and their deviations from the mode (DM) are presented.

¹This was not done for the features *negation (a)* and *negation (c)*, because no measure of dispersion can represent a variable with only one level.

Table C.1:
Coded variables, levels and Deviation from the Mode (DM)

Feature(s)	Section(s)	Variable	Levels	%	% NA	DM	DM NA
Clause order, syntactic integration, Sentence type	5.2, 5.3, 5.8	syntactic_pattern	integration	13.1		0.85	
			resumption	5.5			
			non-integration	27.9			
			sentence-medial	0.2			
Verb tense	5.4	tense_a	sentence-final	39.8			
			simple present	84.2		0.21	
			simple past	9.3			
			present perfect	4.5			
			past perfect	2.0			
			simple present	87.5		0.18	
			simple past	10.6			
			present perfect	1.0			
Modality	5.5	modality_a	past perfect	1.9			
			epistemic	6.13	32.1	0.24	0.72
			evidential	1.46	7.6		
			deontic	2.73	14.3		
			dynamic	8.79	46.0		
			no	80.90			

Note. Due to size, this page presents part 1 of 3 parts of the full table.

Feature(s)	Section(s)	Variable	Levels	%	% NA	DM	DM NA
Modality	5.5	modality_c	epistemic evidential deontic dynamic no	17.64 1.70 9.03 10.54 61.09	45.3 4.4 23.2 27.1	0.49	0.73
Aspect	5.6	aspect_a	state activity accomplishment achievement	38.7 20.3 8.0 32.9		0.82	
		aspect_c	state activity accomplishment achievement	43.5 16.8 8.3 31.3		0.82	
Person & number	5.7	subject_a	1ps 1pp 2ps 2pp 3ps 3pp	13.1 5.5 27.9 0.2 39.8 13.5		0.73	
		subject_c	1ps 1pp 2ps 2pp 3ps 3pp	16.0 5.5 19.9 0.2 46.0 12.4		0.65	

Note. Due to size, this page presents part 2 of 3 parts of the full table.

Feature(s)	Section(s)	Variable	Levels	%	% NA	DM	DM NA
Negation	5.9	negation_a	syntactic	13.77	89.27	0.23	0.21
			morphological	1.65	10.73		
			no	84.57			
Focus particles	5.10	negation_c	syntactic	15.14	87.73	0.25	0.26
			morphological	2.12	12.27		
			no	82.75			
		focus_type	additive	3.7	43.2	0.11	0.85
			iterative	1.2	14.5		
			restrictive	3.6	42.3		
			no	91.4			

Note. Due to size, this page presents part 3 of 3 parts of the full table.

C.4 Initial variable selection

In this section, the details of the initial variable selection are presented. For a general discussion of this step, see section 6.3.2.

Assessing variable importance in clustering is not an easy task. Talavera (2005, p. 440) argues that feature selection for clustering is not addressed often, mostly because there is no consensus on how to evaluate the results of a clustering algorithm. One of the reasons for this is that clustering is an unsupervised machine-learning technique, which means that there is no objective class assignment for each observations against which the results of the clustering can be tested, in contrast to supervised techniques generally called ‘classification’ in the machine-learning literature (see e.g., Berry, Mohamed & Yap, 2019, for an introduction and up-to-date overview). Silvestre, Cardoso and Figueiredo (2013) explain the difference clearly:

In supervised learning, namely in classification, feature selection is a clearly defined problem, where the search is guided by the available class labels. In contrast, for unsupervised learning, namely in clustering, the lack of class information makes feature selection a less clear problem and a much harder task. (Silvestre, Cardoso & Figueiredo, 2013, pp. 331–332)

The major difference between variable selection for classification on the one hand and variable selection for clustering on the other, is thus that in supervised machine learning, the labels or types are known for (at least) a part of the dataset. Algorithms can be trained by estimating those labels or types based on the features in the dataset. The estimated labels are then compared to the existing labels, and the accuracy of the predictions can then be measured. When accuracy is sufficient, the algorithm can be used to label the part of the dataset that has not been assigned labels manually.

For unsupervised techniques, no labels are present *a priori*, making it less clear how to determine the accuracy of the results of the learning algorithm chosen. As a result, no standard approach is available for feature selection in clustering (cf. Questier et al., 2002, p. 311; see also Li et al., 2017). The fact that there is no training set available for evaluation directly affects variable selection methods. For supervised techniques, various models can be generated by starting with only one variable as predictor and incrementally adding features (a ‘forward’ approach) or by starting with a full model and incrementally removing features (a ‘backward’ approach). Features that sufficiently increase the predictive power of the model are kept, while those that do not are left out of the final model. As discussed above, in clustering techniques, the labels are not known, making it impossible to directly assess the contribution of each variable. Before moving on to strategies to deal with this problem, it is deemed necessary here to mention an added complication in this study, namely that the literature available on feature selection for clustering is mainly targeted at clustering numerical variables, not categorical variables (for an overview, see e.g.,

Li et al., 2017, p. 36). Furthermore, existing unsupervised variable selection methods make use of conventional distance metrics (cf. Liu & Zhang, 2016), such as Euclidian distance for numerical data or Gower's distance for categorical data. Such metrics do not take into account the distributional properties of the dataset, as discussed at length in section 6.3.

The above means that insights from different methods have to be combined for variable selection in the current study.² Results will therefore be interpreted with caution. To do so, the following approach was chosen: first, the internal distributions of the variables are evaluated and the results are combined with an informal ranking of theoretical importance of variables. This will constitute the initial variable selection. Second, after the distance calculation in the next section, insights from the initial variable selection are used to measure the impact of variables on the stress of dimension-reducing models of the dataset.

To inspect the informativeness of variables statistically, two main approaches are available, so-called 'filter methods' and 'wrapper methods' (see e.g., Dy & Brodley, 2004; Xiaofei, Deng & Partha, 2005; see Alelyani, Tang & Liu, 2013, for a recent overview). Filter methods assess the qualities of variables by evaluating their internal variation and distribution. Whereas in filter methods the internal distributional characteristics of the variables are used to assess their possible contribution to subsequent clustering steps, wrapper methods work fundamentally different (see Talavera, 2005, p. 441). Wrapper methods are based on feature selection in supervised classification (see Kohavi, John et al., 1997; Dy & Brodley, 2004, pp. 847–848), and take subsets of the feature space to generate clustering solutions, which are then evaluated according to an internal quality criterion, such as an information-theoretic criterion like the Akaike Information Criterion (AIC, see Akaike, 1969; Akaike, 1974; Bozdogan, 1987) or the Bayesian Information Criterion (BIC, see Schwarz, 1978). The contribution of each variable can be assessed by looking at its contribution to the quality of the model. A wrapper method thus uses a form of clustering itself to form groups with which the influence of each of the variables is measured, evaluated and ranked. The type of clustering used is (a form of) model-based clustering, which assumes that 'the data is generated by a mixture of underlying probability distributions' (Vermunt & Magidson, 2002, pp. 89–90) and a likelihood function is used to maximise the likelihood of the expression data, i.e., the probability of a group of observations coming from one distribution, while another group comes from another probability distribution. These algorithms have been tested largely on numerical datasets. Model-based clustering assumes that the data originate 'from a finite mixture of underlying probability distributions' (Blattberg, Kim & Neslin, 2008, p. 414; cf. Fraley & Raftery, 1998). Because each cluster comes from a different (Gaussian) distribution, the contribution of a variable in identifying these clusters can be evaluated. This is, however, no trivial assumption for the data in this study, and forms a serious drawback,

²While a number of new methods have been proposed, most have not been implemented and tested thoroughly yet. See for instance Fop and Murphy (2018).

as wrapper methods may evaluate variable importance based on clusters that were formed on different grounds than used in the (non model-based) clustering approaches in the following steps. Although wrapper methods usually provide a more informative picture of variable importance, its reliance on model-based clustering is an argument in favour of a simpler, but less model-dependent filter approach to perform the initial assessment of the information value of each variable.

Within filter approaches to variable selection, two distinct types of measures can be distinguished: univariate and multivariate selection methods. As the names suggest, univariate methods assess variables individually using an evaluation criterion based on the internal distribution of the variable, for example in terms of entropy, divergence or mutual information. Possible dependencies or interactions between variables thus are not taken into consideration. In multivariate methods, such dependencies are evaluated. Although a number of these methods are available (see Tabakhi, Moradi & Akhlaghian, 2014; Solorio-Fernández, Carrasco-Ochoa & Martínez-Trinidad, 2020, for overviews), most are suited for supervised tasks as they depend on class labels. Furthermore, most methods are limited to or tested on numerical variables only. The initial variable selection in this study was therefore performed by combining a simple univariate method, namely the calculation of the frequency ratio (FR) of each variable, with a ranking based on the theoretical importance of the variables. Although in the methodological literature, expert-selection of variables does not appear often, it can be found in studies applying machine-learning methods (see e.g., van den Berge et al., 2017). In this initial feature selection, no variables will actually be removed from the dataset, but the insights will be used as indications of potentially problematic features. In section 6.3.6, these insights are used together with a multivariate method for the final feature selection.

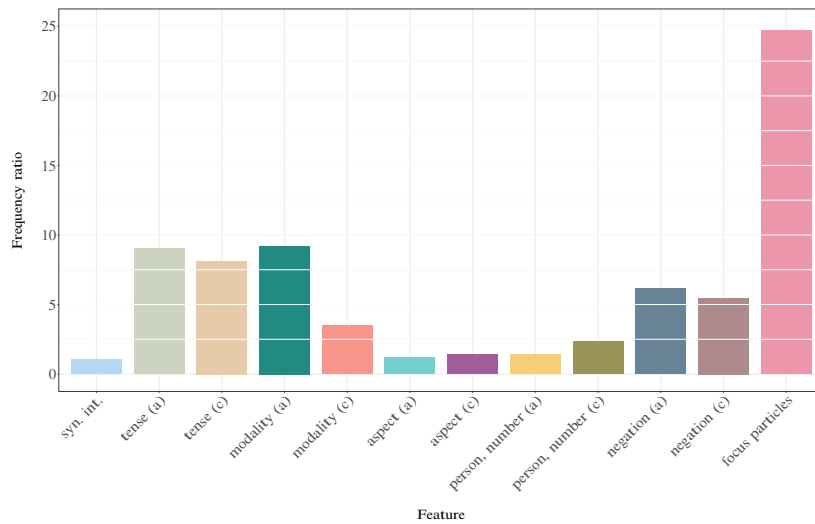
As mentioned above, the goal at this point is to indicate which variables have non-informative distributions or have less theoretical relevance. For the first step, the frequency ratio of each variable was assessed using the formula in (2) below. As can be seen, this simple calculation only divides the frequency of the most frequent value (f_i) by the frequency of the second-most frequent value (f_j). The reasoning here is that if the ratio between the frequency of the most frequent value and the second-most frequent value is large, it may be better to remove the variable from the model (see Kuhn & Johnson, 2013, p. 45).³

$$(2) \text{ FR} = \frac{f_i}{f_j}$$

³There is another criterion that must be met before considering a variable uninformative, namely that the percentage of unique values is less than 20% of the number of observations (see Kuhn, 2008, p. 4; Kuhn & Johnson, 2013, p. 45). This requirement is met by all variables. See section C.2.

In Figure 6.1 presented in section 6.3, and repeated below in Figure C.1, the frequency ratio of each variable is presented. As this ratio is the frequency of the most common value of a feature divided by the second most common value, the higher the ratio is, the bigger the prevalence of the most common value is.

Figure C.1:
Frequency ratio per feature



In this figure, it can be seen that some ratios are higher than others. While it is up to the analyst to set thresholds for the frequency ratio, no hard boundaries are needed to see there is one clear outlier, namely focus particles. This can be explained by the fact that most conditionals do not feature a focus particle, so the ‘no’-value has a much higher frequency than any of the other values (i.e., types of focus particles, see section 5.10). For this particular feature, absence accounted for 3757 of the values, while the second most frequent value, additive focus particles, had a frequency of only 152. Using the formula in (2), this results in $3757/152 = 24.72$. This is a problem for any subsequent step in the analysis, as this variable introduces complexity into the model, while explaining very little variation. It can also be seen that modality in the antecedent, and tense in both clauses have somewhat higher frequency ratio’s than the other features. For modality, this has the same cause as for focus particles, namely that around 80% of all antecedents is not modalised. This is interesting when contrasted with modalisation of consequents, which has a much lower frequency ratio, mainly due to a lower number of non-modalised clauses and a secondary prevalence of epistemic modality.

C.5 Distance calculation

Before the insights from the previous section can be used for the final variable selection, distance calculations and evaluations thereof are needed. Various distance measures are elaborated in this section. For a general discussion of this step, see sections 6.3.3 to 6.3.5.

C.5.1 Basic distance calculation

In (3) below, the formula for *Gower's Distance* is presented.

$$(3) S_{ij} = \frac{\sum_{k=1}^N W_{ijk} S_{ijk}}{\sum_{k=1}^N W_{ijk}}$$

Here, W_{ijk} is the weight for variable k between conditionals i and j , and S_{ijk} is the distance between conditionals i and j with respect to that variable k . Weight W is 1 by default and is a constant value per variable. The distances or *dissimilarities* between conditionals are calculated by subtracting Gower's similarity score from 1. Using the measure in (3), a dissimilarity matrix can be calculated, consisting of the dissimilarities between all individual conditionals on all features.

The reason for the somewhat explicit elaboration on distance calculation here is twofold. First, the calculation of the distance matrix can have profound effect on any subsequent analysis, and although *distance* might seem to be an objective measurement, the researcher has several choices to make, such as the choice for a metric used to calculate distance. Typically, one can choose from *Euclidean*, *Manhattan* or *City block*, and *Gower's distance* (see e.g., Anderberg, 1973, Chapter 5). The first two metrics are only applicable to numerical datasets (or data transformed to numerical values), and as in corpus linguistics the data are often collected on the categorical level, this leaves Gower's Distance. A second choice that, to my knowledge, is not mentioned in earlier corpus linguistics studies, even in those which explicitly mention the step of distance calculation, is how missing values are dealt with – probably because most implementations of Gower's metric allow for such values to be included.⁴ This, however, is non-trivial and can have, as will be shown in what follows, severe impact on the distance matrix and subsequent analyses. Second, the distance matrix itself is a source of information for the researcher, and can be used to answer questions concerning the level of homogeneity of the dataset, and, for instance, to identify the most and least representative examples (see section 6.3.7).

Distance calculation will be explained examples (397) to (400) from section 6.3, repeated below for convenience.

(397) If you flick the switch, the light will go on.

⁴As the reader will notice, the subject of missing values is a recurrent issue throughout this thesis. See chapter 5.

(398) If he attacks the enemies, they strike back.

(399) The water is not cold, if it is boiling.

(400) Even if we work hard, we may not leave early today.

In Table 6.1 from section 6.3, repeated below in Table C.2, it is reflected that that two of the conditionals have modal marking in the consequent.

Table C.2:

Data structure for examples in (397) to (400)

Example	Clause order	Person & Number (a)	Modality (c)
(397)	initial	2ps	epistemic
(398)	initial	3ps	no
(399)	final	3ps	no
(400)	initial	1pp	deontic

As (398) and (399) have *no* as a value for this feature, Gower's metric considers them to have a distance of 0 for this feature, i.e., they are identical on this feature. This seems right, but a possible bias arises when the total distance between these two conditionals is calculated. Their distance is 0.33, because they share two of the three features, namely person and number, and modality. The other distances are presented in Table 6.2 in section 6.3, repeated below in Table C.3.

Table C.3:

Distance matrix for examples in (397) to (400)

	Ex. (397)	Ex. (398)	Ex. (399)	Ex. (400)
Ex. (397)	0.00			
Ex. (398)	0.67	0.00		
Ex. (399)	1.00	0.33	0.00	
Ex. (400)	0.67	0.67	1.00	0.00

Looking at the examples, however, one could also argue that conditionals in (398) and (399) have only one feature in common (i.e., person and number), as the absence of a feature (modality) is hardly grounds for similarity. This problem is discussed in general terms by Anderberg as follows.

[...] There is the question of what to do with 0-0 matches. [...] For example, suppose the data units are animals and the variables are "has feathers," and "has webbed feet." Dogs and cats and many other animals would fall into cell *d* [not possessing either attribute,

AR] because there is no way they could have such attributes. It would be misleading to allow these 0-0 matches to contribute to the measure of association between cats and dogs. (Anderberg, 1973, p. 88)

As most conditionals are not marked for modality (see section 5.5), should the absence of this feature contribute to the similarity index? As discussed, conditionals without a focus particle could be annotated using ‘NA’. The result is that in most implementations of Gower’s metric (see the formula in (3) above), the feature is ignored completely in the comparison of two conditionals of which at least one has ‘NA’ for this feature, while it still adds to the (dis)similarity of conditionals that do have this relatively infrequent feature. This would then result in a distance of not 0.33, but 0.50 between the conditionals in (398) and (399), because they would only share one of two features present. This seems more appropriate, as can be seen in the distance matrix in C.4.

Table C.4:

Distance matrix with ‘NA’ for ‘no’ in Table C.2

	Ex. (397)	Ex. (398)	Ex. (399)	Ex. (400)
Ex. (397)	0.00			
Ex. (398)	0.50	0.00		
Ex. (399)	1.00	0.50	0.00	
Ex. (400)	0.67	0.50	1.00	0.00

Several differences can be seen between the distance matrix in Table C.3 and C.4 above. Although the distance between (398) and (399) is corrected for agreement on an absent feature, there is another change, namely that the distance between the conditionals in (397) and (398) has become 0.5, because (398) has ‘NA’ for the focus particle feature, removing it from the distance calculation. For this small example corpus, in which half of the observations actually have this feature, one could argue for both including these no-values or excluding them, but remembering the low frequency of a feature such as modal marking in especially the antecedent (see section 5.5), this would mean inflating the similarity between conditionals by including highly prevalent ‘no’-values. On the other hand, treating ‘no’-values as ‘NA’ introduces the problem that conditionals with ‘NA’ for certain features may be considered more identical than other conditionals, while such a result is debatable.

C.5.2 Evaluation of distance matrices by multimodality

In this section, histograms of distances per measurement are presented and evaluated in terms of multimodality, because multiple modes in the distribution of distances indicates multiple clusters in the data (see Ackerman, Adolfsson & Brownstein, 2016; Adolfsson, Ackerman & Brownstein, 2019).

Before discussing the distributions, please note that the distances were normalised after calculation. The reason for doing so, was that distance measures produce results on different scales which do not necessarily fall between 0 and 1. The distances were normalised using the simple so-called ‘min-max normalisation’ in (4) below, which was applied to each distance distribution, resulting in a comparable scale from 0 to 1 for each distance distribution, while keeping the internal distribution the same.

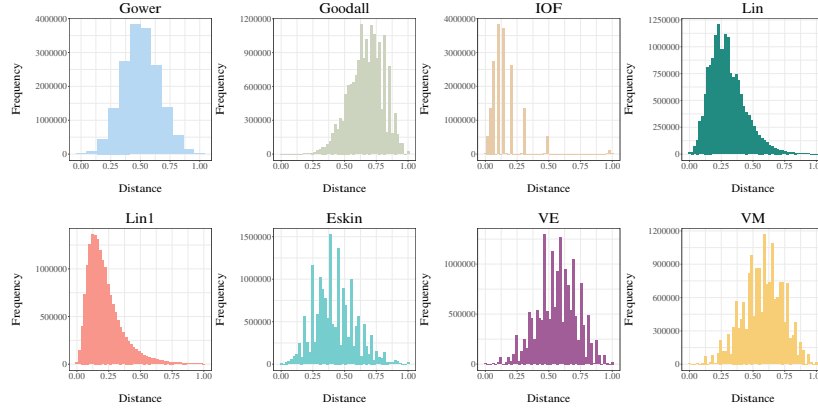
$$(4) \quad z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

A further step to maximise the clusterability of the data was to identify and remove outliers from the distance matrix. As Almeida et al. (2007, p. 209) argue, data with outliers ‘are difficult to tackle with most clustering algorithms’, because the data structure becomes ‘less defined’ and may have a negative impact on clustering results (especially in case of single and average linkage, see also section 6.4.4). For the current purposes, a simple strategy was used, in which all distances outside a threshold value (here, 5 times the standard deviation) were standardised.⁵

The histograms of the distance matrices are presented in Figure 6.2 in section 6.3, and repeated in Figure C.2 below.

⁵More elaborate tests for outlier-detection are described by, among others, Grubbs (1969), Dean and Dixon (1951). See also Tietjen and Moore (1972) for discussion. These tests were not used here, because they rely more heavily than the current approach on a normal distribution of the data, whereas tests for multimodality test for the opposite.

Figure C.2:
Distribution of distances per measure



Looking at these histograms, it can be seen that the different distance calculations unfortunately do not produce clear multimodal distributions.⁶ For Gower’s measure, the general shape of a normal distribution can be seen, but we also clearly see the result of the simple calculation, as there are only twelve distinct values in the complete distance matrix due to a limited number of possible distances based on the Gower (or ‘Simple Matching’) measure. The distribution of Goodall distances shows a negative skew, meaning that the left tail is longer and mass of the distribution is on the right of the figure. The IOF measure produces the tendency of a right-tailed (i.e., positive skewness) distribution, from which it is not clear whether it is suffering from the same problem associated with the discrete nature of the data as Gower’s measure, or whether the tail indeed shows separate modes. Both the Lin and Lin1 measures, show a unimodal, but right-skewed distribution. The Eskin measure features a number of smaller modes, but as these figures are based on discrete data, these figures should be interpreted with caution. Like the *Lin* and *Lin1* measures, the VE and VM measures produce similar, but not identical distance distributions, with the modes of the former being slightly more dispersed than the latter.

As a more formal check, each distribution was subjected to a multimodality test. The general idea of applying such a test on a distance matrix is that it assumes that the data comes from a unimodal distribution, which functions as the null hypothesis. Given the test chosen (see below), a large p -value (≥ 0.05) indicates no significant diversion from the (nearest) unimodal distribution, i.e., only a single mode is present in the data. A small p -value (< 0.05) on the other

⁶For comparison, see the examples by Ackerman, Adolfsson and Brownstein (2016, p. 5), which show a number of truly multimodal distance distributions.

hand, questions the assumption that the data are unimodally distributed, and indicates that there is evidence for multiple modes in the data, which could reflect multiple clusters (Adolfsson, Ackerman & Brownstein, 2019, pp. 6–7). Of course, the histograms were already visually inspected for unimodality, but a statistical test may determine in a more formal way whether or not further clustering steps are warranted. One such test is the *dip* test, resulting in a dip statistic which reflects the maximum distance between the distribution in question and the closest unimodal distribution (see Hartigan & Hartigan, 1985, p. 70; Hartigan, 1985; Maechler, 2016, for implementation), and provides a corresponding *p*-value, indicating whether or not the null hypothesis that the distances come from a unimodal distribution may be rejected. The test takes each set of distances, and compares these distributions to the closest normal distribution, indicating whether the data contain one or more peaks or *modes* (cf. Chamalis & Likas, 2018).

The dip tests performed provided an unexpected result, indicating that all distributions differ significantly from a unimodal distribution, i.e., all *p*-values are less than 0.05.⁷ The reason for reporting this finding is first that this problem was found yet in the literature on clusterability, and second that the actual histograms may provide a clue to the cause of what at least looks like false-positive results. As can be seen in the histograms in Figure 6.2 (see page 6.3 in section 6.3), especially that for the Gower distances, the discrete nature of the data is reflected in the number of distinct distances. In fact, as mentioned with respect to the distance matrix for Gower’s measure, only 12 distinct distances are present, which can be explained by the fact that this simple distance measure, in which correspondence and non-correspondence simply amount to a distance of 0 or 1, has a limited set of output distances. The *dip* statistic, however, is tested on numeric (i.e., non-discrete) data, which does not suffer from this problem.⁸ A possible explanation is that the ‘gaps’ between the discrete distances are picked up by the statistic as deviations from the closest normal distribution, resulting in significant deviations from the null hypothesis. This, of course, is problematic and leads to misleading results, because we can see the distribution of distances in most cases actually does closely resemble the bell curve of a normal distribution. Because of this, the visual assessment the distributions will be used with caution, and a second approach to evaluating the distance matrices is presented in the next section.

⁷In fact, all rounded *p*-values are 0.00.

⁸Unfortunately, another frequently used multimodality test, the Silverman test (Silverman, 1981) suffers from the same problem with categorical data, i.e., it indicates that all distributions in Figure 6.2 on page 353 in section 6.3 deviate significantly from a unimodal distribution.

C.5.3 Evaluation of distance matrices by dimension-reduction

The goodness-of-fit value used for evaluating the dimension reduction results was calculated using the following formula, commonly called *Kruskal's Stress*.

$$(5) \text{ Stress} = \sqrt{\frac{\sum_{ij} (d_{ij} - \hat{d}_{ij})^2}{\sum_{ij} d_{ij}^2}}$$

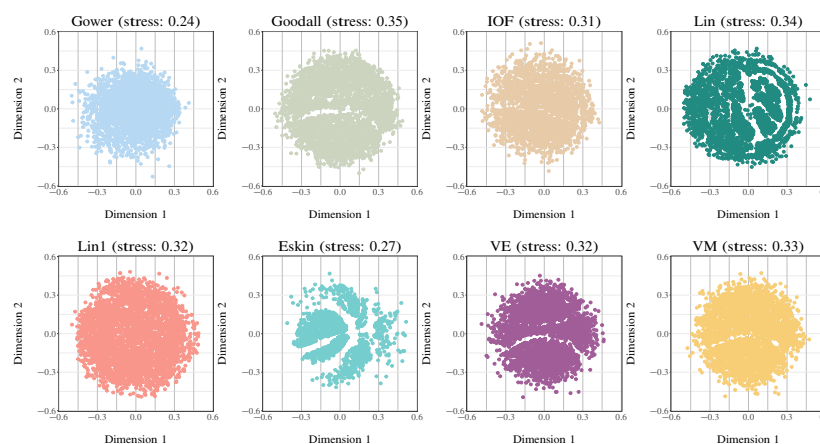
Here, d_{ij} is the distance between observations i and j , and $\hat{d}_{ij}$ is the distance between those observations in the model. The lowest stress value is 0, which indicates 'complete accordance between all rank order distances in the input data and the final ordination' (Dexter, Rollwagen-Bollens & Bollens, 2018, p. 435). The greater the value, the worst the fit of the model is to the actual distance matrix. A common guideline is that stress values higher than 0.2 are considered 'poor and potentially uninterpretable' (Tyler & Kowalewski, 2014, p. 5). Clarke (1993, p. 126) provides the following 'rules of thumb' for interpretation of stress levels:

- (6) < 0.05 = excellent ordination, no prospect of misinterpretation
- < 0.1 = good ordination, no real risk of misinterpretation
- < 0.2 = usable ordination, risk of misinterpretation
- > 0.2 = dangerous to interpret
- > 0.35 = effectively randomly placed

As Dexter, Rollwagen-Bollens and Bollens (2018) argue, however, such guidelines 'do not account for the mathematical relationship which links ordination stress to sample size' and they show how large data sets may suffer from increased stress levels.

Below, in figure C.3, the NDMS-configurations for each of the distance measurements is presented, together with the stress index. Please note that for each configuration, two dimensions were used. While increasing the number of dimensions generally decreases stress, the configuration becomes harder to visualise and interpret (Dexter, Rollwagen-Bollens & Bollens, 2018, p. 434). Keeping the number of dimensions at two both conforms to the standards in the literature, and allows for comparison and easier interpretation of results.

Figure C.3:
NMDS configurations and stress levels for distance matrices (full feature set)

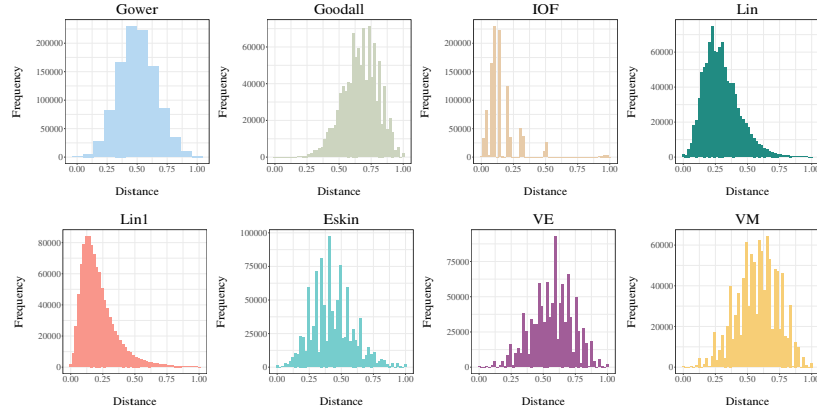
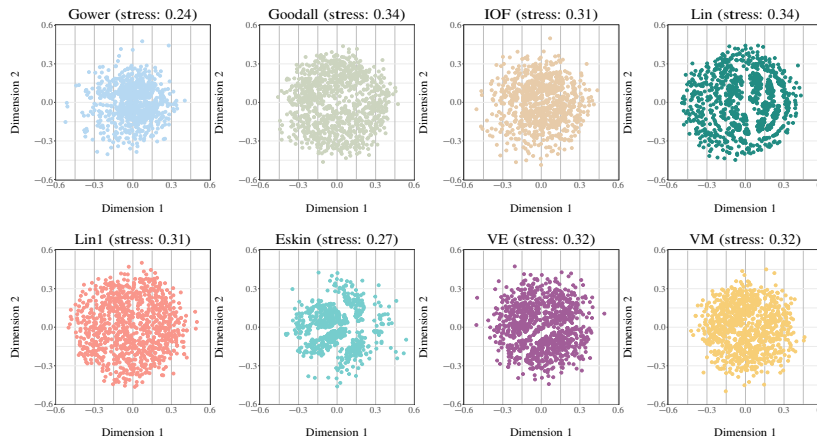


Note. All configurations are based on two-dimensional ordination.

What can be seen here, is that all stress levels are above 0.20, and only two are between 0.20 and 0.30.⁹ Again, one should be careful in interpreting these figures in isolation, but together with the inspection of the distributions of the distances, it seems that no measure indicates strong clusterability. The Gower and Eskin measures indicate a relatively low stress level. Especially the Eskin measure seems able to produce a configuration with well-separated groups of observations. The above does not mean that no further steps can be taken in the exploration of the feature space of Dutch conditionals.

A first possible cause for the results reported above became clear in the previous chapter, namely that a number of features showed significant and sometimes strong associations to mode and register. It therefore could be argued that the overall analysis of the data may be troubled by these factors. Therefore, distance matrices were also calculated per mode-register combination (spoken-formal, spoken-informal, written-formal, written-informal). The corresponding distributions of distances per measure and the NMDS configurations are presented below.

⁹Although Dexter, Rollwagen-Bollens and Bollens (2018, pp. 437–438) show a clear ‘asymptotically increasing relationship between ordination stress and sample size’, using both field-derived and simulated data, as we will see in what follows, sample-size does not seem to be the main cause of the high stress levels here.

Figure C.4:*Distribution of distances per measure (spoken-formal sub-corpus)***Figure C.5:***NMDS configurations and stress levels for distance matrices (spoken-formal sub-corpus)*

Note. All configurations are based on the full feature set and on two-dimensional ordination.

Figure C.6:
Distribution of distances per measure (spoken-informal sub-corpus)

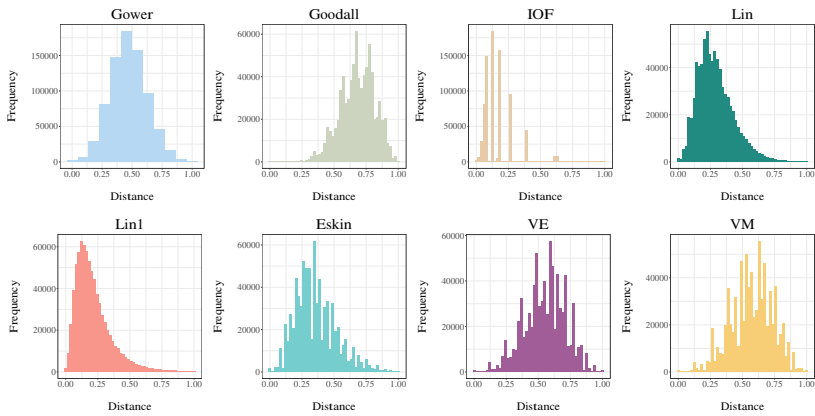
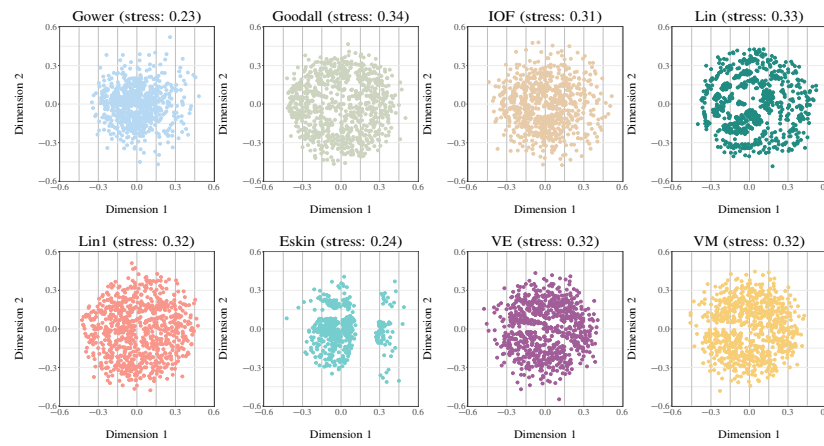


Figure C.7:

NMDS configurations and stress levels for distance matrices (spoken-informal sub-corpus)



Note. All configurations are based on the full feature set and on two-dimensional ordination.

Figure C.8:

Distribution of distances per measure (written-formal sub-corpus)

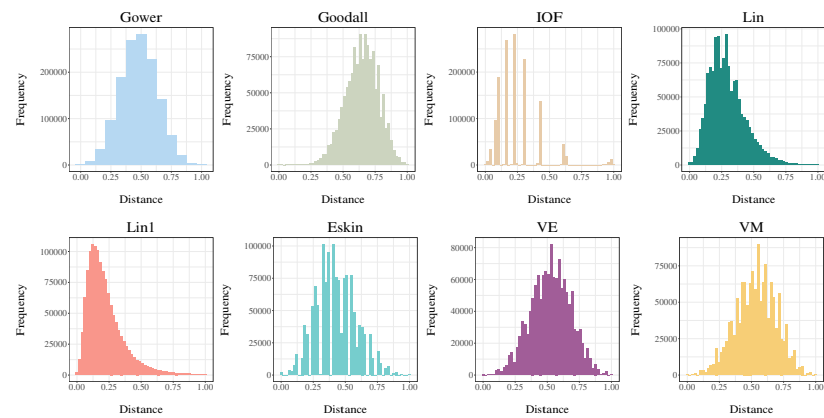
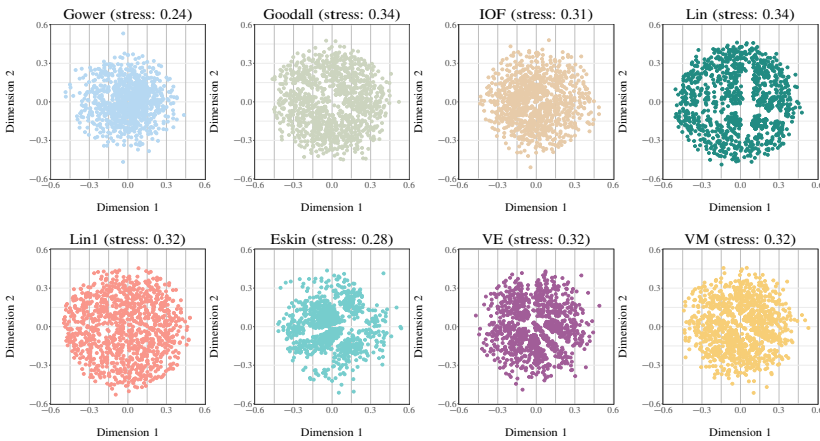
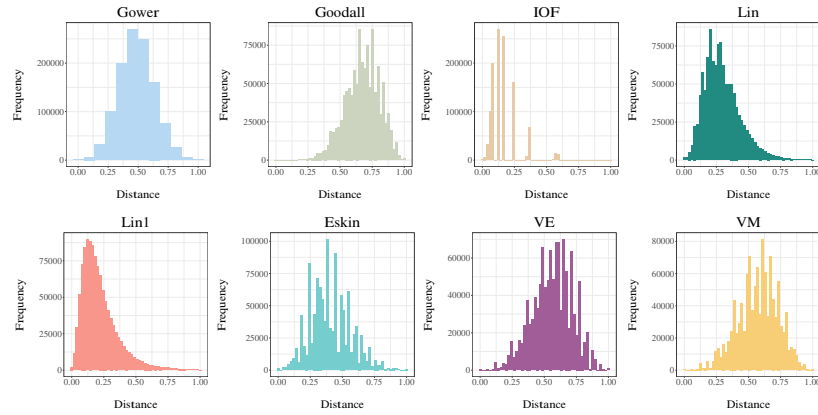
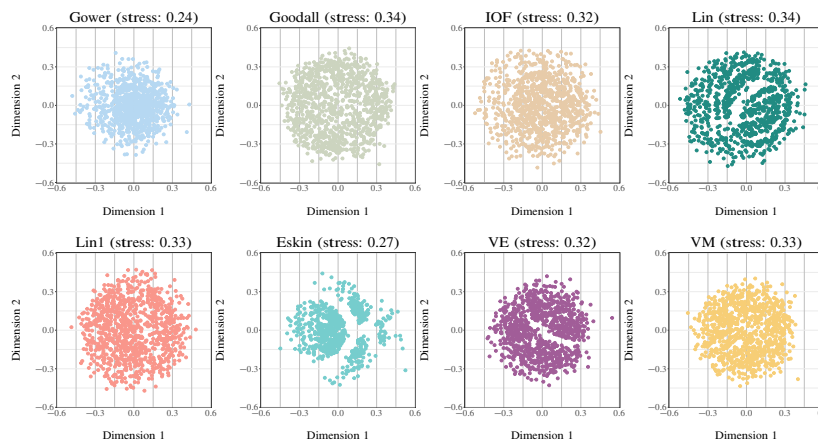


Figure C.9:
NMDS configurations and stress levels for distance matrices (written-formal sub-corpus)



Note. All configurations are based on the full feature set and on two-dimensional ordination.

Figure C.10:*Distribution of distances per measure (written-informal sub-corpus)***Figure C.11:***NMDS configurations and stress levels for distance matrices (written-informal sub-corpus)*

Note. All configurations are based on the full feature set and on two-dimensional ordination.

As these figures show, there is no indication that mode and register have a systematic impact on the distributions of distances and stress levels in dimension reduction. In other words, calculating distances per sub-corpus does not seem to increase the clusterability of the data set.

A second possible cause was already discussed in section 6.3, namely that clustering algorithms may suffer from datasets including variables that are not relevant to the set of variables that indeed do show signs of underlying structure. Therefore, the next section returns to variable selection in order to investigate whether clusterability can be improved by removing variables from the feature space of conditionals.

C.6 Final variable selection

To evaluate the contribution of each variable in the dataset, a number of models was generated, including a full model with all variables, an informed model using only those variables suggested by the initial variable selection discussed above, supplemented, for testing purposes, with a number of random models. For a general discussion of this step, see section 6.3.6.

For reasons of computation time, the models were based on a random sample of 500 conditionals from the corpus. First, all distance measures discussed in section 6.3.4 were calculated for this sample. The histograms were plotted to check comparability to distances for the full dataset, and, crucially, the same NMDS-procedure was followed. As may be expected by sample size, the results were almost identical to those presented in figure C.3.¹⁰ This indicates that the sample is representative of the complete dataset. The resulting NMDS configurations and goodness-of-fit values may therefore be used as a baseline for further variable selection. The next step was to follow the same procedure as above, but for an ‘informed model’ i.e., the set of features indicated by the initial variable selection. This model involves seven instead of twelve variables, namely syntactic integration, negation in the antecedent and in the consequent, modality in the antecedent and in the consequent, and tense in the antecedent and in the consequent. Directly comparing the ordination results from this set to that of the full set of variables may be criticised however, as a lower number of variables provides less variation to be explained by a model. Therefore, five random sets of seven variables were selected and put through the same procedure. The results are presented below.¹¹

¹⁰The rounded stress values were 0.23 (Gower), 0.35 (Goodall), 0.31 (IOF), 0.33 (Lin), 0.31 (Lin1), 0.27 (Eskin), 0.33 (VE) and 0.33 (VM).

¹¹The random variable sets were the following.

Random model 1: aspect (a), aspect (c), focus particle, modality (c), negation (c), subject (c), tense (a)

Random model 2: aspect (c), modality (a), modality (c), negation (a), subject (a), subject (c), syntactic integration

Random model 3: focus particle, modality (a), negation (a), negation (c), tense (c), subject (a), syntactic integration

Table C.5:
Goodness-of-fit values for NMDS configurations

Model	Gower	Goodall	IOF	Lin	Lin1	Eskin	VE	VM
Full	0.23	0.35	0.31	0.33	0.31	0.27	0.33	0.33
Informed	0.15	0.28	0.24	0.27	0.24	0.17	0.24	0.24
Random 1	0.20	0.31	0.30	0.31	0.27	0.23	0.28	0.28
Random 2	0.21	0.32	0.31	0.32	0.30	0.23	0.30	0.30
Random 3	0.17	0.29	0.27	0.30	0.24	0.18	0.25	0.25
Random 4	0.19	0.31	0.29	0.32	0.25	0.21	0.28	0.28
Random 5	0.17	0.30	0.28	0.30	0.26	0.21	0.26	0.26

Note. Goodness-of-fit values are reported in terms of stress values.

As we can see in this table, there indeed seems to be an effect of number of variables on ordination stress. However, it can also be observed that none of the models involving a random selection of seven variables performs as well as the informed model. We can see, however, that ‘random model 3’ comes close to the informed model, which can be explained by the fact that only two variables of this model do not appear in the informed model (focus particles, and subject of the antecedent). As an intermediate conclusion, it can be seen that removing features indicated as problematic by either a high frequency ratio (focus particles) or theoretical relevance (aspect, person and number) indeed improves the model. Further variables could be added or deleted in a stepwise-fashion until the lowest stress-values have been acquired, but as discussed in the sections above, there is a risk involved in not having an agreed upon measure of quality of a clustering solution. Furthermore, as less variables introduce less variation to be explained, a smaller model is not preferred per se. Although removing another feature from the informed model does slightly improve the fit of the NMDS-configuration, most notably when removing syntactic integration (resulting in stress values between 0.11 and 0.24), subsequent analyses would not take into account this feature, while it has been linked to conditional connections convincingly in the literature, placing it high in the theoretical ranking presented in section 6.3. By removing this variable, any variation concerning it introduces would not be used for clustering, and would not be explained. While this may not be a perfect way to go about feature selection, as was already mentioned based on the literature in section 6.3, feature-selection for unsupervised machine-learning using categorical variables is problematic. As no agreed upon and robust methods have been found to evaluate unsupervised machine-

Random model 4: aspect (a), focus particle, negation (a), negation (c), subject (a), tense (a), syntactic integration

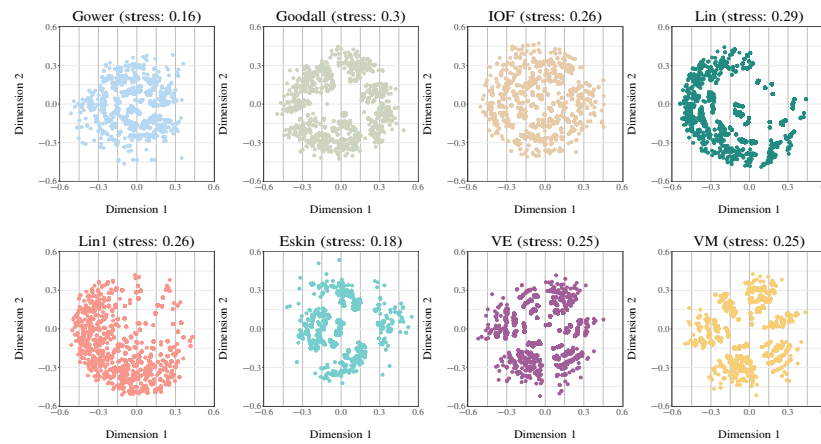
Random model 5: aspect (a), aspect (c), modality (a), negation (c), subject (c), tense (a), tense (c)

learning outcomes based on categorical data, the variable selection from the informed model in table C.5 was selected for the subsequent steps in the analyses.

