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

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CHAPTER 6

6. General discussion

6.1. Introduction

This dissertation examined the psycholinguistic state of the so-called plural gender class in Cushitic languages and the selection mechanism of bound gender-marked morphemes during speech production. Some Cushitic languages are characterized by an uncommon mixing of gender and number features, which is reflected in the behavior of the third agreement class apart from masculine and feminine genders. This third agreement class represents a group of nouns that trigger plural agreement form irrespective of their number values, either single-reference or multiple-reference. The studies presented here provide evidence for the analysis of this plural agreement class as a value of gender and not number in Cushitic languages by applying picture-word interference paradigm to Konso, a Lowland East Cushitic language of Ethiopia. The present findings also show that bound gender-marked morphemes are selected competitively while some studies have taken the noncompetitive account to be the underlying processing mechanism for selecting bound morphemes. The first experimental study (Chapter 2) provided the basis for the follow-up studies. This chapter established the prospect for conducting psycholinguistic investigation in under-studied languages in less-resourced rural areas and provided some indication for the presence of gender congruency effect in Konso. Chapter 3 demonstrated that the so-called plural gender is processed in the same way as masculine and feminine genders, which are categorical gender values across all Cushitic languages. Measurements of response times revealed that plural gender produced similar congruency effect as feminine and masculine genders, which provides support for the analysis of plural as a value of gender in the language. Chapter 4 further investigated whether the

pattern of the effect observed in Chapter 3 can be replicated in a different experimental scenario whereby regular multiple-reference nouns were used both as targets and distractors. Chapter 4 indicated that plural gender nouns are processed similarly as feminine and masculine single-reference nouns, and different from regular multiple-reference nouns. Recall that all gender-marked elements in the experiments reported in the present dissertation were bound morphemes that are suffixed as definite markers on nouns or as subject inflection on verbs. This demonstrates that gender congruency effects can be obtained during bound morpheme production in Konso. Importantly, Chapter 5 addressed one of the current discussions in the speech production literature regarding the selection mechanism of bound gender-marked morphemes. Chapter 5 employed the simple picture naming task; evidently an appropriate task for examining whether selecting bound morphemes follows competitive or rather non-competitive mechanisms. It was shown that, with equal proportions of gender-marked suffixes, producing multiple-reference definite nouns was characterized by reaction time costs for non-plural gender trials, for which the suffixes of single-reference and multiple-reference were different. On the other hand, uttering multiple-reference sentences was correlated with benefits for plural gender trials when two thirds of trials required *–n* (the suffix used in all multiple-reference and for plural gender in the single-reference). These results are consistent with the view that selection of bound morphemes follows competitive processes.

Altogether, the studies reported in the present dissertation have shown that plural is indeed a value of gender and not number in Konso. Moreover, bound gender-marked morphemes, such as definite suffixes and verb inflections of Konso, involve competitive rather

than non-competitive selection mechanisms. The studies presented in this dissertation also played a vital role in extending the psycholinguistic investigation of gender beyond Indo-European languages and in introducing experimental approaches into the study of Cushitic gender.

In what follows, we shall first discuss the evidence on the processing of plural as a value of gender in Konso. Then we look at the evidence that show bound gender-marked morphemes follow competitive selection processes. Finally, a reflection on undertaking psycholinguistic behavioral studies in the rural area of southwest Ethiopia will be presented.

6.2. The processing of plural as a gender in Cushitic languages

Mention was made that Konso and some other related Cushitic languages have the property that the third value of gender, beside masculine and feminine, is "plural." This plural gender refers to a class of nouns that take plural agreement form even when they represent single entities. Two different linguistic analyses have been proposed to analyze the status of the so-called plural gender in Cushitic languages: *plural-as-a-number feature* only (Corbett & Hayward, 1987; Corbett, 1991, 2005, 2012) versus *plural-as-a-gender feature* as well (e.g. Hayward, 1979; Savà, 2005; Mous, 1993, 2008; Orkaydo, 2013).

In this dissertation, Chapter 3 addressed the question of whether processing of plural gender during speech production produces a similar pattern of congruency effects as masculine and feminine gender in Konso. Masculine and feminine are the accepted gender classes in Konso and other Cushitic languages. As it has been shown

in the results of the two experiments in Chapter 3 that plural gender nouns show gender congruency effects like masculine and feminine nouns. This indicates that plural is processed like masculine and feminine genders, which supports the analysis that the so-called "plural" gender is part of the system of gender values in Konso.

The fact that plural gender nouns require the same agreement as third person plural subject on the verb triggered the use of the term "plural" as a value of gender in Konso. Moreover, there are extra connections between the plural gender and multiplicity of number. First, coordinated nouns require plural agreement on the verb regardless of the gender values of the coordinated nouns. For instance, the coordinated noun phrase combining a masculine and feminine word requires plural agreement in Konso as can be seen in the sentence. *ɠartaaynu iʃuʔ inantaaynu tikupa ikalin* /*ɠarta-aynu iʃuʔ inanta-aynu tika-opa i=kal-i-n/* elder.brother.M-1SG.POSS.M/F and girl.F-1SG.POSS.M/F house-to 3=return.home-PF-P/ 'My elder brother and my sister returned home' (Orkaydo, personal communication). Second, number is a derivational category in Konso, i.e. some nouns derive a multiple-reference number form from a non-derived single-reference, others derive a single-reference from a non-derived multiple-reference, and many other patterns (Orkaydo, 2013, pp. 80-89). There are seven different multiple-reference formations in Konso, and the one to be uttered is lexically decided. All these multiple-reference formations inflict plural gender onto the noun.

