

Subordination and discourse segmentation revisited, or: Why matrix clauses may be more dependent than complements

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1. Introduction

All approaches to the structural analysis of texts and discourse have to make assumptions about the smallest units out of which larger pieces of discourse are constructed. A plausible first candidate for the status of “minimal discourse segment” is the grammatical clause, so it comes as no surprise that from the start of an approach such as Rhetorical Structure Theory (Mann & Thompson 1988), this assumption has actually been put forward. A simple text consists of a series of simplex clauses, connected by particular conceptual relations making the series of clauses into a coherent text. Thus one naturally wants to take at least all main clauses of a text as minimal segments. Complications arise when other clauses than main ones are also taken into consideration; sometimes one wants to assign such a clause the status of segment, sometimes not. This has also been evident since the beginning of RST. The problem I want to address in this paper is how to give a principled account of the relationship between grammatical subordination on the one hand, and the segmentation of texts into their minimal units on the other.

Let me begin by reviewing explicitly the motivation for denying certain non-main clauses the status of discourse segments. Consider the following example:

- (1) They left early; they absolutely wanted to be on time.

This mini-text consists of two segments. The conceptual relation connecting them and holding them together as a textual whole is some sort of causality; a

competent reader will know that the desire to reach a destination on time provides a motivation for leaving early, and thus interpret the contents of the second segment as actually providing the cause of the event described in the first. Obviously, the number of discourse segments corresponds exactly to the number of finite grammatical clauses in (1).¹ Now consider example (2).

- (2) They left early(,) because they absolutely wanted to be on time.

If (1) is considered to be a text, consisting of two segments, then (2) is one as well. There are also two separately identifiable propositions, and the conceptual relationship between them is the same as in (1). The difference is that the relationship is explicitly *marked* as causal in (2), whereas (1) lacks such a marking; thus although the interpretation of (2) can therefore be said to be more constrained than that of (1), there is no reason to assign it a fundamentally different status as a text. Calling (1) a text consisting of two segments and (2) a single clause text, for example, would clearly miss a generalization. As a matter of fact, it is intuitions like these that motivated the idea that this type of 'clause combining' can actually be regarded as the grammaticalization (conventionalized structural expression) of discourse relations (Matthiessen & Thompson 1988).

However, the same kind of considerations (concerning conceptual inter-clausal relationships) also leads to the conclusion that not all clauses should be considered to constitute discourse segments. Consider examples (3) and (4).

- (3) They left early; it is essential that they be on time.
 (4) They left early; they think that in that way they will definitely be on time.

With respect to cases like these, one also wants to make it possible to state a generalization: there is a conceptual relationship of causality in (3) connecting its component sentences in the same way as is the case in (1) and (2), and the same is true for (4). This requires one to assume that both (3) and (4) contain two segments, but each contains *three* finite clauses (the part following the semicolon consisting of a main and a subordinate clause). Therefore, as early as in Mann and Thompson's original RST-proposal, clauses that functioned as subjects (cf. (3)) or complements (cf. (4)) were denied the status of discourse segments. Matthiessen and Thompson (1988) called the type of subordination exemplified in (2) "clause combining", while the type of subordination in (3) and (4) was characterized as "embedding"; only the former cases are to be considered as grammaticalizations of discourse relations, while the latter are

properly viewed as actual *constituents* of their host clauses.

Although the notions are not really defined in a fully explicit manner, it is intuitively clear what the authors are trying to get at, and this distinction also turns up in later approaches to discourse structure (Pander Maat 1994, p. 30–36; Sanders 1992, p. 115/6; Sanders & van Wijk 1996, p. 126/7). However, it should also be noted that the exceptional status of subject and complement clauses is not really *explained* in this way. This becomes even more problematic when one realizes that there is minimally one more exceptional type of clause: restrictive relatives. Again, the motivation for assigning these a different status is not formulated very explicitly, but it can be made sufficiently clear. Consider examples (5), containing a restrictive relative clause, and (6), with a non-restrictive one.

- (5) These schools all appear to have relatively many students who grew up in culturally deprived families.
- (6) They shouted at the waiter, who so far did not seem to have noticed them.

One does not want to view (5) as a text consisting of two segments primarily because there does not seem to be a conceptual relationship between the two clauses making them into a textual whole (i.e. the clause just specifies some property of its head noun, restricting its denotation; cf. below). In other words, one does not want to divide (5) into two segments as indicated in (5)'.

- (5)' #a. These school all appear to have relatively many students
- b. who grew up in culturally deprived families.

On the other hand, the *non*-restrictive relative clause in (6) does have some conceptual relationship with the matrix clause (beyond mentioning a property of its referent): a plausible interpretation could be that the situation mentioned in the relative clause specifies the *reason* for their shouting at the waiter. Thus one would want to divide (6) into two discourse segments between which a textual relation (in this case, of causality) may be construed; cf. (6)'.

- (6)' a. They shouted at the waiter,
- b. who so far did not seem to have noticed them.

What is it that restrictive relative clauses, subject and complement clauses have in common which makes them exceptions to the 'rule' that discourse segments correspond to grammatical clauses? This is the question that has to be an-

swered in order to make a start with an *explanatory* account of the relationship between the two. In the remainder of this paper, I want to propose a number of hypotheses intended as steps in that direction; as my point of departure I will take the analysis proposed in Schilperoord and Verhagen (1998).