The results of dimension reduction on this feature set on the complete dataset are presented in the NMDS configurations in Figure C.12 below.

Figure C.12:

NMDS configurations and stress levels for distance matrices (reduced feature set)



Note. All configurations are based on two-dimensional ordination.

As can be seen here, stress levels are lower for all metrics, and lowest for Gower and Eskin, which both indicate ‘usable ordination’, albeit with a risk of misinterpretation (see the guidelines listed in (6) on page 501).

APPENDIX D

Cluster evaluations

D.1 Introduction

In this appendix, the measures for cluster evaluations are discussed in technical detail (section D.2). In sections D.3 and D.4, the evaluations of hierarchical and partitional cluster solutions are discussed. In section D.5, finally, the dendrogram of the hierarchical clustering solution is presented. For the main discussion of clustering results and their evaluations, see chapter 6.

D.2 Measures of cluster evaluation

First of all, the homogeneity within clusters (i.e., within-cluster variance or *purity*) was measured using the *Within-Cluster Entropy* coefficient (WCE). The within-cluster variability in the k -cluster solution is calculated using the formula by Šulc and Řezanková (2019, p. 65) below, in which n_g is the number of observations in cluster g , and n_{gcu} is the number of observations in cluster g having value u for variable c .

$$(1) \ WCE(k) = \sum_{g=1}^k \frac{n_g}{n \cdot m} \sum_{c=1}^m \left(- \sum_{u=1}^{K_c} \left(\frac{n_{gcu}}{n_g} \ln \frac{n_{gcu}}{n_g} \right) \right)$$

A low WCE-value reflects low within-cluster variability, i.e., high within-cluster homogeneity. As this value is influenced by the number of clusters, a higher number of clusters will result in a lower WCE-value (cf. Ladds et al., 2018, p. 10), which is one of the reasons hinted at above to use a number of indices, rather than just one measure of clustering quality.

Second, *separation* of clusters, i.e., between-cluster variance (see Sevcik, Rezankova & Husek, 2011), was measured using *Pseudo F Coefficient based on Entropy* (PsFE), as discussed by Šulc (2016, p. 33) and applied by Ladds et al. (2018), presented in the formula below.

$$(2) \text{ PsFE}(k) = \frac{(n-k)[nWCE(1) - nWCE(k)]}{(k-1)nWCE(k)}$$

The PsFE-value depends on the number of observations n , the number of clusters k , variability in the complete dataset $nWCE(1)$ and within-cluster variability $nWCE(k)$, where k is the number of clusters in the solution. The higher the PsFE-value, the better the grouping distinguishes between groups.

Third, *consistency* was measured by means of average silhouette width (the *Silhouette Coefficient*). The silhouette width of an observation, calculated using the formula from Kaufman and Rousseeuw (1990, p. 85) below, in which i is an observation, $a(i)$ is the ‘average dissimilarity of i to all other objects of A’ and $b(i)$ is the closest neighbouring cluster, i.e., the cluster that has the lowest average dissimilarity to cluster A.

$$(3) \text{ s}(i) = \frac{b(i) - a(i)}{\max\{a(i), b(i)\}}$$

Here, the Silhouette Coefficient (or ‘average silhouette width’; see Kaufman & Rousseeuw, 1990, p. 87) was used to assess the consistency of a clustering solution given k clusters. The solution with the highest Silhouette Coefficient is indicated to be the most appropriate solution for the given dataset. As silhouette widths are normalised values between -1 and 1, and as this coefficient is not restricted to particular algorithms, it can be used to assess the clustering solutions in more absolute terms. Kaufman and Rousseeuw (1990, p. 88) provide the following interpretation guidelines, which, as with other such guidelines, should be used with caution and attention to the underlying data. Silhouette Coefficient between 0.71 and 1.00 suggest a ‘strong structure’ has been found, while values between 0.51 and 0.70 suggest a ‘reasonable structure’. Values between 0.26 and 0.50 indicate a ‘weak structure’ and it is advised to try applying additional methods on the dataset. Values lower than 0.26 indicate ‘no substantial structure’. Negative values indicate observations are grouped in the wrong cluster.

Fourth, a measure used during data preparation (see section C.2 in appendix C), namely *deviation from the mode* (DM), was used as a counterweight to silhouette widths, as in testing the algorithms and evaluations, some silhouette coefficients indicated high consistency for solutions with extremely big or small clusters. This was especially the case for solutions with a low number of clusters. As it is, of course, unwanted to select a solution with such a skewed membership distribution, DM-values were used as an index of dispersion over clusters formed. Please note that a high DM-value is not preferable per se, as a cluster solution does not require comparable frequencies per cluster, but a very low DM-value is an indication of extreme size differences between clusters.

Fifth and finally, the stability of clustering solutions was evaluated using a bootstrapping procedure. In this case, 100 samples of the dataset were taken. Each of these samples consisted of randomly selected points from the dataset. Each point could be selected more than once. Clustering was performed on the random samples (see Hennig, 2007; Hennig & Liao, 2013, pp. 325–330). The result was evaluated using the Jaccard similarity index, expressed in (4) below (see Arnaboldi et al., 2015, pp. 87–88), which reflects the similarity between the clustering solution for the random sample under inspection W_1 and the original clustering solution W_2 , by dividing the intersection $\cap$ of both sets (i.e., members of the same cluster in both sets) by their union $\cup$ (i.e., all members of both sets). In other words, the coefficient reflects the proportion of observations from the sample that belong to the cluster that matches the same cluster in the originally found or ‘true’ clusters (cf. Hennig, 2007, p. 261).

$$(4) \quad J(W_1, W_2) = \frac{|W_1 \cap W_2|}{|W_1 \cup W_2|}$$

The Jaccard coefficient is a value between 0 and 1 and the higher the value, the greater the overlap between the current sample and the clustering solution. For each clustering solution, the mean Jaccard similarity over all 100 samples was used as an index for cluster stability.

D.3 Evaluation of hierarchical cluster solutions

Agglomerative clustering starts with k clusters, where k is equal to the number of observations – in this case, 4109 conditionals. It goes without saying that a ‘solution’ of 4109 clusters does not provide any insights. Therefore, at each *run* or *iteration*, the algorithm merges the closest clusters, until the number of clusters is 2 (as a ‘solution’ of one cluster is as uninformative as a $k=n$ ‘solution’). Now, the question is how the algorithm determines which clusters are closest. With the initial clusters, each cluster holds one observation, and the distance between those ‘clusters’ coincides with the calculated distance between the two observations. This becomes problematic, however, for each subsequent step, as clusters now contain more than one observation. The parameter *linkage* determines how the algorithm calculates the distance between two clusters, i.e., how the ‘closeness’ of two clusters is defined (see Kaufman & Rousseeuw, 1990, pp. 45–48). In *single linkage* or the *nearest neighbour rule* the similarity between two clusters is defined as the distance between their two most similar members, and consequently, the two clusters with the smallest distance between their most similar members are merged. This linkage criterion is said to be *local*, because it only considers the areas of clusters that are closest to each other. Next, in *complete linkage* or the *furthest neighbour rule* the similarity of two clusters is defined as the distance between their two most dissimilar members. The complete linkage criterion is non-local, as it is influenced by complete clusters, which lie in between the most dissimilar members of each cluster, instead of only their closest areas. While this can be seen as an advantage, it

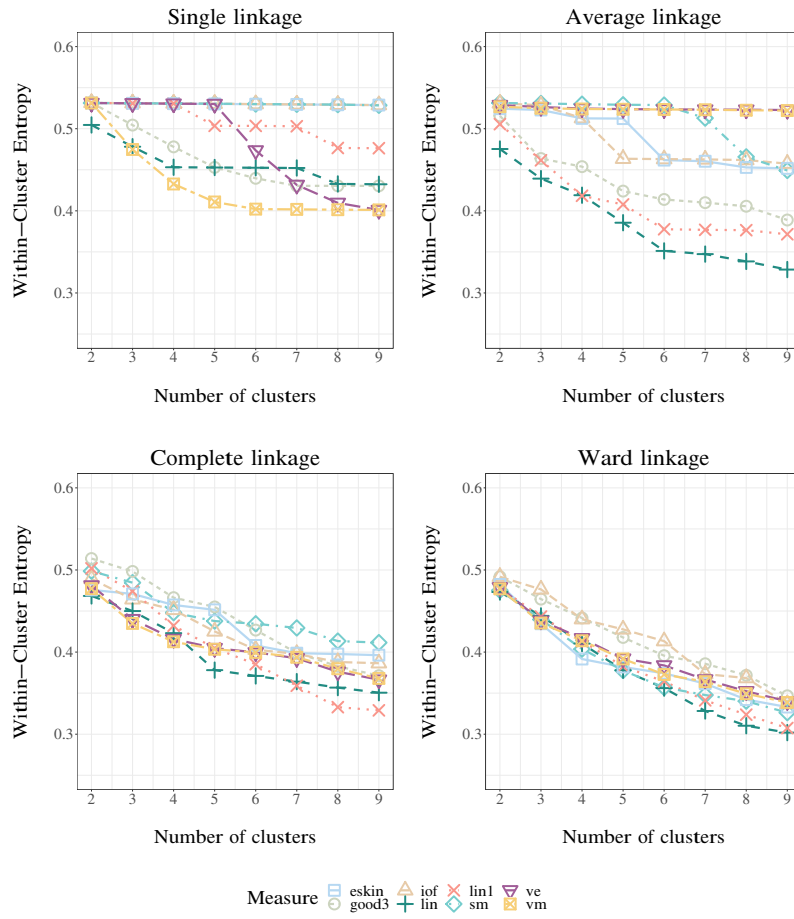
also means that complete linkage is more sensitive to outliers (see Kaufman & Rousseeuw, 1990, p. 227; Cibulková et al., 2019, p. 37). *Average linkage* is, as the name implies, a compromise between single and complete linkage in that it measures the distance between two clusters in terms of the difference between the average of the dissimilarities of all their respective members. Finally, there is Ward’s *Minimum Variance Method* (cf. Ward, 1963; see also Anderberg, 1973, pp. 42–44; Kaufman & Rousseeuw, 1990, pp. 230–234; Legendre & Legendre, 1998, pp. 329–333). Ward linkage calculates the distance from each observation to the centroid (the mean distance) of the cluster it is assigned to.¹ At the start, all clusters contain only one observation, so the centroid and observation coincide, hence the sum of all distances is 0. At each next step, however, the distance between observations centroids increases, and the sum of the squared distances also increases. At each step, Ward linkage forms clusters based on the combination of observations or clusters that increase the squared distance from the centroids the least. As the optimum linkage depends on the specific dataset used, and the optimum can be operationalised by information-theoretic notions, linkage was chosen by comparison of evaluations.

The number of clusters or k depends, as one may expect, mostly on the inherent structure in the dataset, and on theoretical preconceptions, as for some datasets, there may be theoretically informed choices for the number of clusters. It also depends on what was called ‘simplicity’ in section 6.2.5, as a classification with a large number of types may miss important generalisations, whereas a classification with a small number of types may risk overgeneralisation (see also the discussion in section 7.3). For each distance matrix discussed in section 6.3, a clustering solution using each combination of linkage parameter (*single*, *average*, *complete*) and number of clusters k (2 to 9) was generated. For each of these solutions, the five evaluation indices discussed in the previous section were calculated. Each criterion is discussed below.

Figure D.1 below present the ‘Within-Cluster Entropy’ (WCE) of clustering solutions using each of the linkages discussed above for 2 to 9 clusters. As discussed before, a lower WCE-value indicates more homogeneity within the clusters.

¹There are two algorithms implementing Ward’s *Minimum Variance Method*, which may lead to confusion. See Murtagh and Legendre (2014) for a clear explanation and overview. In this study, Ward’s (1963) original criterion is used, which is implemented as ‘ward.D2’ in the (base) R-function *hclust* and as ‘ward’ in the Agnes-function of the R-package *cluster* (Maechler et al., 2019).

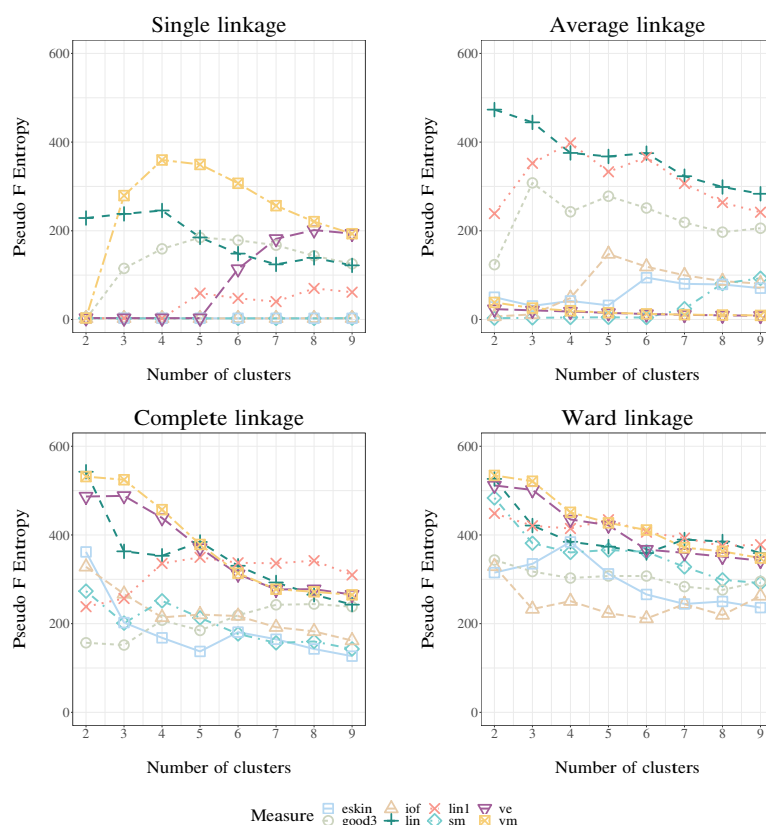
Figure D.1:
Evaluation of optimal linkage and number of clusters by Within-Cluster Entropy (WCE)



What can be seen in Figure D.1, is that the WCE-values for single-linkage solutions are higher on average than for the other linkages. For average linkage, especially the Goodall, Lin, and Lin1 measures perform better, and for complete and Ward linkage, it can be seen that the Lin and Lin1 measure produce the most homogeneous clusters, with WCE-values decreasing with increasing number of clusters, especially between 2 and 6 clusters with complete linkage.

In Figure D.2 below, the ‘Pseudo F Entropy’ (PsFE) of clustering solutions using each of the linkages discussed above for 2 to 9 clusters is presented. As discussed before, a higher PsFE-value indicates more heterogeneity between the clusters (i.e., better separated clusters).

Figure D.2:
Evaluation of optimal linkage and number of clusters by Pseudo F Entropy (PsFE)

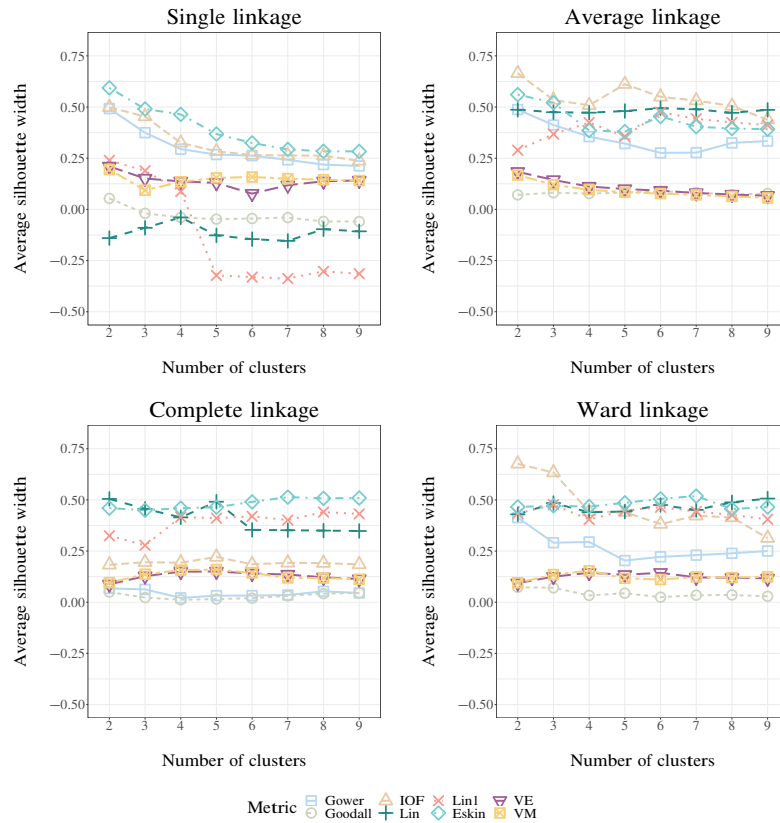


What can be seen in Figure D.2, is that a number of PsFE-values for single and, to a lesser extent, average linkage are extremely low in comparison to complete and Ward linkage. For single linkage, this is comparable to the results on clustering of categorical data reported by Ladds et al. (2018, p. 13). For average linkage, high PsFE-values were found for the Lin measure, especially between two and five clusters, and for the Lin1 measure, which is more stable, especially between two and six clusters. As these values, especially for the low-cluster solutions, strongly deviate from the other measures, dispersion within these solutions must be critically assessed. All the other measures have low separation values, although some measures show clear increases from 4 clusters and up, such as solutions using the Goodall measure and IOF measure. Complete linkage shows a somewhat different picture, with high values for the VE and VM measures, which however decrease rapidly after two-cluster solutions. Again, Lin and Lin1 are relatively high, with a peak for the Lin1 measure at four clusters. Ward linkage also produces high values for the VE and VM measure, which, like with complete linkage decrease rapidly after two-cluster solutions. Given the stability of separation values, this figure suggest a solution of two to four clusters using the Lin1 measure with average, complete or Ward linkage, or the VE or VM measure with complete or Ward linkage.

The consistency of cluster membership is visualised by means of Silhouette Coefficient, i.e., the maximal average silhouette width for the complete dataset, in Figure D.3 below.

Figure D.3:

Evaluation of optimal linkage and number of hierarchical clusters by Silhouette Coefficient (SC)



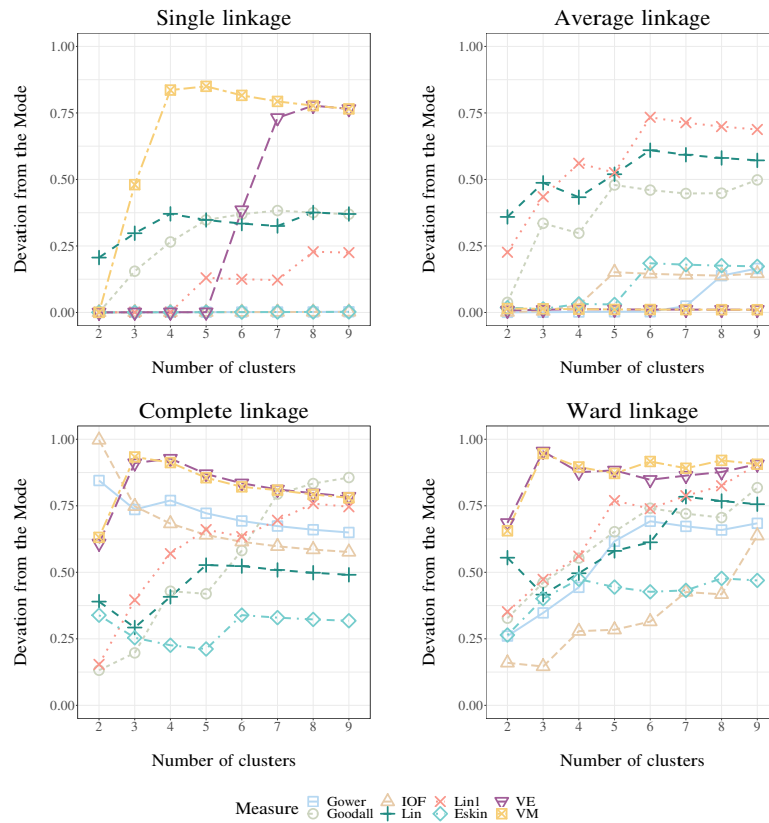
Before looking at the values in this figure, it is important to stress here that no strong conclusions should be drawn yet, as silhouette coefficients can be used especially to estimate the correct number of clusters, but they only paint part of the picture of cluster quality. For the single-linkage solutions, high coefficients were found for the Eskin and IOF measures. Lin and Lin1, however, produce negative silhouette coefficients, indicating that, on average, conditionals seem to be placed in the wrong clusters. For average linkage, IOF seems to perform best especially in 2- and 5-cluster solutions. For complete linkage, values are lower, which can be explained by the fact that complete linkage tends to produce very compact clusters, often resulting in less separation between clusters (Kaufman & Rousseeuw, 1990, pp. 7–48). The Lin, Lin1 and Eskin measures perform around the lower ‘reasonable structure’-bound. For Ward

linkage, high values were obtained for the IOF measure, which, however, decrease rapidly after three-cluster solutions. It can also be seen that the Lin, Lin1 and Eskin measures perform reasonably well, as with complete linkage. None of the coefficients suggests a ‘strong structure’, however.

As discussed before, it is particularly useful to interpret silhouette coefficients in relation to measures of dispersion, because clusters with extreme size differences may still yield high silhouette widths, while they are not very informative. As can be seen in Figure D.4 below, there are indeed solutions, especially produced with single and average linkage and low cluster numbers, that suffer from this issue.

Figure D.4:

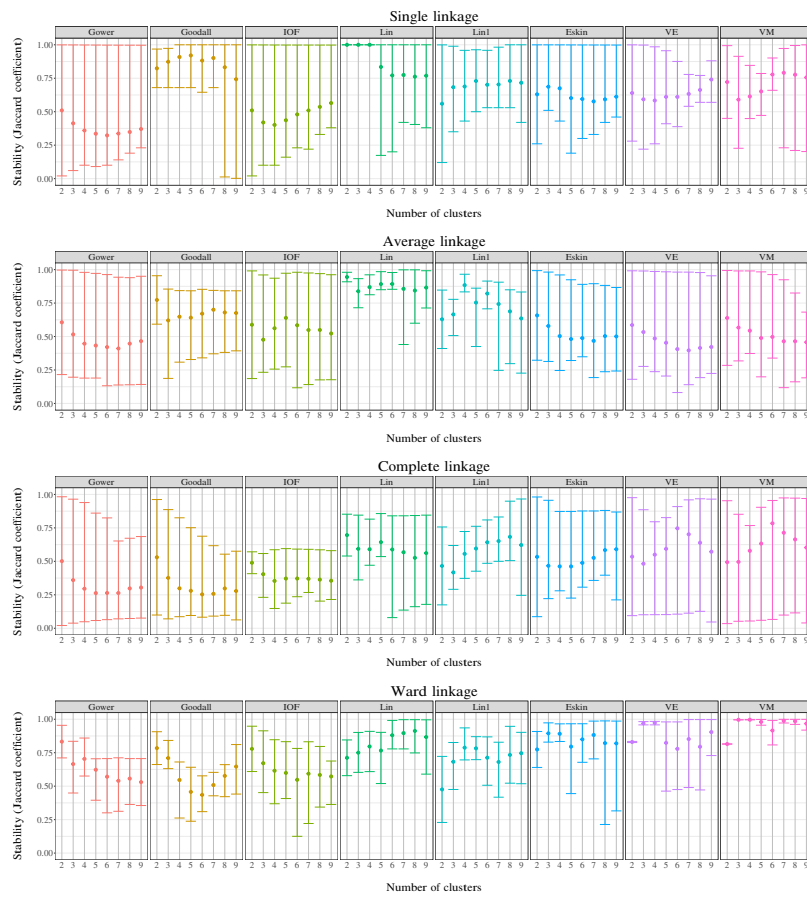
Evaluation of dispersion of hierarchical clustering solutions by Deviation from the Mode (DM)



As dispersion values, implemented as *deviation from the mode* (DM), were only used here to check for very skewed membership distributions, not as an absolute indication of quality, the figure above is useful mostly for identifying solutions with extremely low dispersion values, i.e., it would be undesirable to select a solution simply on the basis of high a high DM-value, because it does not make sense to claim that a clustering in which the memberships are balanced evenly is a good solution per se. In fact, given what we have discussed in chapter 3, it is probable that a prototypical type of conditional is more frequent than non-prototypical types. As a clear example of the importance of balancing silhouette widths and (some measure of) dispersion, take the Eskin 2-cluster single-linkage solution: it has one of the highest average silhouette widths, but its dispersion is extremely low (0.0004867364). Upon inspection of the solution itself, it turned out that this solution consists of two clusters, of which one cluster consists of only one conditional, while the other cluster holds the rest. This is of course also reflected in high within-cluster variation and low between-cluster separation.

Finally, the stability of the solutions was evaluated, because it is important to assess whether a particular solution is reproducible and stable. Figure D.5 below presents the stability values in terms of the average Jaccard coefficients based on a bootstrapping procedure of 100 samples per solution (see Hennig, 2007; Zumel & Mount, 2020, pp. 323–325).

Figure D.5:
Evaluation of stability of hierarchical clustering solutions by Jaccard coefficient



Note. Evaluations are generated by bootstrapping ($n=100$). Dots represent the mean Jaccard coefficient; error bars represent standard deviation.

It can be seen that the stability for most single-linkage solutions are low and/or show more deviation compared to average, complete and Ward's linkage.² Especially the latter shows higher mean Jaccard coefficients with less deviation overall. It can also be seen that the Lin and Lin1 measures score high on stability, in terms of both a high mean Jaccard coefficient and relatively low deviation. All other measures seem to be less stable, especially the VE and VM measure for complete linkage, while, remarkably they score high on stability for Ward linkage. Given their low silhouette coefficients, however, these should be interpreted with caution.

D.4 Evaluation of partitional cluster solutions

In partitional clustering, the first parameter, or rather choice of algorithms, depends on the partitioning approach. First, the *Partitioning Around Medoids* (PAM) described in section 6.4.2 was selected because of its widespread application, also to categorical datasets (see e.g., Ladds et al., 2018; for linguistics-oriented studies using PAM, see Douven, 2017a; Wälchli, 2018). As discussed, this algorithm works in two steps. First, in the so-called 'build phase', in which the algorithm selects k medoids (i.e., most representative points), allocating each observation to the nearest medoid. Second, in the 'swap phase', changes are made to the allocation of observations to medoids and the average dissimilarity per cluster is calculated. This is done until the average dissimilarities no longer decrease. As an observation can only be member of one cluster, this is a form of hard-clustering. Second, Fuzzy Analysis or *Fanny* was used, which is a form of soft-clustering, as it assigns to each object not a definitive cluster choice, but a membership coefficient, indicating how well that particular objects fits within each cluster. In contrast to the use of representative objects by PAM, this approach does not choose representative observations as medoids, but it minimises the dispersion over all clusters for each observation, as memberships of individual objects should be as large for its most appropriate cluster as possible, while being as low as possible for the other clusters formed (for more details, see Kaufman & Rousseeuw, 1990, p. 171). The algorithm is also capable of hard-clustering, however, simply by selecting the cluster with the highest membership coefficient for each object. This is important, as it allows for applying the same evaluation measurements as for the other clustering solutions.

²As can be seen, the 2- to 4-cluster Lin single-linkage solutions, and a number of VE and VM solutions using Ward linkage are maximised and show no deviation. In the latter cases, this is because of very low dispersion, resulting in one large and one small, but very stable cluster. Inspection of the single linkage Lin-clusters however show that this is not the case. Another cause may be a number of very similar clusters merged in an early step, the so-called *chaining effect* (see Kaufman & Rousseeuw, 1990, p. 48). As a number of evaluation measures were used, however, for which single linkage performs worst, this point will not be inspected further.

The second parameter is the number of clusters k , which needs to be set before clustering. To evaluate the optimal number of clusters, solutions with k ranging from 2 to 9 are generated and evaluated. As mentioned before, this is a usual practice in studies developing and applying clustering algorithms.

In Figure D.6 below, the homogeneity within clusters expressed as WCE is presented for both the partitioning around medoids algorithm (PAM) and the fuzzy analysis (FANNY) algorithm.

Figure D.6:

Evaluation of PAM and FANNY solutions by Within-Cluster Entropy coefficient (WCE)

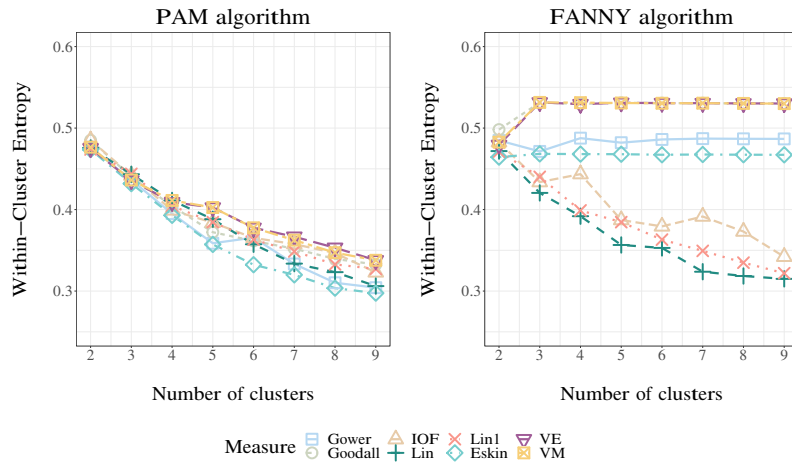
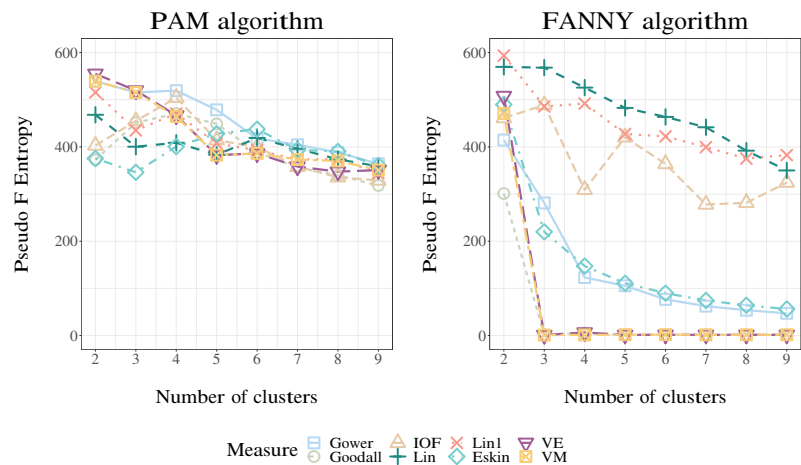


Figure D.1 shows that the within-cluster variability decreases for higher cluster numbers for all measures with the PAM algorithm, comparable to the decrease of within-cluster variability for hierarchical clustering using complete and Ward linkage (see Figure D.1 on page 515). For the FANNY algorithm, however, a relatively high within-cluster variability was found, with only the distances from the Lin, Lin1 and VE measure decreasing with an increasing number of clusters.

In Figure D.7 below, cluster heterogeneity measured in terms of PsFE is presented. As with hierarchical clustering in the previous section, higher PsFE values indicate more better separation between clusters.

Figure D.7:
Evaluation of PAM and FANNY solutions by Pseudo F Entropy (PsFE)

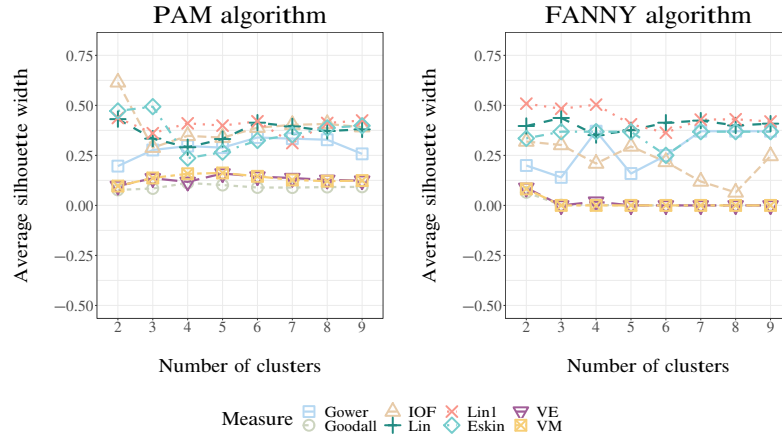


Again, Figure D.7 presents more stable results for all measures using the PAM algorithm, whereas the FANNY algorithm provides relatively high separation values for the Lin and Lin1, and to a lesser extent the IOF measures only. For the other measures, we see a drastic drop in between-cluster variance. Please note that a contributing factor may be the fact that the soft-clustering has to be converted into hard (or ‘crisp’) cluster assignments.

The consistency of cluster membership is visualised by means of silhouette coefficients, as presented in Figure D.8 below.

Figure D.8:

Evaluation of optimal algorithm and number of partitional clusters by Silhouette Coefficient (SC)

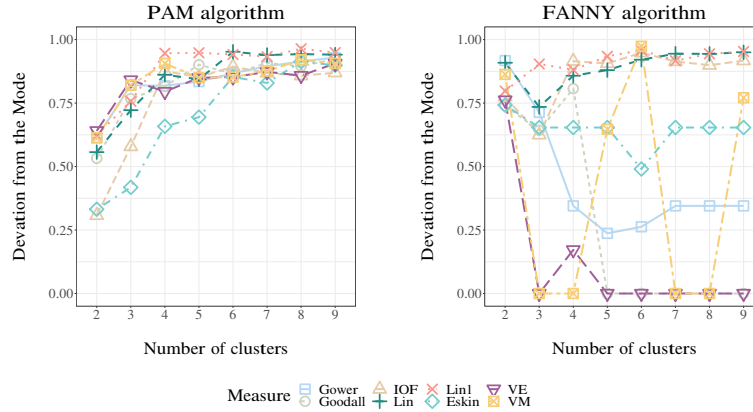


Using the same guidelines as for hierarchical clustering in the previous section, it can be seen that none of the solutions achieve high silhouette widths. In contrast to the single-linkage solutions evaluated in the previous section, none of the solutions had negative silhouette coefficients. In line with the previous measures, very low silhouette coefficients were found for fuzzy clustering for a number of measures, and the same trend can be observed, albeit less dramatically so, for the partitional algorithm. As for the results of hierarchical clustering, a peak in the PAM results for the two-cluster IOF-solution was found, but this result has to be evaluated in terms of dispersion too, as for hierarchical clustering, two-cluster solutions sometimes had extremely low dispersion values. What can also be seen in Figure D.8, is that the Lin and Lin1 measure reach relatively high and stable SC's in fuzzy clustering, peaking at just above 0.50 for the four-cluster Lin1 solution.

As mentioned before, it is important to uncover potential problems with extreme cluster sizes. The deviations from the mode (DM) per clustering solution are presented in Figure D.9 below.

Figure D.9:

Evaluation of dispersion of partitional clustering solutions by Deviation from the Mode (DM)



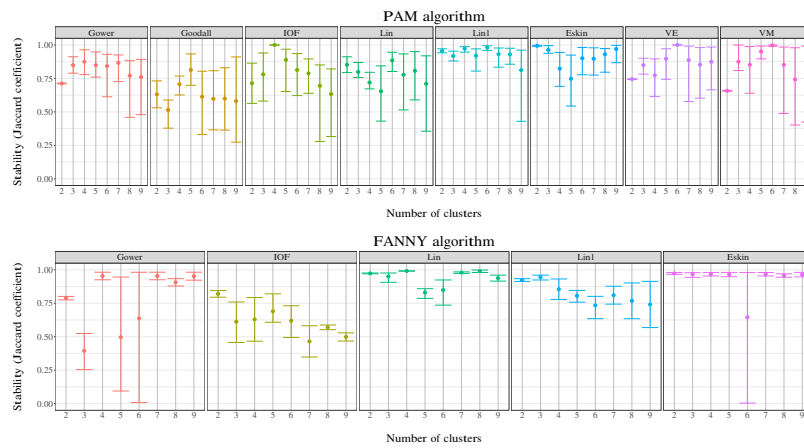
Again, higher dispersion values are not better per se – these figures are used to find extremely low dispersions. The lineplots for the FANNY results may look strange due to the sharp decreases and increases in dispersion values, but upon closer inspection, this can be explained by the fact that a number of solutions effectively clustered all conditionals into one cluster, rendering zero-dispersion and unusable results. The reason for this, in turn, is that these solutions suffered from evenly-spread cluster memberships, i.e., each observation was assigned the same probability for each of the clusters. Inspection of, for instance, the fuzzy five-cluster Goodall solution indeed revealed that each observation had membership coefficients for each cluster very close to 0.2, which simply is $\frac{1}{k=5}$.³ Forcing a crisp-clustering, then, forces the algorithm to choose the highest probability, while in fact all probabilities are the same. The algorithm then assigns all conditionals to the same cluster. This was the case for a number of solutions based on the Goodall, VE and VM measures. Therefore, these measures were not included in the bootstrapping procedure of which I will present the results below. Discarding the Goodall, VE and VM measures, lower values were found for the IOF and Eskin measure for solutions of four or less clusters resulting from the PAM algorithm.

Finally, the stability measures for the solutions were generated and inspected. In Figure D.10 below, the stability values in terms of the average Jaccard coefficients are presented, which are the result from the same procedure as re-

³As an illustration, the mean of the cluster coefficients for cluster 1 in this solution was 0.2 with a standard deviation of 0.00000002181074.

ported in the previous section. Please note that, given the unusable clusters resulting from a number of Goodall, VE and VM solutions, these measures were removed from the stability plot for the FANNY algorithm.

Figure D.10:
Evaluation of stability of partitional clustering solutions using Jaccard coefficient (SC)



Note. Evaluations are generated by bootstrapping ($n=100$). Dots represent the mean Jaccard coefficient; error bars represent standard deviation.

In Figure D.10, high stabilities with low variance for Lin and especially Lin1 can be seen, although stability decreases for those measures with an increase of clusters. High stability values were also found for the two-cluster Eskin solution, and the six-cluster VE and VM solutions.

As fuzzy clustering is a soft-clustering algorithm, it produces membership coefficients (MC). These are presented in Table D.1 below, which allows inspection of the coefficients to see how the probabilities of those cluster memberships are distributed.

Table D.1:*Membership coefficients (MC) of Lin1 FANNY solutions (2-4 clusters)*

#	Cluster 1			Cluster 2			Cluster 3			Cluster 4		
	MC	<i>sd</i>	<i>max</i>	MC	<i>sd</i>	<i>max</i>	MC	<i>sd</i>	<i>max</i>	MC	<i>sd</i>	<i>max</i>
2 cl.	0.43	0.29	0.98	0.57	0.29	0.99						
3 cl.	0.30	0.26	0.94	0.38	0.29	0.92	0.32	0.27	0.92			
4 cl.	0.24	0.26	0.93	0.17	0.21	1.00	0.32	0.30	0.92	0.27	0.27	0.92

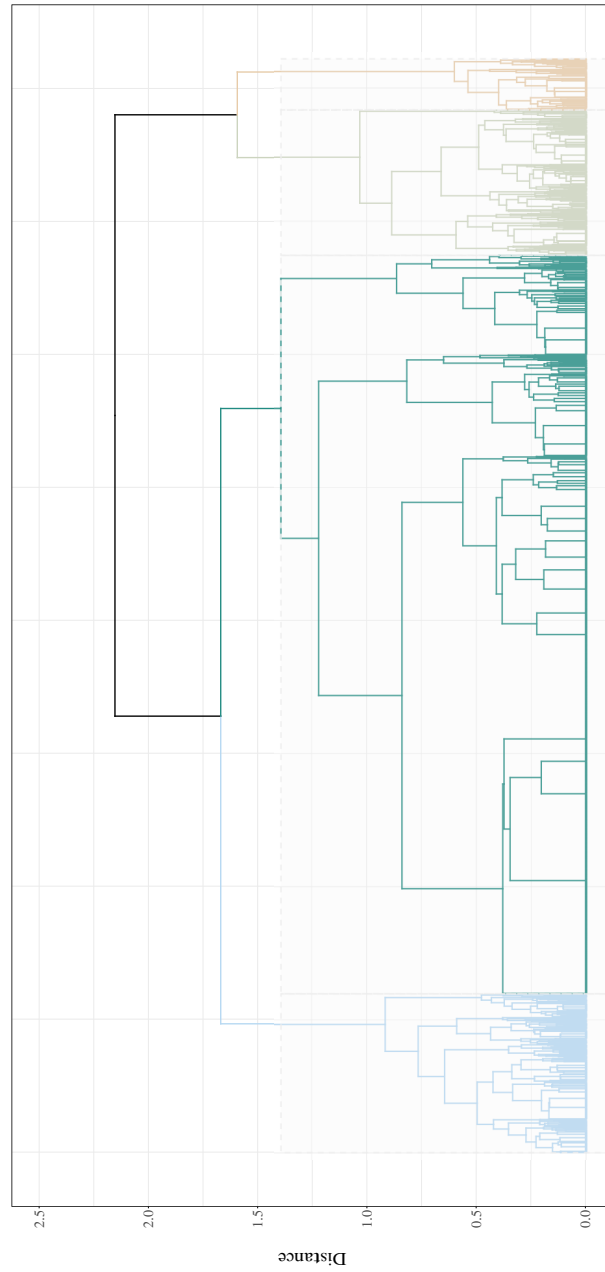
These numbers reflect that most conditionals have been assigned to clusters with probabilities well outside the problematic figures of evenly-spread membership assignments that were found for the fuzzy clustering based on the Goodall, VE and VM measures.

D.5 Dendrogram of hierarchical clustering

In addition to the cluster visualisation presented in Figure 6.5 in section 6.5, Figure D.11 presents the results of the selected hierarchical clustering as a dendrogram. The four clusters are indicated by borders. Please note that, due to the large dataset, only the top of the dendrogram, at which the main clusters discussed are formed, is displayed.

The horizontal axis at the bottom of the dendrogram accommodates all conditionals. The width of each cluster therefore approximates its size. The height or distance at which two objects or clusters join indicates their similarity, i.e., the smaller the vertical distance, the more similar two objects or clusters are. In Figure D.11, it can be observed that the sub-clusters in the left-most cluster are joined at a lower point in the dendrogram, meaning that they are more similar than, for instance, the sub-clusters of the second cluster from the left, as the former sub-clusters join at a height below 1, whereas the latter join at a height well above 1.

Figure D.11:
Dendrogram of hierarchical clustering (Lin, average, 4 clusters)



Note. From left to right, clusters 1, 3, 2, and 4 are presented. The colours used correspond to the colours used in section 6.5.

APPENDIX E

Annotation guidelines and experimental materials (classifications)

E.1 Introduction

In this appendix, the annotation guidelines for applying classifications of conditionals to corpus data are presented (see sections E.2 to E.4). Furthermore, in section E.5, the results of the calculation of rater reliability on corpus items are presented. See chapter 3 for discussion of these classifications, and section 4.2 for discussion on applying classifications to corpus data. Note furthermore that the annotation guidelines below are presented in English, whereas they were presented in Dutch for the experiment reported on in section 4.2.

E.2 Quirk et al.’s (1985) classification

E.2.1 Introduction

Quirk et al. (1985) present a classification of conditionals based on the type of connection between the antecedent and consequent. Before annotating, please read the section ‘Conditional clauses’ in Quirk et al. (1985, pp. 1089–1099) carefully.

The three main types of conditionals in this classification are direct conditionals, which are further divided into open and hypothetical conditionals, indirect conditionals, which are further divided into politeness, uncertainty, metalinguistic, and speech-act conditionals, and rhetorical conditionals. All types and subtypes are exemplified in (1) to (7) respectively.

- (1) **Direct open conditional**
 If you put the baby down, she'll scream. (Quirk et al., 1985, p. 1088)
Als je de baby neerzet, gaat ze schreeuwen.
- (2) **Direct hypothetical conditional**
 If you had listened to me, you wouldn't have made so many mistakes.
 (Quirk et al., 1985, p. 1091)
Als je naar me geluisterd zou hebben, zou je niet zo veel fouten hebben gemaakt.
- (3) **Indirect politeness conditional**
 If may be quite frank with you, I don't approve of any concessions to ignorance. (Quirk et al., 1985, p. 1095)
Als ik heel eerlijk mag zijn, keur ik geen enkele vorm van onwetendheid goed.
- (4) **Indirect uncertainty conditional**
 If I understand you correctly, the theory is heavily outdated.
Als ik je goed begrijp, is de theorie zwaar verouderd.
- (5) **Indirect metalinguistic conditional**
 She thinks she is more 'zen' than we are, if that's the right way of phrasing it.
Ze denkt dat ze meer 'zen' is dan wij zijn, als dat de juiste verwoording is.
- (6) **Indirect speech-act conditional**
 If you're interested, there's a flyer in my bag.
Als je interesse hebt, er zit een folder in mijn tas.
- (7) **Rhetorical conditional**
 If they're Irish, I'm the Pope. (Quirk et al., 1985, p. 1091)
Als zij Iers zijn, ben ik de Paus.