The category of number in Konso has a number of properties that make it of a different nature than the category of gender. In Konso and other Cushitic languages, the main domain of number agreement is the adjective. An adjective will agree in number with

the head noun. However, the agreement is semantic in nature: using a single-reference adjective modifying a multiple-reference head noun is acceptable and renders the reference of that noun as collective, thus semantically as single-reference. Moreover, number is a category that is not obligatorily expressed. This means that to refer to multiple objects, a speaker has to choose between the use of a non-derived base noun or a derived noun marked for multiple-reference depending on how crucial the speaker considers information on number in a given context. The results from Chapter 3 show the necessity of further empirical investigations on the category of number in Konso and other Cushitic languages. With the aim of addressing this necessity, Chapter 4 investigated the production of gender and number in Konso.

In Chapter 4, we found a congruency effect only in the single-object picture naming condition, where there were different forms for different genders. This may have been the case because so-called plural gender produces a similar pattern of interference/facilitatory effects from distractor words as feminine and masculine genders in Konso. The absence of a reliable effect of congruency in the multiple-object picture naming condition indicates that plural gender produces a different effect from the regular multiple-reference (plural number) nouns. These results suggest that plural is processed as a gender feature rather than a number feature in Konso.

As discussed in the previous chapters, however, treating plural as part of gender feature is said to be challenging for the general linguistic claim of Exclusiveness — values belong to one feature only (Corbett, 2012). According to this claim, values such as ‘singular’ and ‘plural’ belong only to the number feature and thus gender cannot use plural as its value. Corbett (2012), see also Corbett

and Hayward (1987), identified only eleven nouns that require plural agreement form for single-reference (unit reference) in Bayso, another Lowland East Cushitic language. Corbett analysed them as typically occurring in pairs or representing non-count nouns. His conclusion was that these nouns should be lexically marked as taking plural agreement when they are in single-reference similar to *pluralia tantum* nouns and thus plural should be removed from the values of gender. This analysis might serve to tackle seemingly non-standard structures in the system at the price of marking only small number of nouns as exceptions.

In Bayso, Haywards's (1979) list of nouns that take plural agreement is small in number and indeed could be treated as exceptions. However, one can notice that the word list of Hayward (1979) contains not more than a hundred nouns altogether and we may need a much larger list of words to see the actual distributions of nouns into different gender classes in Bayso. Orkaydo (2013) provides relatively larger list of words for Konso. In contrast to Bayso, Konso's plural gender nouns are too many to be treated as exceptional. There are 96 nouns with plural gender against 135 of feminine and 245 of masculine nouns.

Moreover, there is additional linguistic evidence that supports the treatment of plural as a value of gender in Konso. Namely, gender and number represent two independent agreement systems and adjectives show agreement for both categories independently in Konso (Mous, 2008; Orkaydo, 2013). Thus, an adjective agrees in number with the head noun by reduplication of initial CV(C) of its root for multiple-reference nouns (Orkaydo, 2013). In the example, *waakkaa-ɗaa-sini? i=ɗeɗ~ɗer-i* /wooden statue-MULT-DEF.P 3=RDP-be.tall-PF/ 'The wooden statues are tall', the initial CVC of

the adjective root *ɗer-* 'to be long' is reduplicated because the subject *waakkaa-ɗaa-sini?* 'the wooden statues' is a multiple-reference noun. However, in the example *waakkaa-sini? i=ɗer-i* /wooden statue-DEF.P 3=be.tall-PF/ 'The wooden statue is tall', the initial CVC of the adjective root *ɗer–* is not reduplicated because the subject *waakkaa-sini?* 'the wooden statue' is a single-reference noun.

In Konso, gender is also marked on adjectives when they are used as attributes (Orkaydo, 2013). The suffix *–a* is used to mark masculine and feminine genders, and *–aa* is used for plural gender (Orkaydo, 2013). For instance, *waakkaa-sini? ɗer-aa* /wooden statue-DEF.P SG.tall-P/ 'The tall wooden statue'. According to the treatment of plural as a number feature (multiple-reference), we would have two conflicting values of number on the two agreement places of the adjective (single-reference at the beginning of the adjective vs. multiple-reference marked by the suffix *–aa*) in agreement with one and the same head noun. Such a treatment could also lead into inconsistent classification of nouns; one group of nouns would be classified according to gender based on the agreement on the definite marker on nouns, and the other group would be classified according to number on the basis of the final suffix on the adjective. This kind of challenge would not be present in Bayso, since it does not show independent number agreement. Thus, the treatment of plural as a value of gender and not number is an appropriate one in Konso. Importantly, the studies in the present dissertation showed that the so-called plural gender behaved as a gender type rather than a number type.

According to theories of language production that discuss the lexical-syntactic properties, gender and number belong to two different feature categories (Levelt, Roelofs, & Meyer, 1999). The

former, gender, belongs to fixed syntactic features that are said to be idiosyncratic where there is no clear semantic and phonological cue with regard to its value. For instance, the definite marker suffix has to agree in gender with the head noun in Konso definite nouns (*innaa-sini?* /boy.P-DEF.P/ 'the boy' vs. *oχinta-si?* /fence.F-DEF.M/F/ 'the fence'). Yet, there is no conceptual motivation for *innaa* 'boy' to have plural gender whereas *oχinta* 'fence' has feminine gender in Konso. Number, on the other hand, belongs to variable syntactic features, which are not word-specific and its value is based on a conceptual situation.