2. Conceptual independence and discourse segmentation

Working on the basis of analyses of (non-)restrictive relatives that were developed independently from the issue of discourse segmentation (Daalder 1989; Verhagen 1992, 1996a), Schilperoord and Verhagen (1998) propose a condition on discourse segmentation that can briefly be stated as follows:

- (7) *Condition on discourse segmentation (conceptual independence):*
“If a constituent of a matrix-clause A is conceptually dependent on the contents of a subordinate clause B, then B is not a separate discourse segment” (cf. Schilperoord & Verhagen 1998, p.150).

This condition utilizes the idea that a *matrix* structure may be dependent for its conceptualization on some subordinate structure (cf. Langacker 1991, p. 436), and that as a consequence, the subordinate structure involved cannot be a separate discourse segment. Thus, it is not so much conceptual dependence of the subordinate structure that makes it inappropriate as a discourse segment, but rather its role in making its matrix structure conceptually independent. This ‘shift’ is crucial, as we will see shortly. But let me first illustrate the condition by showing how it applies to relative clauses. Consider the restrictive relative in (5) once more:

- (5) These schools all appear to have relatively many students who grew up in culturally deprived families.

Notice that the conceptualization of the referent of *students* is crucially dependent on the contents of the relative clause. The sentence does not say that the schools have relatively many students (and that these grew up in culturally deprived families), but rather that relatively many students grew up in such families. In (6) on the other hand, the conceptualization of the referent of *waiter* is not crucially dependent on the contents of the relative clause:

- (6) They shouted at the waiter, who so far did not seem to have noticed them.

In the non-restrictive interpretation, the denotation of *the waiter* is determined independently of the relative clause, which then provides some *additional* information; this sentence does mean that they shouted at the waiter, and that he did not seem to have noticed them so far. Thus the explanation is that a restrictive relative clause is required to complete the conceptualization of some part of another clause, and hence cannot function as a separate discourse segment.

Schilperoord and Verhagen (1998) claim that the same condition explains the exceptional role of subject and complement clauses, i.e. *in so far as it is exceptional*. The point is that the usual formulation of the exception is not fully adequate. In Mann and Thompson's (1988) original formulation, the claim was that a subject or complement clause was to be considered as "part of its host clause". As long as we take only relatively simple cases of embedding into consideration, that procedure gives the desired segmentation, but problems arise when we apply it to more complicated cases. Such complications actually abound in the material used for the research reported in Schilperoord (1996); (8) is a typical example.

- (8) a. Te uwer informatie merk ik nog op dat cliënt voorziet dat het niet eenvoudig zal zijn om snel ander werk te vinden.
- b. Daarbij komt dat zijn echtgenote zwaar gehandicapt is en dat hij een gezin heeft te onderhouden.
- a. *For your information I note that my client anticipates that it will not be easy to find another job fast.*
- b. *To this should be added that his wife is seriously disabled and that he has a family to care for".*

Fragment (8) consists of two sentences (marked a and b); it contains 6 finite clauses (indicated by the underlined finite verbs). Sentence (a) actually consists of a series of embedded clauses, and it is quite conceivable that recursive application of "Mann & Thompson's rule" could handle it, producing the identification of (a) as a single segment, as seems desirable. The real problem is exemplified by sentence (b). Straightforward application of Mann & Thompson's rule would result in it being characterized as a single segment: each of the two subordinate clauses is a subject clause, to be taken as a part of its host clause. However, the segmentation of (8) into two segments (corresponding exactly to the two full sentences a and b) seems undesirable because it makes it impossible to capture the fact that the writer of this fragment, a

lawyer, adduces *three* arguments in favor of his clients position: the problem of finding another job, the health condition of his wife, and the fact that there is a family to be cared for. The essence of the first of these is contained in the single right-most embedded clause of (a), while the other two points are presented in the *two* subject clauses of (b); as a result of the way Mann & Thompson's rule is formulated, it is not possible to recognize the fact that there are actually two points being made in (b).²

The condition proposed in (7) actually is capable of making the relevant distinction. The reason is that the relevant property of conceptual dependence is attributed to the matrix clause rather than to the subordinate one. Notice that the phrase (in Dutch) *Daarbij komt* ("To this should be added"), as an instruction to add certain pieces of information to a previously established one, is not conceptually complete, in a sense not even interpretable, without the information provided in the subordinate clause. The point is not that this information could only be provided by a clause (the 'subject slot' could also be filled by a noun phrase, for example *nog iets anders*, "something else"); rather, the point is that *in this case*, it is a subordinate clause that fulfills this necessary function of making the matrix conceptually independent, so that the subordinate clause does not constitute a separate discourse segment. Now by the same token, one complete clause always suffices for creating a conceptually complete message; the unit of a matrix and the first subordinate clause is never conceptually dependent on a second one. Consequently, all further subordinate clauses can be properly characterized as separate discourse segments,³ so that fragment (8) may be divided into the three segments indicated in (8)'':

- (8)'' a. Te uwer informatie merk ik nog op dat cliënt voorziet dat het niet
eenvoudig zal zijn om snel ander werk te vinden.
*For your information I note that my client anticipates that it will not be
easy to find another job fast.*
- b. Daarbij komt dat zijn echtgenote zwaar gehandicapt is
To this should be added that his wife is seriously disabled
- c. en dat hij een gezin heeft te onderhouden.
and that he has a family to care for.