E.2.2 Instructions

Determine the most suiting type. Please note that grammatical features of types can be of help in determining the type, but they will most likely not exhaustively determine the type. As the type reflects a connection between antecedent and consequence, determining its type is at least partly interpretative, i.e. world

knowledge is needed. Annotate the according label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the letters after the semicolon. They will be converted to their full counterparts after you are done annotating.

Direct-open (dio; 1)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent. The speaker is neutral about the likelihood of the situations.

Examples

- (a) Als je de baby neerzet, gaat ze schreeuwen.
If you put the baby down, she'll scream.
- (b) Als Colin in Londen is, dan verblijft hij in het Hilton.
If Colin is in London, he {stays/will stay} at the Hilton.

Tests

- The conditional can be embedded into a matrix clause, as in 'I think that if you put the baby down, she'll scream.'
- The conditional can be converted into a direct-hypothetical conditional by backshifting the tense of the finite verb, as in 'If you would put the put the baby down, she'd scream.'
- The integrative and resumptive word-order patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in *Als Colin in Londen is, hij verblijft in het Hilton*. 'If Colin is in London, he {stays/will stay} at the Hilton.'

Direct-hypothetical (dih; 2)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent. The speaker expresses disbelief that the condition will be, is or was fulfilled and conveys the unlikelihood of the consequent being true.

Examples

- (a) Als je naar me geluisterd zou hebben, zou je niet zo veel fouten hebben gemaakt.
If you would have listened to me, you wouldn't have made so many mistakes.
- (b) Als ze harder zou praten, zou ze beter te verstaan zijn.
If she would speak louder, she would be easier to hear.

Tests

- The conditional can be embedded into a matrix clause, as in ‘I think that if you had listened to me, you wouldn’t have made so many mistakes.’
- The conditional can be converted into a direct-open conditional by removing the modal auxiliaries and adverbs and changing the tense of the finite verb into present tense, as in ‘If you listen to me, you will not make so many mistakes.’
- The integrative and resumptive word-order patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in *Als je naar me geluisterd zou hebben, je zou niet zo veel fouten hebben gemaakt*. ‘If you had listened to me, you wouldn’t have made so many mistakes.’

Indirect-politeness (inp; 3)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent expresses courtesy to soften the speech act in the consequent.

Examples

- (a) Als ik heel eerlijk mag zijn, ben ik het niet met je eens.
If I may be honest, I do not agree with you.
- (b) Als je het niet erg vindt dat ik het zeg, je trui is te kort.
If you do not mind me saying, your sweater is too short.

Tests

- The conditional cannot be embedded into a matrix clause, as in ‘I think that if I may be honest, I do not agree with you.’
- Verb tense cannot be used to indicate epistemic uncertainty, as in *Als ik heel eerlijk zou mogen zijn, zou ik dat niet met je eens zijn*. ‘If I would be permitted to be honest, I would not agree with you.’
- The integrative, resumptive and non-integrative word-order patterns are possible.

Indirect-uncertainty (inu; 4)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent expresses the uncertainty of the speaker. Mind that this may also be a politeness strategy.

Examples

- (a) Als ik het goed heb begrepen, is de theorie verouderd.
If I have understood correctly, the theory is outdated.

Tests

- Verb tense cannot be used to indicate epistemic uncertainty, as in *Als ik het goed begrepen zou hebben, zou de theorie verouderd zijn*. ‘If I would have understood correctly, the theory would be outdated.’
- The conditional cannot be embedded into a matrix clause, as in ‘I think that if I understood correctly, the theory is outdated.’
- The integrative and resumptive patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in *Als ik het goed heb begrepen, de theorie is verouderd*. ‘If I have understood correctly, the theory is outdated.’

Indirect-metalinguistic (inm; 5)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent is used to comment on the linguistic form of (a part of) the consequent.

Examples

- (a) Zijn stijl is bloemig, als dat het juiste woord is.
His style is florid, if that's the right word

Tests

- Verb tense cannot be used to indicate epistemic uncertainty, as in ‘His style would be florid, if that would be the right word.’
- The conditional cannot be embedded into a matrix clause, as in ‘I think that his style is florid, if that's the right word.’
- Only the sentence-medial and sentence-final clause order can be used. Sentence-initial order leads less acceptable result, as in *Als dat het juiste woord is, zijn stijl is bloemig*. ‘If that's the right word, his style is florid.’

Indirect-speech act (ins; 6)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent presents the condition under which the speaker utters the consequent.

Examples

- (a) Als je mijn kant op gaat, ik kan wel een lift gebruiken.
If you're going my way, I need a lift back.
- (b) Als je trek hebt, er staan koekjes op tafel.
If you're hungry, there are cookies on the table.

Tests

- Verb tense cannot be used to indicate epistemic uncertainty, as in ‘If you would go/be going my way, I would need a lift back.’

- The conditional cannot be embedded into a matrix clause, as in ‘I think that if you’re going my way, I need a lift back.’
- The resumptive syntactic pattern is not possible, as in *Als je trek hebt, dan staan er koekjes op tafel*. ‘If you’re hungry, then there are cookies on the table.’

Rhetorical conditional (rhe; 7)

The rhetorical conditional has the form of an open conditional, but presents an absurd situation in either the antecedent or the consequent. This absurdity licenses the falsehood of the other clause.

Examples

- (a) *Als zij Iers zijn, ben ik de Paus.*
If they’re Irish, I’m the Pope.
- (b) *Hij is negentig als hij al een dag oud is.*
He’s ninety if he’s a day.

Notice that the subtype in which the antecedent is absurd (‘He is a day’), as in (b), does not seem to be used in Dutch as opposed to English.

Tests

- Verb tense cannot be used to indicate epistemic uncertainty without losing the rhetorical function, as in ‘If they were Irish, I would be the pope.’
- The conditional cannot be embedded into a matrix clause without losing the rhetorical function, as in ‘I think that if they are Irish, I am the pope.’
- The integrative and resumptive word-order patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in *Als zij Iers zijn, ik ben de Paus*. ‘If they’re Irish, I’m the Pope.’
- Only the sentence-initial clause order is possible (e.g., ? *Ik ben de paus(,) als zij Iers zijn*. ‘I am the pope(,) if they’re Irish.’)

E.2.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Incomplete utterance (NA)

If the utterance is incomplete, use this label. For instance, the antecedent or consequent does not have a finite verb or, in case of an imperative, does not have an overt subject.

Examples

- (a) Als niet, dan toch.
If not, then still.

Evaluative conditionals (evo; 8, evh; 9)

Especially in Dutch conditionals, there seems to be a use in which the consequent present an evaluative remark on the situation presented in the antecedent. Use the labels ‘evo’ (8) for open evaluative conditionals (the speaker is neutral about the likelihood of the situations) and ‘evh’ (9) for hypothetical evaluative conditionals (the speaker expresses disbelief about the truth of the condition).

Examples

- (a) Als dat mogelijk is, is dat geweldig.
If that is possible, that’s great.
- (b) Als dat zou kunnen, zou ik heel gelukkig zijn.
If that would be possible, I would be very happy.

E.3 Athanasiadou and Dirven’s (1996) classification

E.3.1 Introduction

Athanasiadou and Dirven (1996) present a classification of conditionals based on the type of connection between the antecedent and consequent. Before annotating, please read Athanasiadou and Dirven’s ‘Typology of *if*-Clauses’ (1996), ‘Conditionality, Hypotheticality, Counterfactuality’ (1997a), and ‘Pragmatic Conditionals’ (2000) carefully. The three main types of conditionals in this classification are neutral and non-neutral hypothetical conditionals, course-of-event conditionals and pragmatic conditionals. Further divisions into subtypes are not considered here. All types are exemplified below.

(8) Unmarked hypothetical conditional

- (a) If the weather is fine, we’ll go for a swim.
- (b) If there is no water in your radiator, your engine will overheat immediately.
- (c) If I go bald I’ll shoot myself

(9) Marked hypothetical conditional

- (a) If the weather would be fine, we would go for a swim.
- (b) If there were a beast, I’d have seen it.

(10) Course-of-event conditional

- (a) If there is a drought like this year, the eggs remain dormant.
- (b) If you heat water to 100 degrees, it boils.
- (c) He looked at his watch; if the soldier was coming, it was nearly time.

(11) **Pragmatic conditional**

- (a) If there's one human species that ought to be put out to pasture, it's Presidents and Prime Ministers.
- (b) If the super-organism created by a colony of termites can be compared to an antelope, then the disciplined aggressive columns of the army ants must be reckoned to be the insect equivalent of a beast of prey.
- (c) What about the parents demonstrating, if there are no friends?
- (d) I've come to offer my congratulations, if that's the right word.

E.3.2 Instructions

Determine the most suiting type. Please note that grammatical features of types can be of help in determining the type, but they will most likely not exhaustively determine the type. As the type reflects the coherence relation between antecedent and consequence, determining its type is at least partly interpretative, i.e. world knowledge is needed. Annotate the according label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in your annotation. If you prefer shorter labels, you can use the letters after the semicolon. They will be converted to their full counterparts after you are done annotating.

Unmarked hypothetical conditional (hyn; 1)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent and the situations are hypothetical and not marked for (un)certainity, i.e., it is *neutral*. The speaker does not commit herself to the actual occurrence of the antecedent nor of the consequent. The hypothetical character relates to the occurrence of the antecedent and consequent, not to the relation between the two. The antecedent may present a cause of the consequent, a condition or a supposition.

Examples

- (a) Als het goed weer is, gaan we zwemmen.
If the weather is fine, we'll go for a swim.
- (b) Als er geen water in je radiator zit, oververhit je motor direct.
If there is no water in your radiator, your engine will overheat immediately.

Tests

- The conditional can be paraphrased with ‘on condition that’ or ‘supposing that’, as in ‘We’re going for a swim, on condition that the weather is fine’. If not, it can be paraphrased with ‘because’: ‘He will shoot himself because he goes bald’.
- Negating the antecedent allows for the negated and non-negated consequent, as in *Als het geen mooi weer is, gaan we (toch) zwemmen*. ‘If the weather is not nice, we will go for a swim (anyway).’ and *Als het geen mooi weer is, gaan we niet zwemmen*. ‘If the weather is not nice, we will not go for a swim.’

Marked hypothetical conditional (hym; 2)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent and the situations are hypothetical and, in contrast to the neutral version above, marked by verb tense and/or adverbial modification for a degree of (un)certainity. The speaker commits or distances herself from the actual occurrence of the antecedent and consequent. The hypothetical character relates to the occurrence of the antecedent and consequent, not to the relation between the two. The antecedent may present a cause of the consequent, a condition or a supposition.

Examples

- (a) *Als het goed weer zou zijn geweest, gingen we zwemmen.*
If the weather would have been fine, we would go for a swim.
- (b) *Als er geen water in je radiator zou zitten, oververhitte je motor direct.*
If there would be no water in your radiator, your engine would overheat immediately.

Tests

- The conditional can be paraphrased with ‘on condition that’ or ‘supposing that’, as in ‘We would go for a swim, on condition that the weather was fine’. If not, it can be paraphrased with ‘because’: ‘He would shoot himself because he went bald’.
- In most cases, the finite verb is backshifted to indicate uncertainty, as in the examples above.
- Negating the antecedent allows for the negated and non-negated consequent, as in *Als het geen mooi weer is, gaan we (toch) zwemmen*. ‘If the weather is not nice, we will go for a swim (anyway).’ and *Als het geen mooi weer is, gaan we niet zwemmen*. ‘If the weather is not nice, we will not go for a swim.’

Course-of-event conditional (cec; 3)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent. The clauses refer to two different events which are seen as being in a relation of mutual dependency, i.e. a ‘whenever’ relationship. There is a suggestion of a real occurrence of the two events such that whenever the first occurs, the second occurs, too, but the second is not seen as being triggered by the first. There is hypotheticality, but re-occurrence. There is no marking of uncertainty. The relation can be either co-occurrence or recurring inference.

Examples

- (a) Als er brand is, kun je de brandweer bellen.
If there is a fire, you can call the fire department.
- (b) Als hij er weer aankomt, is het etenstijd.
If he's coming again, it's time for dinner.

Tests

- The focus particle *altijd* ‘always’ or *elke keer* ‘whenever’ can be added, as in *Elke keer als hij aankomt, is het etenstijd*. ‘Every time {if/when} he comes, it’s time for dinner.’
- Negating the antecedent implicates the negation of the consequent, as in *Als het niet waait, wappert onze vlag niet*. ‘If there is no wind, our flag doesn’t wave.’ and not *Als het niet waait, wappert onze vlag (toch)*. ‘If there is no wind, our flag waves (anyway).’

Pragmatic conditional (pra; 4)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent expresses a felicity condition for the speech act carried out in the consequent – either the antecedent expresses identification of, provides context for or comments on the consequent. Verb tense can, but is mostly not used to express unlikelihood of the situation in the antecedent. This type does not make a prediction involving an alternative scenario, i.e., nothing is said or implicated with respect to the non-occurrence of the situation in the antecedent. The consequent may be non-declarative, i.e. the consequent may be interrogative, imperative or exclamative. There can also be an inferential relation between antecedent and consequent. Mind that this may also be a politeness strategy.

Examples

- (a) Als er een goed is in fietsen, dan is het Dumoulin.
If there is one who is good at cycling, it's Dumoulin.
- (b) Ik wil je graag feliciteren, als dat het juiste woord is.
I'd like to congratulate you, if that is the right word.

- (c) Als iemand me nodig heeft, ik ben boven.
If anyone needs me, I'm upstairs.
- (d) Als hij trek heeft, wat mag hij dan eten?
If he is hungry, what can he eat?
- (e) Als ik een man gras zag eten, zou ik zeggen dat hij trek had.
If I would see a man eating grass, I'd say he's hungry.
- (f) Als ze gescheiden is, moet ze getrouwd zijn geweest.
If she's divorced, then she must have been married before.

Tests

- Verb tense cannot easily be used to indicate epistemic uncertainty, as in *Als er een goed zou zijn in fietsen, dan zou het Dumoulin zijn*. 'If there would be one who is good at cycling, it would be Dumoulin.'
- The conditional cannot be embedded into a matrix clause, as in 'I think that if you need me, I'm upstairs.'
- The negation of the antecedent does not trigger an alternative scenario, i.e. 'If you don't need me, I'm not upstairs.'
- The sentence-medial or sentence-final pattern cannot (easily) be used in this type, as in 'My name, if you need help, is Anne'.

E.3.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Incomplete utterance (NA)

If the utterance is incomplete, use this label. For instance, the antecedent or consequent does not have a finite verb or, in case of an imperative, does not have an overt subject.

Examples

- (a) Als niet, dan toch.
If not, then still.

E.4 Dancygier and Sweetser's (2005) classification

E.4.1 Introduction

Dancygier and Sweetser (2005) present a classification of the type of connection between the antecedent and consequent in conditionals. Before annotating, please read (at least) paragraphs 2.1, 2.2, 5.1 to 5.3 and 5.6 to 5.7 from Dancygier and Sweetser's *Mental Spaces in Grammar: Conditional Constructions*. The two main types of conditionals in this classification are predictive

conditionals, functioning in the content domain, and non-predictive conditionals. The latter type is further divided into inferential conditionals, speech-act conditionals and metalinguistic conditionals, functioning in the epistemic, pragmatic and metatextual domain respectively. All types and subtypes are exemplified below.

(12) **Specific predictive conditional**

- (a) If you mow the lawn, I'll give you ten dollars.
- (b) If Hiro reaches out and takes the hypercard, then the data it represents will be transferred from this guy's system into Hiro's computer.

(13) **Generic predictive conditional**

- (a) If I leave the house, he gets angry.
- (b) If you heat water to 100 degrees, it boils.

(14) **(Non-predictive) inferential conditional conditional**

- (a) If he typed her thesis, he loves her.
- (b) If the lights are on, they must be home.

(15) **(Non-predictive) speech-act conditional**

- (a) If you need any help, my name is Ann.
- (b) If you are hungry, there are biscuits on the sideboard.

(16) **(Non-predictive) metalinguistic conditional**

- (a) My ex-husband, if that's the right word, hates onion soup.
- (b) That's what we're in business to do, get this cocksucker nailed, if you'll excuse my Greek.

(17) **(Non-predictive) meta-metaphoric conditional**

- (a) If the beautiful Golden Gate is the thoroughbred of bridges, the Bay Bridge is the workhorse.

E.4.2 Instructions

Determine the most suiting type. Please note that grammatical features of types can be of help in determining the type, but they will most likely not exhaustively determine the type. As the type reflects the coherence relation between antecedent and consequence, determining its type is at least partly interpretative, i.e. world knowledge is needed. Annotate the according label. Below the coding instructions are presented, together with examples. The labels are presented between parentheses. The parentheses are not to be included in

your annotation. If you prefer shorter labels, you can use the numbers after the semicolon. They will be converted to their full counterparts after you are done annotating.

Specific-predictive (content) (spr; 1)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent. There is a reference to a specific situation, not to the general occurrence of a situation. The speaker can be neutral about the likelihood of the situations, or use verb tense and modal adverbs to express less likelihood of occurrence of the situation. In both cases, a prediction is made and the alternative scenario is triggered, i.e., if the situation in the antecedent does not occur, the situation in the consequent will most likely also not occur.

Examples

- (a) Als je het gras maait, krijg je tien dollar.
If you mow the lawn, I'll give you ten dollars.
- (b) Als Hiro zijn arm uitstrekt en de hypercard pakt, zullen de gegevens worden overgezet van het systeem van deze vent naar Hiro's systeem.
If Hiro reaches out and takes the hypercard, then the data it represents will be transferred from this guy's system into Hiro's computer.

Tests

- The conditional can be embedded into a matrix clause, as in 'I think that if he takes the card, the data will be transferred.'
- The finite verb is backshifted to indicate uncertainty, i.e., *Als Hiro de kaart zal pakken* 'If Hiro will take the card' becomes *Als Hiro de kaart pakt* 'If Hiro takes the card' and *Als ik won* 'If I won' becomes *Als ik had gewonnen* 'If I had won'.
- An prediction is made and an alternative scenario is triggered, i.e. 'If you mow the lawn' triggers both the situation of mowing the lawn and of not mowing the lawn and its consequences.
- The integrative and resumptive patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in *Als je het gras maait, ik geef je tien dollar*. 'If you mow the lawn, I will give you ten Dollar.'

Generic-predictive (content) conditional (gpr; 2)

The (truth of) the situation in the consequent is dependent on the (truth of) the situation in the antecedent. There is a reference to a generic, re-occurring, sometimes (natural) law-like pattern, indicated by the simple present (or 'generic present') in both clauses. In a minority of cases, also the simple past can be used, as exemplified below. A prediction is made

and the alternative scenario is triggered, i.e., if the situation in the antecedent does not occur, the situation in the consequent will most likely also not occur.

Examples

- (a) Hij wordt (altijd) boos als ik het huis verlaat.
He gets angry if I leave the house
- (b) Als je water opwarmt tot 100 graden, kookt het.
If you heat water to 100 degrees, it boils.
- (c) Als Mrs. Dugan de telefoon niet kon opnemen (wat vaak gebeurde), sprak Muriel met Claire.
If Mrs. Dugan couldn't come to the phone (which was often the case), Muriel talked to Claire instead.

Tests

- The conditional can be embedded into a matrix clause, as in 'I think that if you heat water to 100 degrees, it will boil.'
- When a temporal adverbial and/or a modal auxiliary are added, the conditional loses its generic meaning, as in 'He gets angry/will get angry if I leave the house today'.
- It is possible to add the focus particle *altijd* 'always' before the conditional conjunction without changing the meaning, as in *Altijd als ik het huis verlaat, wordt hij boos*. 'Always if.'
- The integrative and resumptive patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in ? *Als ik het huis verlaat, hij wordt boos*. 'If I leave the house, he gets angry.'

Inferential conditional (inf; 3)

The consequent presents a conclusion based on the argument presented in the antecedent. With respect to the predictive conditional, cause and effect appear reversed in this type. For example, the 'epistemic version' of 'If you heat water to 100 degrees, it boils' is 'If water boils, it is heated to 100 degrees'. The situations represented can be both specific and generic. The speaker can be neutral about the likelihood of the situations, or use verb tense and modal adverbs to express less likelihood of occurrence of the situation. In both cases, a prediction is made and the alternative scenario is triggered, i.e., if the situation in the antecedent does not occur, the situation in the consequent will most likely also not occur.

Examples

- (a) Als het universum oneindig is, moet er elders leven zijn.
If the universe is infinite, there must be life somewhere else.
- (b) Als het licht aan is, zijn ze thuis.
If the lights are on, they are home.

Tests

- The conditional can be embedded into a matrix clause, as in ‘I think that if the lights are on, they are home.’
- Verb tense can be used to indicate epistemic uncertainty, as in ‘If the lights would be on, they would be at home’.
- The integrative and resumptive word-order patterns are possible, but applying the non-integrative pattern leads to less acceptable results, as in ? *Als het licht aan is, ze zijn thuis*. ‘If the light is on, they are home.’
- The epistemic modal verb *moeten* ‘must’ can be added to the consequent, as in *Als het licht aan is, moeten ze thuis zijn*. ‘If the light is on, they must be home.’

Speech-act conditional (spa; 4)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent expresses a felicity condition for the speech act carried out in the consequent. The situations represented can be both specific and generic. Verb tense can, but is most likely not used to express unlikelihood of the situation in the antecedent. This type does not make a prediction involving an alternative scenario, i.e., nothing is said or implicated with respect to the non-occurrence of the situation in the antecedent. The consequent may be non-declarative, i.e. the consequent may be interrogative, imperative or exclamative. Mind that this may also be a politeness strategy.

Examples

- (a) Als ik het mag vragen, wat vind je van mijn trui?
If I may ask, what do you think of my sweater?
- (b) Als hulp nodig hebt, mijn naam is Anne.
If you need help, my name is Ann.

Tests

- Verb tense cannot easily be used to indicate epistemic uncertainty, as in *Als ik het zou mogen vragen, wat zou je van mijn trui vinden?* ‘If I would be permitted to ask, what would you say of my sweater?’
- The conditional cannot be embedded into a matrix clause, as in ‘I think that if you need help, my name is Ann.’
- The negation of the antecedent does not trigger an alternative scenario, i.e. ‘If you don’t need help, my name is not Ann.’
- The sentence-medial or sentence-final pattern cannot (easily) be used in this type, as in ‘My name is Anne, if you need help’.

- The non-intergative word-order pattern is preferred for this type. Integrative and resumptive word-order patterns lead to less acceptable results, as in ? *Als je hulp nodig hebt, is mijn naam Anne.* 'If you need help, my name is Ann.' and ? *Als je hulp nodig hebt, dan is mijn naam Anne.* 'If you need help, then my name is Ann.'

Metalinguistic conditional (mel; 5)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent is used to comment on the linguistic form of (a part of) the consequent. The antecedent must follow the consequent or intercalate the consequent, but cannot precede it, as in *Als dat het juiste woord is, zijn stijl is bloemig.* 'If that's the right word, his style is florid.'

Examples

- (a) Mijn ex-man, als dat het juiste woord is, haat soep.
My ex-husband, if that's the right word, hates soup.
- (b) Oma voelt zich beroerd, als ik dat zo mag zeggen.
Grandma is feeling lousy, if you'll allow me to put it that way.

Tests

- Verb tense cannot be used to indicate epistemic uncertainty, as in 'My ex-husband, if that would be the right word, hates soup.'
- Only the sentence-medial and sentence-final clause order can be used. Sentence-initial order leads less acceptable result, as in *Als dat het juiste woord is, haat mijn ex-man soep.* 'If that's the right word, my ex-husband hates soup.'

Meta-metaphoric conditional (mem; 6)

The (truth of) the situation in the consequent is not dependent on the (truth of) the situation in the antecedent. Rather, the antecedent presents a metaphor that is continued in the consequent.

Examples

- (a) Als de Golden Gate de volbloed van de bruggen is, dan is de Bay Bridge het werkpaard.
If the beautiful Golden Gate is the thoroughbred of bridges, the Bay Bridge is the workhorse.
- (b) Als het leven kaarslicht is, dan zijn mensen motten die erin verbranden.
If life is a candle-flame, then people are moths burned on the flame.

Tests

- Verb tense can be used to indicate epistemic uncertainty, as in ‘If Moriarty would be the Napoleon of crime, then Holmes would be a civilian Wellington.’
- The conditional can be embedded into a matrix clause, as in ‘I think that if Moriarty is the Napoleon of crime, then Holmes is a civilian Wellington.’
- The sentence-medial or sentence-final pattern cannot (easily) be used in this type, as in ‘People are moths burned on the flame, if life is a candle-flame.’
- The intergative and resumptive word-order patterns are preferred for this type. The non-integrative pattern leads to less acceptable results, as in ? *Als de Golden Gate de volbloed van de bruggen is, de Bay Bridge is het werkpaard*. ‘If the beautiful Golden Gate is the thoroughbred of bridges, the Bay Bridge is the workhorse.’

E.4.3 Problem cases

Please take note of the following known problem cases and code accordingly.

Incomplete utterance (NA)

If the utterance is incomplete, use this label. For instance, the antecedent or consequent does not have a finite verb or, in case of an imperative, does not have an overt subject.

Examples

- (a) Als niet, dan toch.
If not, then still.

Deciding between predictive and inferential reading

Although in theory and most examples, the difference between the content and epistemic conditionals below are clear, in practice, it is sometimes hard to distinguish between the two. Use the test above to choose the most suitable type.

Examples

- (a) If he loves her, he’ll type her thesis.
 Content-level predictive conditional: The loving is a precondition for the typing. (Dancygier & Sweetser, 2005, p. 117)
- (b) If he typed her thesis, he loves her.
 My knowledge that the typing happened is a precondition for my conclusion about the loving. (Dancygier & Sweetser, 2005, p. 117)

E.5 Average agreement per corpus item

Table E.1:
Average agreement per item

Corpus item	Quirk et al.	Athanasiadou and Dirven	Dancygier and Sweetser	<i>mean</i>	<i>sd</i>
1	0.61	0.69	0.56	<i>0.62</i>	<i>0.06</i>
2	0.43	0.24	0.31	<i>0.33</i>	<i>0.08</i>
3	0.12	-0.06	0.35	<i>0.14</i>	<i>0.17</i>
4	0.79	-0.02	0.18	<i>0.32</i>	<i>0.35</i>
5	1.00	0.69	0.18	<i>0.62</i>	<i>0.34</i>
6	0.79	0.43	0.69	<i>0.64</i>	<i>0.15</i>
7	0.06	0.00	-0.07	<i>0.00</i>	<i>0.05</i>
8	0.43	0.04	0.31	<i>0.23</i>	<i>0.20</i>
9	0.11	0.15	-0.15	<i>0.03</i>	<i>0.13</i>
10	1.00	0.28	0.56	<i>0.61</i>	<i>0.30</i>
11	0.14	0.35	0.24	<i>0.24</i>	<i>0.09</i>
12	0.28	0.43	0.18	<i>0.30</i>	<i>0.10</i>
13	0.43	0.18	0.22	<i>0.28</i>	<i>0.11</i>
14	0.32	0.16	-0.05	<i>0.14</i>	<i>0.15</i>
15	0.45	0.02	0.09	<i>0.19</i>	<i>0.19</i>
16	0.43	0.02	-0.07	<i>0.13</i>	<i>0.22</i>
17	1.00	0.84	0.57	<i>0.81</i>	<i>0.18</i>
18	1.00	0.22	0.84	<i>0.69</i>	<i>0.34</i>
19	-0.18	0.44	-0.17	<i>0.03</i>	<i>0.29</i>
20	0.10	0.70	0.42	<i>0.41</i>	<i>0.25</i>
21	-0.01	0.05	0.01	<i>0.02</i>	<i>0.03</i>
22	-0.07	0.05	0.18	<i>0.05</i>	<i>0.10</i>
23	0.45	0.56	0.84	<i>0.62</i>	<i>0.16</i>

Note. Average agreement scores per item are reported in terms of O'Connell-Dobson-Schouten coefficients (see O'Connell & Dobson, 1984).

E.6 Materials

Below the materials used in the experiment are presented. Note that the conditionals in focus were presented in bold in the experiment as well.

Table E.2:
Experimental materials (corpus, control, and test items)

No.	Item	Corpus	Mode	Genre	Source
1	Een hernia kan zomaar terugkomen. Maar Schultz wor- stelt nog met haar forehand sinds ze haar grip op ad- vies van Franker bij een zekere Belser heeft laten ver- anderen. Telkens als ze geestelijk in nood zat, om- dat die forehand niet werkte, moest ik haar ko- men redden. En Brenda had als meisje van zeventien echt een van de beste forehands in het circuit.	Condiv	Written	News	nrc/ nieuws6
2	Sturing en Bos waren met hun mentaliteit en instelling gouden jongens voor de trainer. Je kon ze 's nachts om hulp vragen als er stront aan de knikker was...	Condiv	Written	News	tele/ nie_sl2
3	Mensen die nu in de nachtopvang zitten, zien dat lot- genoten uit het eigen circuit toch onder de pannen ko- men. En dan krijg je de drang van: als Jan het kan, moet ik dat ook kunnen. Het is een kwestie van lange adem. Maar het lukt.	Condiv	Written	News	limburg/ div06

Note. Due to size, this page presents part 1 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
4	Maar dat kan niet want de ZCTU beschikt niet over de kwaliteiten van een president, aldus Moegabe, die er voor de goede orde aan toevoegde: “ De vakbonden vergissen zich als ze geloven dat ze sterker zijn dan mijn regering. Ik waarschuw de ZCTU. Ik maak geen grapjes, ik ben bloedserieus.”	Condiv	Written	News	tele/ nie_s5
5	Ja, maar toen was er in feite slechts één tegenstander met wie rekening moest worden gehouden, de Sovjet-Unie, die zowel door Amerikanen als Europeanen als een potentiële bedreiging van hun veiligheid werd beschouwd. Nu is het beeld, als u wilt: het vijand-beeld, veel diffuser geworden en de Amerikaanse bereidheid in te grijpen navenant onzekerder.	Condiv	Written	News	nrc/ varia5
6	Het kan zijn dat men daarom al snel tevreden is met de beperkte frequentieweergave van de cd. Maar als de cd-kopers vaker muziek zouden horen in een goede concertzaal, zou men zich wel eens achter de oren krabben.	Condiv	Written	News	nrc/ nieuws4
7	We moeten oppassen dat de toeloop op de opleidingen in Limburg niet te groot wordt. Het is gevaarlijk als ‘genoeg werk’ het enige argument is om aan de Pabo te gaan studeren.	Condiv	Written	News	limburg/ nieuws04

Note. Due to size, this page presents part 2 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
8	Met dit oordeel kan een einde komen aan de monopoliepositie van KPN's CD-foongids, het telefoonboek op cd-rom. KPN mag ook geen beperkende voorwaarden meer opleggen als het de gegevens verkoopt.	Condiv	Written	News	nrc/ nieuws6
9	Khoury is de enige die vaak naar Israël reist, ook al vinden collega's dat ongepast. Omdat hij niemand kan vinden die dat voor The Arab Daily wil doen, zoekt hij nu een Israëlsche correspondent. 'OK, als Israël nog onze vijand is voor wat het de Palestijnen aan-doet, lees erover, van binnenuit! Het belangrijkste nieuws is dat van de vijand."	Condiv	Written	News	nrc/ nieuws9
10	Veel mensen doen dingen waarvan ze best weten dat het niet mag. Maar als het niet wordt bestraft, gaat zo iets wennen en gaat het steeds een stukje verder. Daar gaan we nu een stukje voor steken.	Condiv	Written	News	tele/ nie_spl
11	Het was hem in zijn praktijk opgevallen dat hoeren vaak frigide zijn bij hun klant en dan de smoes verzinnen dat het onprofessioneel zou zijn als ze wel tot een orgasme zouden geraken. Het is niet eens een smoes.	Condiv	Written	News	tele/ ver- str4.txt

Note. Due to size, this page presents part 3 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
12	'Ik geef toe, we hadden de kunstenaar kunnen informeren. Het beeld ligt nu tijdelijk boven in het magazijn en wordt opgepoetst. In volle glorie kan meneer Huisman straks de heronhulling verrichten, als het aan mij ligt ', stelt Closset.	Condiv	Written	News	limburg/ div02.txt
13	Of ik tevreden ben over mijn eigen spel in de film? Ja, want de film is goed. En als een film goed is, dan ben jij vanzelf ook goed.	Condiv	Written	News	limburg/ div05.txt
14	Zij koesterden een droom: het uit de ruimte bijlichten van donkere plekken op aarde in Arctische gebieden met poolnacht. Maar ook streken waar een natuurramp is gebeurd, teneinde nachtelijk reddingswerk te vereenvoudigen. De verborgen doelstelling is natuurlijk een militaire: want als je een poolstad kan verlichten, kan dat ook met een slagveld.	Condiv	Written	News	tele/ nie_sp9.txt
15	Oh dus dat is gewoon voor de arbeids-uh-vriendelijkheid dat jullie daar uh zorgen dat er wat daglicht binnen kan komen. Ja, en als je midden in de fabriek zit ja je weet niet of 't buiten onweert of dondert of regent of de zon schijnt. dat weet je pas als je naar buiten stapt . nee .	CGN	Spoken	Face-to-face	fm000400

Note. Due to size, this page presents part 4 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
16	Mmm? Als je 't niet zou weten dan hoor je niet dat de radio aan staat. Nee, maar was trouwens wel gaaf dat con-cert.	Corpus	Spoken	Face-to- face	fn000411
17	Ja een maand geleden vroor 't nog 's nachts en uh hij start gelijk ab-soluut direct. Maar als 'k dan 't gas losliet dan sloeg ie af. dus die automatische choke vind ik half.	CGN	Spoken	Face-to- face	fn000948
18	Ja maar ik bedoel als dat uh... als je huis een meter in 't water staan dan loopt 't uh toch wel onder. Mmm ja. Nou kijk, d'r is een verschil tussen een meter en twintig centimeter he.	CGN	Spoken	Face-to- face	fn007816
19	Oh. Ja ik vind dat wel heel in-teressant en ik als ik dat zo zie dan denk ik ook dat die man 't heeft gedaan. ook als je dat hoort maar van de andere kant ja.	CGN	Spoken	Face-to- face	fn000458

Note. Due to size, this page presents part 5 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
20	Ja. Als ik die morgen die floppy's niet kan vinden, waar liggen die dan?	CGN	Spoken	Face-to-face	fn000646
21	Zat ik ook aan te denken. Als wij nou zaterdag Wietske op gaan halen zaterdagmiddag dan kun jij zaterdagmorgen 't huisje in orde maken. Uh .	CGN	Spoken	Face-to-face	fn007817
22	Ik moet 't allemaal regelen zegt ie. Dus als ik uh ja 't kwam er eigenlijk op neer van ik moet leren delegeren dus als ik iemand de opdracht geef om mijn verslagen te tikken dan delegeer ik toch?	CGN	Spoken	Face-to-face	fn000363
23	Maar heb je meer van die bossen hier in de buurt? Als je naar Woerleit gaat, aan de overkant van de snelweg is ook een groot bos.	CGN	Spoken	Face-to-face	fn000676
24	Er is een hoop geklieder en geklooi in de postmoderne kunstscene. Als dat kunst is, dan ben ik ook een kunstenaar!	Control	NA	NA	NA

Note. Due to size, this page presents part 6 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
25	Het is inmiddels juli, he... als Oscar wordt ingeloot bij, eh, bij geneeskunde, dan wacht hem een gouden toekomst. Ik hoop echt voor ik hoop voor hem dat het gaat lukken.	Control	NA	NA	NA
26	Treurig als het is, hoort de dood ook het bij het leven. Als het leven een kaars is, zijn mensen de motten die op de vlam afvliegen.	Control	NA	NA	NA
27	Dus als ik het goed begrijp, heeft de zanger van REM de band niet verlaten? De platenbaas knikte en duwde me de nieuwe cd in handen. Of ik die even wilde recenseren.	Control	NA	NA	NA
28	Het is een genot om naar te luisteren. Dus: als je zin hebt en nog geen avondplannen, het Nederlands Philharmonisch Orkest speelt vanavond Tsjaikovski.	Control	NA	NA	NA

Note. Due to size, this page presents part 7 of 8 parts of the full table.

No.	Item	Corpus	Mode	Genre	Source
29	Als er geen koffie zou zijn, zouden de gasten niet zo lang blijven hangen.	Control	NA	NA	NA
30	Jij bent uh ook zo iemand die veel sport. En steeds als je sport hebt, is je energieniveau gezakt. Eet jij dan wel genoeg?	Control	NA	NA	NA
31	Zoals de kalender aangeeft, is het weer oktober en als de O weer in de maand is, wordt het snel koud.	Control	NA	NA	NA
32	Met deze uitspraak kan een einde komen aan de marktpositie van Google. De zoekmachinegigant mag ook geen privacy-restricties meer opleggen als het de zoekgegevens verko-opt.	Re-test	NA	NA	NA
33	Wellicht vinden mensen de beperkte beeldkwaliteit van analoge tv daarom al snel voldoende. Maar als de tv-kijkers vaker zouden kijken naar echte HD-zenders, zou men wel aan het twijfelen slaan.	Re-test	NA	NA	NA

Note. Due to size, this page presents part 8 of 8 parts of the full table.

APPENDIX F

Supplementary Materials

The supplementary materials for this dissertation, such as data, programming code, and annotation guidelines, can be found online on Dataverse at <https://doi.org/10.34894/3QTEKH> (for details, see Reuneke, 2022a), and at <https://www.reuneke.nl/dissertation> (for details, see Reuneke, 2022b). In case a password is required, use ‘5%*uGnP\$5DF3’ (without quotation marks).

Bibliography

- Aarts, F. G. A. M. (1988). ‘Review of ‘A Comprehensive Grammar of the English Language by Randolph Quirk, Sidney Greenbaum, Geoffrey Leech, and Jan Svartvik: The Great Tradition Continued’. In: *English Studies* 69.2, pp. 163–173. DOI: <https://doi.org/10.1080/00138388808598565>.
- Aarts, F. and H. Wekker (1987). *A Contrastive Grammar of English and Dutch*. Leiden: Nijhoff.
- Ackerman, M., A. Adolfsson and N. Brownstein (2016). *An Effective and Efficient Approach for Clusterability Evaluation*. URL: <https://arxiv.org/abs/1602.06687>.
- Acock, A. C. and G. R. Stavig (1979). ‘A Measure of Association for Non-parametric Statistics’. In: *Social Forces* 57.4, pp. 1381–1386. DOI: <https://doi.org/10.2307/2577276>.
- Adams, E. W. (1966). ‘Probability and the Logic of Conditionals’. In: *Studies in Logic and the Foundations of Mathematics*. Vol. 43. Elsevier, pp. 265–316.
- (1970). ‘Subjunctive and Indicative Conditionals’. In: *Foundations of Language* 6.1, pp. 89–94.
- (1975). *The Logic of Conditionals: An Application of Probability to Deductive Logic*. Dordrecht: Springer.
- Adolfsson, A., M. Ackerman and N. C. Brownstein (2019). ‘To Cluster, or not to Cluster: An Analysis of Clusterability Methods’. In: *Pattern Recognition* 88, pp. 13–26. DOI: <https://doi.org/10.1016/j.patcog.2018.10.026>.
- Aggarwal, C. C. (2014). ‘An Introduction to Cluster Analysis’. In: *Data Clustering: Algorithms and Applications*. Ed. by C. C. Aggarwal and C. K. Reddy. Boca Raton, Florida: Chapman & Hall/CRC, pp. 1–28.
- Agresti, A. (2007). *An Introduction to Categorical Data Analysis*. 2nd ed. Hoboken, NJ: John Wiley & Sons.
- Akaike, H. (1969). ‘Fitting Autoregressive Models for Prediction’. In: *Annals of the Institute of Statistical Mathematics* 21.1, pp. 243–247.

- Akaike, H. (1974). 'A new Look at the Statistical Model Identification'. In: *IEEE Transactions on Automatic Control* 19.6, pp. 716–723.
- Akatsuka, N. (1985). 'Conditionals and the Epistemic Scale'. In: *Language* 61.3, pp. 625–639. DOI: <https://doi.org/10.2307/414388>.
- (1986). 'Conditionals are Discourse-Bound'. In: *On Conditionals*. Ed. by E. C. Traugott, A. G. B. ter Meulen, J. S. Reilly and C. A. Ferguson. Cambridge University Press, pp. 333–352. DOI: <https://doi.org/10.1017/cbo9780511753466>.
- (1991). 'Dracula Conditionals and Discourse'. In: *Interdisciplinary Approaches to Language: Essays in Honor of S.-Y. Kuroda*. Ed. by C. Georgopoulos and R. Ishihara, pp. 25–37. DOI: https://doi.org/10.1007/978-94-011-3818-5_2.
- (1997a). 'Negative Conditionality, Subjectification, and Conditional Reasoning'. In: *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company, pp. 323–354. DOI: <https://doi.org/10.1075/cilt.143.19aka>.
- (1997b). 'On the co-Construction of Counterfactual Reasoning'. In: *Journal of Pragmatics* 28.6, pp. 781–794.
- (1999). 'Towards a Theory of Desirability in Conditional Reasoning'. In: *Function and Structure: In Honor of Susumu Kuno*. Ed. by A. Kamio and K.-i. Takami. Amsterdam: John Benjamins Publishing Company, pp. 195–213. DOI: <https://doi.org/10.1075/pbns.59.11aka>.
- Akmajian, A. (1984). 'Sentence Types and the Form-Function Fit'. In: *Natural Language & Linguistic Theory* 2.1, pp. 1–23.
- Albert-Balázs, J. (2018). 'Negatie in het Nederlands en in het Hongaars'. In: *Internationale Neerlandistiek* 56.1, pp. 43–56. DOI: <https://doi.org/10.5117/in2018.1.albe>.
- Alelyani, S., J. Tang and H. Liu (2013). 'Feature Selection for Clustering: A Review'. In: *Data clustering: Algorithms and Applications* 29.1.
- Alishahi, A. and S. Stevenson (2008). 'A Computational Model of Early Argument Structure Acquisition'. In: *Cognitive Science* 32.5, pp. 789–834. DOI: <https://doi.org/10.1080/03640210801929287>.
- Almeida, J. A. S., L. M. S. Barbosa, A. A. C. C. Pais and S. J. Formosinho (2007). 'Improving Hierarchical Cluster Analysis: A new Method With Outlier Detection and Automatic Clustering'. In: *Chemometrics and Intelligent Laboratory Systems* 87.2, pp. 208–217. DOI: <https://doi.org/10.1016/j.chemolab.2007.01.005>.
- Anderberg, M. R. (1973). *Cluster Analysis for Applications*. Burlington: Academic Press/Elsevier Science. DOI: <https://doi.org/10.1016/c2013-0-06161-0>.
- Anderson, A. R. (1951). 'A Note on Subjunctive and Counterfactual Conditionals'. In: *Analysis* 12.2, pp. 35–38.
- Anderson, A. R. and N. D. Belnap (1975). *Entailment: the Logic of Relevance and Necessity*. 2nd ed. Princeton: Princeton University Press.