Whether plural gender behaved as a gender in other Cushitic languages that have a similar feature is an issue for future research. As stated earlier, about one-third of Cushitic languages are said to have this third value of gender. Let us look at the analysis of grammatical gender and number in Bayso, another Cushitic language on which the relevant studies were undertaken. Bayso belongs to Lowland East Cushitic branch and it is spoken in the southwest of Ethiopia. The review of Bayso is based on the works of Hayward (1979), Corbett and Hayward (1987), and Corbett (2012). Readers are referred to those references for the original analyses, further discussions and additional examples.

Hayward (1979) has analyzed the gender and number system of Bayso and separated gender from number. He identified three gender values, which are derived from the agreement patterns of the subject on the verb, agreement in associative particle and agreement in demonstratives. Each of these agreeing elements has three separate forms that are labeled as masculine (M), feminine (F) and plural (P) gender based on comparable criteria.

Agreement at clause level distinguishes three forms, in which masculine, feminine and plural nouns require third person masculine, third person feminine and third person plural subject markers on the verb, respectively, as shown in the following examples:

Bayso subject gender agreement on the verb (Hayward, 1979, p. 101)

(28) lúban gira
lion is.M
'There is a lion'

(29) kimbir gitta
bird is.F
'There is a bird'

(30) ilkoo giran
tooth/teeth are.P
'There is a tooth/ are teeth'

In addition to *lúban* 'lion', the verb form *gira* agrees with *ódo* 'father' and *abbi* 'brother', and the nouns requiring this form are called masculine gender. Similarly, the verb form *gitta* agrees with nouns such as *kimbir* 'bird', *aa/aayo* 'mother', *abba* 'sister', and such nouns are said to be feminine gender. The form *girran*, however, agrees with nouns that are semantically mass or non-count/non-singular and it is referred to as a plural agreement form, nouns that require this agreement form are called plural gender nouns. Not all non-count nouns take this form. For example, *igg* 'blood' and *ess* 'grass' require masculine agreement form while count nouns such as *ilkoo* 'tooth/teeth', *iloo* 'eye' require plural agreement form. This, according to Hayward (1979), shows the relative arbitrariness of the assignment of nouns to the plural gender.

Agreement in the associative particle (PRT) also distinguishes three markers, *ka* for masculine, *ta* for feminine and *o* for plural gender nouns, as shown in the examples below:

Bayso gender agreement forms in the associative particles (Hayward, 1979, p. 102)

(31) ani ka dee lúban…
I PRT.M saw lion
'the lion which I saw…'

(32) ani ta dee kimbir…
I PRT.F saw bird
'the bird which I saw…'

(33) ani o dee ilkoo…
I PRT.P saw tooth/teeth
'the tooth/teeth which I saw…'

According to similar criteria as the other two agreeing elements, three forms are identified by demonstratives occurring with or without a noun. Masculine nouns agree with a demonstrative that incorporate *–kk–*, feminine nouns agree with *–tt–* and plural nouns agree with the element *–n–*, as illustrated by the following examples:

Bayso gender agreement forms in demonstratives (Hayward, 1979, p. 102)

(34) hikki lúban
this.M lion
'this lion'

(35) hitti kimbir
this.F bird
'this bird'

(36) hini ilkoo
this.P tooth/ these teeth
'this tooth/ these teeth'

The agreement pattern of the subject on the verb, agreement in associative particle and agreement in demonstratives, therefore, identifies three different forms individually. Although these forms are not phonologically similar, their division follows the same criteria and termed as masculine, feminine and plural agreement form and nouns that require these agreement forms are said to be masculine, feminine and plural gender, respectively.

Number is the other feature that Hayward (1979) analyzed in relation to gender in Bayso. He identified four values for number: unit reference, multiple reference, paucal reference, and singulative reference. The unit reference form is marked by a zero suffix and

represents an individual member or the class of the referent. The multiple reference form is marked by different suffixes and represents the multiplicity of individual members or items. The paucal reference form is also marked and represents a handful (from two to six) of individuals. The marked singulative reference form, however, represents a particular member only. The following example in Table 32 illustrates these forms:

Table 32 Bayso number system (Hayward, 1979, p. 102)

unit reference	lúban	'a lion/lion'
multiple reference	lúbanjool	'lions'
paucal reference	lubanjaa	'a few lions / some lions'
singulative reference	lubántitti	'a/the particular lion'

As can be seen above, Hayward (1979) analyzes gender and number as independent features in Bayso. The main reason is that gender is not a constant property for nouns; instead, it changes with the number feature. The correlation between gender and number in Bayso, however, leaves the following clear generalizations: all paucal reference forms are plural; singulative reference forms do not take plural gender, rather they keep the same gender as their unit reference form; and all regular multiple reference forms are masculine.

Corbett and Hayward (1987) reanalyze the gender and number system of Bayso based on the work of Hayward (1979). In contrast to previous work, which recognized three gender values, they argue that only two genders (i.e. masculine and feminine) should be recognized in Bayso (taking mainly the small membership in the other class into account).