Interestingly, this does not only provide us with a principled account of a segmentation that is in accordance with our intuitive understanding of such fragments, it also appears to specify the boundaries of planning units in actual language production (see Schilperoord 1996, Chap. 6, and Schilperoord 1997).

Returning to the relationship between condition (7) and Mann and Thompson's original procedure, we can note that certain clauses that fulfill the syntactic function of subject or complement must in fact be allowed to be assigned the status of separate discourse segments. Mann & Thompson's rule could not accommodate such cases, but condition (7) does, while preserving the idea that a matrix forms a discourse unit together with a single complement or subject clause; it furthermore provides a generalization over these clauses and the restrictive relatives. I therefore consider it a substantial part of a more explanatory account of the relationship between grammatical and discourse structure: Only a relationship of conceptual dependence between syntactically related clauses is a sufficient condition preventing them from constituting separate discourse segments.

Still, there are some remaining questions, in particular:

- (a) What is the reason that certain matrix clauses are not conceptually independent? Do such constructions have anything in common that relates to a specific discourse function, distinct from the discourse function of adverbial clauses (the cases of "clause combining" in terms of Matthiessen & Thompson 1988)?
- (b) How do subject and complement clauses *differ* from restrictive relatives, such that the latter *never* constitute separate discourse segments?
- (c) How can we avoid the grammatically impossible conclusion, suggested by the segmentation in (8)", that in fragment (8) a main clause (segment b) and a subordinate one (segment c) are being coordinated?

I believe that there are interesting, interrelated answers to these questions, which will allow us to further deepen our understanding of relationships between grammar and discourse, in particular of the discourse function of the grammatical phenomenon known as complementation.

3. Dimensions of text interpretation: (Inter)subjectivity

A fundamental aspect of the human capacity for using language is the ability to recognize other entities as essentially like oneself, and to take another person's perspective as one that could be one's own. For one thing, the whole idea of intentionally producing utterances to be recognized as such and to be thereby understood (i.e. linguistic communication), would not make sense without that.⁴ More importantly for my present purposes, this ability is manifested in

the interpretation of linguistic utterances in a very general sense: As soon as some observable phenomena (sounds, marks in stone or on paper, gestures) are recognized as instances of language, this implies that their content is attributed to *some* subject of consciousness, possibly unknown, but by implication seen as capable of linguistic communication just like the interpreting person him/herself; if an interpreter would not take the signals observed as having been produced as such, they would simply not count as language (possibly still as signs, but then non-intentional ones, i.e. symptoms). Thus the interpretation of discourse may always be seen as not just constructing some understanding of the events and situations depicted in it, but also as coordinating with some subject of conceptualization; the interpretation of linguistic discourse necessarily has both a “content-dimension” and a (intersubjective) “coordination-dimension”.⁵

In view of this inherent, general feature of discourse interpretation, it should come as no surprise that there are several kinds of linguistic elements and constructions that serve to indicate particular features of this coordination dimension, for example modal expressions of different types. In the present context, it seems that this idea is also highly relevant for the semantic characterization of complementation constructions. A natural description of the function of matrix clauses such as *My client anticipates...* and *It should be added...* is precisely that they do not provide information in the content-dimension, but rather in the coordination dimension of the interpretation of the discourse. The first explicitly instructs the reader to construe the informational content (e.g. “finding a new job will be hard”) as an anticipation, of a particular person. The second provides an instruction by the writer to construe the content information (e.g. “He has a family to care for”) as an additional point, paralleling a previous one. The (more implicit) latter case thus invokes intersubjective coordination between writer and reader, whereas the former expression invokes coordination between the reader and a specific individual mentioned.⁶ Suppose now that we distinguish discourse segments not just linearly, in one dimension, but in two, taking this discussion into account. Then fragment (8) may be represented (somewhat abbreviated) as in Figure 1:

<i>coordination dimension</i>	<i>content dimension</i>
I note that client anticipates:	not easy to find other work fast
Add to this that	his wife is severely disabled
and that ⁷	he has a family to look after

Figure 1. Text segmentation in two dimensions

In such a representation, the matrix clauses are not part of segments in the content dimension. For one thing, this immediately provides an answer to question (c) mentioned above: In *this* dimension there is no coordination of a matrix and a subordinate clause, which allows us to avoid the suggestion to that effect in segmentation (8)". However, a more important question at this point is: Is this just an incidental property of the particular matrix-structures in this particular fragment, or is this a manifestation of a more general phenomenon? How general can the procedure be of assigning the content of matrix clauses to the coordination dimension of discourse interpretation?

As a matter of fact, I think such a procedure can actually be fairly general. I would like to suggest that, whereas constructions with adverbial clauses ('clause combining', see section 1) may be viewed as grammaticalized expressions for rhetorical relations (cf. Matthiessen & Thompson 1988), complementation constructions may be viewed as general grammaticalized expressions for inter-subjective coordination (with the lexical content of the matrix clauses and the complementizers providing the specifics).

To start, it is interesting to have a look at the set of complement-taking verbs, for example as listed for Dutch in the comprehensive reference grammar *Algemene Nederlandse Spraakkunst* (ANS, both in the first and in the recent second edition), and especially to see what kind of concepts these verbs express; the subtypes distinguished by the ANS are presented, with a few examples, in table 1.

