Plural Gender: Behavioral evidence for plural as a value of Cushitic gender with reference to Konso

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CHAPTER 1

1. General introduction

1.1. Background

This dissertation is concerned with the psycholinguistic investigation of grammatical gender and number in Cushitic languages. Gender and number are interrelated in a complex way in Cushitic languages. Masculine and feminine are the accepted gender values across all Cushitic languages. However, there is evidence suggesting the presence of a third gender value in some Cushitic languages. This third gender value is called plural gender since it requires the same agreement form as third person plural number (hereafter: multiple-reference, to avoid confusion with the use of plural as a value of gender). Plural gender represents a class of nouns that require plural agreement form even when they refer to single entities. In other words, by triggering plural agreement form, nouns with plural gender behave as though they were plural while in singular. This third value of gender, i.e. "plural", raises the question whether nouns with this value are processed as part of the number system or whether plural is a gender value on its own right.

Corbett analyzed the gender system of Cushitic languages, specifically Bayso, as having only two values and the third value as part of the number category, see Corbett and Hayward (1987), Corbett (1991, 2005, 2012). Mous (2008) argued that Corbett's analysis does not work for other Cushitic languages because gender and number are two independent agreement systems and adjectives show agreement for both categories independently (for specific languages see also Hayward, 1979 for Bayso; Mous, 1993, 2008 for Iraqw; Pillinger and Galboran, 1999 for Rendille; Savà, 2005 for Ts'amakko; Orkaydo, 2013 for Konso). This dissertation investigates the psycholinguistic status of the so-called plural gender in Cushitic by means of speech production experiments, and with particular

reference to Konso, a Lowland East Cushitic language of Ethiopia (see § 2.2. Gender system of Konso, pp. 35-36).

Speech production is one of the three main areas in psycholinguistics (the psychology of language), beside language acquisition and language comprehension. Speech production studies have been a less studied area compared to language comprehension since monitoring our thoughts may be challenging. Producing an utterance requires determining what to produce (conceptualization), deciding how to produce it (formulation), and producing it (articulation; Levelt, 1989). As Levelt states, during conceptualization, the speaker conceives an intention to convey a message and selects information for assembling anticipated speech, which produce a preverbal message. During formulation, the conceptual representation is transformed into a linguistic form. This contains processes of putting words together to form a sentence (syntactic planning), and selecting words that the speaker intends to produce (lexicalization). During articulation, accessing pieces of internal speech and motor execution are performed. The present dissertation focuses mainly on the syntactic planning stage of formulation, i.e. the stage where selecting syntactic information such as gender and number is specified (Levelt, 1989).

Chronometric measures such as naming latency along with speech error rates are important sources of data for speech production research. Response latency measures are based on varieties of picture naming tasks such as picture-word interference and simple picture naming paradigms. In the picture-word interference task, participants are instructed to name pictures while ignoring distractor words. The relation between the target picture and the distractor word may affect the speed and the accuracy of the

response. In the simple picture naming task, one or two pictures are presented without distractor words, which make it a pure production task without the effect associated with comprehension processes of distractor words. Moreover, there are no assumptions regarding the way distractors activate their abstract gender features and their associated morphemes, and the way these processes correlate with accessing the target (Jescheniak, Schriefers, & Lemhöfer, 2014). In the studies reported in the present dissertation, both picture-word interference and simple picture naming tasks were used to determine the status of the so-called plural gender and the selection mechanism of bound gender-marked morpheme in Konso.

Much research on speech production has shown that gender may influence language processing in gender-marking languages. It has repeatedly been shown in some Germanic languages such as Dutch and German that participants are slower to produce a picture in the presence of a distractor word when the target picture name and the distractor word had a different gender compared to when they had the same gender (e.g. Schriefers, 1993 in Dutch; Schiller & Costa, 2006 in German). This is because the presentation of a target picture in the presence of a distractor word with a different gender may activate two different gender values. The concurrent activation of two different gender values may result in competition. As a result of this competition, the selection of gender value of the target is delayed compared to the situation when both the target and distractor word activate the same gender value. This is the assumption behind competitive selection processing mechanism. This effect has not been consistently reported in other gender-marking languages such as Italian (Miozzo & Caramazza, 1999). Moreover, there is an on-going debate as to whether the selection of bound gender-marked

morphemes, such as adjectival agreement suffixes, follows the competitive processing mechanisms similar to the selection of freestanding gender-marked elements, such as determiners. In the studies reported in the present dissertation, we conducted a series of picture-word interference and simple picture naming tasks in Konso. In these tasks, we examined whether bound gender-marked morphemes are selected competitively besides determining the status of the so-called plural gender.