To this end, they first collected all the nouns that take plural agreement in their unit reference form from Hayward's word list and characterized them as referring to items appearing in pairs (e.g. *kalal*

'kidney', *lukkaa* 'feet', and *iloo* 'eye'). The majority of the remaining nouns in this set are mass nouns (e.g. *eenoo* 'milk', *ongorroo* 'hair', *soo* 'meat' and *udú* 'faeces'). Corbett and Hayward (1987) labeled nouns that take plural agreement for unit reference as lexical exceptions and rule out the concept of "plural" gender in Bayso.

Moreover, they challenge the view that gender is not a constant property but changes with number in Bayso, a position taken by Hayward (1979). Following the labeling of nouns that take plural agreement for unit reference as lexical exceptions, for any other noun (masculine or feminine), the agreement with unit reference (non-derived single-reference) and singulative reference (derived single-reference) are identical since the latter is derived from the former. Nouns that take plural agreement for unit reference cannot derive singulative reference forms, and multiple reference words are automatically masculine in gender.

Note that there was an attempt to extend the psycholinguistic investigation of plural gender to Bayso. This attempt was not fully materialized due to inadequacy of stimuli and participants. Using the available stimuli and participants, however, we carried out a couple of experiments in Bayso that examined the presence of gender congruency in the production of bare noun and gender-marked demonstratives plus noun. Note that these experiments did not include nouns in the plural gender class, as they were small in number. In bare noun naming, no effect of gender congruency was observed. In demonstrative and noun naming, however, participants were slower in the gender-incongruent compared to gender-congruent condition. These results are in line with a previous study in Dutch that showed congruency effects only when gender information is required for selecting correct utterance forms (La Heij, Mak, Sander

& Willeboordse, 1998). This provides further evidence for the presence of a gender congruency effect in non-Indo-European languages. To be able to examine the status of plural gender in Bayso, it is necessary to collect additional words in the language and to work with the community for selecting proficient speakers of the language who are able to do the tasks.

6.3. The competitive nature of selecting bound morphemes

In addition to the status of plural gender in Konso, the studies reported in the present dissertation examined how bound gender-marked morphemes (such as gender-marked suffixes) are processed during speech production. As we have noted in the introduction, the literature on the selection processes of bound gender-marked morphemes is small in number (involving only a few European languages, mainly German & Dutch) and even these few studies provide contradictory evidence. Most of these studies employed picture-word interference tasks that focus on the gender congruency effect and simple picture naming tasks that focus on a gender by number interaction. To examine the retrieval mechanism of bound morphemes in Konso, Chapters 3 and 4 of the present dissertation employed the picture-word interference task and Chapter 5 made use of the simple picture naming task. The experiments in Chapters 3 and 4 investigated whether the gender congruency effect can be obtained in gender-marked bound morpheme production. The experiments in Chapter 5, on the other hand, examined the type and pattern of gender by number interaction effect in the production of bound gender-marked morphemes in Konso.

The results reported in Chapters 3 and 4 have shown that the gender congruency effect can be obtained during the production of bound gender-marked morphemes in Konso. Previous studies do not provide consistent evidence as to whether a congruency effect is observed in the production of bound gender-marked morphemes. In some studies, a gender congruency effect is observed only in the production of gender-marked freestanding morphemes but not in the production of gender-marked bound morphemes (e.g. Schiller & Caramazza, 2003, in German and Dutch; Costa Kovacic, Fedorenko, & Caramazza, 2003, in Croatian; Schiller & Costa, 2006, in German). As a result, these authors concluded that bound gender-marked morpheme production involves a non-competitive processing mechanism while gender-marked freestanding morphemes involve selection-by-competition processes. In other studies, a gender congruency effect was found for bound gender-marked morpheme production as well (e.g. Bordag & Pechmann, 2008, in Czech; Schriefers, 1993, in Dutch). Thus, these authors concluded that bound gender-marked morpheme production involves selection-by-competition processes like that of freestanding morphemes. Similar to Schriefers (1993), as well as Bordag and Pechmann (2008), the results reported in Chapters 3 and 4 reveal the presence of a gender congruency effect in the production of bound gender-marked morphemes.

However, gender congruency effects in picture-word tasks may be ambiguous between competitive and non-competitive selection processes (Jescheniak, Schriefers, & Lemhöfer, 2014; Janssen, Schiller, & Alario, 2014). The reason is that the effect of gender congruency can be accounted by both competitive and non-competitive selection models. The competitive selection model

assumes that the prolonged response times in the gender-incongruent condition resulted from competition between different gender-marked forms. The non-competitive selection model assumes that the faster response times in the gender-congruent condition resulted from priming between convergent gender-marked forms. To disentangle between competitive and non-competitive models, the simple picture naming task seems to be a better paradigm compare to the picture-word task (Jescheniak, et. al., 2014; Janssen, et al., 2014).