Table 1. Semantic types of verbs taking 'direct object clauses' according to the ANS

<i>a</i>	Verbs expressing a statement, question, command, promise, etc., i.e. having a communicative meaning
<i>b</i>	Verbs expressing some form of knowing, believing, supposing, etc.
<i>c</i>	Verbs expressing evaluation [including constructions of the type "find it a pity/strange", etc.]
<i>d</i>	Verbs expressing wish or desire
<i>e</i>	Verbs expressing a way of perceiving
<i>f</i>	Verbs expressing causation

(ANS₁, 1984, p. 840–842; ANS₂, 1997, p. 1156–1158).

There is clearly a generalization to be made over cases (a) through (e): Such predicates all evoke some mental state or process of a subject of consciousness, and the content of the complement is to be attributed to this subject of

consciousness. In other words, these predicates are all “mental space builders” in the sense of Fauconnier (1994). We could express this generalization in the form of a “constructional schema” (in the sense of Langacker 1991, p. 546 or Goldberg 1995): a construction consisting of a mental space building predicate and a clausal complement means that the contents of the subordinate clause is to be attributed to the subject of conceptualization referred to in the matrix clause.⁸

(9) *Complement Construction:*

construction form: $[_{S-a} NP_a [_{\text{Mental Space Predicate}} \dots] \text{ dat/of } [_{S-b} \dots]]$

construction meaning: ATTRIBUTE CONTENTS OF S-B TO REFERENT OF NP_A

Category (f) is different: these predicates indicate causality, with the complement denoting the result; I believe these can be integrated into the account in a motivated way, but as this is only indirectly related to the issue of segmentation, I will not pursue that matter further here.⁹ In any case, it is clear that evoking, in some specific respect, a mental space for the contents of another clause is a very general function of matrix clauses of complements.

With respect to segmentation it is important to ask if this is also true for other matrix clauses, especially those taking subject clauses (another subtype denied segment-status by Mann & Thompson’s rule). In fact, I think it is not difficult to see that is. First of all, one important category of matrix predicates of subject clauses are the passive forms of the predicates mentioned in Table 1 (*It was argued...*, *It has been claimed...*, *It can be seen...*, in which exactly the same relation between matrix and subordinate clauses holds as in the active voice. Another class consists of matrix clauses in which a predicate nominal phrase evokes some subjective point of view, i.e. adjectives as in *It is clear/puzzling...*, or noun phrases as in *It is a problem/question...*¹⁰ Expressions of this type are specifications of a cognitive state with respect to the proposition expressed in the subordinate clause, and thus evoke a conceptualizer entertaining this cognitive state. Thirdly, grammatical subject clauses may be embedded under ‘connecting phrases’ such as *Daarbij komt...* (lit. There-to comes...; “It should be added”, “Additionally”) in (8), or *Hier staat tegenover* (lit. Opposite to this stands...; “On the other hand”, “Conversely”). This type can be considered as evoking subjectivity too, albeit in a way that is more implicit than the other ones: such expressions are instructions on how to handle information and therefore *imply* a subject providing them, rather than that they explicitly mention some cognitive state with respect to a proposition.

The matrix of a complement clause always explicitly specifies a source of subjectivity, while this is not necessary in the matrix of subject clauses. As a consequence it seems that the subjectivity of subject clause constructions is usually interpreted as relating to the *producer* of the discourse, rather than to some other entity. Consider (10), for example.

- (10) Er is echter dringend behoefte aan nieuwe modellen. De twee-relatie is weliswaar een ideaal voor zeer veel homofielen, maar het is duidelijk dat dat dan heel iets anders is dan het traditionele huwelijk.
However, there is an urgent need for new models. It is true that the two-relationship is an ideal for many homosexuals, but it is clear that this will be entirely different from the traditional marriage.

In interpreting this fragment, a reader will normally ascribe responsibility for the claim that something is clear to the writer of the text. In other words: the matrix of a subject clause is usually taken as a manifestation of speaker/writer subjectivity (i.e. that of a speech act participant), rather than as character subjectivity (cf. note 6) as the clause itself contains no reference to a participant who is the source of the subjectivity. It should be pointed out though, that this is not an obligatory semantic feature of the construction as such, but a default option given the fact that the construction does not mark a source of subjectivity and the subjective roles of speech act participants are always available for use in interpretation. If the context contains an explicit reference to another subject of conceptualization, then the attribution of responsibility for the claim is easily changed. Suppose that this fragment was a report about someone delivering a speech on types of homosexual relationships; then it might well have been formulated as in (10)′:

- (10)′ Er is volgens de spreker echter dringend behoefte aan nieuwe modellen. De twee-relatie is weliswaar een ideaal voor zeer veel homofielen, maar het is duidelijk dat dat dan heel iets anders is dan het traditionele huwelijk.
However, according to the speaker there is an urgent need for new models. It is true that the two-relationship is an ideal for many homosexuals, but it is clear that this will be entirely different from the traditional marriage.