1.2. The number of genders in Cushitic languages

Cushitic is a branch of the Afro-asiatic language family that hosts more than 30 languages that are spoken in North Eastern and East Africa. As shown at the beginning of this chapter, there are two competing analyses regarding the number of genders in Cushitic languages. According to one analysis, only masculine and feminine genders are recognized for all Cushitic languages. According to an alternative analysis, there are three values of gender and the third one, in addition to masculine and feminine, is plural gender for those languages that have this value.

In Cushitic languages, there are three agreement domains for gender (Mous, 2008). These are agreement with the subject on the verb, agreement with the head noun for demonstratives and possessives including possessive nominal, and agreement of adjectives with head nouns (Mous, 2008). In the domain of noun phrases, most Cushitic languages distinguish three values for gender; namely masculine, feminine and plural genders. Exceptionally, Oromo, Somali, Rendille and Dhaasanach have only two values for gender (masculine and feminine). In the domain of clauses, Cushitic languages with two-way gender agreement systems are K'abeena,

Elmolo, and Dhaasanach. In the clause domain, Cushitic languages that are said to have plural gender in addition to masculine and feminine genders are Bayso, Konso, Dirayta, Ts'amakko, Rendille, and Boni of the Southern Lowland as well as Iraqw, Alagwa, and Burunge of Southern Cushitic languages. This means that at least one third of the Cushitic languages have three-way gender agreement systems in which the third is said to be plural gender. The assumption behind this research is that, in Konso, the plural agreement class (as realized on definite markers and verbal inflection) is the morphosyntactic realization of a third gender value, the plural. This dissertation aims to test the validity of this assumption by investigating the psychological reality and the processing of the plural agreement class.

1.3. What is the status of the so-called plural gender in Cushitic languages?

In an earlier section, mention was made that plural gender is analyzed as a proper gender value in most descriptive studies on Cushitic languages and as a value of number in some theoretical and typological studies. The first analysis is based on most descriptive studies on Cushitic languages and argued for in Mous (2008). Mous explains that gender and number are two independent agreement systems and adjectives show agreement for both features independently. This means that treating the third value (plural) as a value of number would create an inconsistent scenario whereby adjectives show conflicting values for number and gender in agreement with one and the same head noun.

The second analysis is based on typological and theoretical studies on gender, in which a value is said to belong to only one

feature (Corbett, 2012). This restrictive view, does not allow treating plural as a value of gender possibly to keep the morphosyntactic features distinct. Following this line of argument, Corbett proposes only two values of gender for Bayso and by extension for other Cushitic languages that have similar features (Corbett & Hayward, 1987; Corbett, 1991, 2005, 2012). Note that the original analysis of gender in Bayso distinguishes three values of gender for which nouns are classified based on the agreement shown outside the noun itself (Hayward, 1979). These three values of gender include masculine, feminine and plural genders. Corbett and Hayward (1987) reexamined this original analysis and come to the conclusion that only two values (masculine and feminine) should be accepted as values of gender and there is no need to postulate a third value of gender in Bayso. The authors reasoned that nouns in the third value are small in number that can be treated by properties showing irregularity in number morphology similar to *pluralia tantum* nouns. In this way, plural is excluded from the gender feature and nouns with this value are treated as part of the number feature marked for their exceptional behavior, as nouns requiring plural agreement for single-reference. The studies reported in the present dissertation examined the above two competing analyses using standard behavioral methods developed for the investigation of grammatical gender processing during speech production.