In Chapter 5, we employed the simple picture naming task to address whether bound gender-marked morphemes are selected competitively in Konso, for which most of gender-marked elements are bound morphemes. Bound gender-marked morphemes in Konso include *-si?* and *-sini?* on definite nouns, and *–t*, *–ay* and *–n* on verbs. These morphemes are identical for one gender class in the single-reference and multiple-reference, but differ for the other gender classes. Thus, Konso has two different definite markers in the single-reference definite nouns (*–sini?* for plural gender, and *–si?* for non-plural gender). By contrast, there is only one form for all multiple-reference definite nouns (i.e, *–sini?*), which corresponds to the form of plural gender in the single-reference definite nouns. In the subject agreement on the verb, Konso has three different gender-marking suffixes in the single-reference: *–t* for feminine, *–ay* for masculine, and *–n* for plural gender. However, there is only one verb ending (*–n*) for all in the multiple-reference trials, which corresponds with that of plural gender of the single-reference. In Chapter 5, participants named pictures of one or two objects by producing a single-reference or a multiple-reference gender-marked utterance (Definite noun in Experiment 1a, overt subject sentence in Experiment 2a, and null subject sentence in Experiment 2b) and a bare noun (control

experiment). In these experiments, the proportions with which gender-marked elements occur were manipulated. In Experiment 1a, the occurrence of the two gender-marked definite morphemes was kept equal, half (50%) of responses required *–si?* and the other half required *–sini?* as their definite suffix. In Experiments 2a and 2b, on the other hand, two thirds of the responses required *–n* morpheme, the converging form in the single-reference and multiple-reference trials.

In Experiment 1a, when the occurrence of the proportion of gender-marked morphemes was equally 50%, we observed gender by number interaction with multiple-reference costs of 81 ms for diverging gender-marked forms in single-reference and multiple-reference trials. These diverging forms correspond to the non-plural gender class, where *–si?* was used in the single-reference and *–sini?* was used in the multiple-reference trials. In the multiple-reference non-plural gender definite noun naming, increased competition was produced during bound morpheme selection due to the activation of different gender-marked definite suffixes (i.e. *–si?* vs. *–sini?*) and hence a cost effect was observed in this condition.

In Experiments 2a and 2b, where a higher percentage (66.67%) of responses required the converging form in the single-reference and multiple-reference trials (*–n*), there were multiple-reference benefits for this converging form (131 ms in Experiment 2a and 100 ms in Experiment 2b). This converging form, an *–n* morpheme, corresponds to the plural gender class in the single-reference trials. The benefit in the multiple-reference trials for plural gender may be due to the fact that the single-reference trial and its multiple-reference form gave combined activation to the same multiple-reference gender-marked form, which facilitated the selection of the

correct gender suffix. This benefit effect was not observed in Experiment 1a, where the proportion of occurrence of converging forms in single-reference and multiple-reference trial was 50%. Thus, increasing the proportion of the converging form in single-reference and multiple-reference trials to 66.67% in Experiments 2a and 2b may have increased the activation of this suffix. This increased activation in turn could weaken the competition of other single-reference suffixes with this suffix in the multiple-reference trials, which decreased the multiple-reference cost. By contrast, the convergence of the single-reference suffix with this suffix led to a benefit effect for trials containing a plural gender suffix.

In summary, the results of the study presented in Chapter 5 showed a cost effect for multiple-reference trials when single-reference and multiple-reference gender-marked suffixes differ. This was the case when the occurrence of the proportion of gender-marked morphemes was balanced. When responses with the converging forms in the single-reference and multiple-reference trials increased to 66.67%, this cost effect inclined to reduce and substituted by a benefit effect for multiple-reference trials for which single-reference and multiple-reference suffixes were identical. These patterns of results suggest that bound gender-marked morphemes in Konso are selected in competitive fashion. This is in accordance with theories of language production that assume gender-marked morphemes are selected competitively (Schriefers, 1993; Schriefers, Jescheniak, & Hantsch, 2005; Lemhöfer, Schriefers, & Jescheniak, 2006; Bordag & Pechmann, 2008; Jescheniak, et al., 2014).

In Chapter 5, we considered two major models that account for the selection mechanism of gender-marked morpheme during speech production: competitive and non-competitive selection models. The

major assumption of the non-competitive model is that the selection times of a target utterance depend only on the activation level of the target itself, and the activation of other competitors plays no role (Janssen et al., 2014). The competitive model, on the other hand, assumes that the activation of target utterances also activates competitors, and the activation of these competitors affects the selection times of the target utterance (Jescheniak et al., 2014). Accordingly, competitive and non-competitive models predict different types of gender by number interactions in the production of utterances with gender-marked morphemes in naming tasks. The non-competitive model predicts a gender by number interaction where there is a benefit in the production of multiple-reference trials with converging forms in the single-reference and multiple-reference, a benefit-type interaction (Janssen et al., 2014). The competitive model predicts a gender by number interaction where there is an additional cost in the production of multiple-reference trials with divergent forms in the single-reference and multiple-reference (a cost-type interaction) when the proportion of gender-marked morphemes is at least balanced in the experiment (Jescheniak et al., 2014). The finding of multiple-reference costs for diverging single-reference and multiple-reference gender-marked definite nouns of Experiment 1a in Chapter 5 is in line with the prediction of competitive models but not with non-competitive models.

Moreover, the finding of Chapter 5 is line with simple picture naming studies that propose competitive selection mechanism for the production of bound gender-marked morphemes, such as Schriefers et al. (2005) in German and Lemhöfer et al. (2006) in Dutch. Schriefers et al. and Lemhöfer et al. reported gender by number interactions of the benefit type during bound morpheme production

with a higher percentage (66% in Schriefers et al., 2005; and 75% in Lemhöfer et al., 2006) of responses with the converging form in the single-reference and multiple-reference trials. This corresponds with the benefit effect we observed in Experiments 2a and 2b, where 66.67% of responses required the converging form in the single-reference and multiple-reference trials. The new finding in Chapter 5 was that keeping the proportion of bound gender-marked morphemes equal resulted in a cost effect for multiple-reference trials when single-reference and multiple-reference gender-marked suffixes differ.