Note that the second sentence in this fragment is actually fully identical to the one in (10), but that the opinion expressed in it is now naturally ascribed to the referent of “the speaker” in the previous sentence. But it is a difference between

the matrix of a subject clause and that of a complement clause that identification of the latter's subject of conceptualization is constrained linguistically, whereas the matrix of a subject clause does not necessarily provide such constraints, and is thus the only type that allows for speaker/writer subjectivity without any special markings (complement clause constructions requiring some form of first person marking). The interpretive 'freedom' for the matrix of subject clauses is, in my view, a manifestation of the general property of any instance of language use mentioned at the beginning of this section: it being taken as language implies it being taken as having been intentionally produced as meaningful, and therefore implies the projection of some other cognitive entity like the interpreter. Whatever entity is available for attributing a particular thought in a text to can function as such in the case of subject clauses, but complement clause constructions have the special property that their matrix predicate provides a specific constraint on this attribution.

Still, it is clear that a generalization over the discourse function of the matrix of complement and subject clauses can and should be formulated; the contents of such clauses is attributed to some subject of consciousness, explicitly or implicitly specified in the conceptualization of the matrix clause. This can be represented by means of a generalization of the construction in (9), which I will call the "embedding construction":¹¹

(11) *Embedding Construction:*

construction form:	$[_{S-a} [\text{Predicate} \dots] \text{ dat/of } [_{S-b} \dots]]$
construction meaning:	ATTRIBUTE CONTENTS OF S-b TO CONCEPTUALIZER IN S-a

The idea now is that it is the construction's meaning that is the basis for the conceptual dependence of the matrix clause on a subordinate one. It specifies that the reader/hearer should engage in cognitive coordination with some subject of conceptualization, and such coordination always takes place with respect to some piece of information; cognitive coordination is never 'void': there is no illocutionary act without propositional content, no assessment without an object of evaluation, no instruction to handle incoming information without such information, in general: no coordination between subjects of conceptualization without some object of conceptualization. If interpreting a text involves the alignment of one's cognitive state with that of another, then such alignment necessarily takes place with respect to some informational content. That is a matter of conceptual necessity; what is a matter of linguistic

convention, on the other hand, is the degree to which this relationship between dimensions of discourse interpretation is 'encoded' in one or more specific words (for example modal adverbs) or constructions (such as (11)).

All in all, we now have completed the line of argumentation that allows us to provide an answer to two of the questions formulated at the end of Section 2. First, as regards question (a), the above analysis contains an account of what it is that complement and subject clause constructions have in common, and that explains why the matrix clauses are not conceptually independent: They provide specifications of the coordination dimension, which must be completed by some specification in the content dimension.

In a sense, we have thus turned the traditional notion of 'dependent clause' upside down, by showing that it is the matrix clause that is actually conceptually dependent on a subordinate one. Whereas the original rule formulated by Mann & Thompson seemed to imply that it was the subordinate clause that was not independent, we now have reached the conclusion that it is actually the matrix that should be denied the status of separate discourse segment (along with, of course, one subordinate clause). This does not have to conflict with a functional interpretation of the notion of subordination, as soon as it is recognized that matrix clauses function in a dimension of discourse interpretation (that of cognitive coordination with a subject of conceptualization) that is functionally different from the content dimension (that of providing information). Viewing the embedding construction as a grammatical instrument (certainly not the only one) for indicating relationships between the coordination and content dimensions of discourse interpretation allows us to say simultaneously that structurally embedded information is subordinated to something else (viz. a mental space, usually in some specific way), and that it often still provides the most important information, especially new information. Also, several pieces of information can be subordinated to the same mental space (recall the string of embedded clauses in (8)), without them becoming just constituents of a single discourse segment.

Secondly, this approach also provides a basis for an answer to question (b) at the end of Section 2: What is the difference between subject and complement clauses on the one hand and restrictive relative clauses on the other, such that the latter *never* constitute separate discourse segments? The answer can be formulated in terms of the distinction between the two dimensions introduced in this section: Whereas the specific character of embedding constructions precisely consists in a relationship *between* these two dimensions, restrictive

relatives by definition always function in the same dimension as their head noun, and thus in the same dimension as their matrix clause.

4. Thematic continuity in the content dimension

Before concluding I would like to present an additional piece of evidence suggesting that discourse analysis may profit from a segmentation procedure that takes the distinction between the two dimensions introduced in the previous section into account.¹² This evidence involves certain phenomena of thematic continuity in texts, i.e. indications of how the topic or 'theme' of a particular discourse segment is connected to previous segments.

In Onrust, Verhagen and Doeve (1993, Ch. 2), two ways are distinguished in which the initial and final positions of sentences (in Dutch) may contribute to the thematic cohesion of texts. Given two adjacent sentences S_1 and S_2 in a text, then:

- a. when the sentence initial constituents of S_1 and S_2 refer to the same piece of information, we have a so-called "constant pattern" (about the same topic, two statements are being made);
- b. when the initial constituent of S_2 refers to the same piece of information as a constituent that is (more or less) final in S_1 , we have a so-called "chaining pattern".

This is indicated schematically in Figure 2.

Constant pattern:

[_{S1} A B] [_{S2} A C]

Chaining pattern:

[_{S1} A B] [_{S2} B C]

Figure 2. Two patterns of thematic cohesion.