As stated earlier, Cushitic languages that are characterized by having the so-called plural gender value are Konso, Bayso, Dirayta, Ts'amakko, Rendille, Boni, Iraqw, Alagwa, and Burunge (Mous, 2008). Efforts were made to include at least the first two languages in the present dissertation since these languages are the basis for the aforementioned two contrasting analyses. In actual terms, however,

the experiments, which are reported in the present dissertation, were conducted in Konso due to practical reasons related to the nature of experiments mainly the need for sizeable number of participants and availability of adequate stimulus materials. According to the Central Statistic Agency of Ethiopia (2007), the population of Konso is about 250,000, much larger than the number of Bayso speakers, which stands at 5,500. This means that recruiting large number of suitable candidates for participating in experiments was easier in Konso compared to Bayso. In terms of accessibility and facility, there is a high school at the heart of Konso town (Karat), in which the majority are Konso native speakers and there is access to electricity and relatively suitable room for undertaking experiments. Similarly, based on the available data, Konso has relatively large number of non-derived plural gender nouns. Another motivation for choosing Konso includes the availability of an in-depth analysis of the grammar of the language (Orkaydo, 2013), dictionary, and native speaker linguist (Ongaye Oda Orkaydo).

Konso, the language we studied in the present dissertation, belongs to the Lowland East Cushitic branch and spoken in the southwest of Ethiopia. Konso is said to have a three-way gender distinction system and the third, beside feminine and masculine, is said to be plural gender (Orkaydo, 2013). This three-way gender agreement is marked in the subject inflection on the verb. Accordingly, feminine nouns take the same agreement form as the third person female subject, marked by the suffix *–t* as shown in (1). Masculine nouns take the same agreement form as the third person male subject, marked by the suffix *–ay*, see example (2). Plural gender nouns take the same agreement form as the third person

multiple-reference subject, marked by the suffix *–n* as illustrated in (3).

Konso gender agreement in the subject inflection on the verb in overt subject sentences (Orkaydo, personal communication)

(1) lafta-siʔ i=akk-am-**t-**i
bone-DEF.M/F 3=show-PAS-3F-PF
'The bone was shown.'

(2) ɗoyra-siʔ i=akk-am-**ay**
tree-DEF.M/F 3=show-PAS-PF.3M
'The tree was shown.'

(3) kosaa-siniʔ i=akk-am-i-**n**
granary-DEF.P 3=show-PAS-PF-3**P**
'The granary was shown.'

As the examples above show, simple sentences can have overt subjects, verb roots with subject proclitics and inflectional suffixes in Konso (Orkaydo, 2013, p. 59). The overt subjects can also be omitted and they can be understood from the gender agreement markers on the verb (See examples (4), (5) and (6)).

Konso gender agreement in the subject inflection on the verb in null subject sentences (Orkaydo, personal communication).

(4) i=akk-am-**t-**i
3=show-PAS-3F-PF
'She was shown.'

(5) i=akk-am-**ay**
3=show-PAS-PF.3M
'He was shown.'

(6) i=akk-am-i-**n**
3=show-PAS-PF-3**P**
'They were shown.'

Native Konso speakers were instructed to respond to pictures using overt subject sentences, similar to (1), (2) and (3), and null subject sentences, similar to (4), (5) and (6), in the different experiments reported in the present dissertations.

Native Konso speakers were also requested to respond to pictures using definite nouns. In Konso, the gender of nouns determines the selection of definite marking on nouns and

distinguishes only between plural and non-plural gender (feminine and masculine) definite nouns (Orkaydo, 2013, pp. 77-78). Plural gender nouns take the definite suffix *–sini?* (e.g. *kosaa*$_{P}$-*sini?*$_{DEF.P}$ 'the granary'). Non-plural (masculine and feminine) gender, however, take the definite suffix *–si?* (e.g. *ɠimayta*$_{M}$-*si?*$_{DEF.M/F}$ 'the old man' or *alleeta*$_{F}$-*si?*$_{DEF.M/F}$ 'the hut').

Moreover, there are five multiple-reference suffixes in Konso that mark multiplicity of nouns, of which *–ɗɗaa* and *–ɗaa* are the most productive ones (Orkaydo, 2013). Both *–ɗɗaa* and *–ɗaa* were mainly used in the production of the multiple-object picture naming condition of the experiments reported in the present dissertation as they can attach to the base nouns with different gender values. For instance, the word *kosaa* 'granary' is plural in gender and it takes the multiple-reference suffix *-ɗɗaa* as in *kosaa-ɗɗaa* /granary-MULT/ 'granaries' (Orkaydo, 2013, p. 81). The definite multiple-reference form of this noun would be *kosaa-ɗɗaa-sini?* /granary.P-MULT-DEF.P/ 'the granaries'.