- Andor, M. (2015). ‘Natural Language Conditionals’. PhD thesis. Santiago de Compostela: Universidad de Santiago de Compostela.
- Andritsos, P. and P. Tsaparas (2010). ‘Categorical Data Clustering’. In: *Encyclopedia of Machine Learning*. Ed. by C. Sammut and G. I. Webb. Boston, MA: Springer US, pp. 154–159. DOI: https://doi.org/10.1007/978-0-387-30164-8_99.
- Anscombe, J.-C. and O. Ducrot (1989). ‘Argumentativity and Informativity’. In: *From Metaphysics to Rhetoric*. Dordrecht: Kluwer Academic Publishers Group, pp. 71–87.
- Ariel, M. (2008). *Pragmatics and Grammar*. Cambridge: Cambridge University Press.
- (2010). *Defining Pragmatics*. Cambridge: Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511777912>.
- Arnaboldi, V., A. Passarella, M. Conti and R. I. M. Dunbar (2015). *Online Social Networks: Human Cognitive Constraints in Facebook and Twitter Personal Graphs*. Amsterdam; Boston: Elsevier.
- Arregui, A. (2007). ‘When Aspect Matters: the Case of Would-Conditionals’. In: *Natural Language Semantics* 15.3, pp. 221–264. DOI: <https://doi.org/10.1007/s11050-007-9019-6>.
- (2020). ‘Counterfactuals: “If Kangaroos Had No Tails...”’ In: *The Wiley Blackwell Companion to Semantics*. Ed. by D. Gutzmann, L. Matthewson, C. Meier, H. Rullmann and T. Zimmermann. New York: John Wiley & Sons. DOI: <https://doi.org/10.1002/9781118788516>.
- Artstein, R. and M. Poesio (2008). ‘Inter-Coder Agreement for Computational Linguistics’. In: *Computational Linguistics* 34.4, pp. 555–596.
- Athanasiadou, A. and R. Dirven (1995). ‘Conditional Conjunctions and Conceptual Companions’. In: *Current Approaches to the Lexicon*. Ed. by R. Dirven and J. Vanparys. Bern: Peter Lang, pp. 225–249.
- (1996). ‘Typology of *if*-Clauses’. In: *Cognitive Linguistics in the Redwoods*. Ed. by E. H. Casad. Berlin; New York: De Gruyter Mouton. DOI: <https://doi.org/10.1515/9783110811421.609>.
- (1997a). ‘Conditionality, Hypotheticality, Counterfactuality’. In: *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company, pp. 61–96. DOI: <https://doi.org/10.1075/cilt.143.05ath>.
- (1997b). *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company. DOI: <https://doi.org/10.1075/cilt.143>.
- (2000). ‘Pragmatic Conditionals’. In: *Constructions in Cognitive Linguistics: Selected Papers From the International Cognitive Linguistics Conference, Amsterdam, 1997*. Ed. by A. Foolen and F. van der Leek. Amsterdam; Philadelphia: John Benjamins Publishing Company, pp. 1–26.
- Atkins, S., J. Clear and N. Ostler (1992). ‘Corpus Design Criteria’. In: *Literary and Linguistic Computing* 7.1, pp. 1–16. DOI: <https://doi.org/10.1093/lc/7.1.1>.

- Audring, J. (2016). 'Een Wachtende Partner is een Chagrijnige Partner'. In: *Aries Network: Een Constructicon*. Ed. by A. Reuneker, R. J. U. Boogaart and S. E. Lensink. Leiden: Amsterdam University Press, pp. 16–19.
- Auer, P. (2000). 'Pre-and Post-Positioning of *wenn*-clauses in Spoken and Written German'. In: *Cause, Condition, Concession, Contrast. Cognitive and Discourse Perspectives*. Ed. by E. Couper-Kuhlen and B. Kortmann. Berlin; Boston: De Gruyter Mouton, pp. 173–204.
- Austin, J. L. (1962). *How to Do Things With Words*. Oxford: Clarendon Press.
- (1970). 'Ifs and Cans'. In: *Philosophical Papers*. Ed. by J. L. Austin. 2nd ed. Oxford: Clarendon Press, pp. 205–232.
- Bach, K. (1994). 'Conversational Implicature'. In: *Mind & Language* 9.2, pp. 124–162. DOI: <https://doi.org/10.1111/j.1468-0017.1994.tb00220.x>.
- (1998). 'Standardisation Revisited'. In: *Presupposition, Implicature, and Indirect Speech Acts*. Ed. by A. Kasher. Vol. 4. Pragmatics: Critical Concepts. London: Routledge.
- (1999). 'The Myth of Conventional Implicature'. In: *Linguistics and Philosophy* 22.4, pp. 327–366.
- (2001). 'You don't say?' In: *Synthese* 128.1, pp. 15–44.
- Bach, K. and R. M. Harnish (1979). *Communication and Speech Acts*. Cambridge: MIT Press.
- Bailey, K. D. (1994). *Typologies and Taxonomies: An Introduction to Classification Techniques*. Thousand Oaks, California: Sage Publications.
- Baker, P., A. Hardie and T. McEnery (2006). *A Glossary of Corpus Linguistics*. Edinburgh: Edinburgh University Press.
- Balk-Smit Duyzentkunst, F. (1963). *De grammatische functie. Methode van grammaticale analyse, aan het Nederlands gedemonstreerd*. Groningen: J. B. Wolters.
- Banerjee, A. and S. Chaudhury (2010). 'Statistics Without Tears: Populations and Samples'. In: *Industrial Psychiatry Journal* 19.1, pp. 60–65. DOI: <https://doi.org/10.4103/0972-6748.77642>.
- Banerjee, M., M. Capozzoli, L. McSweeney and D. Sinha (1999). 'Beyond Kappa: A Review of Interrater Agreement Measures'. In: *Canadian Journal of Statistics* 27.1, pp. 3–23. DOI: <https://doi.org/10.2307/3315487>.
- Baptista, L. (2011). 'Say What? On Grice On What Is Said'. In: *European Journal of Philosophy* 22.1, pp. 1–19. DOI: <https://doi.org/10.1111/j.1468-0378.2011.00467.x>.
- Barbiers, S. (2007). 'On the Periphery of Imperative and Declarative Clauses in Dutch and German'. In: *Imperative Clauses in Generative Grammar: Studies in Honour of Frits Beukema*. Ed. by W. van der Wurff. Amsterdam: John Benjamins Publishing Company, pp. 95–112. DOI: <https://doi.org/10.1075/la.103.03bar>.
- (2018). 'Adverbs in Strange Places: On the Syntax of Adverbs in Dutch'. In: *Nederlandse Taalkunde* 23.1, pp. 57–88. DOI: <https://doi.org/10.5117/nedtaa2018.1.barb>.

- Barwise, J. (1986). 'Conditionals and Conditional Information'. In: *On Conditionals*. Ed. by E. C. Traugott, A. G. B. ter Meulen, J. S. Reilly and C. A. Ferguson. Cambridge University Press, pp. 21–54.
- Beaver, D. (1997). 'Presupposition'. In: *Handbook of Logic and Language*. Ed. by J. van Benthem and A. G. B. ter Meulen. Amsterdam; New York: MIT Press, pp. 939–1008.
- Beaver, D. I. and B. Geurts (2014). 'Presupposition'. In: *The Stanford Encyclopedia of Philosophy*. Ed. by E. N. Zalta. Metaphysics Research Lab, Stanford University.
- Beekhuizen, B. F. (2015). 'Constructions Emerging: A Usage-Based Model of the Acquisition of Grammar'. PhD thesis. Leiden: Leiden University.
- Beekhuizen, B. F., J. Watson and S. Stevenson (2017). 'Semantic Typology and Parallel Corpora: Something About Indefinite Pronouns'. In: *Proceedings of the 39th Annual Conference of the Cognitive Science Society*. Ed. by G. Gunzelmann, A. Howes, T. Tenbrink and E. J. Davelaar. Austin, Texas: Cognitive Science Society, pp. 112–117.
- Beller, S. (2002). 'Conditional Promises and Threats – Cognition and Emotion'. In: *Proceedings of the Annual Meeting of the Cognitive Science Society* 24.
- Bennett, D. J. (2004). *Logic Made Easy: How to Know When Language Deceives you*. New York; London: W. W. Norton & Company.
- Bennett, J. (2003). *A Philosophical Guide to Conditionals*. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/0199258872.001.0001>.
- Bennis, H. J. (2007). 'Featuring the Subject in Dutch Imperatives'. In: *Imperative Clauses in Generative Grammar: Studies in Honour of Frits Beukema*. Ed. by W. van der Wurff. Amsterdam: John Benjamins Publishing Company, pp. 113–134. DOI: <https://doi.org/10.1075/la.103.04ben>.
- Berez, A. L. and S. T. Gries (2008). 'In Defense of Corpus-Based Methods: A Behavioral Profile Analysis of Polysemous *get* in English'. In: *Proceedings of the 24th Northwest Linguistics Conference*. Ed. by S. Moran, D. S. Tanner and M. Scanlon. Washington: University of Washington Working Papers in Linguistics, pp. 157–166.
- Berry, M. W., A. Mohamed and B. W. Yap (2019). *Supervised and Unsupervised Learning for Data Science*. Springer.
- Bezdek, J. C., R. Ehrlich and W. Full (1984). 'FCM: The Fuzzy c-Means Clustering Algorithm'. In: *Computers & Geosciences* 10.2-3, pp. 191–203.
- Bhatt, R. and R. Pancheva (2005). 'Conditionals'. In: *The Wiley-Blackwell Companion to Syntax*. Ed. by M. Everaert and H. C. van Riemsdijk. Malden, MA: Wiley-Blackwell; John Wiley & Sons, pp. 638–687.
- Biber, D. (1988). *Variation Across Speech and Writing*. Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511621024>.
- (1993). 'Representativeness in Corpus Design'. In: *Literary and Linguistic Computing* 8.4, pp. 243–257. DOI: <https://doi.org/10.1093/lc/8.4.243>.
- (1995). *Dimensions of Register Variation: A Cross-Linguistic Comparison*. Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511519871>.

- Biber, D. (2006). *University Language: A Corpus-Based Study of Spoken and Written Registers*. Amsterdam: John Benjamins Publishing Company. DOI: <https://doi.org/10.1075/scl.23>.
- Biber, D. and S. Conrad (2009). *Register, Genre, and Style*. Cambridge; New York: Cambridge University Press.
- Biber, D., S. Conrad and R. Reppen (1998). *Corpus Linguistics: Investigating Language Structure and Use*. Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511804489>.
- Biber, D., S. Johansson, G. Leech, S. Conrad and E. Finegan (1999). *Longman Grammar of Spoken and Written English*. Harlow, England: Longman.
- Binnick, R. I. (2006). 'Aspect and Aspectuality'. In: *The Handbook of English Linguistics*. Ed. by B. Aarts and A. McMahon. Malden: Blackwell Publishing, pp. 244–268. DOI: <https://doi.org/10.1002/9780470753002.ch11>.
- (2020). 'Aspect and Aspectuality'. In: *The Handbook of English Linguistics*. Ed. by B. Aarts, A. McMahon and L. Hinrichs. 2nd ed. Chichester: John Wiley & Sons, pp. 183–205. DOI: <https://doi.org/10.1002/9781119540618.ch11>.
- Birner, B. J. (2013). *Introduction to Pragmatics*. Chichester: Wiley-Blackwell; John Wiley & Sons.
- Blakemore, D. (2002). *Relevance and Linguistic Meaning: The Semantics and Pragmatics of Discourse Markers*. Cambridge; New York: Cambridge University Press.
- (2004). 'Discourse Markers'. In: *The Handbook of Pragmatics*. Ed. by L. R. Horn and G. Ward. Oxford: Blackwell Publishing Ltd, pp. 221–240. DOI: <https://doi.org/10.1002/9780470756959.ch10>.
- Blakemore, D. and R. Carston (1999). 'The Pragmatics of *and*-conjunctions: The Non-narrative Cases'. In: *UCL Working Papers in Linguistics*. Vol. 11, pp. 1–20.
- Blattberg, R. C., B.-D. Kim and S. A. Neslin (2008). 'Cluster Analysis'. In: *Database Marketing*. Vol. 18. International series in Quantitative Marketing. New York: Springer, pp. 401–422. DOI: https://doi.org/10.1007/978-0-387-72579-6_16.
- Bloomfield, L. (1984). *Language*. Chicago: University of Chicago Press.
- Bogaards, M. (2019). 'A Mandarin map for Dutch Durativity'. In: *Nederlandse Taalkunde* 24.2, pp. 157–193. DOI: <https://doi.org/10.5117/nedtaa2019.2.002.boga>.
- Bollens, S. M., J. K. Breckenridge, J. R. Cordell, C. A. Simenstad and O. Kalata (2014). 'Zooplankton of Tidal Marsh Channels in Relation to Environmental Variables in the Upper San Francisco Estuary'. In: *Aquatic Biology* 21.3, pp. 205–219. DOI: <https://doi.org/10.3354/ab00589>.
- Bolognesi, M., R. Pilgram and R. van den Heerik (2017). 'Reliability in Content Analysis: The Case of Semantic Feature Norms Classification'. In: *Behavior Research Methods* 49.6, pp. 1984–2001. DOI: <https://doi.org/10.3758/s13428-016-0838-6>.

- Bonnefon, J.-F. (2009). 'A Theory of Utility Conditionals: Paralogical Reasoning From Decision-Theoretic Leakage'. In: *Psychological Review* 116.4, pp. 888–907. DOI: <https://doi.org/10.1037/a0017186>.
- Boogaart, R. J. U. (1999). 'Aspect and Temporal Ordering: A Contrastive Analysis of Dutch and English'. PhD thesis. Amsterdam: Vrije Universiteit Amsterdam.
- (2004). 'Aspect and Aktionsart'. In: *Morphologie: Ein Internationales Handbuch zur Flexion und Wortbildung*. Ed. by G. Booij, C. Lehmann and J. Mugdan. Berlin; New York: Walter de Gruyter.
- (2007a). 'Conditionele constructies met *moest(en)* en *mocht(en)* in Belgisch-Nederlands en Nederlands-Nederlands'. In: *Neerlandistiek.nl* 7.5.
- (2007b). 'The Past and Perfect of Epistemic Modals'. In: *Recent Advances in the Syntax and Semantics of Tense, Aspect and Modality*. Ed. by L. de Saussure, J. Moeschler and G. Puskás. Berlin; New York: Mouton de Gruyter, pp. 47–69. DOI: <https://doi.org/10.1515/9783110198768.47>.
- (2009). 'Semantics and Pragmatics in Construction Grammar: The Case of Modal Verbs'. In: *Constructional Approaches to Language*. Ed. by A. Bergs and G. Diewald. Amsterdam: John Benjamins Publishing Company, pp. 213–241. DOI: <https://doi.org/10.1075/cal.9.09boo>.
- (2013). 'De Modaliteit van temporaliteit'. In: *Nederlandse Taalkunde* 18.3, pp. 324–338. DOI: <https://doi.org/10.5117/nedtaa2013.3.boog>.
- Boogaart, R. J. U. and E. L. J. Fortuin (2016). 'Modality and Mood in Cognitive Linguistics and Construction Grammars'. In: *The Oxford Handbook of Modality and Mood*. Ed. by J. Nuyts and J. van der Auwera. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/oxfordhb/9780199591435.013.23>.
- Boogaart, R. J. U., H. Jansen and M. van Leeuwen (2021). 'Introduction: From Argumentation to Language – And Vice Versa'. In: *The Language of Argumentation*. Ed. by R. J. U. Boogaart, H. Jansen and M. van Leeuwen. Cham: Springer International Publishing, pp. 1–14. DOI: https://doi.org/10.1007/978-3-030-52907-9_1.
- Boogaart, R. J. U. and T. A. J. M. Janssen (2007). 'Tense and Aspect'. In: *The Oxford Handbook of Cognitive Linguistics*. Ed. by D. Geeraerts and H. Cuyckens. Oxford University Press, pp. 803–828. DOI: <https://doi.org/10.1093/oxfordhb/9780199738632.013.0031>.
- (2010). 'Mood in Dutch'. In: *Mood in the Languages of Europe. Germanic, Romance, Celtic Languages and Basque*. Ed. by B. Rothstein and R. Thieroff. Vol. 120. Studies in Language Companion Series. John Benjamins Publishing Company, pp. 117–132.
- Boogaart, R. J. U. and A. Reuneker (2017). 'Intersubjectivity and Grammar'. In: *The Cambridge Handbook of Cognitive Linguistics*. Ed. by B. Dancygier. Cambridge: Cambridge University Press, pp. 188–206. DOI: <https://doi.org/10.1017/9781316339732.013>.

- Boogaart, R. J. U. and R. Trnavac (2011). ‘Imperfective Aspect and Epistemic Modality’. In: *Cognitive Approaches to Tense, Aspect, and Epistemic Modality*. Ed. by A. Patard and F. Brisard. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 217–248.
- Boogaart, R. J. U. and K. Verheij (2013). ‘Als dát Geen Insubordinatie is! De Pragmatiek van Zelfstandige Conditionele Zinnen’. In: *Honderd Jaar Taalwetenschap. Artikelen Aangeboden aan Saskia Daalder bij Haar Afscheid van de Vrije Universiteit*. Ed. by T. A. J. M. Janssen and J. Noordegraaf. Amsterdam/Münster: Stichting Neerlandistiek VU, Nodus Publikationen, pp. 13–28.
- Booij, G. (2002). ‘Constructional Idioms, Morphology, and the Dutch Lexicon’. In: *Journal of Germanic Linguistics* 14.04. DOI: <https://doi.org/10.1017/s1470542702000168>.
- (2018). ‘The Construction of Words: Introduction and Overview’. In: *The Construction of Words*. Ed. by G. Booij. Cham: Springer International Publishing, pp. 3–16. DOI: https://doi.org/10.1007/978-3-319-74394-3_1.
- Boole, G. (1854). *An Investigation of The Laws of Thought on Which are Founded the Mathematical Theories of Logic and Probabilities*. London: Macmillan.
- Borg, I. and P. J. F. Groenen (2005). *Modern Multidimensional Scaling: Theory and Applications*. New York, London: Springer.
- Boriah, S., V. Chandola and V. Kumar (2008). ‘Similarity Measures for Categorical Data: A Comparative Evaluation’. In: *Proceedings of the 2008 Siam International Conference on Data Mining*. Society for Industrial and Applied Mathematics, pp. 243–254. DOI: <https://doi.org/10.1137/1.9781611972788.22>.
- Bouhamed, H., T. Lecroq and A. Rebaï (2012). ‘New Filter Method for Categorical Variables’ Selection’. In: *International Journal of Computer Science Issues* 9.3, pp. 10–19.
- Bozdogan, H. (1987). ‘Model Selection and Akaike’s Information Criterion (AIC): The General Theory and its Analytical Extensions’. In: *Psychometrika* 52.3, pp. 345–370. DOI: <https://doi.org/10.1007/bf02294361>.
- Bracht, G. H. and G. V. Glass (1968). ‘The External Validity of Experiments’. In: *American Educational Research Journal* 5.4, pp. 437–474. DOI: <https://doi.org/10.3102/00028312005004437>.
- Braine, M. D. (1978). ‘On the Relation Between the Natural Logic of Reasoning and Standard Logic.’ In: *Psychological Review* 85.1, pp. 1–21. DOI: <https://doi.org/10.1037/0033-295x.85.1.1>.
- Breitbarth, A., S. Delva and T. Leuschner (2016). ‘A (Very) Imperfect Sandwich: English *should*, German *sollte*, Dutch *mocht/moest* as Grammaticalizing Markers of Conditionality’. In: *Journal of Germanic Linguistics* 28.4, pp. 282–316. DOI: <https://doi.org/10.1017/s1470542716000143>.
- Broekhuis, H. and N. Corver (2016). *Syntax of Dutch: Verbs and Verb Phrases*. Vol. 3. Comprehensive Grammar Resources. Amsterdam: Amsterdam University Press.

- Broekhuis, H., N. Corver and R. Vos (2015a). *Syntax of Dutch: Verbs and Verb Phrases*. Vol. 1. Comprehensive Grammar Resources. Amsterdam: Amsterdam University Press.
- (2015b). *Syntax of Dutch: Verbs and Verb Phrases*. Vol. 2. Comprehensive Grammar Resources. Amsterdam: Amsterdam University Press.
- Broekhuis, H., H. den Besten, K. Hoekstra and J. Rutten (1995). ‘Infinitival Complementation: On Remnant Extraposition’. In: *Linguistic Review* 12, pp. 93–122.
- Broekhuis, H. and E. Keizer (2012). *Syntax of Dutch: Nouns and Noun Phrases*. Ed. by M. d. Dikken and H. J. Bennis. Vol. 1. Comprehensive Grammar Resources. Amsterdam: Amsterdam University Press.
- Brown, P. and S. C. Levinson (1987). *Politeness: Some Universals in Language Usage*. Studies in Interactional Sociolinguistics. Cambridge; New York: Cambridge University Press.
- Buchstaller, I. and G. Khattab (2014). ‘Population Samples’. In: *Research Methods in Linguistics*. Ed. by R. J. Podesva and D. Sharma. Cambridge University Press, pp. 74–95. DOI: <https://doi.org/10.1017/cbo9781139013734.006>.
- Bücker, J. (2016). ‘Focus, Scales, and Concessive Conditionals in German’. In: *Language Sciences* 58, pp. 163–177. DOI: <https://doi.org/10.1016/j.langsci.2016.03.005>.
- Bueno, O. and S. A. Shalkowski (2021). ‘Introduction. Modality Matters: Philosophical Significance’. In: *The Routledge Handbook of Modality*. Ed. by O. Bueno and S. A. Shalkowski. New York: Routledge, pp. 1–7.
- Bunt, H. C. and R. A. Muskens (1999). ‘Computational Semantics’. In: *Computing Meaning*. Ed. by H. C. Bunt and R. A. Muskens. Vol. 1. Studies in Linguistics and Philosophy 73. Kluwer Academic Publishers, pp. 1–32.
- Burke, M. B. (1994). ‘Denying the Antecedent: A Common Fallacy?’ In: *Informal Logic* 16.1. DOI: <https://doi.org/10.22329/il.v16i1.2432>.
- Burton, G. (2021). ‘Rehabilitating the ELT Conditional System’. In: *ELT Journal*. DOI: 10.1093/elt/ccab064.
- Bybee, J. L. (2013). ‘Usage-Based Theory and Exemplar Representations of Constructions’. In: *The Oxford Handbook of Construction Grammar*. Ed. by T. Hoffmann and G. Trousdale. Oxford: Oxford University Press, pp. 49–69. DOI: <https://doi.org/10.1093/oxfordhb/9780195396683.013.0004>.
- Bybee, J. L., R. D. Perkins and W. Pagliuca (1994). *The Evolution of Grammar: Tense, Aspect, and Modality in the Languages of the World*. Chicago: University of Chicago Press.
- Cabin, R. and R. Mitchell (2000). ‘To Bonferroni or Not to Bonferroni: When and How Are the Questions’. In: *Bulletin of the Ecological Society of America* 81, pp. 246–248. DOI: <https://doi.org/10.2307/20168454>.
- Cantwell, J. (2018). ‘Conditionals’. In: *Introduction to Formal Philosophy*. Ed. by S. O. Hansson and V. F. Hendricks. Cham: Springer International Publishing, pp. 131–146. DOI: https://doi.org/10.1007/978-3-319-77434-3_6.

- Capecchi, V. and F. Möller (1968). 'Some Applications of the Entropy to the Problems of Classification'. In: *Quality & Quantity* 2.1-2, pp. 63–84.
- Cappelle, B. (2017). 'What's Pragmatics Doing Outside Constructions?' In: *Semantics and Pragmatics: Drawing a Line*. Ed. by I. Depraetere and R. Salkie. Cham: Springer International Publishing, pp. 115–151. DOI: https://doi.org/10.1007/978-3-319-32247-6_8.
- Carr, E. H. (1986). *What is History?* 2nd ed. London: Macmillan.
- Carston, R. (1998). 'The Semantics/Pragmatics Distinction: A View From Relevance Theory'. In: *UCL Working Papers in Linguistics*. Vol. 10. London: University College London, pp. 1–30.
- (2002). *Thoughts and Utterances*. Malden, MA: Blackwell Publishing. DOI: <https://doi.org/10.1002/9780470754603>.
- (2006). 'Relevance Theory and the Saying/Implicating Distinction'. In: *The Handbook of Pragmatics*. Ed. by L. R. Horn and G. Ward. Oxford: Blackwell, pp. 633–656. DOI: <https://doi.org/10.1002/9780470756959.ch28>.
- (2011). 'Truth-conditional Semantics'. In: *Philosophical Perspectives for Pragmatics*. Ed. by M. Sbisà, J.-O. Östman and J. Verschueren. Amsterdam: John Benjamins Publishing Company, pp. 280–288. DOI: <https://doi.org/10.1075/hoph.10.24car>.
- Carter, S. (2021). 'A Suppositional Theory of Conditionals'. In: *Mind*. DOI: <https://doi.org/10.1093/mind/fzaa071>.
- Carter-Thomas, S. (2007). 'The "Iffiness" of Medical Research Articles: A Comparison of English 'if' and French 'si''. In: *Language and Discipline Perspectives on Academic Discourse*. Ed. by K. Flottum. Cambridge Scholars Press, pp. 150–175.
- Carter-Thomas, S. and E. Rowley-Jolivet (2008). 'If-Conditionals in Medical Discourse: From Theory to Disciplinary Practice'. In: *Journal of English for Academic Purposes* 7.3, pp. 191–205. DOI: <https://doi.org/10.1016/j.jeap.2008.03.004>.
- Castroviejo Miró, E. (2008). 'Deconstructing Exclamations'. In: *Catalan Journal of Linguistics* 7.1, pp. 41–90. DOI: <https://doi.org/10.5565/rev/catjl.132>.
- Celce-Murcia, M. and D. Larsen-Freeman (1999). *The Grammar Book: An ESL/EFL Teacher's Course*. 2nd ed. Boston: Heinle & Heinle.
- Chafe, W. (1984). 'How People Use Adverbial Clauses'. In: *Annual Meeting of the Berkeley Linguistics Society* 10, pp. 437–449. DOI: <https://doi.org/10.3765/bls.v10i0.1936>.
- Chafe, W. and J. Nichols (1986). *Evidentiality: The Linguistic Coding of Epistemology*. Norwood: Ablex Publishing Corporation.
- Chafe, W. and D. Tannen (1987). 'The Relation Between Written and Spoken Language'. In: *Annual Review of Anthropology* 16.1, pp. 383–407. DOI: <https://doi.org/10.1146/annurev.an.16.100187.002123>.
- Chakraborty, C. (1997). 'Grice's Theory of Ordinary Conditionals'. In: *Indian Philosophical Quarterly* 24.4, pp. 543–560.

- Chamalis, T. and A. Likas (2018). ‘The Projected Dip-Means Clustering Algorithm’. In: *Proceedings of the 10th Hellenic Conference on Artificial Intelligence - Setn '18*. Patras, Greece: ACM Press, pp. 1–7. DOI: <https://doi.org/10.1145/3200947.3201008>.
- Chambers, C. D. (1895). ‘The Classification of Conditional Sentences’. In: *The Classical Review* 9.6, pp. 293–294.
- Chapelle, O., B. Schölkopf and A. Zien (2006). ‘Introduction to Semi-Supervised Learning’. In: *Semi-Supervised Learning*. Ed. by O. Chapelle, B. Schölkopf and A. Zien. Cambridge, Massachusetts: MIT Press, pp. 1–12.
- Chapman, S. (2011). *Pragmatics*. Modern Linguistics Series. Houndmills, Hampshire; New York: Palgrave Macmillan.
- Charivarius (1943). *Is dat Goed Nederlands?* 5th ed. Amsterdam: Uitgeverij Ploegsma.
- Chierchia, G. and S. McConnell-Ginet (1990). *Meaning and Grammar: An Introduction to Semantics*. Massachusetts: MIT Press.
- Christie, A. (1926). *The Murder of Roger Ackroyd*. Glasgow: William Collins, Sons.
- Ciardelli, I. (2021). ‘The Restrictor View, Without Covert Modals’. In: *Linguistics and Philosophy*. DOI: <https://doi.org/10.1007/s10988-021-09332-z>.
- Cibulková, J., Z. Šulc, S. Sirota and H. Rezanková (2019). ‘The Effect of Binary Data Transformation in Categorical Data Clustering’. In: *Statistics in Transition New Series* 20.2, pp. 33–47. DOI: <https://doi.org/10.21307/stattrans-2019-013>.
- Cicchetti, D. V. and A. R. Feinstein (1990). ‘High Agreement but low Kappa: II. Resolving the Paradoxes’. In: *Journal of Clinical Epidemiology* 43.6, pp. 551–558. DOI: [https://doi.org/10.1016/0895-4356\(90\)90159-m](https://doi.org/10.1016/0895-4356(90)90159-m).
- Cichosz, P. (2015). ‘(Dis)Similarity Measures’. In: *Data Mining Algorithms*. Chichester, UK: John Wiley & Sons, pp. 311–327. DOI: <https://doi.org/10.1002/9781118950951.ch11>.
- Cirillo, F. (2009). *The Pomodoro Technique*. San Francisco, California: Lulu.
- Clark, B. (1993). ‘Relevance and “Pseudo-Imperatives”’. In: *Linguistics and Philosophy* 16.1, pp. 79–121.
- Clark, H. H. (1996). *Using Language*. Cambridge, England; New York: Cambridge University Press.
- Clarke, R. K. (1993). ‘Non-Parametric Multivariate Analyses of Changes in Community Structure’. In: *Australian Journal of Ecology* 18.1, pp. 117–143.
- Cleveland, W. S. (1993). ‘A Model for Studying Display Methods of Statistical Graphics’. In: *Journal of Computational and Graphical Statistics* 2.4, pp. 323–243. DOI: <https://doi.org/10.2307/1390686>.
- Cohen, J. (1960). ‘A Coefficient of Agreement for Nominal Scales’. In: *Educational and Psychological Measurement* 20.1, pp. 37–46.
- (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ: L. Erlbaum Associates.
- (1992). ‘A Power Primer’. In: *Psychological Bulletin* 112.1, pp. 155–159.

- Cohen, J. L. (1971). 'The Logical Particles of Natural Language'. In: *Pragmatics of Natural Language*. Ed. by Y. Bar-Hillel. Dordrecht: Reidel, pp. 50–68.
- Colleman, T. (2009). 'Verb Disposition in Argument Structure Alternations: A Corpus Study of the Dative Alternation in Dutch'. In: *Language Sciences* 31.5, pp. 593–611. DOI: <https://doi.org/10.1016/j.langsci.2008.01.001>.
- Comrie, B. (1976). *Aspect: An Introduction to the Study of Verbal Aspect and Related Problems*. Cambridge: Cambridge University Press.
- (1986). 'Conditionals: A Typology'. In: *On Conditionals*. Ed. by E. C. Traugott, A. T. Meulen, J. S. Reilly and C. A. Ferguson. Cambridge University Press, pp. 77–100. DOI: <https://doi.org/10.1017/cbo9780511753466>.
- (1989). 'On Identifying Future Tenses'. In: *Tempus - Aspekt - Modus*. Ed. by W. Abraham and T. A. J. M. Janssen. Berlin; New York: De Gruyter.
- (1996). 'Markedness'. In: *Handbook of Pragmatics*. Ed. by J. Verschueren, J.-O. Östman, J. Blommaert and C. Bulcaen. Amsterdam: John Benjamins Publishing Company, pp. 1–13. DOI: <https://doi.org/10.1075/hop.2.mar2>.
- Cook, R. T. (2009). *A Dictionary of Philosophical Logic*. Edinburgh: Edinburgh University Press.
- Cooper, W. S. (1978). 'If-Then': A Case Study in Logico-Linguistic Analysis'. In: *Foundations of Logico-Linguistics*. Dordrecht: Springer, pp. 158–211. DOI: https://doi.org/10.1007/978-94-009-9820-9_8.
- Copi, I. (1973). *Symbolic Logic*. 4th ed. London: Macmillan Company.
- Cornillie, B. (2009). 'Evidentiality and Epistemic Modality: On the Close Relationship Between two Different Categories'. In: *Functions of Language* 16.1, pp. 44–62. DOI: <https://doi.org/10.1075/fol.16.1.04cor>.
- Coussé, E. and A. Oosterhof (2012). 'Het Imperativische Participium in het Nederlands. Vorm, Betekenis en Gebruik'. In: *Nederlandse taalkunde* 17.1, pp. 26–55. DOI: https://doi.org/10.5117/nedtaa2012.1.het_515.
- Cox, T. F. and M. A. A. Cox (2001). *Multidimensional Scaling*. 2nd ed. Monographs on Statistics and Applied Probability. Boca Raton: Chapman & Hall/CRC.
- Cramer, M., S. Hölldobler and M. Ragni (2021). 'When are Humans Reasoning With Modus Tollens?' In: *Proceedings of the Annual Meeting of the Cognitive Science Society* 43.43.
- Crocco, G., L. Fariñas del Cerro and A. Herzig (1995). 'Introduction'. In: *Conditionals: From Philosophy to Computer Science*. Ed. by G. Crocco, L. Fariñas del Cerro and A. Herzig. Studies in Logic and Computation. Oxford; New York: Clarendon Press; Oxford University Press, pp. 1–12.
- Croft, W. (2001). *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford; New York: Oxford University Press.
- Croft, W. and D. A. Cruse (2004). *Cognitive Linguistics*. Cambridge Textbooks in Linguistics. Cambridge, United Kingdom; New York: Cambridge University Press.
- Crouch, R. (1994). 'Tense in Simple Conditionals'. In: *Proceedings of the Ninth Amsterdam Colloquium*. Ed. by P. Dekker and M. Stokhof. Amsterdam: ILLC, University of Amsterdam.

- Crupi, V. and A. Iacona (2021). 'Probability, Evidential Support, and the Logic of Conditionals'. In: *Argumenta* 6.2, pp. 211–222. DOI: 10.14275/2465-2334/202112.CRU.
- Cruse, D. A. (2000). *Meaning in Language: An Introduction to Semantics and Pragmatics*. Oxford: Oxford University Press.
- Cuyper, L. de (2008). *Limiting the Iconic: From the Metatheoretical Foundations to the Creative Possibilities of Iconicity in Language*. Amsterdam; Philadelphia: John Benjamins Publishing Company.
- D'Hertefelt, S. (2015). 'Insubordination in Germanic: A Typology of Complement and Conditional Constructions'. PhD thesis. Leuven: KU Leuven.
- Daalder, S. (1994). 'Tenzij in irreëel conditioneel verband'. In: *Nauwe Betrekkingen: Voor Theo Janssen bij Zijn Vijftigste Verjaardag*. Ed. by R. J. U. Boogaart and J. Noordegraaf. Amsterdam; Münster: Stichting Neerlandistiek VU; Nodus Publikationen, pp. 31–38.
- (2006). 'Regelmaat en interpretatie bij *mits*-constructies in het moderne Nederlands'. In: *Tussen Semantiek en Pragmatiek: Aangeboden aan Theo Jansen bij Zijn Afscheid als Hoogleraar Nederlandse Taalkunde en Taalbeheersing aan de Vrije Universiteit Amsterdam*. Ed. by R. J. U. Boogaart and T. A. J. M. Janssen. Voortgang: Jaarboek voor de neerlandistiek. Amsterdam: Stichting Neerlandistiek, pp. 51–60.
- (2009). 'Conditional Constructions: The Special Case of Modern Dutch *mits*'. In: *Journal of Germanic Linguistics* 21.2, pp. 231–248. DOI: <https://doi.org/10.1017/s1470542709000270>.
- Dąbrowska, E. (2014). 'Recycling Utterances: A Speaker's Guide to Sentence Processing'. In: *Cognitive Linguistics* 25.4, pp. 617–653. DOI: <https://doi.org/10.1515/cog-2014-0057>.
- Dancygier, B. (1985). 'If, unless, and their Polish Equivalents'. In: *Papers and Studies in Contrastive Linguistics* 20, pp. 64–72.
- (1992). 'Two Metatextual Operators: Negation and Conditionality in English and Polish'. In: *Annual Meeting of the Berkeley Linguistics Society* 18.1, pp. 61–75. DOI: <https://doi.org/10.3765/bls.v18i1.1601>.
- (1993). 'Interpreting Conditionals: Time, Knowledge, and Causation'. In: *Journal of Pragmatics* 19.5, pp. 403–434. DOI: [https://doi.org/10.1016/0378-2166\(93\)90003-8](https://doi.org/10.1016/0378-2166(93)90003-8).
- (1998). *Conditionals and Prediction: Time, Knowledge, and Causation in Conditional Constructions*. Cambridge Studies in Linguistics. Cambridge; New York: Cambridge University Press.
- (2002). 'Mental Space Embeddings, Counterfactuality, and the use of *unless*'. In: *English Language and Linguistics* 6.2, pp. 347–377. DOI: <https://doi.org/10.1017/s1360674302000278>.
- (2003). 'Classifying Conditionals: Form and Function. Review of 'Conditionals' by Renaat Declerck and Susan Reed'. In: *English Language and Linguistics* 7.2, pp. 309–323. DOI: <https://doi.org/10.1017/s1360674303001126>.
- Dancygier, B. and E. Mioduszewska (1984). 'Semanto-Pragmatic Classification of Conditionals'. In: *Studia Anglica Posnaniensia* 17, pp. 121–134.

- Dancygier, B. and E. E. Sweetser (1997). ‘Then in Conditional Constructions’. In: *Cognitive Linguistics* 8.2, pp. 109–136. DOI: <https://doi.org/10.1515/cogl.1997.8.2.109>.
- (2000). ‘Constructions with *if*, *since*, and *because*: Causality, Epistemic Stance, and Clause Order’. In: *Cause - Condition - Concession - Contrast*. Ed. by E. Couper-Kuhlen and B. Kortmann. 2000th ed. Berlin; New York: Mouton de Gruyter, pp. 111–142. DOI: <https://doi.org/10.1515/9783110219043.2.111>.
- (2005). *Mental Spaces in Grammar: Conditional Constructions*. Cambridge Studies in Linguistics. New York: Cambridge University Press.
- Davies, E. C. (1979). *On the Semantics of Syntax*. London: Croom Helm.
- De, M. (2021). ‘Possible Worlds’. In: *The Routledge Handbook of Modality*. New York: Routledge, pp. 10–20.
- de Finetti, B. (1936). ‘La Logique de la Probabilité’. In: *Actes du Congrès International de Philosophie Scientifique* 4, pp. 1–9.
- (1995). ‘The Logic of Probability’. In: *Philosophical Studies* 77.1, pp. 181–190. DOI: <https://doi.org/10.1007/bf00996317>.
- de Haan, F. (2006). ‘Typological Approaches to Modality’. In: *The Expression of Modality*. Ed. by W. Frawley. Berlin; Boston: De Gruyter Mouton, pp. 27–70.
- (2009). ‘On the Status of ‘Epistemic’ *must*’. In: *Studies on English Modality: In Honour of Frank Palmer*. Ed. by A. Tsangalidis and R. Facchinetti. Bern: Peter Lang, pp. 261–284.
- de Haan, S. (1986). ‘Gebruiksmogelijkheden van de Nederlandse imperatief’. In: *TABU* 16, pp. 250–260.
- (1991). ‘Meaning and Use of the Dutch Perfect’. In: *The Function of Tense in Texts*. Ed. by J. Gvozdanović and T. A. J. M. Janssen. Amsterdam: Elsevier, pp. 143–156.
- de Hoop, H. and S. Tarenskeen (2015). ‘It’s all about *you* in Dutch’. In: *Journal of Pragmatics* 88, pp. 163–175. DOI: <https://doi.org/10.1016/j.pragma.2014.07.001>.
- de Jong, W. (2021). ‘Superkrachten voor je hoofd’. In: *NRC (03-27-2021)*, pp. 10–11.
- de Raadt, A., M. J. Warrens, R. J. Bosker and H. A. L. Kiers (2019). ‘Kappa Coefficients for Missing Data’. In: *Educational and Psychological Measurement* 79.3, pp. 558–576. DOI: <https://doi.org/10.1177/0013164418823249>.
- de Rooy, J. (1965). ‘Als-of-dat: een semantisch-onomasiologische studie over enkele subordinerende conjuncties in het ABN, de Nederlandse dialecten en het Fries, vergelijkend-synchronisch beschouwd’. PhD thesis. Assen: Katholieke Universiteit Nijmegen.
- de Schepper, K., G. van Bergen, S. Lestrade and W. Stoop (2014). ‘Prag-Raising Versus Neg-Raising’. In: *Nederlandse Taalkunde* 19.1, pp. 105–117. DOI: <https://doi.org/10.5117/nedtaa2014.1.sche>.
- de Smedt, T. and W. Daelemans (2012). ‘Pattern for Python’. In: *Journal of Machine Learning Research* 13.66, pp. 2063–2067.

- de Sutter, G. (2005). 'Rood, Groen, Corpus! Een taalgebruiksgebaseerde analyse van woordvolgordevariatie in tweeledige werkwoordelijke eindgroepen'. PhD thesis. Leuven: KU Leuven.
- de Vuyst, J. (1983). 'Situation-Descriptions: Temporal and Aspectual Semantics'. In: *Studies in Model Theoretic Semantics*. Ed. by A. G. B. ter Meulen. Dordrecht: Foris, pp. 161–176.
- Dean, R. B. and W. J. Dixon (1951). 'Simplified Statistics for Small Numbers of Observations'. In: *Analytical chemistry* 23.4, pp. 636–638.
- Declerck, R. (1984). 'Pure Future' *will* in *if*-clauses'. In: *Lingua* 63.3-4, pp. 279–312.
- (1988). 'Restrictive *when*-clauses'. In: *Linguistics and Philosophy* 11.2, pp. 131–168. DOI: <https://doi.org/10.1007/bf00632459>.
- (1994). 'The *only/already* Puzzle: A Question of Perspective'. In: *Cognitive Linguistics* 5.4, pp. 307–350. DOI: <https://doi.org/10.1515/cogl.1994.5.4.307>.
- (2011). 'The Definition of Modality'. In: *Human Cognitive Processing*. Ed. by A. Patard and F. Brisard. Vol. 29. Amsterdam: John Benjamins Publishing Company, pp. 21–44. DOI: <https://doi.org/10.1075/hcp.29.05dec>.
- Declerck, R. and S. Reed (2000). 'The Semantics and Pragmatics of *unless*'. In: *English Language and Linguistics* 4.2, pp. 205–241. DOI: <https://doi.org/10.1017/s136067430000023x>.
- (2001). *Conditionals: A Comprehensive Empirical Analysis*. Topics in English Linguistics. Berlin; New York: Mouton de Gruyter.
- Delucchi, K. L. (1976). 'On the use and misuse of Chi-Square'. In: *A Handbook for Data Analysis in the Behavioral Sciences: Statistical issues*. Ed. by G. Keren and C. Lewis, pp. 295–319.
- den Hertog, C. H. (1903). *Nederlandsche spraakkunst: Handleiding ten dienste van aanstaande (taal)onderwijzers*. Amsterdam: Versluys.
- Depraetere, I. (2019). 'Meaning in Context and Contextual Meaning: A Perspective on the Semantics-Pragmatics Interface Applied to Modal Verbs'. In: *Anglophonia* 28. DOI: <https://doi.org/10.4000/anglophonia.2453>.
- DeRose, K. and R. E. Grandy (1999). 'Conditional Assertions and "Biscuit" Conditionals'. In: *Noûs* 33.3, pp. 405–420. DOI: <https://doi.org/10.1111/0029-4624.00161>.
- Desarbo, W. S. and D. K. Hildebrand (1980). 'A Marketer's Guide to Log-Linear Models for Qualitative Data Analysis'. In: *Journal of Marketing* 44.3, pp. 40–51. DOI: <https://doi.org/10.2307/1251110>.
- Dexter, E., G. Rollwagen-Bollens and S. M. Bollens (2018). 'The Trouble With Stress: A Flexible Method for the Evaluation of Nonmetric Multidimensional Scaling'. In: *Limnology and Oceanography: Methods* 16.7, pp. 434–443.
- Deygers, K., V. van Den Heede, S. Grondelaers, D. Speelman and H. van Aken (2000). 'Het Condiv-Corpus Geschreven Nederlands'. In: *Nederlandse Taalkunde* 5.4, pp. 356–363.