To the best of our knowledge, the empirical basis of most studies that propose a non-competitive processing mechanism for bound gender-marked morphemes is the gender congruency effect in picture-word tasks (Costa et al., 2003; Schiller & Caramazza, 2003; Schiller & Costa, 2006). These studies reported the absence of gender congruency effects in bound morpheme production. Note that there is counter evidence against such a position (Schriefers, 1993; Bordag & Pechmann, 2008). Moreover, the studies reported in Chapters 3 and 4 of the present dissertation show that a gender congruency effect could be obtained with bound morphemes. However, it should be noted that the status of the bound morphemes might differ between studies (see below). As also stated earlier, there is a growing consensus among researchers in the field that the gender congruency effect in picture-word tasks may not provide direct evidence to resolve the choice between competitive and non-competitive models since both models can account for this effect (Jescheniak et al., 2014; Janssen et al., 2014).

Besides, it is also possible that the observed effect in Konso bound morpheme production might be due to language-specific

properties. Konso is presumably different from Dutch and German, i.e. the languages investigated in the relevant studies. These differences may be indicated in terms of the function of gender suffixes on nouns and verbs, the nature of bound gender-marked morphemes, and the function of gender agreement and its intricate relation with number agreement. The definite suffixes *–si?*$_{M/F}$ and *–sini?*$_{P}$, and the verb inflections *–ay*$_{M}$, *–t*$_{F}$ and *–n*$_{P}$ were gender-marked morphemes, which were used in the Konso experiments that are reported in the present dissertation. These and other closed class functional morphemes are bound and may occur at the end of an utterance in Konso. For instance, no independent word can come between *–si?*$_{M/F}$/*–sini?*$_{P}$ and the noun; and they cannot be used as freestanding morphemes. If *–si?*$_{M/F}$ and *–sini?*$_{P}$ are used independently, they have to change into demonstrative pronouns (*ini?*$_{M/F}$ 'this one' and *ossini?*$_{P}$ 'this thing', Orkaydo, 2013, p. 129). Moreover, unlike the Dutch adjectival inflection *–e*, the definite suffixes *–si?*$_{M/F}$ and *–sini?*$_{P}$ in Konso are not pure (automatic) agreement features; rather they express value (definiteness) and they are not obligatory. The verb endings in Konso (*–ay*$_{M}$, *–t*$_{F}$ and *–n*$_{P}$) are inflectional agreements when we have an explicit subject but when there is no explicit subject, there is no agreement because Konso is a pro-drop language.

Therefore, our study not only replicated the finding of gender by number interactions in bound morpheme naming (Schriefers et al., 2005; & Lemhöfer et al., 2006) but also offered new empirical evidence in support of the view that the production of bound gender-marked morphemes are subject to competitive process. The present study, therefore, extended the findings by Schriefers et al. (2005) and Lemhöfer et al. (2006) to a geographically and genetically distinct

language, Konso. This provides additional cross-linguistic data on the processing mechanism of bound gender-marked morphemes.

6.4. Aspects of field-based psycholinguistics

Mention was made that the psycholinguistic investigations of gender are restricted to a limited number of Germanic and Romance languages. The studies reported in the present dissertation played an important role in extending the psycholinguistic investigation of grammatical gender beyond Indo-European languages. Another issue investigated here was whether it is feasible to apply standard experimental methods to under-represented languages within the field of psycholinguistics in rural areas. Psycholinguistic experiments are often carried out as lab research that requires ingenious experimental designs, advanced lab equipment such as eye-trackers, electroencephalography or even functional magnetic resonance imaging, large groups of experimental participants, and detailed statistical analyses. Our study has shown that it is indeed possible to conduct experiments in the fieldwork context although this has some challenges in comparison with running experiments in a standardized lab as will be shown later. In this regard, the current study uniquely examined the status of plural gender in Konso using behavioral methods, which also provides additional empirical and cross-linguistic evidence as far as bound gender-marked morpheme processing is concerned.

This section presents some of the issues encountered while conducting psycholinguistic behavioral studies in the rural area, outside of the standard lab in under-resourced remote area of East Africa specifically in southwest Ethiopia. The language we investigate is Konso; which belong to the Lowland East Cushitic

branch. In this and other Cushitic languages of the area, there is an interesting linguistic feature that nouns are classified into three gender classes and the third one (besides masculine & feminine) is arguably called plural gender. We employed a series of picture-word interference experiments to examine whether nouns in the plural gender group follow similar processing mechanism as nouns in the already accepted gender groups (masculine and feminine).

Conducting experiments on under-studied languages poses a number of challenges one needs to tackle. From designing up to running the experiments, there have been several challenges that I encountered during my fieldwork in Konso area. In what follows, a detailed discussion of some of these challenges and experiences of dealing with them will be presented hoping that such a discussion would help researchers who plan to undertake experiments on less-studied languages in rural areas. These include: the challenges of finding adequate number of monolingual speakers who are capable of doing computerized tasks; the remoteness of the area from the research institutions; and the challenges related to finding adequate stimulus materials and issues related with the development level of the languages investigated.