In summary, there are two competing traditions to analyze the so-called plural gender in Cushitic languages that are said to have this value. In one tradition, only masculine and feminine are accepted as values of gender and the third value is treated as part of number feature (Corbett & Hayward, 1987; Corbett, 2012). In another tradition, three gender values are recognized including plural as a gender value (Mous, 2008; Savà, 2005; Orkaydo, 2013). In the present dissertation, we examined these two competing analyses (plural as a value of gender vs. plural as a value of number) behaviorally by measuring response times and error rate using picture-word interference task in Konso.

1.4. The psycholinguistics of grammatical gender

In speech production research, grammatical gender has been playing a vital role in understanding how linguistic information is represented in brain and accessed for speech. In this regard, an area of interest for theories of speech production would be the cognitive process required for activating grammatical gender information and using this information to select appropriate gender-marked elements. There have been different models of speech production to account for the mechanism by which processes of gender retrieval are specified. Basically, most prominent models of speech production share the assumption that gender is a stored lexical property that is involved in inflectional processes (see e.g., the network model of Caramazza, 1977; interactive model of Dell, 1986; and Word Encoding by Activation and VERification (WEAVER ++) model of Levelt, Roelofs, & Meyer, 1999).

However, these models predict different processing mechanisms for gender feature retrieval and these predictions were examined empirically by several psycholinguistic studies. In other words, it is not entirely clear as to the specificities of accessing and selecting gender feature since the empirical data display differences in cross-linguistic processing of gender. Studies also differ in addressing the question whether selecting a gender feature involves competitive processes at all. Assuming that gender is selected competitively, the question has also been raised whether it occurs at the grammatical encoding or at the phonological encoding level. There have been further inquiries as to whether selection by competition applies to bare nouns or whether it is confined to gender-marked morphemes, and even more critically as to whether it applies to all gender-marked morphemes including bound morphemes.

For instance, Schriefers (1993) has shown that gender affects the production of noun phrases using picture-word interference tasks in Dutch. Although the effect of gender congruency has been replicated in Dutch and German many times under different conditions by different researchers (e.g. Van Berkum, 1997; La Heij, Mak, Sander, & Willeboordse, 1998; Schriefers & Teruel, 2000; Schiller & Caramazza, 2003), it has not been consistently reported in other languages. For instance, the effect has not been observed in any Romance languages presumably because the selection of determiners in those languages not only depends on the gender value of the noun but also on phonological properties, thus delaying the process of determiner selection and making resolution of gender conflict possible (Costa, Sebastian-Galles, Miozzo, & Caramazza, 1999; Miozzo & Caramazza, 1999; Alario & Caramazzza, 2002). This shows the language-specific property of gender congruency effect.

Moreover, the available literature on speech production provides two competing hypotheses for the selection mechanism of gender-marked morphemes. These are competitive and non-competitive selection processes. The selection-by-competition hypothesis assumes that competitive processing mechanism play a role in selecting gender-marked morphemes (Schriefers, 1993; Schriefers, Jescheniak, & Hantsch, 2005; Lemhöfer, Schriefers, & Jescheniak, 2006; Bordag & Pechmann, 2008; Jescheniak et al., 2014). This means that activating the target utterance also activates its competitors, and the activation of these competitor items delays the selection times of the target utterance and sometimes affects the accuracy of the response (Jescheniak et al., 2014). Jescheniak and colleagues offer a review of the literature on the selection mechanism of gender and conclude that the existing evidence supports a competitive lexical selection

mechanism for gender-marking morphemes including bound morphemes. Noncompetitive selection hypothesis, on the other hand, assumes that the selection times of a target utterance depends only on the activation level of the target itself, and not the activation level of other competitors (Janssen, Schiller, & Alario, 2014). Janssen et al. (2014) argue that the pattern of the available and new data in simple picture naming task is less consistent than what has been described by Jescheniak et al. (2014). Janssen et al. (2014) analysed these data using arguably a more appropriate approach to isolate an idiosyncratic item effect, namely analysing the Number (single-reference vs. multiple-reference) by Format (noun phrase vs. bare noun) interactions for each gender class separately. Studies in the present dissertation examined which one of these competing hypotheses accounts for the selection of gender-marked suffixes in Konso.