- Deza, M. and E. Deza (2013). *Encyclopedia of Distances*. 2nd ed. Berlin: Springer.
- Diepeveen, J., R. J. U. Boogaart, J. Brantjes, P. Byloo, T. A. J. M. Janssen and J. Nuyts (2006). *Modale Uitdrukkingen in Belgisch-Nederlands en Nederlands-Nederlands: Corpusonderzoek en Enquête*. Münster: Nodus Publikationen; Stichting Neerlandistiek VU Amsterdam.
- Diessel, H. (2005). 'Competing Motivations for the Ordering of Main and Adverbial Clauses'. In: *Linguistics* 43.3. DOI: <https://doi.org/10.1515/ling.2005.43.3.449>.
- (2013). 'Adverbial Subordination'. In: *Bloomsbury Companion to Syntax*. Ed. by S. Luraghi and C. Parodi. London: Continuum, pp. 341–354.
- (2015). 'Usage-Based Construction Grammar'. In: *Handbook of Cognitive Linguistics*. Ed. by E. Dąbrowska and D. Divjak. Handbooks of Linguistics and Communication Science. Berlin; Boston: De Gruyter Mouton, pp. 296–322. DOI: <https://doi.org/10.1515/9783110292022-015>.
- Dietz, E.-A., S. Hölldobler and L. M. Pereira (2015). 'On Conditionals.' In: *Gcai 2015*. Vol. 36. Epic series in Computer Science, pp. 79–92.
- Dirix, A. and D. Gelders (2010). 'To Frame is to Explain: A Deductive Frame-Analysis of Dutch and French Climate Change Coverage During the Annual UN Conferences of the Parties'. In: *Public Understanding of Science* 19.6, pp. 732–742. DOI: <https://doi.org/10.1177/0963662509352044>.
- Divjak, D. (2010). *Structuring the Lexicon: A Clustered Model for Near-synonymy*. Berlin; New York: De Gruyter Mouton. DOI: <https://doi.org/10.1515/9783110220599>.
- Divjak, D. and N. Fieller (2014). 'Cluster Analysis: Finding Structure in Linguistic Data'. In: *Human Cognitive Processing*. Ed. by D. Glynn and J. A. Robinson. Vol. 43. Amsterdam: John Benjamins Publishing Company, pp. 405–441. DOI: <https://doi.org/10.1075/hcp.43.16div>.
- Divjak, D. and S. T. Gries (2006). 'Ways of Trying in Russian: Clustering Behavioral Profiles'. In: *Corpus Linguistics and Linguistic Theory* 2.1, pp. 23–60. DOI: <https://doi.org/10.1515/cllt.2006.002>.
- (2008). 'Clusters in the Mind?: Converging Evidence From Near Synonymy in Russian'. In: *The Mental Lexicon* 3.2, pp. 188–213.
- Dolgova Jacobsen, N. (2016). 'The Best of Both Worlds: Combining Cognitive Linguistics and Pedagogic Tasks to Teach English Conditionals'. In: *Applied Linguistics* 39.5, pp. 668–693. DOI: <https://doi.org/10.1093/applin/amw030>.
- Donovan, J. (1895). 'Sonnenschein's Greek Grammar'. In: *The Classical Review* 9.1, pp. 60–67.
- Douven, I. (2016). *The Epistemology of Indicative Conditionals: Formal and Empirical Approaches*. Cambridge: Cambridge University Press.
- (2017a). 'Clustering Colors'. In: *Cognitive Systems Research* 45, pp. 70–81. DOI: <https://doi.org/10.1016/j.cogsys.2017.05.004>.

- (2017b). ‘How to Account for the Oddness of Missing-Link Conditionals’. In: *Synthese* 194.5, pp. 1541–1554. DOI: <https://doi.org/10.1007/s11229-015-0756-7>.
- Douven, I., S. Elqayam and K. Krzyżanowska (2021). ‘Inferentialism: A Manifesto’. In: *Conditionals: Logic, Linguistics, and Psychology*. Palgrave Macmillan. in press.
- Douven, I., S. Elqayam, H. Singmann and J. van Wijnbergen-Huitink (2018). ‘Conditionals and Inferential Connections: A Hypothetical Inferential Theory’. In: *Cognitive Psychology* 101, pp. 50–81. DOI: <https://doi.org/10.1016/j.cogpsych.2017.09.002>.
- Dowty, D. R. (1979). *Word Meaning and Montague Grammar: The Semantics of Verbs and Times in Generative Semantics and in Montague’s PTQ*. Dordrecht; Boston: D. Reidel Publishing Company.
- (1986). ‘The Effects of Aspectual Class on the Temporal Structure of Discourse: Semantics or Pragmatics?’ In: *Linguistics and Philosophy* 9.1, pp. 37–61.
- Dowty, D. R., R. E. Wall and S. Peters (1981). *Introduction to Montague Semantics*. Dordrecht: Springer.
- Ducrot, O. (1996). *Slovenian Lectures. Conférences Slovènes*. Ljubljana: Institut za humanisticne studije.
- Dudman, V. H. (1984). ‘Conditional Interpretations of *if*-Sentences’. In: *Australian Journal of Linguistics* 4.2, pp. 143–204.
- Duin, M. (2011). ‘Als deze zin ook met *wanneer* kan, wat is het verschil dan? Het verschil tussen *wanneer* en *als*’. MA thesis. Leiden: Leiden University.
- Duinhoven, A. M. (1984). ‘Ban de bom! Over Vorm en Betekenis van de Imperatief’. In: *Nieuwe Taalgids* 77.2, pp. 148–156.
- (1995). ‘Had Gebeld! De Irreële Imperatief’. In: *Tijdschrift voor Nederlandse Taal- en Letterkunde* 111.
- (1997). *Middelnederlandse syntaxis: Synchroon en diachroon. Deel 2: De werkwoordgroep*. Leiden: Nijhoff.
- Dummett, M. (1973). *Frege: Philosophy of Language*. London: Gerald Duckworth.
- Dy, J. G. and C. E. Brodley (2004). ‘Feature Selection for Unsupervised Learning’. In: *Journal of Machine Learning Research* 5.Aug, pp. 845–889.
- Ebert, C., C. Endriss and S. Hinterwimmer (2008). ‘A Unified Analysis of Indicative and Biscuit Conditionals as Topics’. In: *Semantics and Linguistic Theory*. Vol. 18, pp. 266–283.
- Edgington, D. (1986). ‘Do Conditionals Have Truth Conditions?’ In: *Crítica: Revista Hispanoamericana de Filosofía*, pp. 3–39.
- (1995). ‘On Conditionals’. In: *Mind* 104.414, pp. 235–329.
- (2008). ‘The Presidential Address: Counterfactuals’. In: *Proceedings of the Aristotelian Society* 108, pp. 1–21.
- (2020). ‘Counterfactual Conditionals’. In: *The Routledge Handbook of Modality*. Ed. by O. Bueno and S. A. Shalkowski. New York: Routledge, pp. 30–39.

- Edgington, D. (2021). 'Suppose and Tell: The Semantics and Heuristics of Conditionals'. In: *History and Philosophy of Logic*, pp. 1–8. DOI: <https://doi.org/10.1080/01445340.2021.1958648>.
- Egre, P. and M. Cozic (2016). 'Conditionals'. In: *The Cambridge Handbook of Formal Semantics*. Ed. by M. Aloni and P. Dekker. Cambridge: Cambridge University Press, pp. 490–524. DOI: <https://doi.org/10.1017/cbo9781139236157.018>.
- Elder, C.-H. (2019a). *Context, Cognition and Conditionals*. Palgrave Studies in Pragmatics, Language and Cognition. Cham: Palgrave Macmillan. DOI: <https://doi.org/10.1007/978-3-030-13799-1>.
- (2019b). 'Metalinguistic Conditionals and the Role of Explicit Content'. In: *Linguistics* 57.6, pp. 1337–1365. DOI: <https://doi.org/10.1515/ling-2019-0029>.
- Elder, C.-H. and K. M. Jaszczolt (2016). 'Towards a Pragmatic Category of Conditionals'. In: *Journal of Pragmatics* 98, pp. 36–53. DOI: <https://doi.org/10.1016/j.pragma.2016.04.013>.
- Elder, C.-H. and E. Savva (2018). 'Incomplete Conditionals and the Syntax–Pragmatics Interface'. In: *Journal of Pragmatics* 138, pp. 45–59. DOI: <https://doi.org/10.1016/j.pragma.2018.09.015>.
- Elliott, W. E. (1981). 'Conditional Sentences in the New Testament'. PhD thesis. Winona Lake: Grace Theological Seminary.
- Enders, C. K. (2010). *Applied Missing Data Analysis*. Methodology in the Social Sciences. New York: Guilford Press.
- Eskin, E., A. Arnold, M. Prerau, L. Portnoy and S. Stolfo (2002). 'A Geometric Framework for Unsupervised Anomaly Detection'. In: *Applications of Data Mining in Computer Security*. Springer, pp. 77–101.
- Espino, O. and R. M. J. Byrne (2012). 'It is not the Case That if you Understand a Conditional you Know how to Negate it'. In: *Journal of Cognitive Psychology* 24.3, pp. 329–334. DOI: <https://doi.org/10.1080/20445911.2011.639759>.
- Espino, O., R. M. J. Byrne and P. N. Johnson-Laird (2020). 'Possibilities and the Parallel Meanings of Factual and Counterfactual Conditionals'. In: *Memory & Cognition* 48.7, pp. 1263–1280. DOI: <https://doi.org/10.3758/s13421-020-01040-6>.
- Ester, M. (2014). 'Density-Based Clustering'. In: *Data Clustering: Algorithms and Applications*. Ed. by C. C. Aggarwal and C. K. Reddy. Chapman & Hall/CRC Data Mining and Knowledge Discovery Series. Boca Raton: Chapman & Hall/CRC, pp. 111–126.
- Estiri, H., J. G. Klann and S. N. Murphy (2019). 'A Clustering Approach for Detecting Implausible Observation Values in Electronic Health Records Data'. In: *BMC Medical Informatics and Decision Making* 19.142. DOI: <https://doi.org/10.1186/s12911-019-0852-6>.
- Evans, J. St. B. T. (1972). 'Reasoning With Negatives'. In: *British Journal of Psychology* 63.2, pp. 213–219. DOI: <https://doi.org/10.1111/j.2044-8295.1972.tb02102.x>.

- (2005). ‘The Social and Communicative Function of Conditional Statements’. In: *Mind & Society* 4.1, pp. 97–113. DOI: <https://doi.org/10.1007/s11299-005-0003-x>.
- Evans, J. S. B. T., J. Clibbens and B. Rood (1996). ‘The Role of Implicit and Explicit Negation in Conditional Reasoning Bias’. In: *Journal of Memory and Language* 35.3, pp. 392–409.
- Evans, J. S. B. T. and S. J. Handley (1999). ‘The Role of Negation in Conditional Inference’. In: *The Quarterly Journal of Experimental Psychology Section A* 52.3, pp. 739–769. DOI: <https://doi.org/10.1080/713755834>.
- Evans, J. S. B. T., S. J. Handley and D. E. Over (2003). ‘Conditionals and Conditional Probability’. In: *Journal of Experimental Psychology: Learning, Memory, and Cognition* 29.2, pp. 321–335. DOI: <https://doi.org/10.1037/0278-7393.29.2.321>.
- Evans, J. S. B. T. and D. E. Over (2004). *If: Supposition, Pragmatics, and Dual Processes*. Oxford: Oxford University Press.
- Evans, N. (2007). ‘Insubordination and its Uses’. In: *Finiteness: Theoretical and Empirical Foundations*. Ed. by I. Nikolaeva. Oxford; New York: Oxford University Press, pp. 366–431.
- Everitt, B. (1977). *The Analysis of Contingency Tables*. Monographs on Applied Probability and Statistics. London; New York: Chapman & Hall; John Wiley & Sons.
- Evers-Vermeul, J., J. Hoek and M. C. Scholman (2017). ‘On Temporality in Discourse Annotation: Theoretical and Practical Considerations’. In: *Dialogue & Discourse* 8.2, pp. 1–20.
- Fauconnier, G. (1994). *Mental Spaces: Aspects of Meaning Construction in Natural Language*. Cambridge; New York, NY, USA: Cambridge University Press.
- Faure, D. and C. Nédellec (1998). ‘A Corpus-Based Conceptual Clustering Method for Verb Frames and Ontology Acquisition’. In: *Lrec Workshop on Adapting Lexical and Corpus Resources to Sublanguages and Applications*. Vol. 707. 728.
- Feger, H. (2001). ‘Classification: Conceptions in the Social Sciences’. In: *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier, pp. 1966–1973. DOI: <https://doi.org/10.1016/b0-08-043076-7/00699-9>.
- Feinstein, A. R. and D. V. Cicchetti (1990). ‘High Agreement but low Kappa: I. the Problems of two Paradoxes’. In: *Journal of Clinical Epidemiology* 43.6, pp. 543–549. DOI: [https://doi.org/10.1016/0895-4356\(90\)90158-l](https://doi.org/10.1016/0895-4356(90)90158-l).
- Ferguson, G. (2001). ‘If you pop Over There: A Corpus-Based Study of Conditionals in Medical Discourse’. In: *English for Specific Purposes* 20.1, pp. 61–82. DOI: [https://doi.org/10.1016/s0889-4906\(99\)00027-7](https://doi.org/10.1016/s0889-4906(99)00027-7).
- Field, A. P., J. Miles and Z. Field (2012). *Discovering Statistics Using R*. London; Thousand Oaks, California: Sage.
- Fillenbaum, S. (1975). ‘If: Some Uses’. In: *Psychological Research* 37.3, pp. 245–260. DOI: <https://doi.org/10.1007/bf00309037>.

- Fillenbaum, S. (1986). 'The Use of Conditionals in Inducements and Deterrents'. In: *On Conditionals*. Ed. by E. C. Traugott, A. T. Meulen, J. S. Reilly and C. A. Ferguson. Cambridge: Cambridge University Press, pp. 179–195.
- Fillmore, C. J. (1975). 'An Alternative to Checklist Theories of Meaning'. In: *Proceedings of the First Annual Linguistics Society, Berkeley*. Berkeley: Berkeley Linguistics Society, pp. 123–131.
- (1985). 'Frames and the Semantics of Understanding'. In: *Quaderni di Semantica* 6.2, pp. 222–254.
- (1986). 'Varieties of Conditional Sentences'. In: *Eastern States Conference on Linguistics*. Vol. 3. Ithaca: DMLL Publications, pp. 163–182.
- (1992). 'Epistemic Stance and Grammatical Form in English Conditional Sentences'. In: *The 26th Regional Meeting of the Chicago Linguistic Society*. Vol. 26, pp. 137–161.
- Fillmore, C. J., P. Kay and M. C. O'Connor (1988). 'Regularity and Idiomaticity in Grammatical Constructions: The Case of *let alone*'. In: *Language* 64.3, pp. 501–538. DOI: <https://doi.org/10.2307/414531>.
- Finkbeiner, R. (2019). 'Reflections on the Role of Pragmatics in Construction Grammar'. In: *Constructions and Frames* 11.2, pp. 171–192. DOI: [10.1075/cf.00027.fin](https://doi.org/10.1075/cf.00027.fin).
- Fleischman, S. (1995). 'Imperfective and Irrealis'. In: *Typological Studies in Language*. Ed. by J. L. Bybee and S. Fleischman. Vol. 32. Amsterdam: John Benjamins Publishing Company, pp. 519–551. DOI: <https://doi.org/10.1075/tsl.32.23fle>.
- Fleiss, J. and J. Cohen (1973). 'Kappa/Weighted Kappa'. In: *Educational and Psychological Measurement* 33, pp. 613–619.
- Foolen, A. (1993). 'De Betekenis van partikels: een dokumentatie van de stand van het onderzoek, met bijzondere aandacht voor 'maar''. PhD thesis. Nijmegen: Katholieke Universiteit Nijmegen.
- Fop, M. and T. B. Murphy (2018). 'Variable Selection Methods for Model-Based Clustering'. In: *Statistics Surveys* 12.0, pp. 18–65. DOI: <https://doi.org/10.1214/18-ss119>.
- Forbes, G. (1994). *Modern Logic: A Text in Elementary Symbolic Logic*. New York: Oxford University Press.
- Ford, C. E. (1993). *Grammar in Interaction: Adverbial Clauses in American English Conversations*. Cambridge: Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511554278>.
- (1997). 'Speaking Conditionally: Some Contexts for *if*-clauses in Conversation'. In: *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company, pp. 387–414. DOI: <https://doi.org/10.1075/cilt.143.21for>.

- Ford, C. E. and S. A. Thompson (1986). 'Conditionals in Discourse: A Text-Based Study From English'. In: *On Conditionals*. Ed. by E. C. Traugott, A. T. Meulen, J. S. Reilly and C. A. Ferguson. Cambridge: Cambridge University Press, pp. 353–372. DOI: <https://doi.org/10.1017/cbo9780511753466.019>.
- Fortuin, E. L. J. (2004). 'De syntaxis van imperatiefsubjecten en modale Partikels: een pragma-semantische benadering'. In: *Nederlandse Taalkunde* 9, pp. 355–375.
- (2011). 'Iconicity, Economy and Frequency: the Paratactic Conditional Perfective Present Construction in Russian'. In: *Russian Linguistics* 35.1, pp. 89–123. DOI: <https://doi.org/10.1007/s11185-010-9071-6>.
- (2019). 'Universality and Language-Dependency of Tense and Aspect: Performatives from a Crosslinguistic Perspective'. In: *Linguistic Typology* 23.1, pp. 1–58. DOI: <https://doi.org/10.1515/lingty-2018-0018>.
- Fortuin, E. L. J. and R. J. U. Boogaart (2009). 'Imperative as Conditional: From Constructional to Compositional Semantics'. In: *Cognitive Linguistics* 20.4. DOI: <https://doi.org/10.1515/cogl.2009.028>.
- Fowlkes, E. B., R. Gnanadesikan and J. R. Kettenring (1988). 'Variable Selection in Clustering'. In: *Journal of classification* 5.2, pp. 205–228.
- Fraley, C. and A. E. Raftery (1998). 'How Many Clusters? Which Clustering Method? Answers via Model-Based Cluster Analysis'. In: *The Computer Journal* 41.8, pp. 578–588.
- (2002). 'Model-Based Clustering, Discriminant Analysis, and Density Estimation'. In: *Journal of the American Statistical Association* 97.458, pp. 611–631. DOI: <https://doi.org/10.1198/016214502760047131>.
- Frege, G. (1879). *Begriffsschrift, Eine der Arithmetischen Nachgebildete Formelsprache des Reinen Denkens*. Verlag von Louis Nebert.
- (1948). 'Sense and Reference'. In: *The Philosophical Review* 57.3, pp. 209–230. DOI: <https://doi.org/10.2307/2181485>.
- Fugard, A., N. Pfeifer, M. B. and G. Kleiter (2011). 'How People Interpret Conditionals: Shifts Toward the Conditional Event'. In: *Journal of Experimental Psychology Learning Memory and Cognition* 37, pp. 635–648.
- Funk, W.-P. (1985). 'On a Semantic Typology of Conditional Sentences'. In: *Folia Linguistica* 19.3-4, pp. 365–413. DOI: <https://doi.org/10.1515/flin.1985.19.3-4.365>.
- Gabrielatos, C. (2010). 'A Corpus-Based Examination of English if-Conditionals Through the Lens of Modality: Nature and Types'. PhD thesis. Lancaster University.
- (2019). 'If-Conditionals and Modality: Frequency Patterns and Theoretical Explanations'. In: *Journal of English Linguistics* 47.4, pp. 301–334. DOI: <https://doi.org/10.1177/0075424219875994>.
- (2020). 'Conditionals, Modality, and Schrödinger's cat: Conditionals as a Family of Linguistic Qubits'. In: *Re-Assessing Modalising Expressions: Categories, Co-Text, and Context*. Ed. by P. Hohaus and R. Schulze. Amsterdam: John Benjamins Publishing Company, pp. 141–172.

- Gabrielatos, C. (2021). ‘If-conditionals: Corpus-based Classification and Frequency Distribution’. In: *ICAME Journal* 45.1, pp. 87–124. DOI: 10.2478/icame-2021-0003.
- Gamut, L. T. F. (1991). *Language, Logic, and Meaning: Introduction to Logic*. Vol. 1.
- Gastwirth, J. L. (1972). ‘The Estimation of the Lorenz Curve and Gini Index’. In: *The Review of Economics and Statistics* 54.3, pp. 306–316. DOI: <https://doi.org/10.2307/1937992>.
- Gazdar, G. (1979). *Pragmatics: Implicature, Presupposition and Logical Form*. New York: Academic Press.
- Gazzo Castañeda, L. E. and M. Knauff (2021). ‘Specificity Effects in Reasoning with Counterintuitive and Arbitrary Conditionals’. In: *Memory & Cognition*. DOI: 10.3758/s13421-021-01235-5.
- Geach, P. T. (1976). *Reason and Argument*. Berkeley: University of California Press.
- Geeraerts, D. (2006). ‘Prototype Theory’. In: *Cognitive Linguistics: Basic Readings*. Ed. by D. Geeraerts. Vol. 34. Berlin; New York: Mouton de Gruyter, pp. 141–166. DOI: <https://doi.org/10.1515/9783110199901.141>.
- (2017). ‘Entrenchment as Onomasiological Salience’. In: *Entrenchment and the Psychology of Language Learning*. Ed. by H.-J. Schmid. Berlin; Boston: De Gruyter Mouton, pp. 153–174. DOI: <https://doi.org/10.1515/9783110341423-008>.
- Geerts, G., W. Haeseryn, J. de Rooij and M. C. van den Toorn (1984). *Algemene Nederlandse Spraakkunst*. Groningen: Wolters-Noordhoff.
- Geis, M. L. (1973). ‘If and unless’. In: *Issues in Linguistics: Papers in Honor of Henry and René Kahane*. Ed. by B. B. Kachru, R. B. Lees, Y. Malkiel, A. Petrangeli and S. Petrangeli. Urbana: University of Illinois Press, pp. 231–253.
- Geis, M. L. and W. G. Lycan (1993). ‘Nonconditional Conditionals’. In: *Philosophical Topics* 21.2, pp. 35–56. DOI: <https://doi.org/10.5840/philtopics199321215>.
- Geis, M. L. and A. M. Zwicky (1971). ‘On Invited Inferences’. In: *Linguistic Inquiry* 2.4, pp. 561–566.
- Gerlofs, J. M. (2009). ‘The use of Conditionals in Argumentation: A Proposal for the Analysis and Evaluation of Argumentatively Used Conditionals’. PhD thesis. Amsterdam: University of Amsterdam.
- Geurts, B. (1999). *Presuppositions and Pronouns*. Amsterdam; New York: Elsevier.
- (2017). ‘Presupposition and Givenness’. In: *The Oxford Handbook of Pragmatics*. Ed. by Y. Huang. Vol. 1. Oxford University Press, pp. 180–198. DOI: <https://doi.org/10.1093/oxfordhb/9780199697960.013.21>.
- Giannakidou, A. (1998). *Polarity Sensitivity as (Non)Veridical Dependency*. Linguistik Aktuell. Amsterdam: John Benjamins Publishing Company.
- Gildersleeve, B. L. (1882). ‘Studies in Pindaric Syntax’. In: *The American Journal of Philology* 3.12, pp. 434–455.

- Glasbey, S. (2007). 'Aspectual Composition in Idioms'. In: *Recent Advances in the Syntax and Semantics of Tense, Aspect and Modality*. Ed. by d. Louis, J. Moeschler and G. Puskás. Berlin: Mouton de Gruyter, pp. 71–87.
- Godden, D. M. and D. Walton (2004). 'Denying the Antecedent as a Legitimate Argumentative Strategy: A Dialectical Model'. In: *Informal Logic* 24.3, pp. 219–243. DOI: <https://doi.org/10.22329/il.v24i3.2146>.
- Goebel, A. (2017). 'Laws for Biscuits: Independence and Dependence in Conditionals'. In: *Semantics and Linguistic Theory* 27, pp. 377–396. DOI: <https://doi.org/10.3765/salt.v27i0.4163>.
- Goldberg, A. E. (1995). *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.
- (1996). 'Making One's Way Through the Data'. In: *Grammatical Constructions: Their Form and Meaning*. Ed. by S. A. Thompson and M. Shibatani. Oxford: Oxford University Press, pp. 29–53.
- (2006). *Constructions at Work: The Nature of Generalization in Language*. Oxford; New York: Oxford University Press.
- (2013). 'Constructionist Approaches'. In: *The Oxford Handbook of Construction Grammar*. Ed. by T. Hoffmann and G. Trousdale. Oxford University Press, pp. 15–31. DOI: 10.1093/oxfordhb/9780195396683.013.0002.
- (2019). *Explain me This: Creativity, Competition, and the Partial Productivity of Constructions*. Princeton, NJ: Princeton University Press.
- Gomes, G. (2020). 'Concessive Conditionals Without *even if* and Nonconcessive Conditionals with *even if*'. In: *Acta Analytica* 35.1, pp. 1–21. DOI: <https://doi.org/10.1007/s12136-019-00396-y>.
- Goodall, D. W. (1966). 'A New Similarity Index Based on Probability'. In: *Biometrics* 22.4, pp. 882–907. DOI: <https://doi.org/10.2307/2528080>.
- Goodwin, W. W. (1879). *The Greek Verb*. 5th ed. Cambridge: John Wilson & Son.
- Gower, J. C. (1971). 'A General Coefficient of Similarity and some of its Properties'. In: *Biometrics* 27.4, pp. 857–871. DOI: <https://doi.org/10.2307/2528823>.
- Greenberg, J. H. (1957). 'The Nature and Uses of Linguistic Typologies'. In: *International Journal of American Linguistics* 23.2, pp. 68–77.
- (1966). 'Some Universals of Grammar With Particular Reference to the Order of Meaningful Elements'. In: *Universals of Language: Report of a Conference Held at Dobbs Ferry, New York, April 13-15, 1961*. Ed. by J. H. Greenberg. 2nd ed. Cambridge, Massachusetts: MIT Press, pp. 73–113.
- Grice, H. P. (1957). 'Meaning'. In: *The Philosophical Review* 66.3, pp. 377–388. DOI: <https://doi.org/10.2307/2182440>.
- (1975). 'Logic and Conversation'. In: *Speech Acts*. Ed. by P. Cole and J. L. Morgan. Leiden: Brill, pp. 41–58. DOI: https://doi.org/10.1163/9789004368811_003.
- (1989). *Studies in the way of Words*. Cambridge, Massachusetts: Harvard University Press.

- Grice, H. P. and A. R. White (1961). 'The Causal Theory of Perception'. In: *Proceedings of the Aristotelian Society, Supplementary Volumes* 35, pp. 121–168.
- Gries, S. T. and N. Otani (2010). 'Behavioral Profiles: A Corpus-Based Perspective on Synonymy and Antonymy'. In: *ICAME Journal* 34, pp. 121–150.
- Gries, S. T. and A. Stefanowitsch (2010). 'Cluster Analysis and the Identification of Collexeme Classes'. In: *Empirical and Experimental Methods in Cognitive/Functional Research*. Ed. by S. Rice and J. Newman. Stanford: CSLI Publications.
- Gries, S. Th. (2009). *Quantitative Corpus Linguistics With R: A Practical Introduction*. New York: Routledge.
- (2010). 'Behavioral Profiles: A Fine-Grained and Quantitative Approach in Corpus-Based Lexical Semantics'. In: *The Mental Lexicon* 5.3, pp. 323–346. DOI: <https://doi.org/10.1075/ml.5.3.04gri>.
- (2013). *Statistics for Linguistics With R: A Practical Introduction*. Berlin: Walter de Gruyter.
- Grubbs, F. E. (1969). 'Procedures for Detecting Outlying Observations in Samples'. In: *Technometrics* 11.1, pp. 1–21.
- Grusdt, B. and M. Franke (2021). 'Communicating Uncertain Beliefs with Conditionals: Probabilistic Modeling and Experimental Data'. In: *Proceedings of the Annual Meeting of the Cognitive Science Society*. Vol. 43, pp. 1712–1718.
- Günthner, S. (2016). 'From Biclausal Constructions to 'Stand-Alone'-Conditionals: 'Syntactically Disintegrated wenn-constructions' in Everyday Spoken German'. In: *Sprache Interaktion Arbeitspapierreihe* 58.
- Gwet, K. L. (2008). 'Computing Inter-Rater Reliability and its Variance in the Presence of High Agreement'. In: *British Journal of Mathematical and Statistical Psychology* 61.1, pp. 29–48. DOI: <https://doi.org/10.1348/000711006x126600>.
- (2011). 'On Krippendorff's Alpha Coefficient'. Gaithersburg, MD.
- (2014). *Handbook of Inter-Rater Reliability: The Definitive Guide to Measuring the Extent of Agreement Among Raters*. Advanced Analytics, LLC.
- Haegeman, L. M. V. (2003). 'Conditional Clauses: External and Internal Syntax'. In: *Mind and Language* 18.4, pp. 317–339. DOI: <https://doi.org/10.1111/1468-0017.00230>.
- (2012). *Adverbial Clauses, Main Clause Phenomena, and Composition of the Left Periphery*. Oxford; New York: Oxford University Press.
- Haegeman, L. M. V. and H. Wekker (1984). 'The Syntax and Interpretation of Futurate Conditionals in English'. In: *Journal of Linguistics* 20.1, pp. 45–55. DOI: <https://doi.org/10.2307/4175718>.
- Haeseryn, W., K. Romijn, J. Geerts de Rooij and M. C. van den Toorn (1997). *Algemene Nederlandse Spraakkunst*. 2nd ed. Groningen: Wolters-Noordhoff.

- Haigh, M., A. J. Stewart, J. S. Wood and L. Connell (2011). 'Conditional Advice and Inducements: Are Readers Sensitive to Implicit Speech Acts During Comprehension?' In: *Acta Psychologica* 136.3, pp. 419–424. DOI: <https://doi.org/10.1016/j.actpsy.2011.01.009>.
- Haiman, J. (1974). 'Concessives, Conditionals, and Verbs of Volition'. In: *Foundations of Language* 11, pp. 341–359. DOI: <https://doi.org/10.2307/25000782>.
- (1978). 'Conditionals are Topics'. In: *Language* 54.3, pp. 564–589. DOI: <https://doi.org/10.1353/lan.1978.0009>.
- (1985). *Natural Syntax: Iconicity and Erosion*. Cambridge Studies in Linguistics. Cambridge; New York: Cambridge University Press.
- Haiman, J. and S. A. Thompson (1984). "Subordination" in Universal Grammar'. In: *Proceedings of the Tenth Annual Meeting of the Berkeley Linguistics Society*. Vol. 10, pp. 510–523. DOI: <https://doi.org/10.3765/bls.v10i0.1973>.
- Hale, B. (1997). 'Grundlagen §64'. In: *Proceedings of the Aristotelian Society*. Vol. 97. 3, pp. 243–261. DOI: <https://doi.org/10.1111/1467-9264.00015>.
- Han, J., L. Zhu, M. Kulldorff, S. Hostovich, D. G. Stinchcomb, Z. Tatalovich, D. R. Lewis and E. J. Feuer (2016). 'Using Gini Coefficient to Determining Optimal Cluster Reporting Sizes for Spatial Scan Statistics'. In: *International Journal of Health Geographics* 15.1. DOI: <https://doi.org/10.1186/s12942-016-0056-6>.
- Handley, S. J., J. S. B. T. Evans and V. A. Thompson (2006). 'The Negated Conditional: A Litmus Test for the Suppositional Conditional?' In: *Journal of Experimental Psychology: Learning, Memory, and Cognition* 32.3, pp. 559–569. DOI: <https://doi.org/10.1037/0278-7393.32.3.559>.
- Harnad, S. (2017). 'To Cognize is to Categorize: Cognition is Categorization'. In: *Handbook of Categorization in Cognitive Science*. Elsevier, pp. 21–54.
- Harris, R. J. (2001). *A Primer of Multivariate Statistics*. 3rd ed. Mahwah: Lawrence Erlbaum Associates.
- Hartigan, J. A. and P. M. Hartigan (1985). 'The Dip Test of Unimodality'. In: *The Annals of Statistics* 13.1, pp. 70–84. DOI: <https://doi.org/10.1214/aos/1176346577>.
- Hartigan, P. M. (1985). 'Computation of the Dip Statistic to Test for Unimodality'. In: *Applied Statistics* 34.3, pp. 320–325. DOI: <https://doi.org/10.2307/2347485>.
- Hartmann, S. and U. Hahn (2020). 'A New Approach to Testimonial Conditionals'. In: *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. Ed. by S. Denison, M. Mack, Y. Xu and B. C. Armstrong, pp. 981–986.
- Haspelmath, M. (1997). *Indefinite Pronouns*. Oxford; New York: Clarendon Press; Oxford University Press.
- (2006). 'Against Markedness (and What to Replace it With)'. In: *Journal of Linguistics* 42.1, pp. 25–70.

- Hassett, W., S. M. Bollens, T. D. Counihan, G. Rollwagen-Bollens, J. Zimmerman, S. Katz and J. Emerson (2017). 'Veligers of the Invasive Asian Clam *Corbicula Fluminea* in the Columbia River Basin: Broad-scale Distribution, Abundance, and Ecological Associations'. In: *Lake and Reservoir Management* 33.3, pp. 234–248. DOI: <https://doi.org/10.1080/10402381.2017.1294218>.
- Hay, J. and H. Baayen (2003). 'Phonotactics, Parsing and Productivity'. In: *Italian Journal of Linguistics* 15, pp. 99–130.
- Hayes, A. F. and K. Krippendorff (2007). 'Answering the Call for a Standard Reliability Measure for Coding Data'. In: *Communication Methods and Measures* 1.1, pp. 77–89.
- Heim, I. and A. Kratzer (1998). *Semantics in Generative Grammar*. Oxford: Blackwell Publishers.
- Hempel, C. G. and P. Oppenheim (1936). *Der Typusbegriff im Lichte der Neuen Logik (The Concept of Type in the Light of Modern Logic. Scientific-Theoretical Investigations in Constitution Research and Psychology)*. Wissenschaftstheoretische Untersuchungen zur Konstitutionsforschung und Psychologie. Leiden: Sijthoff.
- Hempel, C. G. (1965). 'Fundamentals of Taxonomy'. In: *Aspects of Scientific Explanation*. Glencoe: Free Press, pp. 137–154.
- Hennig, C. (2007). 'Cluster-Wise Assessment of Cluster Stability'. In: *Computational Statistics & Data Analysis* 52.1, pp. 258–271. DOI: <https://doi.org/10.1016/j.csda.2006.11.025>.
- (2015). 'What are the True Clusters?' In: *Pattern Recognition Letters* 64, pp. 53–62. DOI: <https://doi.org/10.1016/j.patrec.2015.04.009>.
- Hennig, C. and T. F. Liao (2013). 'How to Find an Appropriate Clustering for Mixed-Type Variables With Application to Socio-Economic Stratification'. In: *Journal of the Royal Statistical Society: Series C (Applied Statistics)* 62.3, pp. 309–369.
- Heringer, J. T. J. (1972). 'Some Grammatical Correlates of Felicity Conditions and Presuppositions'. PhD thesis. Ohio State University Department of Linguistics.
- Hermkens, H. M. (1974). *Verzorgd Nederlands*. 5th ed. Den Bosch: Malmberg.
- Hilpert, M. and S. T. Gries (2009). 'Assessing Frequency Changes in Multistage Diachronic Corpora: Applications for Historical Corpus Linguistics and the Study of Language Acquisition'. In: *Literary and Linguistic Computing* 24.4, pp. 385–401. DOI: <https://doi.org/10.1093/lle/fqn012>.
- Hilton, D. (2016). 'Pragmatic Approaches to Deontic Conditionals: From Rule Content to Rule Use'. In: *Cognitive Unconscious and Human Rationality*. Ed. by L. Macchi, M. Bagassi and R. Viale. MIT Press, pp. 183–203. DOI: <https://doi.org/10.7551/mitpress/10100.003.0014>.
- Hobbs, J. R. (1979). 'Coherence and Coreference'. In: *Cognitive Science* 3.1, pp. 67–90. DOI: https://doi.org/10.1207/s15516709cog0301_4.

- Hoek, J. (2018). *Making Sense of Discourse: On Discourse Segmentation and the Linguistic Marking of Coherence Relations*. Utrecht: LOT/Netherlands Graduate School of Linguistics.
- Hoek, J., J. Evers-Vermeul and T. J. M. Sanders (2019). 'Using the Cognitive Approach to Coherence Relations for Discourse Annotation'. In: *Dialogue & Discourse* 10.2, pp. 1–33.
- Hoeksema, J. (2012). 'On the Natural History of Negative Polarity Items'. In: *Linguistic Analysis* 38.1/2, pp. 3–33.
- Hoeksema, J. and F. Zwarts (1991). 'Some Remarks on Focus Adverbs'. In: *Journal of Semantics* 8.1-2, pp. 51–70. DOI: <https://doi.org/10.1093/jos/8.1-2.51>.
- Holleman, B. C. and H. L. W. Pander Maat (2009). 'The Pragmatics of Profiling: Framing Effects in Text Interpretation and Text Production'. In: *Journal of Pragmatics* 41.11, pp. 2204–2221. DOI: <https://doi.org/10.1016/j.pragma.2008.09.038>.
- Hopper, P. J. and E. C. Traugott (2003). *Grammaticalization*. Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9781139165525>.
- Horn, L. R. (1972). 'On the Semantic Properties of Logical Operators in English'. PhD thesis. Los Angeles: University of California.
- (1984). 'Toward a New Taxonomy for Pragmatic Inference: Q-Based and R Based Implicature'. In: *Meaning, Form and Use in Context*. Ed. by D. Schiffrin. Washington: Georgetown University Press.
- (1985). 'Metalinguistic Negation and Pragmatic Ambiguity'. In: *Language* 61.1, pp. 121–174. DOI: <https://doi.org/10.2307/413423>.
- (1989). *A Natural History of Negation*. The David Hume Series. Chicago: University of Chicago Press.
- (2000). 'From *if* to *iff*: Conditional Perfection as Pragmatic Strengthening'. In: *Journal of Pragmatics* 32.3, pp. 289–326. DOI: [https://doi.org/10.1016/s0378-2166\(99\)00053-3](https://doi.org/10.1016/s0378-2166(99)00053-3).
- (2008). 'Toward a Fregean Pragmatics: Voraussetzung, Nebengedanke, Andeutung'. In: *Explorations in Pragmatics*. Ed. by I. Kecskes and L. R. Horn. Berlin: De Gruyter Mouton, pp. 39–72. DOI: <https://doi.org/10.1515/9783110198843.1.39>.
- (2016). 'Information Structure and the Landscape of (Non-)at-Issue Meaning'. In: *The Oxford Handbook of Information Structure*. Ed. by C. Féry and S. Ishihara. Vol. 1. Oxford University Press. DOI: <https://doi.org/10.1093/oxfordhb/9780199642670.013.009>.
- Horsella, M. and G. Sindermann (1992). 'Aspects of Scientific Discourse: Conditional Argumentation'. In: *English for Specific Purposes* 11.2, pp. 129–139. DOI: [https://doi.org/10.1016/s0889-4906\(05\)80004-3](https://doi.org/10.1016/s0889-4906(05)80004-3).
- Howitt, D. and D. Cramer (2008). *Introduction to Statistics in Psychology*. 4th ed. Harlow: Prentice Hall.
- Hsu, H.-M., Y.-F. Wang and K.-M. Hu (2015). 'Direct and Indirect Conditionals: A Corpus-Based Study of Chinese *Yaoshi* and *Yaobushi* in Spoken and Written Discourse'. In: *Taiwan Journal of Linguistics* 13.2, pp. 31–77.

- Huang, Y. (2009). 'Neo-Gricean Pragmatics'. In: *Concise Encyclopedia of Pragmatics*. Ed. by J. Mey. 2nd ed. Amsterdam: Elsevier, pp. 676–680.
- ed. (2017). *Introduction*. Oxford: Oxford University Press, pp. 1–12. DOI: <https://doi.org/10.1093/oxfordhb/9780199697960.001.0001>.
- Hubers, F. and H. de Hoop (2013). 'The Effect of Prescriptivism on Comparative Markers in Spoken Dutch'. In: *Linguistics in the Netherlands* 30, pp. 89–101. DOI: <https://doi.org/10.1075/avt.30.07hub>.
- Huddleston, R. (1981). 'Review of 'On the Semantics of Syntax: Mood and Condition in English' by Eirian C. Davies'. In: *Journal of Linguistics* 17.1, pp. 121–124.
- (1988). 'Review of 'A Comprehensive Grammar of the English Language' by Randolph Quirk, Sidney Greenbaum, Geoffrey Leech, and Jan Svartvik'. In: *Language* 64.2, pp. 345–354. DOI: <https://doi.org/10.2307/415437>.
- Huddleston, R. and G. K. Pullum (2002). *The Cambridge Grammar of the English Language*. Cambridge University Press. DOI: <https://doi.org/10.1017/9781316423530>.
- Hwang, M. O. (1979). 'A Semantic and Syntactic Analysis of if-Conditionals'. MA thesis. Los Angeles: University of California.
- Iatridou, S. (1991). 'Topics in Conditionals'. PhD thesis. Massachusetts: Massachusetts Institute of Technology.
- (1993). 'On the Contribution of Conditional *Then*'. In: *Natural Language Semantics* 2.3, pp. 171–199. DOI: <https://doi.org/10.1007/bf01256742>.
- (2000). 'The Grammatical Ingredients of Counterfactuality'. In: *Linguistic Inquiry* 31.2, pp. 231–270.
- (2021). 'Grammar Matters'. In: *Conditionals, Paradox, and Probability*. Ed. by L. Walters and J. Hawthorne. Oxford: Oxford University Press, pp. 122–140. DOI: <https://doi.org/10.1093/oso/9780198712732.003.0008>.
- Ippolito, M. (2003). 'Presuppositions and Implicatures in Counterfactuals'. In: *Natural Language Semantics* 11.2, pp. 145–186. DOI: <https://doi.org/10.1023/a:1024411924818>.
- (2013). *Subjunctive Conditionals: A Linguistic Analysis*. Linguistic Inquiry Monographs. Cambridge, Massachusetts; London, England: MIT Press.
- Israel, M. (1996). 'The *way* Constructions Grow'. In: *Conceptual Structure, Discourse and Language*. Ed. by A. E. Goldberg. Stanford: CSLI, pp. 217–230.
- (2011). *The Grammar of Polarity: Pragmatics, Sensitivity, and the Logic of Scales*. Cambridge University Press.
- Jackendoff, R. (2002). *Foundations of Language: Brain, Meaning, Grammar, Evolution*. Oxford; New York: Oxford University Press.
- Jackson, F. (1979). 'On Assertion and Indicative Conditionals'. In: *The Philosophical Review* 88.4, pp. 565–589. DOI: <https://doi.org/10.2307/2184845>.
- (1987). *Conditionals*. Oxford; New York: Blackwell.
- (1998). *Mind, Method, and Conditionals: Selected Essays*. London; New York: Routledge.

- (2006). ‘Conditionals’. In: *The Blackwell Guide to the Philosophy of Language*. Ed. by M. Devitt and R. Hanley. New Jersey: Wiley-Blackwell; John Wiley & Sons, pp. 212–224.
- Jacobsen, N. (2015). ‘A Cognitive Linguistic Analysis of English Conditionals in English for Academic Purposes (EAP) Instruction: Implications From Sociocultural Theory’. In: *Cognitive Linguistics and Sociocultural Theory*. Ed. by K. Masuda, C. Arnett and A. Labarca. Berlin: De Gruyter, pp. 103–126. DOI: <https://doi.org/10.1515/9781614514442-007>.
- Jacoby, S. and E. Ochs (1995). ‘Co-Construction: An Introduction’. In: *Research on Language and Social Interaction* 28.3, pp. 171–183. DOI: https://doi.org/10.1207/s15327973rlsi2803_1.
- Jain, A. K. and R. C. Dubes (1988). *Algorithms for Clustering Data*. New Jersey: Prentice-Hall, Inc.
- Jansen, F. (2009). ‘Het middenstuk in stukjes: Een onderzoek op basis van een corpus naar de werkzaamheid van grammaticale en communicatieve woordvolgordeprincipes in journalistieke teksten’. In: *Nederlandse Taalkunde* 14.2, pp. 172–191.
- Jansen, H. (2003). ‘Van omgekeerde strekking. Een pragma-dialectische reconstructie van a contrario-argumentatie in het recht’. PhD thesis. Amsterdam: Universiteit van Amsterdam.
- (2011). “‘If That Were True, I Would Never Have...’ The Counterfactual Presentation of Arguments That Appeal to Human Behaviour’. In: *Proceedings of the Seventh Conference of the International Society for the Study of Argumentation*. Ed. by F. H. van Eemeren, B. J. Garssen, D. Godden and G. Mitchell. Amsterdam: Rozenberg, pp. 881–889.
- Janssen, T. A. J. M. (1989). ‘Tempus: Interpretatie en Betekenis’. In: *De Nieuwe Taalgids* 82.312, pp. 323–325.
- Jespersen, O. (1940). *A Modern English Grammar on Historical Principles*. London: Allen and Unwin.
- Johnson-Laird, P. N. (1982). ‘Formal Semantics and the Psychology of Meaning’. In: *Processes, Beliefs, and Questions: Essays on Formal Semantics of Natural Language and Natural Language Processing*. Ed. by S. Peters and E. Saarinen. Synthese Language Library. Dordrecht: Springer, pp. 1–68. DOI: https://doi.org/10.1007/978-94-015-7668-0_1.
- (1986). ‘Conditionals and Mental Models’. In: *On Conditionals*. Ed. by E. C. Traugott, A. G. B. ter Meulen, J. S. Reilly and C. A. Ferguson. Cambridge: Cambridge University Press, pp. 55–76. DOI: <https://doi.org/10.1017/cbo9780511753466>.
- (2012). ‘The Truth About Conditionals’. In: *The Science of Reason: A Festschrift for Jonathan St. B. T. Evans*. Ed. by K. Manktelow, D. Over and S. Elqayam. New York: Psychology Press, pp. 135–160.
- Johnson-Laird, P. N. and R. M. J. Byrne (2002). ‘Conditionals: A Theory of Meaning, Pragmatics, and Inference.’ In: *Psychological Review* 109.4, pp. 646–678. DOI: <https://doi.org/10.1037/0033-295x.109.4.646>.