These patterns are not obligatory ones, but when used they do contribute to the cohesion of texts. As they have been defined these notions only apply to the initial and final positions of (complete) sentences. This sometimes restricts the applicability of the notions, giving rise to conflicts with language users' intuitions about textual cohesion. Students, when applying the analytic method of

which these definitions form a part, quite generally treat cases like the following as instances of chaining:

- b. Het gevaar bestaat dat uw klanten door de aanhoudende vertragingen ontevreden worden over uw bedrijf. Wij denken dat dit voorkomen kan worden door te zorgen voor een snellere informatiestroom naar de bezorgafdeling. Een mogelijkheid hiertoe wordt gevormd door ...
"The danger exists that because of the continuing delays, your customers will become dissatisfied with your company. We think that this can be prevented by accelerating the flow of information to the delivery department. One possible option in this respect is..."

According to the definitions in Onrust et al. (1993) however, this cannot be an instance of any pattern, because the demonstrative anaphor *dit* is not in an initial position of a sentence.

Now note that between the final position of the first sentence in (6) — the underlined part "become dissatisfied with your company" — and the demonstrative in the second sentence is the matrix "We think that" — i.e. information relating to the coordination dimension. If we take this into account, and segment the text as in Figure 3, it is immediately apparent that *in the content dimension*, the demonstrative *is* adjacent to its antecedent, so in this dimension we actually do have a chaining pattern.

<i>coordination dimension</i>	<i>content dimension</i>
Het gevaar bestaat dat <i>The danger exists that</i>	uw klanten ... <u>ontevreden worden over uw bedrijf</u> <i>your customers will <u>become dissatisfied with your</u></i>
Wij denken dat <i>We think that</i>	<u>dit</u> voorkomen kan worden door te zorgen voor een snellere informatiestroom... <i><u>this</u> can be prevented by accelerating the flow of information...</i>

Figure 3. Thematic cohesion in content dimension.

What we may want to propose is that the conditions for patterns of thematic continuity should apply within one specific dimension of discourse representation. Given the distinction between the two dimensions as suggested here, we may say that material that is linearly intervening but relates to another dimension than the antecedent and the anaphor, is 'invisible' to the formation of

patterns of thematic cohesion.

In order to see if this adaptation of the patterning conditions would account for the actual use of discourse anaphors in spontaneously produced texts, a search was undertaken in a corpus with text fragments from different genres,¹³ collecting all instances of the complementizers *dat* and *of* that were immediately followed by a demonstrative with an antecedent elsewhere in the text (i.e. not in the same sentence). In this corpus, there were 62 instances satisfying this criterion — thus all of them ‘violating’, as it were, the thematic continuity conditions as formulated by Onrust et al. (1993). However, taking the distinctions proposed here into account, 39 of them turn into straightforward examples of the chaining pattern (perhaps even 42), and 9 (possibly 10) into examples of the constant pattern. So there are at least 48 out of 62 ‘exceptional’ cases that turn out to be regular ones as an immediate consequence of distinguishing the coordination and content dimensions in the representation of discourse.

An example of the most frequent pattern, that of chaining, is given in (13). At the end of one sentence the idea is expressed of the government taking over the entire production machinery. In the linear text, we then get a matrix clause opening a mental space assigned to some economists who used to believe something on theoretical grounds, thus belonging to the coordination dimension (which is indicated by small capitals), and then, as the first element of a new segment in the content dimension, we get the anaphor, referring to the idea at the end of the previous content segment. Such pieces of text are indeed completely natural and unproblematic.

- (13) [...] Wanneer wij, in de rug gesteund door de moderne economie, het laissez faire afwijzen, dan staan wij voor de keus tussen twee alternatieven. In de eerste plaats kan de overheid het gehele productieapparaat overnemen. SOMMIGE ECONOMEN MEENDEN VROEGER OP THEORETISCHE GRONDEN, DAT dit niet tot gevolg kon hebben dat de welvaart op gunstige wijze zou worden verdeeld, maar dit standpunt is thans door de meeste economen verlaten.

“[...] When we, with the support of modern economy, decline the principle of ‘laissez-faire’, we face a choice between two alternatives. On the one hand, the government could take over the entire production machinery. SOME ECONOMISTS USED TO BELIEVE ON THEORETICAL GROUNDS, THAT this could not lead to a advantageous distribution of richness, but this opinion has now been abandoned by most economists.”

Fragment (14) contains an example of a constant pattern, that can be analyzed in a similar way.

- (14) De EEG-raad van ministers van landbouw heeft maandag in Luxemburg in beginsel overeenstemming bereikt over de methodiek van een regeling voor vlas: er zal een forfaitaire toeslag per hectare worden gegeven [...]. Over het bedrag van die toeslag zal de Europese Commissie nog een voorstel doen. MINISTER LARDINOIS VERWACHTTE WEL DAT deze iets hoger zal worden dan de huidige Nederlandse toeslag [...].
- "On Monday, the European council of ministers of agriculture has reached agreement in Luxembourg about the method of a regulation for flax: a standard surcharge per acre will be given [...]. As to the amount of the surcharge, the European Committee will produce a proposal. MINISTER LARDINOIS DID EXPECT THAT this will turn out somewhat higher than the present surcharge in the Netherlands [...]."*

Thus there is not only evidence from readers' intuitions, but also from the distribution of discourse anaphors in spontaneously produced texts, that language users treat these devices for cohesion across sentence boundaries in a way that takes the distinction between the coordination and content dimensions into account. This finding thus provides independent support for the proposal to systematically use this distinction in the segmentation of texts.