Schriefers (1993) observed significantly longer naming latencies in the gender-incongruent condition compared to the gender-congruent condition in Dutch noun phrase (NP) production. He interpreted the observed gender congruency effect as showing competition in the selection of the abstract gender feature of the noun at the syntactic level. The reason was that two different gender values compete for selection in the gender-incongruent condition. This was not the case in the gender-congruent condition as both the target and the distractor activate one and the same gender value. However, Miozzo and Caramazza (1999) propose that the gender congruency effect reflects processing at the phonological encoding level and not at the grammatical encoding level following their failure to find the effect in Italian. Initially, the authors argued that the effect would have to be observed in bare noun naming as well if the congruency

effect shows competition between syntactic features at the grammatical encoding level and not between the word forms at the phonological encoding level. In line with this argument, La Heij et al. (1998) failed to observe a gender congruency effect in bare noun naming although they observed the effect in determiner and noun naming in Dutch. However, the absence of the effect in bare noun production can also be accounted for by assuming that gender information is selected only when needed for noun phrase production (Levelt et al., 1999).

Schiller and Caramazza (2003) provide strong evidence for the hypothesis that the gender congruency effect is located at the phonological encoding level and not at the grammatical encoding level. They observed congruency effect for single-reference NPs but not for multiple-reference NPs in Dutch and German. In these languages, there are distinct gender-marked forms in single-reference but there is only one form for all genders in the multiple-reference NPs. The logic was that the congruency effect should have been found both in single-reference and multiple-reference NPs if the effect was originated at grammatical encoding level. The absence of the effect in the multiple-reference NPs, in which the gender feature does not surface overtly, shows that the congruency effect is located at the phonological encoding level, where the gender-marked phonological forms are selected. This means that gender-marking forms and not the abstract gender nodes are subjected to competition for selection.

Another critical issue in the study of gender feature retrieval has to do with the selection processes of bound versus freestanding morphemes. As will be shown later, some studies propose that only freestanding gender-marked elements are selected competitively but

bound gender-marked morphemes do not involve competitive selection processes (Schiller & Caramazza, 2003; Costa, Kovacic Fedorenko, & Caramazza, 2003; Schiller & Costa, 2006). Other studies propose that there is no need to propose different selection mechanism for bound and freestanding morphemes as they both are selected in a competitive manner (Schriefers, 1993; Schriefers, Jescheniak, & Hantsch, 2005; Lemhöfer, Schriefers, & Jescheniak, 2006; Bordag & Pechmann, 2008; Jescheniak et al., 2014).

In sum, the experimental study of gender feature retrieval in language production has been shedding more light on the mechanisms that govern the selection of lexical grammatical features and their role in the processing of inflectional morphology. As the above review illustrates, the question regarding the selection mechanism of bound gender-marked morphemes is not adequately addressed yet. This means that additional empirical studies are necessary to provide further evidence to broaden our understanding of the processing mechanism of gender in speech production. The studies reported in the present dissertation applied the picture-word interference and simple picture naming tasks to Konso. These studies aimed at filling the gap of cross-linguistic confirmation on the selection mechanism of gender from non-Indo-European languages and introducing experimental approaches for studying gender in Cushitic languages.

1.5. Does producing bound morphemes involve competitive processes?

In speech production, the selection processes of grammatical function (closed-class) items such as definite suffixes are different from content (open-class) words such as nouns and verbs (Garrett, 1982).

For instance, the material necessary for accessing and selecting nouns is mainly provided by the semantic structure (Caramazza, 1977; Dell, 1986; Levelt et al., 1999). This is different in the case of function words such as definite markers. As in the case of many gender-marking languages, selection of definite markers depends on the specific properties of the noun in Konso, the language we investigated in the present dissertation (e.g., *furaa-sini?* /key.P-DEF.P/ 'The key' vs. *kuta-si?* /dog.M-DEF.M/F/ 'The dog'). The choice of the correct definite suffix in Konso depends on the grammatical gender of the noun. Konso single-reference definite nouns are associated with either plural or non-plural genders. This means that the selection of a particular definite suffix in a single-reference definite noun in Konso relies on accessing information on definiteness and gender. In other words, selecting a definite suffix happens following the selection of the noun and accessing its gender information provided that plural is indeed a gender value in Konso.