Coping with less accessible and less conducive environments

The fieldwork setting is different from the experimental lab where most of behavioral psycholinguistic experiments are typically undertaken. Most field-based psycholinguistic experiments are carried out in a remote area where there is no access to electricity and other facilities, and may be in a hotel room or a classroom where there is high humidity and external noise interference. Not to

mention that field-based psycholinguistics does involve travelling to rural areas where the languages are spoken. In most cases, these areas are located far from the research institutions. Konso, the language that are investigated in the present dissertation, are located over 7,000 kilometers away from Leiden University, where the research institute is located. This posed a challenge on designing the experiments and running pilot experiments since native speakers of Konso were not available near to the research institute. To run experiments, it required transporting the researcher and research equipment to these areas, in which there was no access to suitable experimental rooms and nor to electricity and Internet services. This means that when planning experiments on less-studied languages in rural areas, one needs to be aware of these circumstances and be prepared for tackling them in advance.

Konso speakers live in the remote area of southwest of Ethiopia. Konso people inhabit Konso Woreda6. Karat town is the center of Konso Woreda administration, where the experiments reported in the present dissertation were conducted. Karat is located about 600 kilometers south of Addis Ababa. Travelling to Karat from Addis Ababa takes one and half days by bus. Karat had limited access to electricity and Internet services, and there were no ventilated soundproof experimental rooms. The experiments were undertaken in relatively quiet rooms at a Konso High School. Regarding electricity, diesel power generators that belonged to the school was used.

6 Woreda is the smallest administrative unit besides Kebele in Ethiopia

Working with small number of participants

In many standardized psycholinguistic experiments that investigate grammatical gender/number processing, participants are usually university students who have tremendous experience in doing such experiments. These students are familiar with various experimental paradigms, arrangements, procedures, and apparatus and stimuli. This may make it easier and faster to run experiments with these participants though these practices have been criticized lately for creating opportunistic samples instead of random samples, as it should be. Moreover, they are easily accessible and willing to participate in the studies in exchange for course credits or some monetary compensation. Participants from less-studied languages, on the other hand, tend to be small in number with varied age and education levels with little or no experience of participating in psycholinguistic experiments. This may make it challenging to undertake experiments with such participants as it may require more time to access, select and train them in the field.

Absence of adequate number of suitable participants is one of the methodological challenges in working with less-studied languages. The speakers of the language, which are studied in the present dissertation, are small in number. According to the census of Central Statistical Agency of Ethiopia in 2007, Konso Woreda has a total population of 235,087. In Konso Woreda, Konso is the largest ethnic group (87.01%) and their language, Konso, was spoken as a first language by 86.64% of the inhabitants (Central Statistical Agency of Ethiopia, 1994). However, only 8.14% of the population was considered literate in Konso Woreda, of whom only 0.94% was in high school (Central Statistical Agency of Ethiopia, 1994). Although the experiments did not necessary require literacy skills,

participants of the experiments on Konso were recruited from high school students, which represented less than 1% of the population of Konso. The reason for choosing high school students was to have participants with comparable education level and age group that are able to take part in computerized experiments with little training. Although small percentages of native speakers of Konso are studying at high school level, it did not affect recruiting adequate number of Konso speakers. This is because, in Karat High School, where the participants of Konso experiments were recruited, there were more than 2,000 students, of whom the majority was from the Konso ethnic group. Although recruiting an adequate number of suitable candidates seemed to be challenging while working with less studied languages, going to the center of their village could help.

Moreover, although the majority of the students had not been exposed to linguistic experimentation and had no prior exposure to the tools used for the experiment, they had received very basic computer literacy and had some theoretical information as to how behavioral studies are administered. Introducing participants with tools was not a problem. Introducing participants with tasks was rather challenging and some of the participants often failed to follow the instructions. This posed a challenge during my first fieldwork, in which I had the standard procedure to follow. According to this procedure, first participants were presented with all the target pictures along with their intended names twice, in which participants were familiarized with pictures and encouraged to use the intended name of each picture. Then, each target picture was put on a screen for 350 ms. Here the presentation of pictures were accompanied by pink noise to acquaint participants with distractor elements. Finally, in the test phase proper, participants were requested to name pictures

as quickly and as accurately as possible using specific utterance formats such as bare noun or definite noun. They were also instructed to ignore simultaneously presented auditorily distractor words, which had the same or different gender as the target. The instructions were written in English and often interpreted in Amharic (a lingua franca) by the experimenter. Although participants could understand both English and Amharic, processing three languages at the same time might affect their performance and the results of the experiments. The absence of experience on the part of the participants was reflected in their struggle to disregard the distractor words. Some of the participants seemed to follow a strategy whereby they first listen to the distractor word and then start producing the target, which contributed to the overall slow naming latency as shown in Chapter 2. A few went on commenting, in the middle of the task, that there was a difference between the picture names and the audio they heard. All these factors indicate that the need to train participants more using a similar task as the test proper and the need to use oral instruction only in the target language throughout the experiment. This was what I did during my second and third fieldworks and there was a big difference as shown in Chapters 3, 4 and 5.

Dealing with the high level of bilingualism in the area is another important issue as far as the nature of participants is concerned. Bilingualism is the norm rather than an exception in a multilingual country such as Ethiopia. Konso is not an exception. In Konso, for example, although some people in the village are said to be monolingual, the vast majority either speaks or undestands more than one language. At Karat High School, like many other high schools across the country, English is the official language of education

whereas Amharic and Konso are the languages of interaction in and out of the school. Students use Konso natively at home and at school with family, with friends, and with Konso native speaker teachers. Combined, Konso is the dominant language in the school environment though frequent code switching with Amharic and occasional code mixing with some English words is not uncommon.

