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

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8. Summary

This thesis presents evidence obtained through a variety of picture naming tasks to investigate how native speakers of Konso process grammatical gender and number features. Gender and number features are characterized by an unusual overlapping in Konso and some other Cushitic languages. This intriguing property of gender and number is reflected on the behavior of the third agreement class, often called plural gender, in addition to masculine and feminine gender. This third agreement class (plural gender) refers to a class of nouns that require plural agreement forms even when they represent single entities. An ongoing debate in the linguistic literature concerns the status of this plural gender class for those languages that have this feature. Currently two basic hypotheses are contrasted. The *plural-as-a-number* feature hypothesis proposes that there is no need of postulating a third gender class for nouns taking plural agreement when they have single-reference as they can be analyzed as a number value with features indicating irregularity in number agreement. By contrast, the *plural-as-a-gender* feature hypothesis proposes that plural constitutes a gender feature of its own right since gender and number are two independent agreement systems and adjectives show separate agreement for both categories. This thesis provides psycholinguistic evidence for the analysis of this plural agreement class as a value of gender and not number by applying the picture-word interference paradigm to Konso, a Lowland East Cushitic language. While most psycholinguistic studies on the process of grammatical gender and number features have been limited to a handful of European languages in well-equipped laboratories, this

thesis has extended the study onto Cushitic languages in under-resourced semi-rural areas of Ethiopia. One of the main focuses of this dissertation is the role of field-based psycholinguistics for cross-linguistic investigation of gender and number features during speech production. Importantly, the thesis provides additional evidence as to how bound gender-marked morphemes are processed, one of the contentious issues in the current literature on theories of speech production.

Chapter 2 employed the picture-word interference task to examine how grammatical gender is processed during speech production in Konso. Previous studies in gender-marking languages have repeatedly demonstrated that grammatical gender could affect language processing. For example, in a picture-word interference task, where participants are requested to name pictures while ignoring distractor words accompanying the pictures, German and Dutch speakers were slower to produce a picture when the picture and the distractor have a different gender compare to when they have the same gender (see Schriefers, 1993; Caramazza et al., 2001; Schiller & Caramazza, 2003; Schiller & Costa, 2006; Schriefers & Teruel, 2000). This effect, where naming times of a picture are faster when the name of the picture and a distractor has the same gender, often called a gender congruency effect. Schriefers (1993) was the first to report the gender congruency effect in Dutch noun phrase production.

In Konso, nouns are said to be classified into three gender classes, the third being plural gender besides masculine and feminine (Orkaydo, 2013). As stated earlier, it is unclear whether plural behaves as a gender or as a number feature and how plural gender nouns are processed online during speech production. Chapter 2

presents two picture-word interference experiments, which examined whether or not nouns that have this third value, plural, show the same pattern of effect from gender-congruent/-incongruent distractor words that we see in Dutch and German. In the first experiment, participants named pictures by producing a bare noun while ignoring a simultaneously presented distractor noun. An overall congruency effect of 19 milliseconds (ms) was found (gender-congruent condition faster than gender-incongruent), which was significant only in the subject analysis of the target gender. In the second experiment, participants produced nouns with a gender-marked definite marker suffix. A non-significant 13 ms overall congruency effect was observed. The results of the two experiments fail to reach significance and hence it was impossible to draw strong conclusions.

Two possibilities are conceivable for the failure to obtain significant congruency effects in Konso. One possibility is that although all possible precautions were taken in the absence of norms in the language to control for factors such as word frequency, familiarity, typicality and age of acquisition, it could be the case that the effect of congruency is masked due to some methodological flaws in connection with the choice of stimuli and the design of experiments. The fact that the overall naming latency in both experiments was very slow (above 1,000 ms on average, which is much longer than most previous studies) may have masked the effect of congruency. Participants also performed very slowly in naming certain nouns irrespective of their distractor conditions possibly due to semantic interference within different target pictures and/or different distractor words, and the absence of clarity in the pictures used. Also, in Experiment 1 (bare noun naming), the number of distractors in the incongruent condition was twice the number of

distractors in the congruent condition as there were three gender types in the experiment. The motivation for this was to examine the effect of plural gender nouns independently as targets and as distractors vis-à-vis the other gender classes, which are recognized as values of genders. This might have caused the unintended impact of masking the effect of congruency in the experiment since the total number of distractors in the congruent condition was half the number of distractors in the incongruent condition. Similarly, in Experiment 2 (definite noun naming), distractor words were presented with their gender-marked definite suffixes, which might have an impact on the participants' responses as it may have led them to focus on form similarity between the target and the distractor.