In some works on the processing mechanism of closed-class items, a further distinction has been proposed for the selection processes of different closed-class items (Costa et al., 2003; Schiller & Caramazza, 2003; Schiller & Costa, 2006). This distinction contrasts the selection of bound closed-classed morphemes with that of freestanding morphemes. According to this contrast, bound morphemes are selected following noncompetitive processes, while freestanding morphemes are selected competitively. For the processing of bound morphemes, some proposed a noncompetitive transformation of a base form (Costa et al., 2003). On the other hand, one and the same processing mechanism has been proposed for selecting both bound and freestanding closed-class items, which is selection by competition (Schriefers, 1993; Schriefers et al., 2002,

2005; Jescheniak et al., 2014). The studies in the present dissertation provided additional evidence that bound morphemes follow competitive selection processes.

Using picture-word interference paradigm, Schriefers (1993) investigated whether competition is involved in the production of Dutch noun phrases (NPs) consisting of an adjective with a gender-marked suffix and a noun (Experiment 2). In Dutch, gender is marked by the inflectional suffix of the adjective when the NP is produced without a definite article. For neuter gender, the adjective is used in its citation form (which is identical to its stem, e.g., *groen* in *groen huis* 'green house'); for common gender nouns it carries the suffix *–e* (schwa) as in *groene stoel* 'green chair'. Schriefers (1993) observed a congruency effect in gender-marked adjectives and noun production. Recall that Schriefers obtained a congruency effect in his first experiment that contained freestanding gender-marked morphemes. He interpreted the results of both experiments as showing competition for selecting bound morphemes related with the gender inflection of the adjective as well as for selecting freestanding gender-marked determiners.

A study by Schiller and Caramazza (2003), however, did not observe an effect of congruency in producing gender-marked bound morphemes either in Dutch or in German. Note that Schiller and Caramazza reported congruency effects for the corresponding freestanding morphemes in producing a gender-marked determiner and noun or determiner plus adjective followed by a noun in Dutch and in German. Costa et al. (2003) reported a similar finding as Schiller and Caramazza (2003) using Croatian speakers. Costa et al. (2003) found a congruency effect in the production of freestanding morphemes consisted of gender-marked accusative pronouns (e.g.

vidim ga$_{M}$ vs. *vidim je*$_{F}$ 'I see it') but not in the production of bound morphemes consisted of a gender-marked possessive pronoun and a noun (*moj*$_{M}$ + noun vs. *moja*$_{F}$ + noun 'my + noun'). Similarly, Schiller and Costa (2006) examined whether bound morphemes processed differently from freestanding morphemes in German. The authors reported a congruency effect for producing freestanding morpheme in the form of a gender-marked definite determiner and a noun (*der*$_{M}$ + noun vs. *die*$_{F}$ + noun 'the + noun'). However, they did not observe a congruency effect for bound morpheme production consisting of a gender-marked indefinite determiner and a noun (*ein*$_{M}$ + noun vs. *eine*$_{F}$ + noun 'a + noun').

Contrary to reports that show contrasting effects for bound versus freestanding morphemes, Bordag and Pechmann (2008) obtained a congruency effect for bound gender-marked morphemes and freestanding morphemes in Czech. The authors observed congruency effect when Czech participants produced freestanding morphemes consisted of demonstrative and noun (Experiment 1) as well as bound morphemes consisted of a gender-marking ordinal number (adjective) and a noun (Experiments 2 & 3).

As can be seen in the above reviews, picture-word interference studies investigating whether bound morphemes follow competitive selection processes are small in number and provide contradictory evidences. In our picture-word studies (Chapters 2, 3 & 4), we investigated whether the selection of gender-marked bound morphemes involve competitive processing mechanisms in addition to resolving the status of plural gender in Konso.

Following the inconsistent evidence on the selection processes of bound gender-marked morphemes in picture-word studies, Schriefers et al. (2005) introduced simple picture naming task for investigating

whether selecting bound morphemes follow competitive processing in German. Rather than a picture-word task, a simple picture naming task is said to be an appropriate paradigm for adjudicating between competitive and noncompetitive hypotheses (Janssen et al., 2014). Schriefers et al. (2005) tested the naming of noun phrases with gender-marked size adjectives in German (Experiment 3).