5. Conclusion

The central claim in this paper is that it necessary, for an adequate segmentation procedure for natural language texts, to take into account two distinct dimensions of discourse interpretation with respect to which textual fragments may be interpreted. The nature of these dimensions is an immediate consequence of an intrinsic property of interpreting language, viz. that it by definition implies not only processing informational content, but also engaging in cognitive coordination with some entity projected to be responsible for that information. As cognitive coordination in turn presupposes some information to function as object of coordination, the interpretation of expressions in the coordination dimension is not conceptually independent from information in the content dimension. In these terms, constructions with complement and subject clauses have been analyzed as grammatical means for systematically distributing information over these two dimensions; the claim is that this

provides a functional explanation for the condition that in such constructions, the matrix is not conceptually independent, therefore does not constitute a separate discourse segment, but needs at least one subordinate clause to make it conceptually independent (allowing further subordinate clauses to be added as separate segments). This view of conceptual independence as a condition on discourse segmentation is also empirically superior to previous formulations of the conditions on discourse segments.

Notes

1. Under certain analyses, the second segment of (1) might be said to properly contain an *infinite* clause (the complement of *want*), but I will not consider that issue in this paper, though I believe that the present approach can ultimately be helpful in clarifying that as well. See Verhagen (1995) for some suggestions.
2. This is not meant to imply that the three arguments are necessarily to be taken as equal. Recall that the issue here is *just* segmentation, not the assignment of (hierarchical) structure. Thus the grammatical structure of (b) could very well be taken as an indication that the last two arguments are to be taken as constituting a set to be added to the single argument in sentence (a) (cf. below). The point here is simply that the question of segmentation precedes the assignment of structure.
3. Again: only segmentation is the issue here, not the assignment of structural relationships; cf. note 2.
4. A clear exposition of the view of linguistic communication as influencing another person's cognition by displaying the intention to do so can be found in Keller (1995, p. 153ff., 1998, p. 136ff.). It is crucially related to Grice's (1957) notion 'meaning_{NN}' and also occurs, in slightly variable forms, in several other approaches to pragmatics.
5. This distinction is related, but not identical, to distinctions between different domains of use, for example the distinction between epistemic and content domains as proposed in Sweetser (1990), or that between pragmatic and semantic sources of coherence as proposed in Sanders (1992). Cf. Foolen (1996) and Verhagen (1996b, p. 274/5) for some discussion.
6. This difference consists in the distinction between what I called "speaker-hearer-subjectivity" and "character-subjectivity" (cf. below; also J. Sanders 1994). In certain areas, such as that of language change, this difference is very important (cf. Verhagen 2000, for an example).
7. In this representation the coordinating conjunction is taken to be an element in the coordination dimension, but this is not crucial. At the moment I have no principled considerations to offer on this point, but I find this representation useful for expository purposes.
8. In a different terminology, a similar insight has been formulated for *that*-clauses, the

most prototypical subclass of complements, by Wierzbicka (1988: 132–140): “... reference to knowledge is present in all sentences with *THAT*” (p.137; Wierzbicka in turn cites a few other linguists who have proposed partly similar analyses, notably Bolinger). I believe that the mental space *cum* construction approach provides a generalization over these and other types of complements (linking the ‘space building’ feature to the construction and leaving other aspects of the semantics to the lexical specifications of the verbs and complementizers involved), as well as one that allows for integration into a more general theory of perspectivization.

9. The direction of the generalization I would like to propose is that causation is also attribution of the situation denoted by the complement clause to something else, but then to an objective factor (i.e. the cause) rather than to a subjective one. In that perspective, the complementation construction would constitute an example of a particular kind of constructional polysemy. See Verhagen (1996b) for some discussion of this idea, and Foolen (1996) for some criticism.

10. In Dutch, the matrix clauses do not have to contain the pro-form *it*, for neither category of predicate nominal. Thus Dutch does not only have matrix clauses of the type *Een probleem is dat...* (“A problem is that...”), but also *Duidelijk is dat...* (lit. “Clear is that...”). The parallel between these two types is one reason why in some grammatical traditions, the initial noun phrase in a clause of the type *Een/het probleem is dat...* is analyzed as a preposed predicate nominal rather than a subject.

11. As with complement clauses, the matrix of a subject clause may also have a causal relationship with the subordinate clause (Cf. *The result/reason is...*). As mentioned in note 9, I think a further generalization is possible, so that we actually have constructional polysemy here, but I will not pursue that issue in this paper.

12. There should also be independent grammar-internal arguments for positing a construction such as (11) as part of the grammar of a language. I think such arguments can indeed be provided, at least for Dutch (cf. Verhagen 1996b and Foolen 1996, for somewhat different views). Furthermore, this analysis has consequences for the grammatical characterization of subordination as such. Again, these issues are only indirectly related to the matter of discourse segmentation, so I will not go into them here.

13. The Eindhoven Corpus, in the version available from the Free University in Amsterdam; it is described in Uit den Boogaart (1975) and Renkema (1981).

References

- ANS₁ (1984). *Algemene Nederlandse Spraakkunst*. Onder redactie van G. Geerts, W. Haeseryn, J. de Rooij, M. C. van den Toorn. Groningen/Leuven: Wolters-Noordhoff.
- ANS₂ (1997). W. Haeseryn, K. Romijn, G. Geerts, J. de Rooij, M. C. van den Toorn. *Algemene Nederlandse Spraakkunst*. Tweede, geheel herziene druk. Groningen/Deurne: Martinus Nijhoff/Wolters Plantyn.