- Joos, M. (1964). *The English Verb: Form and Meanings*. Madison/Milwaukee: University of Wisconsin Press.
- Jowett, B., ed. (1892). *The Dialogues of Plato, Translated Into English With Analyses and Introductions*. By Plato. 3rd ed. Vol. 1. Oxford: Oxford University Press.
- Juhos, C., A. C. Quelhas and R. M. J. Byrne (2015). 'Reasoning About Intentions: Counterexamples to Reasons for Actions.' In: *Journal of Experimental Psychology: Learning, Memory, and Cognition* 41.1, pp. 55–76. DOI: <https://doi.org/10.1037/a0037274>.
- Kaegi, A. (1905). *A Short Grammar of Classical Greek*. Ed. by J. A. Kleist. St. Louis: B. Herder.
- Kang, N., E. M. van Mulligen and J. A. Kors (2012). 'Training Text Chunkers on a Silver Standard Corpus: Can Silver Replace Gold?' In: *BMC Bioinformatics* 13.17. DOI: <https://doi.org/10.1186/1471-2105-13-17>.
- Kaplan, A. and J. M. Goldsen (1965). 'The Reliability of Content Analysis Categories'. In: *Language of Politics: Studies in Quantitative Semantics*, pp. 83–112.
- Kapsner, A. (2020). 'Connexivity and the Pragmatics of Conditionals'. In: *Erkenntnis*. DOI: <https://doi.org/10.1007/s10670-020-00325-1>.
- Karttunen, L. (1971). 'Implicative Verbs'. In: *Language* 47.2, pp. 340–358. DOI: <https://doi.org/10.2307/412084>.
- (2016). 'Presupposition: What Went Wrong?' In: *Semantics and Linguistic Theory (Salt)*. Ed. by M. Moroney, C.-R. Little, J. Collard and D. Burgdorf. Vol. 26. LSA and CLC Publications, pp. 705–731. DOI: <https://doi.org/10.3765/salt.v26i0.3954>.
- Karttunen, L. and S. Peters (1979a). 'Conventional Implicature'. In: *Syntax and Semantics: Presupposition*. Ed. by C.-K. Oh and D. A. Dinneen. Vol. 11. New York: Academic Press, pp. 1–56.
- (1979b). 'Conventional Implicature'. In: *Syntax and Semantics* 11, pp. 1–56.
- Kaufman, L. and P. J. Rousseeuw (1990). *Finding Groups in Data: An Introduction to Cluster Analysis*. Hoboken: John Wiley & Sons.
- Kaufmann, M. and S. Kaufmann (2015). 'Conditionals and Modality'. In: *The Handbook of Contemporary Semantic Theory*. Ed. by S. Lappin and C. Fox. Chichester: John Wiley & Sons, pp. 237–270. DOI: <https://doi.org/10.1002/9781118882139.ch8>.
- Kaufmann, W. A. (2013). *Nietzsche: Philosopher, Psychologist, Antichrist*. Princeton: Princeton University Press.
- Kay, P. (1990). 'Even'. In: *Linguistics and Philosophy* 13.1, pp. 59–111. DOI: <https://doi.org/10.1007/bf00630517>.
- Kehler, A., L. Kertz, H. Rohde and J. L. Elman (2008). 'Coherence and Coreference Revisited'. In: *Journal of Semantics* 25.1 Spec. Iss. Pp. 1–44. DOI: <https://doi.org/10.1093/jos/ffm018>.
- Kemeny, J. G. (1959). *A Philosopher Looks at Science*. New York: Van Nostrand.

- Kemmer, S. and A. Verhagen (1994). 'The Grammar of Causatives and the Conceptual Structure of Events'. In: *Cognitive Linguistics* 5.2, pp. 115–156.
- Kempson, R. M. (1975). *Presupposition and the Delimitation of Semantics*. Cambridge: Cambridge University Press.
- Khemlani, S., I. Orenes and P. N. Johnson-Laird (2014). 'The Negations of Conjunctions, Conditionals, and Disjunctions'. In: *Acta Psychologica* 151, pp. 1–7. DOI: <https://doi.org/10.1016/j.actpsy.2014.05.004>.
- Kim, H.-Y. (2017). 'Statistical Notes for Clinical Researchers: Chi-Squared Test and Fisher's Exact Test'. In: *Restorative Dentistry & Endodontics* 42.2, pp. 152–155. DOI: <https://doi.org/10.5395/rde.2017.42.2.152>.
- Kirsner, R. S. (1970). 'The Role of *Zullen* in the Grammar of Modern Standard Dutch'. In: *Lingua* 24, pp. 101–154.
- Kment, B. (2020). 'Counterfactuals and Causal Reasoning'. In: *Perspectives on Causation: Selected Papers From the Jerusalem 2017 Workshop*. Ed. by E. A. Bar-Asher Siegal and N. Boneh. Cham: Springer International Publishing, pp. 463–482. DOI: https://doi.org/10.1007/978-3-030-34308-8_15.
- Kneale, W. C. and M. Kneale (1962). *The Development of Logic*. Oxford: Clarendon Press.
- Knott, A. (2001). 'Semantic and Pragmatic Relations and Their Intended Effects'. In: *Human Cognitive Processing*. Ed. by T. J. M. Sanders, J. Schilperoord and W. P. M. S. Spooren. Vol. 8. Amsterdam: John Benjamins Publishing Company, pp. 127–152. DOI: <https://doi.org/10.1075/hcp.8.08kno>.
- Kohavi, R., G. H. John et al. (1997). 'Wrappers for Feature Subset Selection'. In: *Artificial Intelligence* 97.1-2, pp. 273–324.
- Kollewijn, R. A. (1892). 'Het Systeem van de Tijden der Werkwoorden'. In: *Taal en Letteren* 2, pp. 141–147.
- König, E. (1985). 'On the History of Concessive Connectives in English. Diachronic and Synchronic Evidence'. In: *Lingua* 66.1, pp. 1–19. DOI: [https://doi.org/10.1016/s0024-3841\(85\)90240-2](https://doi.org/10.1016/s0024-3841(85)90240-2).
- (1991). *The Meaning of Focus Particles: A Comparative Perspective*. London; New York: Routledge.
- König, E. and J. van der Auwera (1988). 'Clause Integration in German and Dutch Conditionals, Concessive Conditionals, and Concessives'. In: *Clause Combining in Grammar and Discourse*. Ed. by J. Haiman and S. A. Thompson. Amsterdam: John Benjamins Publishing Company, pp. 101–133. DOI: <https://doi.org/10.1075/tsl.18.07kon>.
- Köpcke, K.-M. and K.-U. Panther (1989). 'On Correlations Between Word Order and Pragmatic Function of Conditional Sentences in German'. In: *Journal of Pragmatics* 13.5, pp. 685–711. DOI: [https://doi.org/10.1016/0378-2166\(89\)90074-x](https://doi.org/10.1016/0378-2166(89)90074-x).
- Koster, J. (1975). 'Dutch as an SOV Language'. In: *Linguistic Analysis* 1.2, pp. 111–136.

- Kratzer, A. (1986). ‘Conditionals’. In: *Chicago Linguistics Society* 22.2, pp. 1–15.
- (2012). *Modals and Conditionals*. Oxford; New York: Oxford University Press.
- Krifka, M. (1989). ‘Nominal Reference, Temporal Constitution and Quantification in Event Semantics’. In: *Semantics and Contextual Expression*. Ed. by R. Bartsch, J. v. Benthem and P. v. Emde Boas. Berlin; Boston: De Gruyter, pp. 75–116. DOI: <https://doi.org/10.1515/9783110877335-005>.
- Kripke, S. A. (1959). ‘A Completeness Theorem in Modal Logic’. In: *Journal of Symbolic Logic* 24.1, pp. 1–14. DOI: <https://doi.org/10.2307/2964568>.
- Krippendorff, K. (2004). *Content Analysis: An Introduction to its Methodology*. Sage.
- Kruskal, J. and M. Wish (1978). *Multidimensional Scaling*. Thousand Oaks, California: Sage Publications.
- Kruskal, J. B. (1964). ‘Nonmetric Multidimensional Scaling: A Numerical Method’. In: *Psychometrika* 29.2, pp. 115–129.
- Krzyżanowska, K., S. Wenmackers and I. Douven (2013). ‘Inferential Conditionals and Evidentiality’. In: *Journal of Logic, Language and Information* 22.3, pp. 315–334. DOI: <https://doi.org/10.1007/s10849-013-9178-4>.
- Krzyżanowska, K. (2019). ‘What is wrong with False-Link Conditionals?’ In: *Linguistics Vanguard* 5.s3, p. 20190006. DOI: <https://doi.org/10.1515/lingvan-2019-0006>.
- Krzyżanowska, K., P. Collins and U. Hahn (2017). ‘The Puzzle of Conditionals With True Clauses: Against the Gricean Account’. In: *Cogsci 2017 Proceedings of the 39th Annual Meeting of the Cognitive Science Society, London, UK, 26-29 July 2017*. Ed. by R. Granger, U. Hahn and R. Sutton, pp. 2476–2481.
- (2020). ‘...That P is Relevant for Q: Indicative Conditionals and Learning From Testimony’. In: *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. Ed. by S. Denison, M. Mack, Y. Xu and B. C. Armstrong, pp. 987–993.
- Krzyżanowska, K., S. Wenmackers and I. Douven (2014). ‘Rethinking Gibbard’s Riverboat Argument’. In: *Studia Logica* 102.4, pp. 771–792. DOI: <https://doi.org/10.1007/s11225-013-9507-2>.
- Kuhn, M. (2008). ‘Building Predictive Models in R using the Caret Package’. In: *Journal of Statistical Software* 28.5. DOI: <https://doi.org/10.18637/jss.v028.i05>.
- Kuhn, M. and K. Johnson (2013). *Applied Predictive Modeling*. New York: Springer-Verlag.
- Kuroda, M. (2007). ‘Analysis of Contingency Tables’. In: *Statistical Methods for Biostatistics and Related Fields*. Berlin: Springer, pp. 105–124. DOI: https://doi.org/10.1007/978-3-540-32691-5_6.
- Ladds, M. A., N. Sibanda, R. Arnold and M. R. Dunn (2018). ‘Creating Functional Groups of Marine Fish from Categorical Traits’. In: *PeerJ* 6. DOI: <https://doi.org/10.7717/peerj.5795>.

- Lakoff, G. (1987). *Women, Fire, and Dangerous Things: What Categories Reveal About the Mind*. Chicago: University of Chicago Press.
- Landis, J. R. and G. G. Koch (1977). 'The Measurement of Observer Agreement for Categorical Data'. In: *Biometrics* 33.1, pp. 159–174. DOI: <https://doi.org/10.2307/2529310>.
- Langacker, R. W. (1978). 'The Form and Meaning of the English Auxiliary'. In: *Language* 54.4, pp. 853–882. DOI: <https://doi.org/10.2307/413237>.
- (1987). *Foundations of Cognitive Grammar. Theoretical Prerequisites*. Vol. 1. Stanford, California: Stanford University Press.
- (1988a). 'A Usage-Based Model'. In: *Current Issues in Linguistic Theory*. Ed. by B. Rudzka-Ostyn. Vol. 50. Amsterdam: John Benjamins Publishing Company, pp. 127–161. DOI: <https://doi.org/10.1075/cilt.50.06lan>.
- (1988b). 'An Overview of Cognitive Grammar'. In: *Current Issues in Linguistic Theory*. Ed. by B. Rudzka-Ostyn. Vol. 50. Amsterdam: John Benjamins Publishing Company, pp. 3–48. DOI: <https://doi.org/10.1075/cilt.50.03lan>.
- (1991). *Foundations of Cognitive Grammar, Volume II: Descriptive Application*. California: Stanford University Press.
- (2008). *Cognitive Grammar: A Basic Introduction*. Oxford; New York: Oxford University Press.
- Lassiter, D. (2020). 'What we can Learn From how Trivalent Conditionals Avoid Triviality'. In: *Inquiry* 63.9–10, pp. 1087–1114. DOI: <https://doi.org/10.1080/0020174x.2019.1698457>.
- (in press). 'Decomposing Relevance in Conditionals'. In: *Mind & Language*.
- Lauerbach, G. (1979). *Form und Funktion Englischer Konditionalsätze mit 'if': Eine Konversationslogische Und Sprechakttheoretische Analyse*. Linguistische Arbeiten; 72. Tübingen: Niemeyer.
- Lazarsfeld, P. F. (1966). 'Concept Formation and Measurement in the Behavioral Sciences: Some Historical Observations'. In: *Concepts, Theory and Explanation in the Behavioral Sciences*. Ed. by G. J. Drenzo. New York: Random House, pp. 144–205.
- Leclercq, B. (2020). 'Semantics and Pragmatics in Construction Grammar'. In: *Belgian Journal of Linguistics* 34, pp. 225–234. DOI: <https://doi.org/10.1075/bjl.00048.lec>.
- Lee, C.-B. (2001). 'The Information Status of English *if*-clauses in Natural Discourse'. In: *Language Research*, pp. 483–505.
- Leech, G. (2007). 'New Resources, or Just Better old Ones? The Holy Grail of Representativeness'. In: *Corpus Linguistics and the Web*. Ed. by M. Hundt, N. Nesselhauf and C. Biewer. Brill, pp. 133–149. DOI: https://doi.org/10.1163/9789401203791_009.
- Leech, G. N. (1971). *Meaning and the English Verb*. London: Longman.
- Legendre, P. and L. Legendre (1998). *Numerical Ecology*. Amsterdam: Elsevier.

- Leuschner, T. (2016). ‘Fictive Questions in Conditionals?: Synchronic and Diachronic Evidence From German and English’. In: *Human Cognitive Processing*. Ed. by E. Pascual and S. Sandler. Vol. 55. Amsterdam: John Benjamins Publishing Company, pp. 193–213. DOI: <https://doi.org/10.1075/hcp.55.10leu>.
- Leuschner, T. and D. van den Nest (2015). ‘Asynchronous Grammaticalization: V1-Conditionals in Present-day English and German’. In: *Languages in Contrast* 15.1, pp. 34–64. DOI: <https://doi.org/10.1075/lic.15.1.03leu>.
- Levinson, S. C. (1979). ‘Pragmatics and Social Deixis: Reclaiming the Notion of Conventional Implicature’. In: *Annual Meeting of the Berkeley Linguistics Society*. Ed. by C. Chiarello, J. Kingston, E. E. Sweetser, J. Collins, H. Kawasaki, J. Manley-Buser, D. W. Marschak, C. O’Connor, D. Shaul, M. Tobey, H. Thompson and K. Turner. Vol. 5. Berkeley, California: Berkeley Linguistics Society, pp. 206–223.
- (1983). *Pragmatics*. Cambridge University Press.
- (2000). *Presumptive Meanings: the Theory of Generalized Conversational Implicature*. Cambridge, Massachusetts: MIT Press.
- Levshina, N. (2011). ‘*Doe wat je niet laten kan*: A Usage-Based Analysis of Dutch Causative Constructions’. PhD thesis. Leuven: Katholieke Universiteit Leuven.
- (2015). *How to do Linguistics With R: Data Exploration and Statistical Analysis*. Amsterdam; Philadelphia: John Benjamins Publishing Company.
- (2016). ‘A Geometric Exemplar-based Model of Semantic Structure: The Dutch Causative Construction with *laten*’. In: *Constructional Approaches to Language*. Ed. by J. Yoon and S. T. Gries. Vol. 19. John Benjamins Publishing Company, pp. 241–262. DOI: [10.1075/cal.19.09lev](https://doi.org/10.1075/cal.19.09lev).
- Levshina, N. and L. Degand (2017). ‘Just *Because*: In Search of Objective Criteria of Subjectivity Expressed by Causal Connectives’. In: *Dialogue & Discourse* 8.1, pp. 132–150. DOI: <https://doi.org/10.5087/dad.2017.105>.
- Lewis, C. I. (1912). ‘Implication and the Algebra of Logic’. In: *Mind* 21.84, pp. 522–531.
- (1918). *A Survey of Symbolic Logic*. Berkeley: University of California Press.
- Lewis, D. (1973a). ‘Causation’. In: *The Journal of Philosophy* 70.17, pp. 556–567. DOI: <https://doi.org/10.2307/2025310>.
- (1973b). *Counterfactuals*. Oxford: Blackwell.
- (1976). ‘Probabilities of Conditionals and Conditional Probabilities’. In: *The Philosophical Review* 85.3, pp. 297–315. DOI: <https://doi.org/10.2307/2184045>.
- Li, J., K. Cheng, S. Wang, F. Morstatter, R. P. Trevino, J. Tang and H. Liu (2017). ‘Feature Selection: A Data Perspective’. In: *ACM Computing Surveys* 50.6, pp. 1–45.
- Libbrecht, M. W. and W. S. Noble (2015). ‘Machine Learning Applications in Genetics and Genomics’. In: *Nature Reviews Genetics* 16.6, pp. 321–332.

- Lin, D. (1998). 'An Information-Theoretic Definition of Similarity'. In: *Proceedings of the 15th International Conference on Machine Learning*. Burlington: Morgan Kaufmann, pp. 296–304.
- Linde, C. (1976). 'Constraints on the Ordering of *if*-clauses'. In: *Annual Meeting of the Berkeley Linguistics Society*. Vol. 2, pp. 280–285.
- Liu, M. and D. Zhang (2016). 'Feature Selection With Effective Distance'. In: *Neurocomputing* 215, pp. 100–109. DOI: <https://doi.org/10.1016/j.neucom.2015.07.155>.
- Liu, M. (2019a). 'Current Issues in Conditionals'. In: *Linguistics Vanguard* 5.s3. DOI: <https://doi.org/10.1515/lingvan-2019-0003>.
- (2019b). 'The Elastic Nonveridicality Property of Indicative Conditionals'. In: *Linguistics Vanguard* 5.s3. DOI: <https://doi.org/10.1515/lingvan-2019-0007>.
- Liu, M. and M. Barthel (2021). 'Semantics Processing of Conditional Connectives: German *wenn* 'if' versus *nur wenn* 'only if''. In: *Journal of Psycholinguistic Research*. DOI: 10.1007/s10936-021-09812-0.
- Liu, M., S. Rotter and A. Giannakidou (2021). 'Bias and Modality in Conditionals: Experimental Evidence and Theoretical Implications'. In: *Journal of Psycholinguistic Research*. DOI: 10.1007/s10936-021-09813-z.
- Löbner, S. (1989). 'German *schon* - *erst* - *noch*: An Integrated Analysis'. In: *Linguistics and Philosophy* 12.2, pp. 167–212. DOI: <https://doi.org/10.1007/bf00627659>.
- (2002). *Understanding Semantics*. London: Arnold.
- Lombardi Vallauri, E. (2016). 'Insubordinated Conditionals in Spoken and Non-Spoken Italian'. In: *Insubordination*. Ed. by N. Evans and H. Watanabe. John Benjamins Publishing Company, pp. 145–170.
- Łukasiewicz, J. (1970). *Selected Works*. Ed. by L. Borkowski. Amsterdam: North-Holland Publishing Company.
- Lycan, W. G. (2001). *Real Conditionals*. Oxford; New York: Clarendon Press; Oxford University Press.
- Łyda, A. and M. Zasowska (2021). 'Fictional Threatening: The Case of Disjunctive Conditionals'. In: *Linguistica Silesiana* 42, pp. 207–237. DOI: <https://doi.org/10.24425/linsi.2021.137238>.
- MacFarlane, J. (2020). *Philosophical Logic: A Contemporary Introduction*. Routledge. DOI: <https://doi.org/10.4324/9781315185248>.
- Mackay, J. (2015). 'Actuality and Fake Tense in Conditionals'. In: *Semantics and Pragmatics* 8, pp. 1–12. DOI: <https://doi.org/10.3765/sp.8.12>.
- (2017). 'Past Tense and Past Times in Subjunctive Conditionals: Past Tense and Past Times in Subjunctive Conditionals'. In: *Pacific Philosophical Quarterly* 98, pp. 520–535. DOI: <https://doi.org/10.1111/papq.12195>.
- Mackie, J. L. (1972). *Truth, Probability and Paradox: Studies in Philosophical Logic*. Clarendon Library of Logic and Philosophy. Oxford: Clarendon Press.

- MacQueen, J. (1967). 'Some Methods for Classification and Analysis of Multivariate Observations'. In: *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability*. Vol. 1. 14. Oakland, CA, USA, pp. 281–297.
- Maechler, M. (2016). *Diptest: Hartigan's Dip Test Statistic for Unimodality – Corrected*. R package version 0.75-7.
- Maechler, M., P. Rousseeuw, A. Struyf, M. Hubert and K. Hornik (2019). *Cluster: Cluster Analysis Basics and Extensions*. R package version 2.1.0.
- Magnus, P. D. (2015). *For all X*. New York: University at Albany.
- Mahlberg, M. and C. Smith (2012). 'Dickens, the Suspended Quotation and the Corpus'. In: *Language and Literature: International Journal of Stylistics* 21.1, pp. 51–65. DOI: <https://doi.org/10.1177/0963947011432058>.
- Malamud, S. A. (2012). 'Impersonal Indexicals: one, you, man, and du'. In: *The Journal of Comparative Germanic Linguistics* 15.1, pp. 1–48. DOI: <https://doi.org/10.1007/s10828-012-9047-6>.
- Marradi, A. (1990). 'Classification, Typology, Taxonomy'. In: *Quality & Quantity* 24.2, pp. 129–157.
- Marsland, S. (2015). *Machine Learning: An Algorithmic Perspective*. 2nd ed. London: Chapman and Hall/CRC.
- Martin, J. R. and P. R. R. White (2005). *The language of evaluation: Appraisal in English*. Palgrave Macmillan.
- Mato Míguez, B. (2016). 'The Expression of Directive Meaning: A Corpus-Based Study on the Variation Between Insubordinated *if*-Clauses, Imperatives and Conditionals in Contemporary Spoken British and American English'. PhD thesis. Santiago de Compostela: Universidad de Santiago de Compostela.
- Mauck, S. and P. Portner (2006). 'Review of 'Conditionals: A Comprehensive Empirical Analysis' by Renaat Declerck and Susan Reed'. In: *Lingua* 116.8, pp. 1330–1337. DOI: <https://doi.org/10.1016/j.lingua.2005.03.001>.
- Mauri, C. and J. van der Auwera (2012). 'Connectives'. In: *The Cambridge Handbook of Pragmatics*. Ed. by K. Allan and K. M. Jaszczolt. Cambridge: Cambridge University Press, pp. 377–402. DOI: <https://doi.org/10.1017/cbo9781139022453.021>.
- Mayes, P. (1994). 'Conditionals and the Logic of Desirability: An Interview With Noriko Akatsuka'. In: *Issues in Applied Linguistics* 5.2, pp. 449–461.
- McCarthy, M. and A. O'Keeffe (2012). 'What are Corpora and how Have They Evolved?' In: *The Routledge Handbook of Corpus Linguistics*. Ed. by M. McCarthy and A. O'Keeffe. Milton Park, Abingdon; New York: Routledge, pp. 3–13.
- McCready, E. (2010). 'Varieties of Conventional Implicature'. In: *Semantics and Pragmatics* 3.8. DOI: <https://doi.org/10.3765/sp.3.8>.
- McCune, B., J. B. Grace and D. L. Urban (2002). *Analysis of Ecological Communities*. 2nd ed. Gleneden Beach, Oregon: MjM Software Design.
- McDermott, M. (1999). 'Counterfactuals and Access Points'. In: *Mind* 108.430, pp. 291–334.

- McEnery, T. and A. Hardie (2012). *Corpus Linguistics: Method, Theory and Practice*. Cambridge Textbooks in Linguistics. Cambridge; New York: Cambridge University Press.
- McEvoy, P. and D. Richards (2001). ‘Using log-Linear Models to Analyse Categorical Data’. In: *NT Research* 6.5, pp. 867–875.
- Ménard, P. A. and A. Mougeot (2019). ‘Turning Silver Into Gold: Error-Focused Corpus Reannotation With Active Learning’. In: *Proceedings of Natural Language Processing in a Deep Learning World*. Montreal, Canada: Incoma Limited, Shoumen, Bulgaria, pp. 758–767. DOI: https://doi.org/10.26615/978-954-452-056-4_088.
- Mercier, H. and D. Sperber (2011). ‘Why do Humans Reason? Arguments for an Argumentative Theory’. In: *Behavioral and Brain Sciences* 34.2, pp. 57–74. DOI: <https://doi.org/10.1017/s0140525x10000968>.
- (2019). *The Enigma of Reason*. Harvard: Harvard University Press.
- Mervis, C. B. and E. Rosch (1981). ‘Categorization of Natural Objects’. In: *Annual Review of Psychology* 32.1, pp. 89–115. DOI: <https://doi.org/10.1146/annurev.ps.32.020181.000513>.
- Michaelis, L. A. and K. Lambrecht (1996). ‘Toward a Construction-Based Theory of Language Function: The Case of Nominal Extraposition’. In: *Language* 72.2, pp. 215–247. DOI: <https://doi.org/10.2307/416650>.
- Miller, G. A. and P. N. Johnson-Laird (1976). *Language and Perception*. Harvard: Belknap Press.
- Miltsakaki, E., R. Prasad, A. Joshi and B. Webber (2004). ‘The Penn DIScourse Treebank’. In: *Proceedings of the Fourth International Conference on Language Resources and Evaluation (Lrec’04)*. Lisbon, Portugal: European Language Resources Association (ELRA), pp. 2237–2240.
- Miroló, C. and C. Izu (2019). ‘An Exploration of Novice Programmers’ Comprehension of Conditionals in Imperative and Functional Programming’. In: *Proceedings of the 2019 ACM Conference on Innovation and Technology in Computer Science Education*. Aberdeen: Acm, pp. 436–442. DOI: <https://doi.org/10.1145/3304221.3319746>.
- Mulken, M. J. P. v. and P. J. Schellens (2012). ‘Over Loodzware Bassen en Wapperende Broekspijpen. Gebruik en Perceptie van Taalintensiverende Stijlmiddelen’. In: *Tijdschrift voor Taalbeheersing* 34.1, pp. 26–53.
- Murakami, H. (1987a). *Norwegian Wood*. Ed. by J. Rubin. New York: Vintage International.
- (1987b). *Norwegian Wood*. Trans. by E. Fennema. Amsterdam: Olympus, Atlas Contact.
- Murtagh, F. and P. Contreras (2017). ‘Algorithms for Hierarchical Clustering: An Overview, II’. In: *WIREs Data Mining and Knowledge Discovery* 7.6. DOI: <https://doi.org/10.1002/widm.1219>.
- Murtagh, F. and P. Legendre (2014). ‘Ward’s Hierarchical Agglomerative Clustering Method: Which Algorithms Implement Ward’s Criterion?’ In: *Journal of Classification* 31.3, pp. 274–295. DOI: <https://doi.org/10.1007/s00357-014-9161-z>.

- Nall, S. P. and T. M. Nall (2010). 'English 'if-clauses': A Corpus-Based Genre Analysis of their Incidence, Ordering and Pragmatic Effects.' In: *Journal of Applied Linguistics & Professional Practice* 7.2.
- Neuendorf, K. A. (2017). *The Content Analysis Guidebook*. 2nd ed. Los Angeles: Sage.
- Newstead, S. E. (1997). 'Conditional Reasoning With Realistic Material'. In: *Thinking & Reasoning* 3.1, pp. 49–76.
- Nieuwint, P. J. G. M. (1986). 'Present and Future in Conditional Protases'. In: *Linguistics* 24.2, pp. 371–392. DOI: <https://doi.org/10.1515/ling.1986.24.2.371>.
- (1992). 'On Conditionals: A Study of Conditional Sentences in English and Dutch'. PhD thesis. Tilburg University.
- Nivelle, N. (2008). 'Tegenfeitelijke Voorwaardelijke Zinnen in Argumentatieve Juridische Teksten'. PhD thesis. KU Leuven.
- Noakes, T. (1991). *Lore of Running*. 3rd ed. Champaign, Illinois: Leisure Press.
- Nolan, D. (2013). 'Why Historians (and Everyone Else) Should Care About Counterfactuals'. In: *Philosophical Studies* 163.2, pp. 317–335. DOI: <https://doi.org/10.1007/s11098-011-9817-z>.
- Noordman, L. G. M. (1979). *Inferring From Language*. Berlin: Springer.
- Nuyts, J. (2002). 'Grounding and the System of Epistemic Expressions in Dutch: A Cognitive-Functional View'. In: *Grounding*. Ed. by F. Brisard. Berlin; Boston: De Gruyter. DOI: <https://doi.org/10.1515/9783110899801.433>.
- (2005). 'The Modal Confusion: On Terminology and the Concepts Behind it'. In: *Modality: Studies in Form and Function*. Ed. by A. Klinge and H. H. Müller. London: Equinox, pp. 5–38.
- (2006). 'Modality: Overview and Linguistic Issues'. In: *The Expression of Modality*. Ed. by W. Frawley. The Expression of Cognitive Categories. Berlin: Mouton de Gruyter, pp. 1–26.
- Nuyts, J., P. Byloo and J. Diepeveen (2010). 'On Deontic Modality, Directivity, and Mood: The case of Dutch *mogen* and *moeten*'. In: *Journal of Pragmatics* 42.1, pp. 16–34. DOI: <https://doi.org/10.1016/j.pragma.2009.05.012>.
- Nuyts, J. and W. Vonk (1999). 'Epistemic Modality and Focus in Dutch'. In: *Linguistics* 37.4, pp. 699–737.
- O'Connell, D. L. and A. J. Dobson (1984). 'General Observer-Agreement Measures on Individual Subjects and Groups of Subjects'. In: *Biometrics*, pp. 973–983.
- Oaksford, M. and N. Chater (2012). *Cognition and Conditionals: Probability and Logic in Human Thinking*. Oxford: Oxford University Press, pp. 1–418.
- Ohm, E. and V. A. Thompson (2004). 'Everyday Reasoning With Inducements and Advice'. In: *Thinking & Reasoning* 10.3, pp. 241–272.
- Oostdijk, N. (2000). 'The Spoken Dutch Corpus. Overview and First Evaluation.' In: *LREC-2000*. Ed. by M. Gravididou, G. Carayannis, S. Markantantou, S. Piperidis and G. Stainhaouer. Vol. 2, pp. 887–894.

- Oostdijk, N., M. Reynaert, V. Hoste and I. Schuurman (2013). ‘The Construction of a 500-Million-Word Reference Corpus of Contemporary Written Dutch’. In: *Essential Speech and Language Technology for Dutch: Results by the Stevin Programme*. Ed. by P. Spyns and J. Odijk. Berlin: Springer, pp. 219–247. DOI: https://doi.org/10.1007/978-3-642-30910-6_13.
- Over, D. E. (2017). ‘Causation and the Probability of Causal Conditionals’. In: *The Oxford Handbook of Causal Reasoning*. Ed. by M. R. Waldmann. Vol. 1. Oxford: Oxford University Press, pp. 307–325. DOI: <https://doi.org/10.1093/oxfordhb/9780199399550.013.3>.
- Over, D. E. and N. Cruz (2021). ‘The Suppositional Theory of Conditionals and Rationality’. In: *The Handbook of Rationality*. Ed. by M. Knauff and W. Spohn. Cambridge: MIT Press, pp. 395–403.
- Over, D. E., I. Douven and S. Verbrugge (2013). ‘Scope Ambiguities and Conditionals’. In: *Thinking & Reasoning* 19.3–4, pp. 284–307. DOI: <https://doi.org/10.1080/13546783.2013.810172>.
- Overdiep, G. S. (1937). *Stilistische Grammatica van het Moderne Nederlandsch*. Zwolle: Tjeenk-Willink.
- Oyelade, J., I. Isewon, F. Oladipupo, O. Aromolaran, E. Uwoghien, F. Ameh, M. Achas and E. Adebisi (2016). ‘Clustering Algorithms: Their Application to Gene Expression Data’. In: *Bioinformatics and Biology Insights* 10, pp. 237–253. DOI: <https://doi.org/10.4137/bbi.s38316>.
- Paardekooper, P. C. (1950). ‘Als en dan bij vergelijkingen’. In: *De Nieuwe Taalgids* 43, pp. 160–167.
- (1957). ‘De tijd als spraakkunstgroep in het ABN’. In: *De Nieuwe Taalgids* 50, pp. 38–45.
- (1970). ‘Groter als’. In: *De Nieuwe Taalgids* 63, pp. 329–337.
- (1986). *Beknopte ABN-Syntaxis*. Eindhoven: Uitgave in eigen beheer.
- Palmer, F. R. (1974). *The English Verb*. London; New York: Longman.
- (1986). *Mood and Modality*. Cambridge: Cambridge University Press.
- (2001). *Mood and Modality*. 2nd ed. Cambridge Textbooks in Linguistics. Cambridge, UK; New York: Cambridge University Press.
- Pander Maat, H. L. W. and T. J. M. Sanders (2006). ‘Connectives in Text’. In: *Encyclopedia of Language & Linguistics*. Elsevier, pp. 33–41. DOI: <https://doi.org/10.1016/b0-08-044854-2/00500-9>.
- Panther, K.-U. and L. L. Thornburg (2005). ‘Motivation and Convention in Some Speech act Constructions: A Cognitive Linguistic Approach’. In: *Re-viewing Linguistic Thought*. Ed. by S. Marmaridou, K. Nikiforidou and E. Antonopoulou. Berlin; New York: De Gruyter Mouton. DOI: <https://doi.org/10.1515/9783110920826.53>.
- Partee, B. H. (2007). ‘Compositionality and Coercion in Semantics: The Dynamics of Adjective Meaning’. In: *Cognitive Foundations of Interpretation: Proceedings of the Colloquium, Amsterdam, 27-28 October 2004*. Ed. by G. Bouma, M. Aloni and J. Zwarts. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. 145–162.

- Partee, B. H. (2010). 'Formal Semantics: Origins, Issues, Early Impact'. In: *Baltic International Yearbook of Cognition, Logic and Communication* 6.1. DOI: <https://doi.org/10.4148/biyclc.v6i0.1580>.
- Pascual, E. (2014). *Fictive Interaction: The Conversation Frame in Thought, Language, and Discourse*. Amsterdam: John Benjamins Publishing Company. DOI: <https://doi.org/10.1075/hcp.47>.
- Pauwels, A. (1953). *De plaats van het hulpwerkwoord, verleden deelwoord en infinitief in de Nederlandse bijzin*. Leuven: M. & L. Symons.
- Peirce, C. S. (1933). *The Collected Papers of Charles Sanders Peirce, Vol. III: Exact Logic*. Ed. by C. Hartshorne and P. Weiss. Cambridge: Harvard University Press.
- Peugh, J. L. and C. K. Enders (2004). 'Missing Data in Educational Research: A Review of Reporting Practices and Suggestions for Improvement'. In: *Review of Educational Research* 74.4, pp. 525–556. DOI: <https://doi.org/10.3102/00346543074004525>.
- Piwek, P. (2000). 'Imperatives, Commitment and Action: Towards a Constraint-Based Model'. In: *LDV Forum*. Vol. 17. 1/2, pp. 92–114.
- Pollmann, T. (1975). 'Temporele en conditionele *als*-zinnen: Een terreinverkenning I'. In: *De Nieuwe Taalgids* 86.1, pp. 186–199.
- Pollmann, T. and A. Sturm (1977). *Over Zinnen Gesproken: Termen en Begrippen van de Traditionele Grammatica*. Culemborg: Tjeenk Willink.
- Poole, M. E. and T. W. Field (1976). 'A Comparison of Oral and Written Code Elaboration'. In: *Language and Speech* 19.4, pp. 305–312. DOI: <https://doi.org/10.1177/002383097601900401>.
- Postma, G. J. (2006). 'Van 'groter dan' naar 'groter als'. Structurele oorzaken voor het verval van het comparatieve voegwoord 'dan'.' In: *Nederlandse Taalkunde* 11.1, pp. 2–22.
- Postma, G. J. and H. J. Bennis (2006). 'Variatie in Negatie: Het Gedrag van het Negatieve Cliticum in het Middeldrents van Rond 1400'. In: *Taal & Tongval* 58.1, pp. 148–167.
- Potts, C. (2005). *The Logic of Conventional Implicatures*. Oxford: Oxford University Press.
- (2007a). 'Into the Conventional-Implicature Dimension'. In: *Philosophy Compass* 2.4, pp. 665–679. DOI: <https://doi.org/10.1111/j.1747-9991.2007.00089.x>.
- (2007b). 'The Expressive Dimension'. In: *Theoretical Linguistics* 33.2. DOI: <https://doi.org/10.1515/tl.2007.011>.
- Prasad, R., N. Dinesh, A. Lee, E. Miltsakaki, L. Robaldo, A. Joshi and B. Webber (2008). 'The Penn Discourse Treebank 2.0.' In: *Proceedings of the Sixth International Conference on Language Resources and Evaluation (Lrec'08)*. Ed. by N. Calzolari, K. Choukri, B. Maegaard, J. Mariani, J. Odijk, S. Piperidis and D. Tapias. Marrakech, Morocco: European Language Resources Association (ELRA), pp. 2961–2968.

- Prasad, R., E. Miltsakaki, N. Dinesh, A. Lee, A. Joshi, L. Robaldo and B. Webber (2017). *The Penn Discourse Treebank 2.0 Annotation Manual*. URL: <https://www.seas.upenn.edu/~pdtb/PDTBAPI/pdtb-annotation-manual.pdf>.
- Predelli, S. (2009). 'Towards a Semantics for Biscuit Conditionals'. In: *Philosophical Studies* 142.3, pp. 293–305. DOI: <https://doi.org/10.1007/s11098-007-9187-8>.
- Proeme, H. (1984). 'Over de Nederlandse Imperativus'. In: *Forum der Letteren* 25.1, pp. 241–258.
- Puente-Castelo, L. (2021). "If you Will Take the Trouble to Inquire Into it Rather Closely, I Think you Will Find That it is not Worth Very Much": Authorial Presence Through Conditionals and Citation Sequences in Late Modern English Life Sciences Texts'. In: *"All Families and Genera": Exploring the Corpus of English Life Sciences Texts*. Ed. by I. Moskowich, I. Lareo and G. Camiña. Amsterdam: John Benjamins Publishing Company, pp. 190–208. DOI: <https://doi.org/10.1075/z.237.10pue>.
- Questier, F., B. Walczak, D. L. Massart, C. Boucon and S. de Jong (2002). 'Feature Selection for Hierarchical Clustering'. In: *Analytica Chimica Acta* 466.2, pp. 311–324.
- Quirk, R., S. Greenbaum, G. Leech and J. Svartvik (1985). *A Comprehensive Grammar of the English Language*. London; New York: Longman.
- Raftery, A. E. and N. Dean (2006). 'Variable Selection for Model-Based Clustering'. In: *Journal of the American Statistical Association* 101.473, pp. 168–178. DOI: <https://doi.org/10.1198/016214506000000113>.
- Ramsey, F. P. (1950). 'General Propositions and Causality'. In: *Foundations of Mathematics and Other Logical Essays*. Ed. by F. P. Ramsey. New York, pp. 237–257.
- Ramsey, V. (1987). 'The Functional Distribution of Preposed and Postposed 'if' and 'When' Clauses in Written Discourse'. In: *Coherence and Grounding in Discourse*. Ed. by R. S. Tomlin. June 1984, pp. 383–408. DOI: <https://doi.org/10.1075/tsl.11.17ram>.
- Rebholz-Schuhman, D., A. Jimeno-Yepes, v. M., N. Kang, J. Kors, D. Milward, P. Corbett, E. Buyko, K. Tomanek, E. Beisswanger and U. Hahn (2010). 'The Calbc Silver Standard Corpus for Biomedical Named Entities: A Study in Harmonizing the Contributions From Four Independent Named Entity Taggers'. In: *Proceedings of the Seventh International Conference on Language Resources and Evaluation (LREC '10)*.
- Recanati, F. (1993). *Direct Reference: From Language to Thought*. Oxford: Blackwell.
- Rehbein, I., M. Scholman and V. Demberg (2016). 'Annotating Discourse Relations in Spoken Language: A Comparison of the Pdtb and CCR Frameworks'. In: *Proceedings of the 10th International Conference on Language Resources and Evaluation (LREC 2016)*. May 23–28, 2016. Portorož, Slov-

- enia*. Ed. by N. Calzolari, K. Choukri, T. Declerck, S. Goggi, M. Grobelnik, B. Maegaard, J. Mariani, H. Mazo, A. Moreno, J. Odijk and S. Piperidis. Paris: European Language Resources Association, pp. 23–28.
- Renkema, J. (2016). *Taal is taal: De interactieve ‘basta’-functie van een schijnbare tautologie*. URL: https://www.janrenkema.nl/pdf/artikel/taal_is_taal.pdf.
- (2020). *Schrijfwijzer*. 6th ed. Amsterdam: Boom.
- Renmans, B. and W. van Belle (2003). ‘The use of the Particle *dan* in Dutch Conditional Sentences’. In: *Leuvense Bijdragen – Leuven Contributions in Linguistics and Philology* 92, pp. 141–158. DOI: <https://doi.org/10.2143/lb.92.1.542037>.
- Rescher, N. (2007). *Conditionals*. Cambridge, Massachusetts: MIT Press.
- Reuneker, A. (2016). ‘Conditional use of Prepositional Phrases in Dutch: The Case of Zonder (‘Without’)’. In: *Linguistics in the Netherlands* 33, pp. 121–134. DOI: <https://doi.org/10.1075/avt.33.09reu>.
- (2017a). *Classifying Conditionals in Discourse. Presentation at CogLing7, Nijmegen, The Netherlands*. URL: https://www.reuneker.nl/files/papers/reuneker_2017_cogling_classifying_conditionals_in_discourse.pdf.
- (2017b). ‘Sentence-medial *if*-clauses in Dutch’. In: *Nederlandse Taalkunde* 22.1, pp. 137–148. DOI: <https://doi.org/10.5117/nedtaa2017.1.reun>.
- (2020). ‘Clause Order and Syntactic Integration Patterns in Dutch Conditionals’. In: *Linguistics in the Netherlands* 37, pp. 119–134. DOI: <https://doi.org/10.1075/avt.00041.reu>.
- (2022a). *Data and scripts for Connecting Conditionals. DataverseNL*. DOI: <https://doi.org/10.34894/3QTEKH>.
- (2022b). *File repository for Connecting Conditionals*. URL: <https://www.reuneker.nl/dissertation>.
- Reuneker, A. and R. J. U. Boogaart (2013). ‘De argumentatieve oriëntatie van ‘het is dat’’. In: *Studies in Taalbeheersing* 4. Ed. by R. J. U. Boogaart and H. Jansen. Assen: Van Gorcum, pp. 291–301.
- (2021). ‘*Dat als*: Een schrijfadvice en de praktijk’. In: *Wat gebeurt er in het Nederlands?! Over taal, frequentie en variatie*. Ed. by N. van der Sijs, L. Fonteyn and M. van der Meulen, pp. 177–182.
- Rice, S. (2010). ‘Sampling in Geography’. In: *Key Methods in Geography*. Ed. by N. Clifford, S. French and G. Valentine. Los Angeles: Sage, pp. 230–252.
- Rieger, A. (2015). ‘Defending a Simple Theory of Conditionals’. In: *American Philosophical Quarterly* 52.3, pp. 253–260.
- Rijppma, E. and F. G. Schuringa (1972). *Nederlandse Spraakkunst*. van Bakel, Jan. Groningen: Wolters-Noordhoff.
- Robertson, A. T. (1919). *A Grammar of the Greek New Testament in the Light of Historical Research*. Cambridge University Press.
- Rohlf, F. J. (1970). ‘Adaptive Hierarchical Clustering Schemes’. In: *Systematic Biology* 19.1, pp. 58–82.