In German, there is a convergence of bound inflectional morphemes for nouns of feminine gender, and divergence for nouns of masculine and neuter gender in single-reference and multiple-reference utterances. Schriefers et al. (2005) obtained gender by number interaction in the naming of noun phrases containing a gender-marked adjective and a noun but not in the bare noun naming. This provides support for the hypothesis that bound morphemes is selected competitively (Schriefers et al., 2005).

However, resolving between competitive and noncompetitive hypotheses requires further analyses on shapes of gender by number interactions (Janssen et al., 2014). This is because both hypotheses can account for the effect depending on the shape of interactions. Therefore, the most important point regarding a competitive selection mechanism has to do with the presence or the absence of a cost effect in multiple-reference trials when the single-reference and multiple-reference gender-marked items have divergent forms (Jascheniak et al., 2014). Jascheniak et al. (2014) further contend that the presence or absence of a clear cost term might depend on the proportion with which the different gender-marked morphemes have to be used in the experiment. For example, keeping the proportion of determiners equal, Schriefers et al. (2002) observed a multiple-reference cost in the naming of neuter gender nouns and a marginally significant multiple-reference cost in the naming of masculine nouns in German

freestanding morpheme production (Experiment 1). In a study by Lemhöfer et al., (2006) on Dutch NP production, however, with 75% of trials requiring the converging form *de*, there was a multiple-reference gain for this converging form and a reduced multiple-reference cost for the diverging forms (*de* vs. *het*). Chapter 5 of the present dissertation examined whether varying the occurrence of the percentage of bound gender-marked morphemes could affect the shape of gender by number interaction.

1.6. Introduction to experimental chapters

Gender in Cushitic languages has an intriguing property due to its interaction with number. This property is reflected in the agreement patterns of the third agreement class, which is arguably treated as a value of gender beside masculine and feminine (Hayward, 1979; Mous, 2008; Orkaydo, 2013). The subject matter of the studies in the present dissertation is that determining the psycholinguistic status of plural gender in Cushitic languages with particular reference to Konso. The dissertation is also aimed at shedding more light on the retrieval mechanism of bound gender-marked morphemes. Series of picture-word interference and simple picture naming experiments were conducted in Konso using native speakers of the language in their homeland setting. I have conducted the experiments in three field trips between 2012 and 2014. These experiments are presented in four chapters in the dissertation. In what follows, I introduce the four experimental chapters briefly.

Chapter 2 of this dissertation contains the first sets of experiments in Konso. The experiments reported in this chapter are the first in the language and in the area. In this sense, the study opened the window for further investigations as they indicated the

feasibility of conducting behavioral studies in under-studied languages and in less-resourced semi-rural areas of Konso. The aim of the study was examining whether gender congruency effect, which we see in Germanic languages such as Dutch and German, can be obtained in non-Indo-European languages. More specifically, I report the results of two picture-word interference experiments on bare noun and definite noun naming in Konso. In Experiment 1, participants named pictures by producing a bare noun while ignoring a simultaneously presented auditory distractor word, which has the same gender or different gender as the target. In Experiment 2, participants produced nouns with a gender-marked definite suffix while disregarding a gender-congruent or a gender-incongruent distractor word. The results of the experiments provided some indication for the presence of gender congruency effect in the language although the over all effects fail to reach robust significance levels.

In chapter 3, I report the first behavioral evidence regarding the status of plural gender in Cushitic languages. In this chapter, two picture-word interference experiments examined whether plural gender shows similar effects as the already accepted gender values of the language. In Experiment 1, native speakers of Konso were requested to produce nouns with gender-marked definite suffixes while ignoring a simultaneously presented auditory distractor that has same or different gender as the target. In Experiment 2, participants were instructed to respond to pictures by producing an overt subject or a null subject sentence while disregarding a gender-congruent or a gender-incongruent distractor. The central aim of the experiments reported in this chapter was to examine whether nouns with plural gender produce the same pattern of interference from gender-

incongruent and/or facilitation from gender-congruent distractor words as masculine and feminine genders. If plural is a value of gender in Konso, naming utterances with plural gender should produce similar congruency effects as masculine and feminine genders. Conversely, if such effects were absent in naming utterances with plural gender but present only in masculine and feminine gender, plural would not be treated as a value of gender. Combined, compared to the gender-congruent condition, gender-incongruent distractor words slowed down the naming latencies of the target pictures significantly. Crucially, the results of the two experiments displayed that plural gender nouns show gender congruency effects like masculine and feminine nouns. This indicates that plural is processed in the same way as masculine and feminine genders, which supports the analysis that the so-called "plural" gender indeed is part of the system of gender features in Konso.