- Boogaart, P. C. uit den (1975). *Woordfrequenties in geschreven en gesproken Nederlands*. Utrecht: Oosthoek, Scheltema & Holkema.
- Daalder, S. (1989). Continuative relative clauses. In Norbert Reiter (Ed.), *Sprechen und Hören. Akten des 23. Linguistischen Kolloquiums* (pp. 195–207). Tübingen: Niemeyer.
- Fauconnier, G. (1994). *Mental Spaces. Aspects of Meaning Construction in Natural Language*. Cambridge: Cambridge University Press. [First edition, 1985, Cambridge, MA: The MIT Press.]
- Foolen, A. (1996). Tekstsegmentatie, onderschikking en subjectiviteit. Commentaar op Arie Verhagen. *Gramma/TTT*, 5, 269–272.
- Goldberg, A. E. (1995). *Constructions. A Construction Grammar Approach to Argument Structure*. Chicago/London: The University of Chicago Press.
- Grice, H. P. (1957). Meaning. *The Philosophical Review*, 66, 377–388.
- Keller, R. (1995). *Zeichentheorie*. Tübingen/ Basel: Francke Verlag.
- Keller, R. (1998). *A Theory of Linguistic Signs*. Oxford: Oxford University Press.
- Langacker, R. W. (1991). *Foundations of cognitive grammar*, 2. Descriptive application. Stanford: Stanford University Press.
- Mann, W. C., & Thompson, S. A. (1988). Rhetorical Structure Theory: Toward a functional theory of text organization. *Text*, 8, 243–281.
- Matthiessen, C., & Thompson, S. A. (1988). The structure of discourse and ‘subordination’. In J. Haiman & S. A. Thompson (Eds.), *Clause Combining in Grammar and Discourse* (pp. 275–329). Amsterdam: John Benjamins, 275–329.
- Onrust, M., Verhagen, A., & Doeve, R. (1993). *Formuleren*. Houten/Zaventem: Bohn Stafleu Van Loghum.
- Pander Maat, H. (1994). *Tekstanalyse*. Groningen: Martinus Nijhoff.
- Renkema, J. (1981). *De taal van “Den Haag”: een kwantitatief-stilistisch onderzoek naar aanleiding van oordelen over taalgebruik*. 's-Gravenhage: Staatsuitgeverij.
- Sanders, J. (1994). *Perspective in narrative discourse*. Tilburg (diss. KUB).
- Sanders, T. J. M. (1992). *Discourse structure and coherence: Aspects of a cognitive theory of discourse representation*. Tilburg (diss. KUB).
- Sanders, T. J. M., & van Wijk, C. (1996). PISA - A procedure for analyzing the structure of explanatory texts. *Text*, 16, 91–132.
- Schilperoord, J. (1996). *It's about time. Temporal aspects of cognitive processes in text production*. Amsterdam/Atlanta: Rodopi.
- Schilperoord, J. (1997). Temporele modificatie in clauses; een pauze-analytische studie naar tekstproductie. In H. van den Bergh, D. M. L. Janssen, N. Bertens, M. Damen (Eds.), *Taalgebruik ontrafeld. Bijdragen van het zevende VIOT-taalbeheersingscongres gehouden op 18, 19 en 20 december 1996 aan de Universiteit van Utrecht* (pp. 263–274). Dordrecht: ICG Publications.
- Schilperoord, J., & Verhagen, A. (1998). Conceptual dependency and the clausal structure of discourse. In Jean-Pierre Koenig (Ed.), *Discourse and Cognition. Bridging the Gap* (pp. 141–163). Stanford: CSLI Publications.
- Sweetser, E. E. (1990). *From etymology to pragmatics. Metaphorical and cultural aspects of semantic structure*. Cambridge: Cambridge University Press.

- Verhagen, A. (1992). Patroonsplitsing en zinsstructuur. In H. Bennis & J. W. de Vries (Eds.), *De Binnenbouw van het Nederlands. Een bundel artikelen voor Piet Paardekooper* (pp. 373–382). Dordrecht: ICG Publications.
- Verhagen, A. (1995). Subjectification, syntax, and communication. In D. Stein & S. Wright (Eds.), *Subjectivity and subjectivisation: linguistic perspectives* (pp. 103–128). Cambridge: Cambridge University Press.
- Verhagen, A. (1996a). Sequential conceptualization and linear order. In E. H. Casad (Ed.), *Cognitive Linguistics in the Redwoods. The Expansion of a New Paradigm in Linguistics* (pp. 793–817). Berlin: Mouton de Gruyter.
- Verhagen, A. (1996b). Tekstsegmentatie, onderschikking en subjectiviteit. *Gramma/TTT*, 5, 249–268, 273–275.
- Verhagen, A. (2000). ‘The girl that promised to become something’: An exploration into diachronic subjectification in Dutch. In T. F. Shannon & J.P. Snapper (Eds.), *The Berkeley Conference on dutch Linguistics 1997: the Dutch Language at the Millennium* (pp. 197–208). Lanham, MD: University Press of America.
- Wierzbicka, A. (1988). *The Semantics of Grammar*. Amsterdam/ Philadelphia: John Benjamins.