- Rooryck, J. E. C. V. and G. J. Postma (2007). 'On Participial Imperatives'. In: *Imperative Clauses in Generative Grammar: Studies in Honour of Frits Beukema*. Ed. by W. van der Wurff. Amsterdam: John Benjamins Publishing Company, pp. 273–296.
- Rosch, E. (1973). 'Natural Categories'. In: *Cognitive Psychology* 4.3, pp. 328–350.
- (1975). 'Cognitive Representations of Semantic Categories'. In: *Journal of Experimental Psychology* 104, pp. 192–233.
- (1978). 'Principles of Categorization'. In: *Cognition and Categorization*. Ed. by B. B. Lloyd, J. Wiles and E. Rosch. Hillsdale, NJ: Erlbaum, pp. 27–48.
- Rothschild, D. (2021). 'A Note on Conditionals and Restrictors'. In: *Conditionals, Paradox, and Probability: Themes From the Philosophy of Dorothy Edgington*. Ed. by L. Walters and J. Hawthorne. Oxford University Press, pp. 19–39. DOI: <https://doi.org/10.1093/oso/9780198712732.003.0003>.
- Rowley-Jolivet, E. and S. Carter-Thomas (2008). 'When Practice Belies 'Theory': Form, Function and Frequency of *if*-Conditionals in Specialised Discourse'. In: *ASp* 53-54, pp. 39–61. DOI: <https://doi.org/10.4000/asp.343>.
- Rühlemann, C. and K. Aijmer (2015). 'Corpus Pragmatics: Laying the Foundations'. In: *Corpus Pragmatics*. Ed. by K. Aijmer and C. Rühlemann. Cambridge: Cambridge University Press, pp. 1–26. DOI: <https://doi.org/10.1017/cbo9781139057493.001>.
- Russell, B. (1903). *The Principles of Mathematics*. 2nd ed. Berlin: W. W. Norton & Company.
- (1905). 'On Denoting'. In: *Mind* 14.56, pp. 479–493.
- Sadock, J. M. (1978). 'On Testing for Conversational Implicature'. In: *Pragmatics*. Ed. by P. Cole. Syntax and Semantics. New York: Academic Press, pp. 281–297.
- Saeed, J. (2011). 'Pragmatics and Semantics'. In: *Foundations of Pragmatics*. Ed. by W. Bublitz and N. R. Norrick. Berlin; New York: De Gruyter Mouton.
- Sagan, C. (1977). *The Dragons of Eden: Speculations on the Evolution of Human Intelligence*. New York: Ballantine Books.
- Saldanha, E.-A. D., S. Hölldobler and I. L. Rocha (2017). 'Obligation Versus Factual Conditionals Under the Weak Completion Semantics'. In: *Proceedings of the Second Young Scientist's International Workshop on Trends in Information Processing*, pp. 55–64.
- Salmon, N. (2005). 'Two Conceptions of Semantics'. In: *Semantics Versus Pragmatics*. Ed. by Z. Szábo. Oxford: Oxford University Press, pp. 317–328.
- Sanders, J. and K. van Krieken (2019). 'Traveling Through Narrative Time: How Tense and Temporal Deixis Guide the Representation of Time and Viewpoint in News Narratives'. In: *Cognitive Linguistics* 30.2, pp. 281–304. DOI: <https://doi.org/10.1515/cog-2018-0041>.
- Sanders, T. J. M. and W. P. M. S. Spooren (2007). 'Discourse and Text Structure'. In: *Handbook of Cognitive Linguistics*. Oxford: Oxford University Press, pp. 916–941.

- Sanders, T. J. M., W. P. M. S. Spooren and L. G. M. Noordman (1992). 'Toward a Taxonomy of Coherence Relations'. In: *Discourse Processes* 15.1, pp. 1–35. DOI: <https://doi.org/10.1080/01638539209544800>.
- Sanders, T. J. M. and N. Stukker (2012). 'Causal Connectives in Discourse: A Cross-Linguistic Perspective'. In: *Journal of Pragmatics* 44.2, pp. 131–137. DOI: <https://doi.org/10.1016/j.pragma.2011.12.007>.
- Sanders, T. J. M. and E. E. Sweetser (2009). 'Causality in Language and Cognition – What Causal Connectives and Causal Verbs Reveal About the way we Think'. In: *Causal Categories in Discourse and Cognition*. Ed. by T. J. M. Sanders and E. E. Sweetser. Berlin; New York: Walter de Gruyter, pp. 1–18. DOI: <https://doi.org/10.1515/9783110224429>.
- Sandri, G. (1969). 'On the Logic of Classification'. In: *Quality and Quantity* 3.1–2, pp. 80–124. DOI: <https://doi.org/10.1007/bf00166506>.
- Sanford, D. H. (1989). *If P, Then Q: Conditionals and the Foundations of Reasoning*. The Problems of Philosophy. London; New York: Routledge.
- Sankoff, G. (1989). 'A Quantitative Paradigm for the Study of Communicative Competence'. In: *Explorations in the Ethnography of Speaking*. Ed. by R. Bauman and J. Sherzer. 2nd ed. Cambridge University Press, pp. 18–49. DOI: <https://doi.org/10.1017/cbo9780511611810.005>.
- Santorio, P. (2019). 'Interventions in Premise Semantics'. In: *Philosophers' Imprint* 19, pp. 1–27.
- Scheepers, C. (2017). 'Log-Linear Analysis'. In: *The Sage Encyclopedia of Communication Research Methods*. Thousand Oaks, California: SAGE Publications, Inc, pp. 887–890. DOI: <https://doi.org/10.4135/9781483381411.n309>.
- Scheffler, I. (1982). *Science and Subjectivity*. Indianapolis: Hackett Publishing.
- Schelfhout, C., P.-A. Coppen and N. Oostdijk (2003). 'Positions of Parentheticals and Interjections: A Corpus-Based Approach'. In: *Linguistics in the Netherlands*. Ed. by L. Cornips and P. Fikkert. Vol. 20. Amsterdam: John Benjamins Publishing Company, pp. 155–166.
- Schiffrin, D. (1992). 'Conditionals as Topics in Discourse'. In: *Linguistics* 30.1, pp. 165–198. DOI: <https://doi.org/10.1515/ling.1992.30.1.165>.
- (2006). *In Other Words: Variation in Reference and Narrative*. Studies in Interactional Sociolinguistics. Cambridge, UK; New York: Cambridge University Press.
- Schilperoord, J. and A. Verhagen (1998). 'Conceptual Dependency and the Clausal Structure of Discourse'. In: *Discourse and Cognition: Bridging the Gap*, pp. 141–163. DOI: <https://doi.org/10.1016/j.jaad.2013.03.040>.
- Schmid, H.-J. (2020). *The Dynamics of the Linguistic System: Usage, Conventionalization, and Entrenchment*. Oxford; New York: Oxford University Press.
- Scholman, M. C. J., J. Evers-Vermeul and T. J. M. Sanders (2016). 'Categories of Coherence Relations in Discourse Annotation'. In: *Dialogue & Discourse* 7.2, pp. 1–28. DOI: <https://doi.org/10.5087/dad.2016.201>.

- Schouten, E. M. (2000). *The Role of the Native Language in the non-Native Acquisition of Hypothetical Conditional Structures*. LOT/Netherlands Graduate School of Linguistics. The Hague: Holland Academic Graphics.
- Schouten, H. J. A. (1982). 'Measuring Pairwise Interobserver Agreement When all Subjects are Judged by the Same Observers'. In: *Statistica Neerlandica* 36.2, pp. 45–61.
- Schroyens, W. and W. Schaeken (2003). 'A Critique of Oaksford, Chater, and Larkin's (2000) Conditional Probability Model of Conditional Reasoning.' In: *Journal of Experimental Psychology: Learning, Memory, and Cognition* 29.1, pp. 140–149. DOI: <https://doi.org/10.1037/0278-7393.29.1.140>.
- Schulz, K. (2011). '"If you'd Wiggled A, Then B Would've Changed": Causality and Counterfactual Conditionals'. In: *Synthese* 179.2, pp. 239–251. DOI: <https://doi.org/10.1007/s11229-010-9780-9>.
- (2014). 'Fake Tense in Conditional Sentences: A Modal Approach'. In: *Natural Language Semantics* 22.2, pp. 117–144. DOI: <https://doi.org/10.1007/s11050-013-9102-0>.
- Schulze, R. and P. Hohaus (2020). 'Modalising Expressions and Modality: An Overview of Trends and Challenges'. In: *Studies in Language Companion Series*. Ed. by P. Hohaus and R. Schulze. Vol. 216. Amsterdam: John Benjamins Publishing Company, pp. 1–16. DOI: <https://doi.org/10.1075/slcs.216.01sch>.
- Schwarz, G. (1978). 'Estimating the Dimension of a Model'. In: *The Annals of Statistics* 6.2, pp. 461–464. DOI: <https://doi.org/10.1214/aos/1176344136>.
- Schwarz, S. and E. Smitterberg (2020). '"If Anyone Would Have Told me, I Would Have not Believed it": Using Corpora to Question Assumptions About Spoken vs. Written Grammar in EFL Grammars and Other Normative Works'. In: *Studies in Corpus Linguistics*. Ed. by E. Jonsson and T. Larsson. Vol. 97. Amsterdam: John Benjamins Publishing Company, pp. 284–300. DOI: <https://doi.org/10.1075/scl.97.17sch>.
- Schweizer, B. and A. Sklar (1960). 'Statistical Metric Spaces'. In: *Pacific Journal of Mathematics* 10.1, pp. 313–334. DOI: <https://doi.org/10.2140/pjm.1960.10.313>.
- Searle, J. R. (1969). *Speech Acts: An Essay in the Philosophy of Language*. Cambridge: Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9781139173438>.
- (1975). 'Indirect Speech Acts'. In: *Syntax and Semantics*. Ed. by P. Cole and J. L. Morgan. Vol. 3. Brill, pp. 59–82. DOI: https://doi.org/10.1163/9789004368811_004.
- (1976). 'A Classification of Illocutionary Acts'. In: *Language in Society* 5.1, pp. 1–23.
- (1979). *Expression and Meaning: Studies in the Theory of Speech Acts*. Cambridge: Cambridge University Press.
- Sebben, S. and J. Ullrich (2021). 'Can Conditionals Explain Explanations? A Modus Ponens Model of B Because A'. In: *Cognition* 215, p. 104812. DOI: <https://doi.org/10.1016/j.cognition.2021.104812>.

- Seuren, P. A. M. (2010). *The Logic of Language: Language from Within*. Oxford; New York: Oxford University Press.
- Sevcik, R., H. Rezankova and D. Husek (2011). 'Comparison of Selected Methods for Document Clustering'. In: *Advances in Intelligent Web Mastering-3*. Springer, pp. 101–110.
- Sharpe, D. (2015). 'Your chi-Square Test is Statistically Significant: Now What?' In: *Practical Assessment, Research and Evaluation* 20.8, pp. 1–10.
- Siegel, M. E. A. (2006). 'Biscuit Conditionals: Quantification Over Potential Literal Acts'. In: *Linguistics and Philosophy* 29.2, pp. 167–203. DOI: <https://doi.org/10.1007/s10988-006-0003-2>.
- Silverman, B. W. (1981). 'Using Kernel Density Estimates to Investigate Multimodality'. In: *Journal of the Royal Statistical Society: Series B (Methodological)* 43.1, pp. 97–99. DOI: <https://doi.org/10.1111/j.2517-6161.1981.tb01155.x>.
- Silvestre, C., M. Cardoso and M. Figueiredo (2013). 'Clustering and Selecting Categorical Features'. In: *Portuguese Conference on Artificial Intelligence*. Springer, pp. 331–342.
- Singer, P. (1975). *Animal Liberation: A New Ethics for our Treatment of Animals*. New York: Harper Collins.
- Skovgaard-Olsen, N. (2020). 'Relevance and Conditionals: A Synopsis of Open Pragmatic and Semantic Issues'. In: *Logic and Uncertainty in the Human Mind: A Tribute to David E. Over*. Ed. by S. Elgayam, I. Douven, N. Cruz and J. Evans. London; New York: Routledge, pp. 192–206.
- Skovgaard-Olsen, N., P. Collins, K. Krzyżanowska, U. Hahn and K. C. Klauer (2019). 'Cancellation, Negation, and Rejection'. In: *Cognitive Psychology* 108, pp. 42–71. DOI: <https://doi.org/10.1016/j.cogpsych.2018.11.002>.
- Skovgaard-Olsen, N., H. Singmann and K. C. Klauer (2016). 'The Relevance Effect and Conditionals'. In: *Cognition* 150, pp. 26–36. DOI: <https://doi.org/10.1016/j.cognition.2015.12.017>.
- Skovgaard-Olsen, N. and P. Collins (2021). 'Indicatives, Subjunctives, and the Falsity of the Antecedent'. In: *Cognitive Science* 45.11. DOI: 10.1111/cogs.13058.
- Slater, M. H. and A. Borghini (2011). 'Introduction: Lessons From the Scientific Butchery'. In: *Carving Nature at its Joints: Natural Kinds in Metaphysics and Science*. Ed. by J. K. Campbell, M. O'Rourke and M. H. Slater. Cambridge, Massachusetts: MIT Press, pp. 1–32.
- Smedts, W. and W. van Belle (1993). *Taalboek Nederlands*. 4th ed. Kapellen: Pelckmans.
- Smessaert, H. (1999). *Perspectief en Vergelijking: Aspectuele Partikels in het Nederlands*. Leuven: Belgisch interuniversitair centrum voor neerlandistiek/Peeters.

- Smollett, R. (2005). 'Quantized Direct Objects Don't Delimit After All: A Revised Account of the Role of Quantized Direct Objects in Aspectual Composition'. In: *Perspectives on Aspect*. Ed. by H. J. Verkuyl, H. de Swart and A. van Hout. Dordrecht: Springer, pp. 41–59. DOI: https://doi.org/10.1007/1-4020-3232-3_3.
- Smullyan, R. M. (1978). *What is the Name of This Book? The Riddle of Dracula and Other Logical Puzzles*. Englewood Cliffs: Prentice-Hall.
- Smyth, H. W. (1920). *A Greek Grammar for Colleges*. New York: American Book Company.
- Sneath, P. H. A. and R. R. Sokal (1973). *Numerical Taxonomy: The Principles and Practice of Numerical Classification*. A series of Books in Biology. San Francisco: W. H. Freeman.
- Solorio-Fernández, S., J. A. Carrasco-Ochoa and J. F. Martínez-Trinidad (2020). 'A Review of Unsupervised Feature Selection Methods'. In: *Artificial Intelligence Review* 53.2, pp. 907–948. DOI: <https://doi.org/10.1007/s10462-019-09682-y>.
- Sonnenschein, E. A. (1892). *A Greek Grammar for Schools Based on the Principles and Requirements of the Grammatical Society*. London: S. Sonnenschein & Co.
- Sorensen, R. (2012). 'Lying With Conditionals'. In: *The Philosophical Quarterly* 62.249, pp. 820–832.
- Spärck Jones, K. (1972). 'A Statistical Interpretation of Term Specificity and its Application in Retrieval'. In: *Journal of Documentation* 28, pp. 11–21.
- Sperber, D. and D. Wilson (1986). *Relevance: Communication and Cognition*. Cambridge, Massachusetts: Harvard University Press.
- Spooren, W. P. M. S. (2004). 'On the use of Discourse Data in Language use Research'. In: *Words in Their Places: A Festschrift for J. Lachlan Mackenzie*. Ed. by M. Hannay, H. Aertsen and R. J. Lyall. Amsterdam: Faculty of Arts, Vrije Universiteit Amsterdam, pp. 381–393.
- Spooren, W. P. M. S. and L. Degand (2010). 'Coding Coherence Relations: Reliability and Validity'. In: *Corpus Linguistics and Linguistic Theory* 6.2. DOI: <https://doi.org/10.1515/cllt.2010.009>.
- Stalnaker, R. C. (1968). 'A Theory of Conditionals'. In: *Ifs*. Ed. by W. L. Harper, R. C. Stalnaker and G. Pearce. Dordrecht: Springer, pp. 41–55. DOI: https://doi.org/10.1007/978-94-009-9117-0_2.
- (1972). 'Pragmatics'. In: *Semantics of Natural Language*. Ed. by D. Davidson and G. Harman. Dordrecht: Reidel, pp. 389–408.
- (1974). 'Pragmatic Presuppositions'. In: *Semantics and Philosophy*. Ed. by M. K. Munitz and P. Unger. New York: New York University Press, pp. 197–213.
- (1975). 'Indicative Conditionals'. In: *Philosophia* 5.3, pp. 269–286. DOI: <https://doi.org/10.1007/bf02379021>.
- (2002). 'Common Ground'. In: *Linguistics and Philosophy* 25.5/6, pp. 701–721.

- Stalnaker, R. C. (2019). *Knowledge and Conditionals: Essays on the Structure of Inquiry*. Oxford: Oxford University Press.
- Stefanowitsch, A. (2003). 'A Construction-Based Approach to Indirect Speech Acts'. In: *Metonymy and Pragmatic Inferencing*. Ed. by K.-U. Panther and L. L. Thornburg. Amsterdam: John Benjamins Publishing Company, pp. 105–126. DOI: <https://doi.org/10.1075/pbns.113.09ste>.
- Stone, M. A. (2012). 'Denying the Antecedent: Its Effective Use in Argumentation'. In: *Informal Logic* 32.3, pp. 327–356. DOI: <https://doi.org/10.22329/il.v32i3.3681>.
- Strawson, P. F. (1952). *Introduction to Logical Theory*. New York: John Wiley & Sons.
- Strijbos, J.-W. and G. Stahl (2007). 'Methodological Issues in Developing a Multi-Dimensional Coding Procedure for Small-Group Chat Communication'. In: *Learning and Instruction* 17.4, pp. 394–404. DOI: <https://doi.org/10.1016/j.learninstruc.2007.03.005>.
- Stroop, J. P. A. (2011). *Hun Hebben de Taal Verkwanseld: Over Poldernederlands, "Fout" Nederlands en ABN*. Amsterdam: Atheneum.
- Stukker, N., T. J. M. Sanders and A. Verhagen (2008). 'Causality in Verbs and in Discourse Connectives: Converging Evidence of Cross-Level Parallels in Dutch Linguistic Categorization'. In: *Journal of Pragmatics* 40.7, pp. 1296–1322.
- Stukker, N. and A. Verhagen (2019). *Stijl, Taal en Tekst: Stilistiek op Taalkundige Basis*. Leiden: Leiden University Press.
- Šulc, Z. (2016). 'Similarity Measures for Nominal Data in Hierarchical Clustering'. PhD thesis. Prague: University of Economics. DOI: <https://doi.org/10.13140/RG.2.2.33118.02882>.
- Šulc, Z., J. Cibulkova and H. Řezanková (2020). *Nomclust: Hierarchical Cluster Analysis of Nominal Data*. R package version 2.1.4.
- Šulc, Z. and H. Řezanková (2015). 'Nomclust: An R Package for Hierarchical Clustering of Objects Characterized by Nominal Variables'. In: *The 9th International Days of Statistics and Economics, Prague, September 10-12, 2015*, pp. 1581–1590.
- (2019). 'Comparison of Similarity Measures for Categorical Data in Hierarchical Clustering'. In: *Journal of Classification* 36.1, pp. 58–72. DOI: <https://doi.org/10.1007/s00357-019-09317-5>.
- Sweetser, E. E. (1990). *From Etymology to Pragmatics: Metaphorical and Cultural Aspects of Semantic Structure*. Cambridge; New York: Cambridge University Press. DOI: <https://doi.org/10.1017/cbo9780511620904>.
- (1996). 'Reasoning, Mapping and Meta-Metaphorical Conditionals'. In: *Grammatical Constructions: Their Form and Meaning*. Ed. by S. A. Thompson and S. Masayoshi. Oxford: Oxford University Press, pp. 221–233.
- Szabó, Z. G. (2005). *Semantics vs. Pragmatics*. Oxford: New York: Clarendon Press; Oxford University Press.

- Sztencel, M. (2018). *Semantics, Pragmatics and Meaning Revisited*. Cham: Springer International Publishing. DOI: <https://doi.org/10.1007/978-3-319-69116-9>.
- Sztencel, M. and L. Clarke (2018). ‘Deontic Commitments in Conditional Promises and Threats: Towards an Exemplar Semantics for Conditionals’. In: *Language and Cognition* 10.3, pp. 435–466. DOI: <https://doi.org/10.1017/langcog.2018.10>.
- Sztencel, M. and S. E. Duffy (2019). ‘Reporting Conditionals With Modals’. In: *Indirect Reports and Pragmatics in the World Languages*. Ed. by A. Capone, M. García-Carpintero and A. Falzone. Vol. 19. Cham: Springer International Publishing, pp. 201–226.
- Tabakhi, S., P. Moradi and F. Akhlaghian (2014). ‘An Unsupervised Feature Selection Algorithm Based on ant Colony Optimization’. In: *Engineering Applications of Artificial Intelligence* 32, pp. 112–123.
- Talavera, L. (2005). ‘An Evaluation of Filter and Wrapper Methods for Feature Selection in Categorical Clustering’. In: *International Symposium on Intelligent Data Analysis*. Springer, pp. 440–451.
- Tang, X. (2017). ‘Lexeme-Based Collexeme Analysis With Depcluster’. In: *Corpus Linguistics and Linguistic Theory* 13.1. DOI: <https://doi.org/10.1515/clt-2015-0007>.
- Taylor, J. R. (2001). ‘Prototype Theory in Linguistics’. In: *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier, pp. 286–289. DOI: <https://doi.org/10.1016/b978-0-08-097086-8.57034-2>.
- (2003). *Linguistic Categorization*. 3rd ed. New York: Oxford University Press.
- te Winkel, L. A. (1866). ‘Over de wijzen en tijden der werkwoorden’. In: *De Taalgids* 8, pp. 66–75.
- Tellings, J. L. (2016). ‘Counterfactuality in Discourse’. PhD thesis. Los Angeles: University of California Los Angeles.
- (2017). ‘Still as an Additive Particle in Conditionals’. In: *Semantics and Linguistic Theory* 27, pp. 1–21. DOI: <https://doi.org/10.3765/salt.v27i0.4117>.
- (2020). ‘Conditional Answers and the Role of Probabilistic Epistemic Representations’. In: *Proceedings of the Probability and Meaning Conference (PaM 2020)*. Gothenburg: Association for Computational Linguistics, pp. 26–33.
- Terkourafi, M. (2009a). ‘Conventional Meaning’. In: *Key Ideas in Linguistics and the Philosophy of Language*. Ed. by S. Chapman and C. Routledge. Edinburgh: Edinburgh University Press, pp. 28–29.
- (2009b). ‘Conventionality’. In: *The Pragmatics Encyclopedia*. Ed. by L. Cummings. New York: Routledge, pp. 79–81.
- Thompson, V. A., J. S. B. T. Evans and S. J. Handley (2005). ‘Persuading and Dissuading by Conditional Argument’. In: *Journal of Memory and Language* 53.2, pp. 238–257. DOI: <https://doi.org/10.1016/j.jml.2005.03.001>.

- Thumm, M. (2000). 'The Contextualization of Paratactic Conditionals'. In: *Interaction and Linguistic Structures*. InLiSt 20.
- Tietjen, G. L. and R. H. Moore (1972). 'Some Grubbs-Type Statistics for the Detection of Several Outliers'. In: *Technometrics* 14.3, pp. 583–597.
- Tiryakian, E. A. (1968). 'Typologies'. In: *International Encyclopedia of the Social Sciences*. Ed. by D. L. Sills. Vol. 16. New York: The Macmillan Company & The Free Press, pp. 177–186.
- Tognini-Bonelli, E. (2001). *Corpus Linguistics at Work*. Studies in Corpus Linguistics. Amsterdam; Philadelphia: John Benjamins Publishing Company.
- Tomasello, M. (2014). *A Natural History of Human Thinking*. Cambridge, Massachusetts; London, England: Harvard University Press.
- Toulmin, S. (2003). *The Uses of Argument*. Updated edition. Cambridge; New York: Cambridge University Press.
- Traugott, E. C. (1985). 'Conditional Markers'. In: *Proceedings of a Symposium on Iconicity in Syntax, Stanford 1983*. Ed. by J. Haiman. Vol. 6. Amsterdam: John Benjamins Publishing Company, pp. 289–310. DOI: <https://doi.org/10.1075/tsl.6.14clo>.
- (1989). 'On the Rise of Epistemic Meanings in English: An Example of Subjectification in Semantic Change'. In: *Language* 65.1, pp. 31–55. DOI: <https://doi.org/10.2307/414841>.
- (1999). 'The Role of Pragmatics in a Theory of Semantic Change'. In: *Pragmatics in 1998: Selected Papers From the 6th International Pragmatics Conference*. Ed. by J. Verschueren. Vol. 2. Antwerp: International Pragmatics Association, pp. 93–102.
- Traugott, E. C. and E. König (1991). 'The Semantics-Pragmatics of Grammaticalization Revisited'. In: *Approaches to Grammaticalization*. Ed. by E. C. Traugott and B. Heine. Amsterdam: John Benjamins Publishing Company, pp. 189–218.
- Traugott, E. C., A. G. B. ter Meulen, J. S. Reilly and C. A. Ferguson (1986). *On Conditionals*. Cambridge: Cambridge University Press.
- Trnavac, R. and M. Taboada (2021). 'Engagement and Constructiveness in Online News Comments in English and Russian'. In: *Text & Talk* 41.5, p. 000010151520200171. DOI: 10.1515/text-2020-0171.
- Tyler, A. and V. Evans (2003). *The Semantics of English Prepositions: Spatial Scenes, Embodied Meaning, and Cognition*. 1st ed. Cambridge University Press. DOI: 10.1017/CBO9780511486517.
- Tyler, C. L. and M. Kowalewski (2014). 'Utility of Marine Benthic Associations as a Multivariate Proxy of Paleobathymetry: A Direct Test From Recent Coastal Ecosystems of North Carolina'. In: *PLoS ONE* 9.4. Ed. by K. Swadling, e95711. DOI: <https://doi.org/10.1371/journal.pone.0095711>.
- van Bart, P. and A. Sturm (1987). *Zinsanalyse en de termen die daarbij gebruikt worden*. Leiden: M. Nijhoff.
- van Belle, W. (2003). *Zwijgen is niet altijd toestemmen: De rol van inferenties bij het interpreteren en argumenteren*. Leuven; Leusden: Acco.

- van Belle, W. and I. Canegem-Ardijns (2007). 'Review of 'Mental Spaces in Grammar: Conditional Constructions' by Barbara Dancygier and Eve Sweetser'. In: *Linguistics* 5.4, pp. 824–833.
- van Beveren, A., T. Coleman and G. de Sutter (2018). 'De *om*-alternantie: Een verkennende casestudy'. In: *Handelingen: Koninklijke Zuidnederlandse Maatschappij voor Taal- en Letterkunde en Geschiedenis* 71, pp. 191–222.
- van den Berge, M. J. C., R. H. Free, R. Arnold, E. de Kleine, R. Hofman, J. M. C. van Dijk and van Dijk, Pim (2017). 'Cluster Analysis to Identify Possible Subgroups in Tinnitus Patients'. In: *Frontiers in Neurology* 8, pp. 1–7. DOI: <https://doi.org/10.3389/fneur.2017.00115>.
- van den Toorn, M. C. (1984). *Nederlandse Grammatica*. 9th ed. Groningen: Wolters-Noordhoff.
- van der Auwera, J. (1985). 'Only if'. In: *Logique et Analyse* 28.109, pp. 61–74.
- (1986). 'Conditionals and Speech Acts'. In: *On Conditionals*. Ed. by E. C. Traugott, A. G. B. ter Meulen, J. Snitzer Reilly and C. A. Ferguson. Cambridge: Cambridge University Press, pp. 197–214.
- (1993). "Already" and "Still": Beyond Duality'. In: *Linguistics and Philosophy* 16.6, pp. 613–653.
- (1997). 'Conditional Perfection'. In: *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company, pp. 169–190. DOI: <https://doi.org/10.1075/cilt.143.10auw>.
- van der Auwera, J. and V. Gast (2010). 'Categories and Prototypes'. In: *The Oxford Handbook of Linguistic Typology*. Ed. by J. J. Song. Oxford: Oxford University Press, pp. 166–189. DOI: <https://doi.org/10.1093/oxfordhb/9780199281251.013.0010>.
- van der Horst, J. (1995). *Analytische taalkunde*. Groningen: Nijhoff.
- (2010). *Met (het) oog op morgen: Opstellen over taal, taalverandering en standaardtaal*. Leuven University Press. DOI: <https://doi.org/10.2307/j.ctt9qdwvp>.
- van der Wouden, T. (1994). 'Negative Contexts'. PhD thesis. Groningen: University of Groningen.
- (1995). 'De reflectie van logische relaties in woordstructuur: De distributie van het prefix 'on''. In: *TABU* 1, pp. 61–71.
- (1996). 'Hoeven'. In: *TABU* 26, pp. 164–182.
- (1998). 'Dat had niet zo gehoeven: Modaliteit en negatie in de nieuwe ANS'. In: *Nederlandse Taalkunde* 3, pp. 237–252.
- (2000). 'Focus on Appendices in Dutch'. In: *Linguistics in the Netherlands* 17, pp. 233–244. DOI: <https://doi.org/10.1075/avt.17.22wou>.
- (2002). 'Partikels: Naar een partikelwoordenboek voor het Nederlands'. Dutch. In: *Nederlandse Taalkunde* 1, pp. 20–43.
- (2018). 'Eindelijk alles over *nee*?'. In: *Onze Taal* 87.5, p. 17.
- van der Wouden, T. and J. Caspers (2010). 'Nederlandse partikelbeschrijving in internationaal perspectief: Waar zijn we eigenlijk en waar moet het toch naar toe?'. In: *Internationale Neerlandistiek* 48.2, pp. 52–62. DOI: <https://doi.org/10.5117/ivn2010.2.derw>.

- van der Wouden, T. and A. Foolen (2011). 'Pragmatische partikels in de rechterperiferie'. In: *Nederlandse Taalkunde* 16.3, pp. 307–322.
- (2015). 'Dutch Particles in the Right Periphery'. In: *Final Particles*. Ed. by S. Hancil, A. Haselow and M. Post. Berlin: Mouton de Gruyter, pp. 221–247.
- van der Wurff, W. (2007). 'Imperative Clauses in Generative Grammar: An Introduction'. In: *Imperative Clauses in Generative Grammar: Studies in Honour of Frits Beukema*. Ed. by W. van der Wurff. Amsterdam: John Benjamins Publishing Company, pp. 1–94. DOI: <https://doi.org/10.1075/la.103.02wur>.
- van Dijk, T. A. (1979). 'Pragmatic Connectives'. In: *Journal of Pragmatics* 3.5, pp. 447–456. DOI: [https://doi.org/10.1016/0378-2166\(79\)90019-5](https://doi.org/10.1016/0378-2166(79)90019-5).
- van Duijn, M. and A. Verhagen (2019). 'Recursive Embedding of Viewpoints, Irregularity, and the Role for a Flexible Framework'. In: *Pragmatics* 29.2, pp. 198–225. DOI: <https://doi.org/10.1075/prag.18049.van>.
- van Eemeren, F. H. (2010). *Strategic Maneuvering in Argumentative Discourse: Extending the Pragma-Dialectical Theory of Argumentation*. Amsterdam; Philadelphia: John Benjamins Publishing Company.
- van Eemeren, F. H., B. Garssen, E. C. W. Krabbe, A. F. Snoeck Henkemans, B. Verheij and J. H. M. Wagemans (2014). *Handbook of Argumentation Theory*. Dordrecht: Springer.
- van Eemeren, F. H., R. Grootendorst and A. F. Snoeck Henkemans (2002). *Argumentation: Analysis, Evaluation, Presentation*. Mahwah: Lawrence Erlbaum Associates.
- van Eemeren, F. H. and A. F. Snoeck Henkemans (2017). *Argumentation: Analysis and Evaluation*. Second edition. New York: Routledge.
- van Eerten, L. (2007). 'Over het Corpus Gesproken Nederlands'. In: *Nederlandse Taalkunde* 12.3, pp. 194–215.
- van Gorp, B. (2007). 'The Constructionist Approach to Framing: Bringing Culture Back in'. In: *Journal of Communication* 57.1, pp. 60–78.
- van Haaften, T. (1991). 'De interpretatie van verzwegen subjecten'. PhD thesis. Amsterdam: Vrije Universiteit Amsterdam.
- van Haaften, T. and M. van Leeuwen (2021). 'On the Relation Between Argumentative Style and Linguistic Style: Integrating Linguistic-Stylistic Analysis Systematically Into the Analysis of Argumentative Style'. In: *Journal of Argumentation in Context* 10.1, pp. 97–120. DOI: <https://doi.org/10.1075/jaic.20014.haa>.
- van Haeringen, C. B. (1946). *Spanningen in Hedendaags Nederlands*. 's-Gravenhage: D. A. Daamen.
- van Leeuwen, M. (2012). 'Rhetorical Effects of Grammar'. In: *Critical Approaches to Discourse Analysis across Disciplines* 5.2, pp. 88–101.
- van Olmen, D. (2011). 'The Imperative in English and Dutch: A Functional Analysis in Comparable and Parallel Corpora'. PhD thesis. Universiteit Antwerpen.

- van Olmen, D. and S. Heinold (2017). ‘Imperatives and Directive Strategies From a Functional-Typological Perspective: An Introduction’. In: *Imperatives and Directive Strategies*. Ed. by D. van Olmen and S. Heinold. Amsterdam: John Benjamins Publishing Company. DOI: <https://doi.org/10.1075/slcs.184.01van>.
- van Rooij, R. and K. Schulz (2019). ‘Conditionals, Causality and Conditional Probability’. In: *Journal of Logic, Language and Information* 28.1, pp. 55–71. DOI: <https://doi.org/10.1007/s10849-018-9275-5>.
- (2020). ‘Conditionals As Representative Inferences’. In: *Axiomathes*. DOI: <https://doi.org/10.1007/s10516-020-09477-9>.
- van Rossum, G. and F. L. Drake (2009). *Python 3 Reference Manual*. Scotts Valley: CreateSpace.
- Vandergriff, I. (2009). ‘Conditionals and Mental Space Set-Up: Evidence from German Word Order’. In: *Constructional Approaches to Language*. Ed. by A. Bergs and G. Diewald. Vol. 9. Amsterdam: John Benjamins Publishing Company, pp. 193–212. DOI: <https://doi.org/10.1075/cal.9.08van>.
- Vandeweghe, W. (1992). *Perspectivische Evaluatie in het Nederlands: De Partikels van de al/nog/pas-Groep*. Gent: Koninklijke Academie voor Nederlandse Taal- en Letterkunde.
- (2000). *Grammatica van de Nederlandse zin*. Leuven: Garant.
- Vendler, Z. (1967). *Linguistics in Philosophy*. Ithaca, NY: Cornell University Press.
- Verbrugge, S., K. Dieussaert, W. Schaeken, H. Smessaert and W. van Belle (2007). ‘Pronounced Inferences: A Study on Inferential Conditionals’. In: *Thinking & Reasoning* 13.2, pp. 105–133. DOI: <https://doi.org/10.1080/13546780600713227>.
- Verbrugge, S., K. Dieussaert, W. Schaeken and W. van Belle (2004). ‘Promise is Debt, Threat Another Matter: The Effect of Credibility on the Interpretation of Conditional Promises and Threats’. In: *Canadian Journal of Experimental Psychology* 58.2, pp. 106–112. DOI: <https://doi.org/10.1037/h0085801>.
- Verbrugge, S. and H. Smessaert (2010). ‘On the Argumentative Strength of Indirect Inferential Conditionals’. In: *Argumentation* 24.3, pp. 337–362. DOI: <https://doi.org/10.1007/s10503-010-9179-2>.
- (2011). ‘On the Distinction Between Inferential and Meta-Inferential Conditionals in Dutch’. In: *Journal of Pragmatics* 43.14, pp. 3387–3402. DOI: <https://doi.org/10.1016/j.pragma.2011.07.008>.
- Verhagen, A. (1992). ‘Praxis of Linguistics: Passives in Dutch’. In: *Cognitive Linguistics* 3.3, pp. 301–342.
- (2000). ‘Interpreting Usage: Construing the History of Dutch Causal Verbs’. In: *Usage-Based Models of Language*. Ed. by M. Barlow and S. Kemmer. Stanford, California: CSLI Publications, pp. 261–286.
- (2003). ‘The Dutch way’. In: *Usage-Based Approaches to Dutch: Lexicon, Grammar, Discourse*. Ed. by A. Verhagen and J. van de Weijer, pp. 27–56.

- Verhagen, A. (2005). *Constructions of Intersubjectivity: Discourse, Syntax, and Cognition*. New York: Oxford University Press.
- (2007). ‘English Constructions From a Dutch Perspective: Where are the Differences?’ In: *Structural-Functional Studies in English Grammar: In Honour of Lachlan Mackenzie*. Ed. by M. Hannay and G. J. Steen. Amsterdam: John Benjamins Publishing Company, pp. 257–274. DOI: <https://doi.org/10.1075/slcs.83.15ver>.
- (2009). ‘The Conception of Constructions as Complex Signs: Emergence of Structure and Reduction to Usage’. In: *Constructions and Frames* 1.1, pp. 119–152. DOI: <https://doi.org/10.1075/cf.1.1.06ver>.
- (2019). ‘50 Years of Dichotomies: Misunderstandings and the Relevance of Lexical Semantics’. In: *Linguistics in the Netherlands* 36, pp. 60–66. DOI: <https://doi.org/10.1075/avt.00023.ver>.
- (2021). ‘Argumentation in Evolution: On the Relation Between Dyadic and Public Communication’. In: *The Language of Argumentation*. Ed. by R. J. U. Boogaart, H. Jansen and M. van Leeuwen. Cham: Springer International Publishing, pp. 37–60. DOI: https://doi.org/10.1007/978-3-030-52907-9_3.
- (forthcoming). ‘Perspective Management and Iconicity: Depiction and Description in Construing Other Minds’.
- Verhagen, V. and M. Mos (2016). ‘Stability of Familiarity Judgments: Individual Variation and the Invariant Bigger Picture’. In: *Cognitive Linguistics* 27.3, pp. 307–344. DOI: <https://doi.org/10.1515/cog-2015-0063>.
- Verkuyl, H. J. (1972). *On the Compositional Nature of the Aspects*. Dordrecht: Springer. DOI: <https://doi.org/10.1007/978-94-017-2478-4>.
- (1986). ‘Vendler-klassen moeten worden genegeerd’. In: *TABU* 16, pp. 69–84.
- (1989). ‘Aspectual Classes and Aspectual Composition’. In: *Linguistics and Philosophy* 12.1, pp. 39–94.
- (1993). *A Theory of Aspectuality: The Interaction Between Temporal and Atemporal Structure*. Cambridge: Cambridge University Press.
- (2008). *Binary Tense*. CSLI Lecture Notes. Stanford, CA: CSLI Publications.
- Verkuyl, H. J. and H. Broekhuis (2013a). ‘Temporaliteit en Modaliteit’. In: *Nederlandse Taalkunde* 18.3, pp. 306–323. DOI: <https://doi.org/10.5117/nedtaa2013.3.verk>.
- (2013b). ‘Temporaliteit én Modaliteit: een Repliek’. In: *Nederlandse Taalkunde* 18.3, pp. 339–345. DOI: <https://doi.org/10.5117/nedtaa2013.3.ver2>.
- Vermunt, J. K. and J. Magidson (2002). ‘Latent Class Cluster Analysis’. In: *Applied Latent Class Analysis*. Ed. by J. Hagenaars and A. McCutcheon. Cambridge: Cambridge University Press, pp. 89–106.
- von Stechow, K. (1994). ‘Restrictions on Quantifier Domains’. PhD thesis. Amherst: University of Massachusetts.

- (2011). ‘Conditionals’. In: *Semantics: An International Handbook of Natural Language Meaning*. Ed. by K. von Heusinger, C. Maienborn and P. Portner. Vol. 2. Berlin; Boston: De Gruyter, pp. 1515–1537. DOI: <https://doi.org/10.1515/9783110255072.1515>.
- (2012). ‘Subjunctive Conditionals’. In: *The Routledge Companion to Philosophy of Language*. Ed. by G. Russell and D. Graff Fara. New York: Routledge, pp. 466–477.
- von Prince, K. (2019). ‘Counterfactuality and Past’. In: *Linguistics and Philosophy* 42.6, pp. 577–615. DOI: <https://doi.org/10.1007/s10988-019-09259-6>.
- von Wright, G. H. (1973). ‘On the Logic and Epistemology of the Causal Relation’. In: *Studies in Logic and the Foundations of Mathematics* 74, pp. 293–312. DOI: [https://doi.org/10.1016/s0049-237x\(09\)70366-0](https://doi.org/10.1016/s0049-237x(09)70366-0).
- Wälchli, B. (2018). ‘As Long as’, ‘Until’ and ‘Before’ Clauses’. In: *Baltic Linguistics* 9, pp. 141–236.
- Wallwork, A. (2018). *Top 50 Grammar Mistakes*. Cham: Springer International Publishing. DOI: <https://doi.org/10.1007/978-3-319-70984-0>.
- Walters, L. (2021). ‘Introduction’. In: *Conditionals, Paradox, and Probability: Themes From the Philosophy of Dorothy Edgington*. Ed. by L. Walters and J. Hawthorne. Oxford University Press. DOI: <https://doi.org/10.1093/oso/9780198712732.001.0001>.
- Ward, J. H. J. (1963). ‘Hierarchical Grouping to Optimize an Objective Function’. In: *Journal of the American Statistical Association* 58.301, pp. 236–244. DOI: <https://doi.org/10.1080/01621459.1963.10500845>.
- Wason, P. C. (1968). ‘Reasoning About a Rule’. In: *Quarterly Journal of Experimental Psychology* 20.3, pp. 273–281. DOI: <https://doi.org/10.1080/14640746808400161>.
- Weber, M. (1949). *The Methodology of the Social Sciences*. New York: Free Press.
- Weirich, K. M. (2015). ‘Truth and Consequence: Toward a New Account of Indicative Conditionals’. PhD thesis. University of Colorado at Boulder.
- Whitehead, A. N. and B. Russell (1910). *Principia Mathematica*. Cambridge: Cambridge University Press.
- Wiebe, J., R. Bruce and T. P. O’Hara (1999). ‘Development and use of a Gold-Standard Data set for Subjectivity Classifications’. In: *Proceedings of the 37th Annual Meeting of the Association for Computational Linguistics*. Maryland: Association for Computational Linguistics, pp. 246–253.
- Wierzbicka, A. (1988). *The Semantics of Grammar*. Amsterdam: John Benjamins Publishing Company. DOI: <https://doi.org/10.1075/slcs.18>.
- (1997). ‘Conditionals and Counterfactuals: Conceptual Primitives and Linguistic Universals’. In: *On Conditionals Again*. Ed. by A. Athanasiadou and R. Dirven. Amsterdam: John Benjamins Publishing Company, pp. 15–60. DOI: <https://doi.org/10.1075/cilt.143.04wie>.
- Wilcox, A. R. (1973). ‘Indices of Qualitative Variation and Political Measurement’. In: *The Western Political Quarterly* 26.2, pp. 325–343. DOI: <https://doi.org/10.2307/446831>.

- Willer, M. (2022). ‘Negating Conditionals’. In: *Oxford Studies in Philosophy of Language*. Ed. by E. Lepore and D. Sosa. Vol. 2. Oxford: Oxford University Press. Forthcoming.
- Williamson, T. (2020). *Suppose and Tell: the Semantics and Heuristics of Conditionals*. New York: Oxford University Press.
- Wilson, D. (1975). *Presupposition and Non-truth-conditional Semantics*. Cambridge, Massachusetts: Academic Press.
- Wittgenstein, L. (1958). *Philosophical Investigations*. Ed. by G. E. M. Anscombe. 3rd ed. Oxford: Basil Blackwell.
- Wright, P. and A. J. Hull (1986). ‘Answering Questions About Negative Conditionals’. In: *Journal of Memory and Language* 25.6, pp. 691–709. DOI: [https://doi.org/10.1016/0749-596x\(86\)90044-6](https://doi.org/10.1016/0749-596x(86)90044-6).
- Wright, W. (1888). ‘The Empire of the Hittites’. In: *Journal of the Transactions of The Victoria Institute, or Philosophical Society of Great Britain* 21, pp. 55–72.
- Xiaofei, H., C. Deng and N. Partha (2005). ‘Laplacian Score for Feature Selection’. In: *Advances in Neural Information Processing Systems*, pp. 507–514.
- Zakkou, J. (2017). ‘Biscuit Conditionals and Prohibited ‘Then’’. In: *Thought: A Journal of Philosophy* 6.2, pp. 84–92. DOI: <https://doi.org/10.1002/tht3.235>.
- Zevakhina, N. and V. Prigorkina (2020). ‘Quantity Inferences in Conditionals: A Pilot Experimental Study’. In: *Proceedings of 11th International Conference of Experimental Linguistics*. ExLing Society. DOI: <https://doi.org/10.36505/ExLing-2020/11/0058/000473>.
- Zufferey, S., J. Moeschler and A. Reboul (2019). *Implicatures*. New York: Cambridge University Press.
- Zumel, N. and J. Mount (2020). *Practical Data Science With R*. New York: Manning Publications.
- Zwaan, F. L. (1968). ‘De “tussenzin”’. In: *Taalkunde in Artikelen*. Ed. by J. Hoogteijling. Groningen: Wolters-Noordhoff, pp. 360–362.
- Zwart, J.-W. (2011). *The Syntax of Dutch*. Cambridge; New York: Cambridge University Press.
- Zwarts, F. (1981). ‘Negatief Polaire Uitdrukkingen I’. In: *Glott* 4, pp. 35–132.