As described above, chapter 3 presented the finding of comparable congruency effect for the production of plural gender as masculine and feminine genders. Chapter 4 included regular multiple-reference forms both as a target and as a distractor to adjudicate between *plural-as-a-gender feature analysis* and *plural-as-a-number feature analysis*. Thus, Chapter 4 investigates whether plural gender is processed as a gender or as a number feature using three picture-word interference experiments. Participants were presented with pictures of one or two objects with a single-reference or a multiple-reference distractor that has the same or different gender as the target. In experiment 1, Konso participants named pictures using gender-marked definite nouns; and in Experiment 2 and 3, they responded by producing a sentence with overt subject and null subject, respectively. The aim was to investigate whether plural

gender nouns are processed in the same way as feminine and masculine nouns or in the same as regular multiple-reference nouns.

In these experimental contexts, the *plural-as-a-gender feature analysis* would predict that a plural gender produces a similar pattern of effects as those of feminine and masculine gender but a different effect compared to regular multiple-reference nouns. The *plural-as-a-number feature analysis*, however, would predict that the so-called plural gender produces a similar effect as that of regular multiple-reference nouns but a different pattern of effects from those of the feminine and masculine gender. Significant effects of gender congruency were observed in the single-object picture naming condition where the selection of gender suffixes is determined by the target's gender, but not in the multiple-object picture naming condition where the gender-marked suffixes are identical for all. The overall results suggest that plural gender nouns are processed similarly to feminine and masculine single-reference nouns, and differently from regular multiple-reference nouns. This supports the analysis of plural as a gender but not as a number feature in Konso.

All of the above-mentioned experimental chapters provide evidence for the selection processes of bound gender-marked morphemes since all of gender-marked elements in those studies were suffixes (bound morphemes). Chapter 5 investigates the selection processes of bound morpheme in more detail using a different and possibly an appropriate paradigm for the issue, namely simple picture naming task. The aim was to examine whether bound gender-marked morphemes such as gender-marked definite suffixes or verb inflections are selected competitively. In chapter 5, we conducted two simple picture naming experiments for which no distractor words were used. Konso speaking participants were

presented with picture of one or two objects and instructed to produce a single-reference or a multiple-reference gender-marked utterances and a bare noun (control experiment).

In Experiment 1a, definite noun naming, the proportion of bound gender-marked morphemes were kept equal. On the other hand, in Experiments 2a (overt subject sentence naming) and 2b (null subject sentence naming), two third of the trials required a converging form (–n morpheme) in single-reference and multiple-reference. In Experiment 1a, the finding of a gender by number interaction with multiple-reference costs for diverging gender-marked forms, which correspond to the form of non-plural gender, provided evidence for bound morpheme selection-by-competition hypothesis. In Experiments 2a and 2b, a benefit in the multiple-reference utterances for the plural gender but a reduce cost for masculine and feminine genders was also in line with bound morpheme selection-by-competition hypothesis.

Thus, this dissertation is a compilation of four independent experimental chapters in addition to the introduction and conclusion chapters. Admittedly, there is overlap of contents among the experimental chapters as they are based on individual studies that investigate a central question, which are published/submitted/prepared for submission to different publishing outlets. As explained above, the central issue of these chapters remains to be closely related and twofold: the status of plural gender, and the selection mechanism of bound gender-marked morphemes. However, a closer consideration of the individual studies may illustrate their distinct ways of addressing these issues. For instance, chapter 2 focussed mainly on the feasibility of doing behavioral studies in semi-rural areas of Konso, and whether gender congruency

effect can be obtained in non-Indo-European languages. This was important for establishing the basis for testing the central theses of the dissertation. Chapter 3 provided the first evidence for plural as a value of gender in Konso, which shows that plural gender produced similar congruency effect as masculine and feminine genders. Chapter 4 compared the analyses of plural as a gender versus as a number feature by contrasting the production of plural gender with regular multiple-reference number utterances. Chapter 5 addressed the selection mechanism of bound gender-marked morphemes using another and possibly more appropriate paradigm to address the question.