In a standard psycholinguistic experiment in the lab, participants are said to be native speakers (and even sometimes claimed to be monolinguals). We all are exposed to languages other than our native tongue in one or the other way in our life. In this sense, it is not easy to recruit pure monolingual speakers. The same holds for Konso speakers, most people know more than their native tongues. This could also be the case even for those speakers in remote Konso villages who speak only Konso all the time but may go to the market and trade with Amharic or other language speakers. These so-called monolingual speakers are in effect exposed to other languages of the area and/or Amharic (the lingua-franca), and even understand and speak them to some extent whenever they had no other option but speak the other language so as to content with the communicative demands of themselves and others. The question, then, is whether the selected students speak Konso natively and primarily? In other words, was Konso their dominant language?

In order to address the aforementioned questions, let us explain how the selection of participants was carried out. Although, we observed that almost all students speak Konso, their level of proficiency varied depending on possibly the frequency of their language use and where they come from (e.g. rural vs. urban areas). We learnt that some of them who had lived in the urban areas for many years tend to use more and more Amharic. Sometimes, some of

these students speak Konso with several Amharic words. In order to select participants who predominantly and actively speak Konso, the selection was first made by the school director and student coordinator, who themselves are native speakers of Konso. We also administered a quick test of naming basic vocabulary items afterwards. Those students who are selected by the school director and student coordinator, and who have passed the quick test of naming basic vocabulary items were selected to participate in the experiments. Their hearing and vision were intact. The main reason for the relatively careful selection procedure was that some students who did not speak the language superbly still wanted to participate in the experiments due to possibly the exoticness of the experimental paradigm and eagerness to be tested, to see what was going on during the experimentation, and due to the monetary compensation. Thus, one needs to be cautious when selecting participants for experiment in a multilingual setting similar to Konso area. From the perspective of the language proficiency, not everyone who speaks the language is eligible to participate in experiments. They should have relatively high level of mastery and they should use the language as their primary means of communication. This is one of the possible challenges researchers of under-studied languages could face. Speakers of less-studied languages tend to speak several languages in addition to their native-tongue and sometimes they speak the other language more frequently/actively than the target language.

Dealing with scarcity of stimulus materials

In relation to language and stimuli, the absence of standardized writing system, corpus data and normative data could pose a challenge during designing experiments in less studied languages.

Cultural difference with the Western world may also reduce the possibility of borrowing from the standardized pool of stimulus materials developed for other languages.

Konso does not have standardized writing systems and hence we employed auditory distractors instead of written distractors. During the first fieldwork to the Konso area, the written instruction of the experiments was provided in English since English is the language of education, and communication with experimenter was carried out in Amharic (the national lingua franca). This means that students had to process these two languages in addition to the target language while doing the experiment, which may affect their performance and the results of the experiment (see Chapter 2 of this dissertation). In the second and third fieldworks, some measures were taken to minimize the interference of other languages except the language being investigated. These measures include the use of a native speaker assistant; the use of written experimental instruction in a language they fully understand, i.e. Amharic instead of English; the use of auditory instruction in the target language rather than written instruction in other languages; and the use of other languages during the experiment were minimized. These measures along with other manipulations contributed in detecting the effects observed in Chapters 3, 4 and 5.

The other issue regarding the factor language and stimuli is that the absence of linguistic corpus data in most of less-studied languages. In Konso, the language investigated in the present dissertation, no corpus data were available to determine, for example, how frequently words occur in the language. To fill the gap of corpus data, native speakers were requested to rate the stimulus materials for frequency, familiarity, imageability and so on. In Konso, *A grammar*

of Konso (Orkaydo, 2013) and *Konso Dictionary* (Black & Shako, 1973, the printed version of this manuscript was prepared by Mous in 2005) were used as sources for stimuli. Orkaydo, a native speaker and linguist, participated in selecting stimulus materials in Konso as well. Attempts were made to use the word list from Iraqw so as to find additional stimulus material in Konso. Lack of adequate stimulus materials, being one of the challenges for undertaking experimental works in less-studied languages, can be tackled by using the corpus data from related languages, doing linguistic fieldwork ahead to collect additional linguistic data, and working with linguists and consultants of the language.

The cultural difference between the speakers of less-studied languages and well-studied languages of the Western world may not allow to borrow stimuli from the standardized stimulus materials, which are developed based on the culture of the Western world. The culture of Konso speakers are different from the culture of the Western world in many ways, and daily materials used by Konso people are not the same as most of the Western world. This means that words and the concepts used in their daily life are different in the two cultures. This means that researchers, who work on less-studied languages, have to make sure that the stimuli they use reflect the culture of the speakers of the language being investigated. This can be achieved by learning the culture of the speakers of the language and by using the intuition of speakers themselves. In my experience, working on Konso, I tried to familiarize myself with the culture of the people by paying attention to the daily objects that were used by the Konso people and taking pictures of them, by visiting their cultural museums, and by asking native speakers to check whether stimuli were part of their daily life and replacing

those stimuli that were less appropriate by pictures taken from daily objects in the area.

Despite the challenges, we believe it is worth undertaking psycholinguistic experiments in less-studied languages as they shed more light in understanding human language processing better. In this respect, we shed more light into the evolving discipline of field-based psycholinguistics. Thus, we promote the expansion of field-based psycholinguistic investigations in less-studied languages as they provide additional empirical and cross-linguistic evidence and expand our knowledge of language processing mechanisms.