Samenvatting in het Nederlands

Inleiding

Voorwaardelijke constructies, ook wel ‘conditionelen’ (*conditionals*) of ‘conditionele constructies’ genoemd, stellen ons in staat onze gedachten te uiten over mogelijke toestanden van de wereld.¹ Daarmee vormen ze ‘een essentieel onderdeel van het menselijk vermogen tot redeneren en beslissen’ (Evans & Over, 2004, p. 1; zie ook Edgington, 2021, p. 1). Voorwaardelijke constructies spelen daarmee, zoals Hartmann en Hahn (2020, p. 981) betogen, een rol in ‘elk aspect van ons denken, van het alledaagse, zoals in “als je te veel kaas eet, krijg je nachtmerries” tot in de meest fundamentele zorgen, zoals in “als de opwarming van de aarde niet wordt gestopt, zal de zeespiegel dramatisch stijgen”’. Dat zulke samengestelde zinnen een belangrijke rol in onze cognitie spelen, laat ook de ‘als dan’-truc in (1) uit een recente kinderbijlage van NRC zien, waarin advies wordt gegeven over het waarmaken van dromen.

- (1) Vaak weet je al wat je valkuilen zijn. Uit ervaring weet je bijvoorbeeld dat je uit school vaak meteen als een zak aardappelen op de bank ploft omdat je moe bent. Je stapt uit die valkuil door van tevoren levendig te fantaseren over hoe je je het liefst zou willen gedragen als je uit school komt. Bijvoorbeeld: *‘Als ik na school op het punt sta op de bank te ploffen, dan begin ik met het programmeren van mijn eigen game’* [nadruk toegevoegd]. De truc is om je de situatie vooraf zo helder mogelijk voor te stellen. Dat helpt om je beter aan je eigen afspraken te houden. Wetenschappers hebben aangetoond dat de kans dat je hierdoor je doel realiseert drie keer zo groot is, omdat je met deze truc minder wilskracht nodig hebt. (de Jong, 2021, p. 11)

¹In deze samenvatting gebruik ik de term ‘voorwaardelijke constructie’ voor samengestelde zinnen bestaande uit een voorwaardelijke bijzin, meestal ingeleid door *als*, en de bijbehorende hoofdzin.

In dit eenvoudige voorbeeld zien we hoe de situatie die wordt uitgedrukt in de *als*-zin als oorzaak of aanleiding wordt voorgesteld voor een uit te voeren handeling, beschreven in de hoofdzin. Het voorbeeld laat zo zien hoe we voorwaarden en consequenties kunnen gebruiken om ons eigen handelen te sturen.

Het is uiteraard niet zo dat we voorwaarden (*als*) en consequenties (*dan*) enkel in gedachten gebruiken. In communicatie gebruiken we voorwaardelijke constructies, zoals ‘*als-dan*-zinnen’, om gedachten te uiten over situaties waarover we onzeker zijn, situaties die we hypothetisch, waarschijnlijk of juist onwaarschijnlijk achten en zelfs situaties die wij in strijd achten met onze huidige kennis van de wereld – zogenaamde ‘tegenfeitelijke’ situaties (*wat als...*). We nemen bijvoorbeeld een paraplu mee *als* het regent; *als* iemand onbeleefd is, beoordelen we haar of zijn gedrag als ongepast; we concluderen dat iemand getrouwd moet zijn geweest *als* ze een ‘weduwe’ wordt genoemd en we stellen ons voor dat we de trein wél hadden gehaald *als* iets eerder waren vertrokken. We kunnen voorwaardelijke constructies ook gebruiken als we hardop van aanwijzingen naar oplossingen te redeneren, zoals Agatha Christie’s beroemde detective Hercule Poirot in (2) hieronder laat zien door te redeneren over de vraag wie, voorafgaand aan de moord op Roger Ackroyd, het raam heeft geopend.

- (2) “Wie heeft het [raam] geopend? Het is duidelijk dat alleen de heer Ackroyd dat zelf had kunnen doen, en wel om een van de volgende twee redenen. Ofwel omdat de kamer ondraaglijk heet werd (maar aangezien het vuur bijna uit was en er vannacht een scherpe temperatuurdaling was, kan dat niet de reden zijn), ofwel omdat hij iemand op die manier toegang verschaftte. En *als hij iemand op die manier toegang verschaftte* [nadruk toegevoegd], moet het iemand zijn geweest die hij goed kende, aangezien hij zich eerder ongemakkelijk had gevoeld over datzelfde raam.” (Christie, 1926, p. 64, *The Murder of Roger Ackroyd*)

Wat het eerdere voorbeeld uit NRC hierboven al liet zien, is dat je uiteraard geen beroemd detective hoeft te zijn om voorwaardelijke constructies te gebruiken. Zoals Williamson (2020, p. 3) stelt: ‘hypothetisch denken is een centraal onderdeel van het cognitieve leven van de mens [...]. We vertrouwen erop om te beslissen wat we doen. Als je tussen twee alternatieve scenario’s moet kiezen, vergelijk je wat er gebeurt als je het ene pad volgt met wat er gebeurt als je het andere volgt’. In veel gevallen kan het gebruik van een voorwaardelijke constructie echter niet gemakkelijk worden beschouwd als de uiting van zo’n redeneertaak, zoals het voorbeeld in (3) hieronder laat zien.

- (3) Misschien dat jij op een zeker moment mij helpt. We hoeven niet te leven met een kasboek ernaast. *Als jij mij nu nodig hebt, leun dan op me* [nadruk toegevoegd]. Toch? Waarom denk je zo rigide over zulke dingen? (Murakami, 1987b, p. 12, *Norwegian Wood*)

In dit voorbeeld uit Toru Watanabe, de hoofdpersoon uit Murakami's roman *Norwegian Wood*, de voorwaardelijke bijzin *als jij mij nu nodig hebt* niet om te redeneren, maar om een aanbod aan zijn vriendin Naoko te 'contextualiseren'.

Zodra een voorwaardelijke gedachte uitgedrukt wordt in communicatie, moet daaraan een talige vorm worden gegeven. Hoewel in de voorbeelden hierboven steeds hetzelfde voegwoord (*als*) wordt gebruikt, verschillen de functies van de voorwaardelijke bijzinnen – respectievelijk een aanleiding of oorzaak, een argument voor een conclusie en een contextualisering van een aanbod. Aangezien we voorwaardelijke constructies gebruiken om te redeneren, maar ook om te argumenteren en, zoals we hieronder zullen zien, allerlei andere verbanden te leggen tussen situaties waaraan we met taal refereren, is het belangrijk hun vorm en betekenis in communicatieve contexten te bestuderen.

Dit proefschrift richt zich op de verschillende vormen en betekenissen van voorwaardelijke constructies, zonder bepaalde gebruiken *a priori* uit te sluiten. Deze studie streeft ernaar de volgende vraag te beantwoorden: welke betekenissen worden uitgedrukt door middel van voorwaardelijke constructies en hoe verhouden deze betekenissen zich tot de grammaticale eigenschappen van de hoofd- en bijzinnen in die constructies? In de volgende twee paragrafen worden respectievelijk de betekenis en vorm van voorwaardelijke constructies geïntroduceerd. Aangezien de zojuist gepresenteerde hoofdvraag slechts in algemene bewoordingen is geformuleerd, volgt daarna een specificatie van de vraag op basis van hoofdstuk 1 van dit proefschrift. In de daaropvolgende paragrafen worden hoofdstukken 2 tot en met 6 van dit proefschrift samengevat, zodat in de laatste paragraaf een samenvattend antwoord op de onderzoeksvraag kan worden gegeven.

Voorwaardelijke constructies

Zoals blijkt uit de voorbeelden hierboven, worden voorwaardelijke constructies voor verschillende doeleinden gebruikt. In veel onderzoek staan echter slechts specifieke soorten voorwaardelijke constructies centraal en vaak wordt het concept van voorwaardelijke constructies beperkt tot die gebruiken waarbij formele redeneringen een rol spelen.

In veel onderzoek naar voorwaardelijke constructies wordt, al sinds de oude Grieken, betekenis gedefinieerd in termen van waarheidsvoorwaarden (zie onder andere Kneale & Kneale, 1962; Frege, 1879; Copi, 1973; Bennett, 2003; von Fintel, 2011). De betekenis van een zin wordt dan geanalyseerd door te achterhalen hoe de wereld eruit moet zien om de gehele zin als 'waar' (T) te evalueren. In zulke formeel-semantische benaderingen wordt het voegwoord *als* vaak gelijkgesteld aan de logische operator $\supset$ ('materiële conditioneel' of *material conditional*; de zogenaamde 'hoefijzeranalyse' of *horseshoe analysis*; zie bijvoorbeeld Sanford, 1989, p. 51; voor een recente inleiding op de materiële analyse, zie onder andere MacFarlane, 2020 en paragraaf 2.3 in dit proefschrift). De consequentie daarvan is dat voorwaardelijke constructies altijd waar zijn,

tenzij bewering p in de voorwaardelijke bijzin waar is en bewering q in de hoofdzin onwaar ($\perp$). Ter illustratie bekijken we het voorbeeld uit Noakes' *Lore of Running* in (4) hieronder.

- (4) Het essentiële kenmerk tijdens deze periode van hardlopen is niet buiten adem of overdreven moe te raken. Het gemiddelde trainingstempo zal waarschijnlijk 5 tot 7 minuten per kilometer zijn; als je in dat tempo kunt trainen, kun je ook de marathon lopen.²

Stel dat je als hardloper in staat bent om in een gemiddeld tempo tussen de vijf en zeven minuten per kilometer te lopen. Vervolgens kom je erachter dat je de marathon niet kunt uitlopen. In dat geval kun je de auteur van (4) verantwoordelijk houden voor een onware uitspraak, of in ieder geval voor het geven van ontoereikend of slecht advies. Er kunnen natuurlijk veel redenen zijn dat je, zelfs als je een bepaald tempo kunt volhouden, toch geen marathon kunt uitlopen, maar die zijn in deze strikt 'waarheidsvoorwaardelijke' analyse niet relevant. De voorwaarde die door middel van de bijzin wordt geuit is, met andere woorden, een voldoende voorwaarde voor de waarheid van de bewering geuit in de hoofdzin. Het moge duidelijk zijn dat er in werkelijkheid wel degelijk relevante factoren zijn die ervoor zorgen dat alleen het tempo geen garantie is voor een succesvolle marathon – je kunt geblesseerd raken, niet voldoende kilometers hebben opgebouwd of last van hitte krijgen. Wat in het algemeen wordt aangeduid met de term 'betekenis' is dus niet beperkt tot waarheidsvoorwaarden (zie onder andere Gamut, 1991, p. 195–196).³ Zulke niet-waarheidsvoorwaardelijke aspecten van de betekenis van voorwaardelijke constructies stellen ons in staat de eerder globaal geformuleerde onderzoeksvraag te specificeren: in hoeverre verschilt het voorwaardelijke voegwoord *als* zoals gebruikt in natuurlijke taal van de voorwaardelijke operator $\supset$ zoals gebruikt in de logica? Het begrip 'voegwoord' brengt ons vervolgens op het spoor van het tweede aspect van de globale onderzoeksvraag, namelijk de grammaticale vorm van voorwaardelijke constructies.

De vorm van voorwaardelijke constructies

Om een gedachte in een gesprek of tekst uit te drukken, zal die gedachte een talige vorm moeten krijgen. Voorwaardelijke gedachten vormen daarop geen uitzondering. Het uitdrukken van voorwaarden roept daarmee niet alleen woordkeuzes op, maar ook keuzes in grammaticale vorm. Zo gebruikt de spreker in het onderstaande voorbeeld de onvoltooid verleden tijd in zowel de bijzin (*was*) als in de hoofdzin (*zou*).

²Dit voorbeeld is vertaald. Zie het originele voorbeeld op pagina 6 (Noakes, 1991, p. 202)

³Voor een bespreking van de termen 'betekenis' en 'bedoeling', zie onder andere de discussie in paragraaf 7.3.

- (5) Daniël is geen atleet. *Als hij een atleet was, zou hij uithoudingsvermogen hebben.* Hij kan echter de trap niet eens opkomen zonder buiten adem te raken.⁴

De verleden tijd wordt hier echter niet gebruikt om te verwijzen naar het verleden, maar om een afstandelijke houding uit te drukken tegenover de bewering dat Daniël een atleet is (de zogenaamde *fake tense*, cf. Iatridou, 2000). Wanneer we de tijd van (5) veranderen van de onvoltooid verleden tijd in de onvoltooid tegenwoordige tijd, zoals in (6) hieronder, zien we tevens een verandering in betekenis.

- (6) # (Daniël is geen atleet.) *Als hij een atleet is, heeft hij uithoudingsvermogen.* (Hij kan echter niet eens de trap op zonder buiten adem te raken.)

De verandering in betekenis betreft wat in de literatuur wel ‘epistemische afstand’ wordt genoemd (cf. Langacker, 1978). Deze afstandelijke houding is wat verloren gaat bij het veranderen van de werkwoordstijd. De verandering in betekenis op basis van werkwoordstijd verklaart waarom (6) inconsistent is; de neutrale houding ten opzichte van Daniëls status als atleet botst met zowel de conclusie die aan de voorwaardelijke constructie voorafgaat (Daniël is geen atleet), als met de verklaring erna (hij kan de trap niet beklimmen zonder in ademnood te komen).⁵

Spreekers gebruiken de tijd van het werkwoord en andere grammaticale middelen om verschillende soorten voorwaardelijke gedachten uit te drukken. De studie van voorwaardelijke constructies heeft zich echter voor een groot deel gericht op de betekenis van het voorwaardelijke voegwoord (hier: *als*). De discussie in de literatuur draait in feite voor een groot deel om wat *als* betekent, zonder veel van de grammaticale context in die vraag te betrekken (cf. Dancygier & Sweetser, 2005, p. 7–15; zie ook Iatridou, 2021). Dit betekent niet dat er geen literatuur is over de rol van grammatica in het bepalen van de betekenis van voorwaardelijke constructies. Integendeel: over de hierboven geïllustreerde factor werkwoordstijd is veel literatuur beschikbaar (zie bijvoorbeeld Quirk e.a., 1985; Declerck & Reed, 2001; Huddleston & Pullum, 2002 en paragraaf 3.2 in dit proefschrift), evenals over modale hulpwerkwoorden en bijwoorden als *zullen*, *moeten*, *misschien* en *zeker* (zie bijvoorbeeld Sweetser, 1990; Boogaart & Reuneker, 2017; Gabrielatos, 2020 en paragraaf 5.5 in dit proefschrift), maar daar houdt de grammatica van voorwaardelijke constructies niet op. Als we bijvoorbeeld kijken naar de voorbeelden in (7) en (8) hieronder, zien we twee verschillende zinsvolgordes, namelijk een zinsinitiële en een zinsfinale voorwaardelijke *als*-zin.

- (7) Als ik wil afvallen, dan moet ik niet nog een stuk taart eten.
(8) Peter zal niet naar het feest gaan als ik ga.

⁴Dit voorbeeld is vertaald. Zie het originele voorbeeld op pagina 5 (Gerlofs, 2009, p. 89).

⁵Het #-teken geeft aan dat het voorbeeld inconsistent is. Zie pagina xxi voor de in dit proefschrift gebruikte symbolen.

In de literatuur zijn verschillende suggesties gedaan over mogelijke betekenisverschillen tussen voorop- en achteropgeplaatste voorwaardelijke bijzinnen (zie onder andere Ford & Thompson, 1986; Renmans & van Belle, 2003; Diessel, 2005; Reuneker, 2020 en paragraaf 5.2 in dit proefschrift), maar de literatuur is vrij beperkt, vrijwel uitsluitend geïntereerd op het Engelse *if* en factoren als werkwoordstijd en zinsvolgorde zijn vooral in isolatie bekeken, terwijl ze mogelijk interacteren met andere factoren. Zo zien we in het voorbeeld in (9) het modale hulpwerkwoord *zou* in de verleden tijd, in (10) het modale hulpwerkwoord *moet* in de tegenwoordige tijd en daarbij het resumptieve element *dan*. In (11) blijven dergelijke factoren achterwege, maar zien we een afwijkende woordvolgorde in de hoofdzin (zie onder andere König & van der Auwera, 1988; Reuneker, 2020 en paragraaf 5.3 in dit proefschrift).

(9) Als de trein op tijd was geweest, *zou* hij nu al op kantoor zijn geweest.

(10) Als zijn vrouw is gestorven, *dan moet* hij weduwnaar zijn.

(11) Als je trek hebt, *er zitten koekjes* in de trommel.

Deze grammaticale kenmerken zijn niet zomaar inwisselbaar tussen de voorbeelden. Hoewel vooral modaliteit in voorwaardelijke constructies uitgebreid is onderzocht, hebben andere grammaticale kenmerken minder aandacht gekregen, terwijl ze, eveneens volgens de bestaande literatuur, mogelijk van invloed zijn op de betekenis. Zoals gezegd zijn zulke kenmerken daarnaast niet in interactie en op grotere schaal onderzocht.

Op basis van de uitgangspunten van de constructiegrammatica (zie onder andere Goldberg, 1995; Croft & Cruse, 2004) mag worden verwacht dat verschillen in grammaticale vorm systematisch overeenkomen met verschillen in betekenis. Als we zo'n systematische relatie tussen betekenis en vorm aannemen, kunnen we het tweede deel van de vraag die aan het begin werd geïntroduceerd specificeren: in hoeverre zijn de grammaticale vorm en de betekenis van voorwaardelijke constructies in natuurlijke taal aan elkaar gerelateerd? In de rest van dit hoofdstuk vat ik de resultaten van deze studie samen, om zo tot een antwoord op deze onderzoeksvraag te komen.

De semantiek en pragmatiek van voorwaardelijke constructies

In hoofdstuk 2 betoog ik dat het gebruik van voorwaardelijke constructies twee niet-waarheidsvoorwaardelijke betekenisaspecten oproept. Ik analyseer die aspecten vervolgens in termen van implicaturen (cf. Grice, 1975). In deze paragraaf bespreek ik de twee genoemde niet-waarheidsvoorwaardelijke aspecten van betekenis die centraal staan in dit proefschrift.

Ten eerste vereist de context waarin een voorwaardelijke constructie wordt geuit dat de waarheid van de bewering in de bijzin nog niet is vastgesteld. Hoewel een trainer de voorwaardelijke constructie in het hieronder herhaalde

voorbeeld in (4) kan uitspreken terwijl hij op dat moment zijn atleet met een gemiddeld tempo van 5 minuten per kilometer over de atletiekbaan ziet rennen, zou het vreemd zijn om dit zonder verdere reden te doen, omdat de trainer in dit geval waarschijnlijk een ander voegwoord zou gebruiken, zoals *omdat* of *aangezien*, waarmee verantwoordelijkheid wordt genomen voor de bewering die erop volgt.

- (4) Het essentiële kenmerk tijdens deze periode van hardlopen is niet buiten adem of overdreven moe te raken. Het gemiddelde trainingstempo zal waarschijnlijk 5 tot 7 minuten per kilometer zijn; als je in dat tempo kunt trainen, kun je ook de marathon lopen. (Noakes, 1991, p. 202)

Ten tweede is voor een coherente interpretatie van een voorwaardelijke constructie een verband nodig tussen bij- en hoofdzin. Waar het in het bovenstaande voorbeeld duidelijk is dat op een bepaald tempo kunnen trainen iemand (in principe) in staat stelt een marathon te lopen, is zo'n verband in (12) niet gemakkelijk te vinden. Bijgevolg zullen veel lezers dit op zijn minst een vreemde of onsamenvattende uiting vinden.⁶

- (12) ? Als je in dat tempo kunt trainen, heb je een zus die Mary heet.

Puur waarheidsvoorwaardelijk bezien, echter, is de bewering in (12) waar als blijkt dat de aangesprokene inderdaad een zus heeft die de naam Mary draagt. Dat is, zo is bekend in de literatuur, een weinig intuïtieve en evenmin bevredigende analyse (cf. Peirce, 1933; Sanford, 1989).

Uit het bovenstaande volgen, zoals gezegd, twee niet-waarheidsvoorwaardelijke betekenisaspecten van voorwaardelijke constructies. Het eerste aspect wordt in dit proefschrift *non-assertiviteit* (*unassertiveness*) genoemd, het tweede *verbondenheid* of *connectie* (*connectedness*). In hoofdstuk 2 worden deze betekenisaspecten geanalyseerd als conventionele betekenissen van *als*, omdat ze altijd worden opgeroepen bij het gebruik van voorwaardelijke *als*-constructies. Deze betekenissen zijn echter algemeen en hun specifiekere invulling, bijvoorbeeld onzekerheid of tegenfeitelijk bij non-assertiviteit en causaliteit of epistemische inferentie bij connectie worden geanalyseerd als conversationele implicaturen. Deze twee betekenissen structureren het overzicht van classificaties van voorwaardelijke constructies dat hierna wordt samengevat. Daarna wordt op basis van de grammaticale kenmerken van voorwaardelijke constructies onderzocht in hoeverre de specifieke implicaturen gegeneraliseerd zijn, of, met andere woorden, in hoeverre deze specifieke implicaturen door de grammaticale vorm van voorwaardelijke constructies worden opgeroepen.

⁶Vandaar dat het ?-teken voorafgaat aan het voorbeeld.

Classificaties van voorwaardelijke constructies

In hoofdstuk 3 presenteer ik een overzicht van classificaties van voorwaardelijke constructies, waarbij ik twee doelen nastreef. Het eerste doel is het in kaart brengen van de types van voorwaardelijke constructies die in de literatuur worden voorgesteld in relatie tot implicaturen van non-assertiviteit en connectie. Het tweede doel is het inventariseren van grammaticale eigenschappen van voorwaardelijke constructies, met daarbij nadruk op de relatie tot de voorgestelde typen voorwaardelijke constructies.

Het eerste doel is een overzicht te creëren van de typen voorwaardelijke constructies die in de literatuur worden onderscheiden en dat overzicht te structureren aan de hand van de eerder genoemde betekenisaspecten, te weten non-assertiviteit en connectie. Met betrekking tot implicaturen op basis van non-assertiviteit maken de meeste classificaties van voorwaardelijke constructies een onderscheid tussen neutrale en niet-neutrale voorwaardelijke constructies, waarbij de laatste verder onderverdeeld zijn in voorwaardelijke constructies die een bepaalde mate van feitelijkheid, onzekerheid, hypotheticaliteit of tegenfeitelijkheid impliceren (zie de literatuurverwijzingen in paragraaf 3.2). De laatste twee van deze specifieke implicaturen worden in dit proefschrift geanalyseerd in termen van de hierboven geïntroduceerde ‘epistemische afstand’. Met betrekking tot de implicaturen op basis van connectie maken de meeste classificaties onderscheid tussen directe en indirecte voorwaardelijke constructies, waarbij de eerste onderverdeeld zijn in causale en inferentiële connecties, terwijl de laatste soort subtypen omvat zoals pragmatische en metalinguïstische voorwaardelijke constructies (zie de literatuurverwijzingen in paragraaf 3.3).

Het tweede doel van dit hoofdstuk is het inventariseren van de grammaticale kenmerken die de mogelijk gegeneraliseerde conversationele implicaturen kunnen oproepen die in dit proefschrift centraal staan. Implicaturen van non-assertiviteit lijken volgens de literatuur het sterkst verband te houden met werkwoordstijd en modaliteit, hoewel in het hoofdstuk duidelijk wordt dat werkwoordstijd zowel temporele als modale functies heeft en daarmee ambiguïteit oproept. Implicaturen van connectie lijken een zwakkere relatie te hebben met specifieke grammaticale kenmerken, hoewel we hier ook de invloed van werkwoordsvorm en modaliteit zien, aangevuld met kenmerken als zinsvolgorde, ontkenning, zinstype van de hoofdzin, (lexicaal) aspect, het gebruik van focuspartikels en, in het Nederlands, de syntactische integratie van de bij- en hoofdzin.

In hoofdstuk 2 benadruk ik dat conversationele implicaturen per definitie niet-conventioneel zijn, wat betekent dat niet wordt verwacht dat de grammaticale kenmerken die zijn geïnventariseerd in hoofdstuk 3 onveranderlijk dezelfde implicaturen van non-assertiviteit en connectie oproepen. Wel roept het hoofdstuk de verwachting op dat grammaticale kenmerken ‘samenwerken’ of *clusteren* om dergelijke implicaturen op te roepen. De rest van het proefschrift richt zich dan ook op een probabilistische benadering van de relatie tussen de vorm

en betekenis van voorwaardelijke constructies en daarvoor is een uitgebreide corpusstudie uitgevoerd. In de volgende paragraaf worden de voorbereidingen daartoe besproken.

Data en methode

Hoofdstuk 4 is in veel opzichten een voorbereidend hoofdstuk voor de erop volgende hoofdstukken. Het biedt een gedetailleerd verslag van de dataselectie, representativiteit en balans van het corpus, evenals van de annotatieprocedures en -betrouwbaarheid. De annotatie wordt uitvoerig besproken, omdat de maatregelen om interbeoordelaarsbetrouwbaarheid te evalueren en te verhogen nog steeds geen standaardpraktijk zijn binnen de corpuslinguïstiek. Het hoofdstuk biedt dan ook suggesties voor het aanpakken van de problemen die kunnen optreden tijdens geautomatiseerde en handmatige annotatie van taaldata. Uit een experiment blijkt daarnaast dat de annotatie van typen voorwaardelijke constructies in corpusdata niet voldoende betrouwbaar kan worden uitgevoerd.

Deze uitkomst heeft belangrijke consequenties voor de beantwoording van de onderzoeksvragen. De resultaten van het experiment vormen met name een argument om niet, zoals beoogd, een zogenaamd *supervised machine-learning*-algoritme in te zetten, waarbij de grammaticale kenmerken van voorwaardelijke constructies getoetst worden als voorspellers van vooraf gedefinieerde typen. Er is, omdat geen betrouwbare annotatie van typen mogelijk bleek, voor een *unsupervised machine-learning*-algoritme gekozen, waarbij de grammaticale kenmerken zonder vooraf bekende typen worden ingezet om homogene groepen of *clusters* te vormen. Het hoofdstuk geeft tot slot een introductie op de gebruikte statistische en data-analytische technieken die in de hoofdstukken erna worden ingezet.

De grammatica van voorwaardelijke constructies

Net als hoofdstuk 3 dient hoofdstuk 5 een tweeledig doel. Ten eerste geeft het hoofdstuk een uitgebreid overzicht van de grammaticale kenmerken van Nederlandse voorwaardelijke *als*-constructies. De distributies van zinsvolgorde, syntactische integratie, werkwoordstijd, modaliteit, aspect, persoon en getal, zinstype van de consequent, negatie en de aanwezigheid van focuspartikels zijn geanalyseerd in een representatief en gebalanceerd corpus en getest op associaties met modus (gesproken, geschreven teksten) en register (formele, informele teksten). Ten tweede dient het resulterende overzicht als basis voor de data-analyses in hoofdstuk 6. Met betrekking tot de tweede onderzoeksvraag is het doel om systematisch te toetsen in hoeverre de vormkenmerken van Nederlandse voorwaardelijke *als*-zinnen systematisch samenhangen met verschillende gebruiken en in hoeverre dus sprake is van eenheden van vorm en betekenis of *constructies*. Daarom vormt dit hoofdstuk een noodzakelijk, maar ook op zichzelf waardevol overzicht van de grammatica van Nederlandse voorwaardelijke

als-constructies. Naast het overzicht van grammaticale kenmerken biedt hoofdstuk 5 vergelijkingen met eerdere studies van die kenmerken, om het begrip van elk kenmerk te verhogen en om te voorkomen dat factoren die hun distributies mogelijk beïnvloeden over het hoofd werden gezien.

Aangezien de resultaten omvangrijk zijn, worden ze hier kort samengevat en verwijs ik de lezer naar de samenvattingen aan het einde van elk van de paragrafen in hoofdstuk 5. Met betrekking tot zinsvolgorde is de zinsinitiële positie van voorwaardelijke bijzinnen het meest frequent. De resultaten laten tevens zien dat zinsfinale voorwaardelijke bijzinnen niet alleen frequenter zijn dan mag worden verwacht op basis van de literatuur, maar ook dat de zinsvolgorde verband houdt met implicaturen van connectie en meer specifiek, connecties op taalhandelingsniveau. Met betrekking tot syntactische integratie is de integratieve woordvolgorde de meest frequente in geschreven teksten, daar waar het resumptieve patroon met *dan* het meest frequent is in gesproken teksten. De niet-integratieve woordvolgorde komt daarentegen in alle modi en registers weinig voor. Hoewel de literatuur over syntactische integratiepatronen in voorwaardelijke constructies schaars is, suggereren de beschikbare studies een sterke relatie met implicaturen van connectie (of ‘semantische integratie’; zie König & van der Auwera, 1988). In termen van werkwoordstijd laat een grote meerderheid van de voorwaardelijke constructies in zowel de bij- als de hoofdzin de onvoltooid tegenwoordige tijd zien, waarbij werkwoordstijd in de ene zin sterk geassocieerd is met de werkwoordstijd in de andere zin. Hoewel zulke associaties voor verschillende kenmerken zijn gevonden, was er geen zo sterk als die bij werkwoordstijden. De significantie van die associatie is grotendeels toe te schrijven aan de combinatie van verledentijdsvormen in beide zinnen: de onvoltooid verleden tijd in beide zinnen, of de voltooid verleden tijd in beide zinnen. Deze patronen lijken gerelateerd te zijn aan implicaturen van non-assertiviteit en specifiekere, epistemische afstand, zoals het geval was bij de meeste gebruiken van de voltooid verleden tijd en de verleden tijd van *zullen* (*zou*). In tegenstelling tot Engelse voorwaardelijke constructies komen Nederlandse voorwaardelijke constructies niet vaak voor met dit epistemisch-modale hulpwerkwoord in de tegenwoordige tijd in de hoofdzin, wat betekent dat wat in de literatuur over Engelse voorwaardelijke constructies wordt behandeld als mogelijk de sterkste indicator van de causale implicaturen van connectie (‘voorspellende voorwaardelijke constructies’) niet of nauwelijks een indicator is in Nederlandse voorwaardelijke constructies.

Lexicaal aspect werd aan de corpusstudie toegevoegd, omdat de literatuur suggereert dat statieve werkwoorden in voorwaardelijke bijzinnen met voltooid verleden tijd worden gebruikt om implicaturen van tegenfeitelijkheid op te roepen, in tegenstelling tot bijzinnen met gebeurteniswerkwoorden. De resultaten laten zien dat de meeste bij- en hoofdzinnen van Nederlandse voorwaardelijke constructies verwijzen naar *states* (statieve toestanden), gevolgd door *accomplishments* (eindpuntgebeurens). Het verband met implicaturen van non-assertiviteit zou, als zo’n verband bestaat, moeten voortvloeien uit de analyses in hoofdstuk 6, aangezien wordt gesuggereerd dat het een gecombineerd ef-

fect is van werkwoordstijd en aspect. De distributie van persoon en getal in de grammaticale onderwerpen van voorwaardelijke constructies lijkt sterk op wat bekend is uit algemene registerstudies en aangezien deze kenmerken in de literatuur slechts impliciet gerelateerd worden aan implicaturen van connectie, met name in pragmatische voorwaardelijke constructies, zijn deze kenmerken naar verwachting geen sterke indidactoren van implicaturen in het volgende hoofdstuk. Zinstypen van hoofdzinnen worden in de literatuur in verband gebracht met implicaturen van connectie en hoewel de resultaten laten zien dat meer dan 90 procent van de hoofdzinnen van het declaratieve type is, zouden de zinstypen van de resterende hoofdzinnen inderdaad informatief kunnen zijn in het identificeren van het pragmatisch gebruik van voorwaardelijke constructies, zoals het gebruik van voorwaardelijke bijzinnen ten behoeve van negatieve beleefdheidsstrategieën, bijvoorbeeld om een gebod te verzachten. Negatie werd opgenomen in de corpusstudie vanwege het gebruik ervan in onderzoek naar coherentierelaties (in termen van *polariteit*), maar ook omdat de literatuur suggereert dat het kenmerk samen kan werken met werkwoordstijd en modaliteit om non-assertiviteitsimplicaturen van tegenfeitelijkheid op te roepen. In veruit de meeste voorwaardelijke constructies ontbreekt enige vorm van negatie en ook dit kenmerk zal geanalyseerd moeten worden in samenhang met andere kenmerken. Aangezien de literatuur suggereert dat focuspartikels meestal of alleen voorkomen in directe en voorspellende voorwaardelijke constructies, werd dit kenmerk opgenomen in het huidige onderzoek. Focuspartikels, zoals in *zelfs als* en *alleen als*, voegen meestal een additieve of beperkende betekenis aan de voorwaardelijke bijzin toe, maar op basis van corpusbevindingen is de categorie ‘iteratieve partikels’, zoals in *altijd als* en *telkens als*, toegevoegd aan de typen die in de literatuur worden genoemd.

Hoofdstuk 5 biedt een uitgebreid overzicht van de grammatica van voorwaardelijke constructies in het Nederlands. Aangezien hoofdstuk 3 een overzicht geeft van grammaticale kenmerken die grotendeels op het Engels zijn gebaseerd, biedt dit proefschrift ook een contrastieve analyse van de grammatica van Nederlandse en Engelse voorwaardelijke constructies. Verder is de huidige studie niet alleen gebaseerd op geschreven taaldata, zoals gebruikelijk is in de literatuur, maar ook op gesproken taaldata, gebalanceerd op de dimensie register, wat relatief ongebruikelijk is in de literatuur over voorwaardelijke constructies. Hoewel de resultaten die in hoofdstuk 5 zijn gepresenteerd op zichzelf al waardevol zijn, aangezien een dergelijk overzicht niet eerder beschikbaar was voor Nederlandse voorwaardelijke constructies, zijn ze vooral nuttig wanneer ze aan verkennende multivariate analyses worden onderworpen, zodat mogelijke interacties tussen de kenmerken aan het licht komen. De verzameling kenmerken (*feature set*) dient daarmee als basis voor een aantal *data-driven* analyses die als doel hebben na te gaan hoeverre kenmerken van Nederlandse voorwaardelijke constructies samenwerken of *clusteren* en daarmee gezien kunnen worden als grammaticale contexten die gegeneraliseerde implicaturen van non-assertiviteit en connectie oproepen. Deze analyses behandelen we in de volgende paragraaf over hoofdstuk 6.

Clusters van voorwaardelijke constructies

In hoofdstuk 6 draag ik argumenten aan voor het analyseren van voorwaardelijke constructies als paren van vorm en betekenis (constructies), om zo relaties tussen de grammaticale kenmerken en de implicaturen van voorwaardelijke constructies te onderzoeken. Het primaire doel was te onderzoeken in hoeverre de distributies van grammaticale kenmerken van Nederlandse voorwaardelijke constructies kunnen worden gezien als grammaticale contexten die generaliseerde of zelfs geconventionaliseerde implicaturen van non-assertiviteit en connectie oproepen, om zo het laatste deel van de tweede onderzoeksvraag te beantwoorden. Het secundaire doel was om de mogelijkheden van beproefde en *state-of-the-art machine learning*-technieken voor taaldata te onderzoeken (voor inleidingen in clusteranalyse, zie onder andere Anderberg, 1973; Kaufman & Rousseeuw, 1990; Aggarwal, 2014; Divjak & Fieller, 2014).

Met betrekking tot het primaire doel laten de resultaten van de clusteranalyses geen duidelijke relatie zien tussen clusters van grammaticale kenmerken enerzijds en implicaturen van non-assertiviteit of connectie anderzijds. Met andere woorden: uit geen van de analyses blijken duidelijke overeenkomsten tussen de typen die in de literatuur worden onderscheiden en de gevonden clusters. Zelfs typen uit zeer invloedrijke classificaties, zoals Quirk e.a.'s (1985) directe en indirecte voorwaardelijke constructies, of Dancygier en Sweetser (2005) inhoudelijke (voorspellende), epistemische en pragmatische voorwaardelijke constructies zijn niet duidelijk zichtbaar in de clusters die door de algoritmen zijn gevormd. Met betrekking tot de genoemde onderzoeksvraag suggereert dit resultaat dus een negatief antwoord: de grammaticale kenmerken die in deze studie zijn opgenomen, lijken niet te clusteren op kenmerken die gezamenlijk implicaturen van non-assertiviteit en connectie oproepen. Waar de resultaten van het partitionele clusteralgoritme moeilijk te interpreteren blijken in termen van implicaturen en daarbij veel invloed laten zien van individuele kenmerken per cluster, combineert het gebruikte hiërarchische algoritme sterker de gezamenlijke kenmerken van voorwaardelijke constructies om clusters te vormen. De resultaten laten een groot ongemarkeerd cluster zien van wat als prototypische voorwaardelijke constructies zou kunnen worden gezien, namelijk voorwaardelijke constructies met de tegenwoordige tijd in beide zinnen, geen modale markering van antecedenten en een minderheid van vooral epistemisch-modaal gemarkeerde hoofdzinnen. Dit versterkt de eerdere observatie dat directe en indirecte voorwaardelijke constructies in het Nederlands niet worden gemarkeerd door respectievelijk de aan- of afwezigheid van het modale werkwoord *zullen*, waar dat wel het geval is voor het Engelse *will*. Dit inzicht duidt daarmee tevens op het belang van taalspecificiteit in deze studie. Een ander interpreteerbaar cluster in de resultaten van de hiërarchische analyse bestaat uit een groep voorwaardelijke constructies met werkwoorden in de verleden tijd en modaal gemarkeerde hoofdzinnen. De voorwaardelijke constructies in dit cluster roe-

pen implicaturen van epistemische afstand op, maar belangrijk te vermelden is dat het algoritme geen onderscheid maakte tussen temporele en epistemische afstand, wat een veelvoorkomende discussie in de literatuur over de talige onderspecificatie van tijds- en modaliteitmarkeringen weerspiegelt.

Met betrekking tot het secundaire doel, het onderzoeken van de mogelijkheden van *machine learning*-technieken voor onderzoek naar taaldata, zijn de resultaten gemengd. Aan de ene kant draagt deze studie een *bottom-up, data-driven* benadering van voorwaardelijke constructies bij aan een onderzoeksveld waarin de meeste classificaties en studies *top-down, theory-driven* zijn (zie hoofdstuk 3). Dit proefschrift biedt een in methodologisch opzicht vernieuwende combinatie van pragmatische analyses die hypothesen over voorwaardelijke constructies genereren en de toepassing van zowel bewezen als *state-of-the-art machine-learning*-technieken om data in een representatief en gebalanceerd corpus van Nederlandse voorwaardelijke constructies te clusteren. Als zodanig was dit een veelbelovende benadering om de relatie tussen grammatica en betekenis te onderzoeken. Hoewel de gekozen clusteralgoritmen en de evaluaties indicaties geven van redelijke onderliggende structuren, blijken deze structuren, zoals hierboven beschreven, niet sterk gerelateerd te zijn aan de implicaturen die centraal staan in bestaande classificaties van voorwaardelijke constructies. De resultaten zijn daarmee indicatief, maar niet doorslaggevend voor het beantwoorden van de vraag in hoeverre er verbanden zijn tussen de grammaticale kenmerken en implicaturen van voorwaardelijke constructies. De resultaten suggereren slechts zwakke verbanden tussen de vorm en betekenis van voorwaardelijke constructies en de typen die in de literatuur worden onderscheiden. Het is daarom waarschijnlijk dat de typen in de literatuur niet (sterk) gerelateerd zijn aan de grammatica van voorwaardelijke constructies. De in hoofdstuk 2 geanalyseerde implicaturen van non-assertiviteit en connectie zijn dus hoogstwaarschijnlijk niet of slechts zwak gegeneraliseerd.

Conclusie

Dit proefschrift richt zich op voorwaardelijke constructies in het Nederlands en de relatie tussen hun grammaticale vorm en implicaturen van non-assertiviteit en connectie. Naast een gecombineerde waarheidsvoorwaardelijke en pragmatische analyse van voorwaardelijke constructies en een overzicht van classificaties van verschillende typen voorwaardelijke constructies geven de analyses en resultaten in deze studie niet alleen inzicht in de vorm en betekenis van voorwaardelijke constructies, maar ze bieden ook een uitgebreid overzicht van de grammatica van voorwaardelijke constructies in het Nederlands op basis van een representatief en gebalanceerd corpus van geschreven en gesproken taal, zowel uit het formele als uit het informele register. De annotatie van taalgegevens is daarbij in detail besproken en de resulterende richtlijnen en procedures dragen bij aan de corpuslinguïstiek in het algemeen en aan studie van voorwaardelijke constructies in het bijzonder. Dit proefschrift biedt daarnaast inzicht in

de toepassing en evaluatie van clusteranalytische algoritmen op grammaticale kenmerken en de problemen en mogelijke oplossingen die daarbij een rol spelen. Uit de resultaten blijkt dat de typen van voorwaardelijke constructies die in de literatuur worden onderscheiden, en die daarin aan specifieke grammaticale kenmerken worden gerelateerd, niet of slechts in geringe mate weerspiegeld worden in de resultaten van de clusteranalyses. Dat betekent hoogstwaarschijnlijk dat de grammaticale kenmerken van Nederlandse voorwaardelijke constructies geen gegeneraliseerde implicaturen van non-assertiviteit en connectie oproepen, of niet die implicaturen die in de literatuur over voorwaardelijke constructies worden voorgesteld. Mogelijke verklaringen van dit resultaat, zoals taalspecificiteit en het graduele onderscheid tussen betekenis en pragmatiek in de constructiegrammatica, alsmede een vooruitblik op mogelijke richtingen voor toekomstig onderzoek worden besproken in het laatste hoofdstuk van dit proefschrift.

Aan het begin van dit hoofdstuk werd geïllustreerd hoe we voorwaardelijke constructies gebruiken om onze gedachten over mogelijke toestanden van de wereld uit te drukken. Ze stellen ons in staat om vooruit te denken, acties te plannen en alternatieve scenario's te formuleren. Mercier en Sperber (2011, 2019, zie ook hoofdstuk 10) beargumenteren zelfs dat de evolutionaire functie van redeneren, en daarmee het gebruik van voorwaardelijke constructies, primair argumentatief is. Verdere studie van voorwaardelijke constructies is dan ook belangrijk om ons begrip van deze cognitieve en communicatieve vaardigheden te vergroten. De huidige studie draagt bij aan dit streven door inzicht te geven in de rol die semantiek, pragmatiek en grammatica spelen in de manier waarop taalgebruikers voorwaardelijke gedachten uiten.

Curriculum Vitæ

Alex Reuneke was born on the 2nd of January 1985 in Leidschendam, the Netherlands. He obtained degrees in Media Technology (MSc; 2008), Literary Studies (MA; 2011), and Dutch Language and Culture (MA, *cum laude*; 2012). He started his PhD research in 2015 at the Leiden University Centre for Linguistics (LUCL) with a grant from the Netherlands Organisation for Scientific Research (NWO), which resulted in this dissertation. His research has appeared in proceedings and journals such as *Nederlandse Taalkunde* (*Dutch Linguistics*), and *Linguistics in the Netherlands*, and in the popular magazine *Onze Taal*. Furthermore, he co-authored a chapter on intersubjectivity and grammar in *The Cambridge Handbook of Cognitive Linguistics* (2017). Recently, he was awarded the *Academische Jaarprijs van de Maatschappij der Nederlandse Letterkunde* for the best paper on Dutch linguistics of 2019-2020 (Reuneke, 2020). In addition to the topics covered in this dissertation, his academic interests include computational linguistics, corpus linguistics, Dutch verb spelling, and the rhetorical use of grammatical constructions. Next to his position as a PhD candidate, and in combination with his position as lecturer at the Faculty of Computer Science at The Hague University of Applied Sciences from 2006 to 2020, he has taught courses within the BA programs of Linguistics, and Dutch language and culture at Leiden University, including courses on general linguistics, corpus linguistics, semantics, pragmatics, statistics, academic skills, and rhetoric. While he was completing this dissertation, he accepted a position as lecturer in Language and Communication at Leiden University.