The other possibility is that there is no congruency effect either in bare noun naming and/or in bound gender-marked morpheme production. Previous studies in Dutch demonstrated that there is no congruency effect in bare noun naming (see La Heij, Mak, Sander, & Willeboordse, 1998) as the gender feature is selected only when needed for production (see Levelt, Roelofs, & Meyer, 1999). With respect to the absence or the presence of gender congruency effect in bound gender-marked production, the evidence accumulated this far is rather mixed and inconclusive. On the one hand, congruency effect is limited to the production of noun phrases with gender-marked freestanding morphemes and not to the production of noun phrases with gender-marked bound morphemes (see Schiller & Caramazza, 2003; Costa, Kovacic, Fedorenko, & Caramazza, 2003; Schiller & Costa, 2006). On the other hand, the congruency effect is observed in the production of noun phrases with gender-marked freestanding morphemes as well as in the production of noun phrases with gender-marked bound morphemes (see Schriefers, 1993; Bordag &

Pechmann, 2008). This means that whether there is no gender congruency effect in the language or the effect of congruency may have been masked, and whether plural gender is a proper gender value or a value inherent to the number feature requires additional experiments. Additional experiments were undertaken in Konso with necessary modifications that involve avoiding and/or replacing defect stimuli (e.g. semantically related pictures and/or distractors, and less clear pictures), using gender-marked elements only for target utterances and bare nouns for distractors, utilizing equal number of distractors between congruent and incongruent conditions, additional training for participants to improve their performance. The results of these additional experiments are reported in Chapter 3.

In Chapter 3, two picture-word interference experiments were reported. In Experiment 1, Konso speakers produced nouns with gender-marked definite suffixes while ignoring auditory distractor words. Naming latencies were significantly shorter when targets and distractor words matched in gender, compared to when they did not. In Experiment 2, participants responded to target pictures by producing one of two sentence types with gender-marked inflections, either with or without overt subject. Overall, compared to the gender-congruent condition, gender-incongruent distractor words slowed down the naming latencies of the target pictures significantly. The fact that this gender congruency effect was also observed for the production of plural gender nouns provides evidence that plural gender is processed similarly to masculine and feminine. This supports the analysis of plural as a value of gender. The results also demonstrate that a congruency effect can be obtained in the production of bound gender-marked morphemes, which is consistent

with the competition hypothesis for the selection processes of bound morphemes.

Chapter 4 broadened the investigation of the status of plural gender with the inclusion of regular multiple-reference number into the experiments. In other words, Chapter 4 investigates whether the so-called plural gender is processed in the same as the other genders (masculine or feminine), which are recognized as values of gender, or in the same way as regular multiple-reference number in picture-word tasks. To investigate whether plural is processed as gender or number using picture-word tasks; pictures of one or two objects were presented with a single-reference or a multiple-reference distractor that has the same or different gender as the targets. In Experiment 1, participants responded to the pictures using gender-marked definite nouns; and in Experiments 2 and 3, they responded by producing a sentence with overt subject and null subject, respectively. 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. It also indicates that the gender congruency effect occurs at the phonological encoding level, and the selection of gender-marked suffixes involves competitive processes.

As stated earlier, whether the selection of bound gender-marked morphemes involves competitive processes is an ongoing debate in the speech production literature (see, Jescheniak, Schriefers, &

Lemhöfer, 2014; Janssen, Schiller, & Alario, 2014). The results reported in Chapters 3 and 4 reveal the presence of a gender congruency effect in the production of bound gender-marked morphemes. This does not necessarily indicate that bound morphemes are selected competitively. This is because the effect of congruency can be accounted by both competitive (competition between varied gender-marked forms in the incongruent condition delays response times) and noncompetitive (priming between convergent gender-marked forms in the congruent condition speeds up response times) selection models. In this respect, a simple picture naming task, which does not involve distractors, is the preferred paradigm for determining whether bound morphemes are selected competitively.

Chapter 5 employed a simple picture naming task to examine whether bound gender-marked morphemes are selected competitively in Konso, in which most of gender-marked elements are bound morphemes. In two experiments in Konso, participants named pictures of one or two objects by producing a single-reference or a multiple-reference gender-marked utterance 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 gender-marked morphemes was equally often whereas in Experiments 2a and 2b two-thirds of the responses required the converging form (the suffix *–n*) in the single-reference and multiple-reference trials. 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 (Experiment 1a). When the

proportion of responses with the converging forms in the single-reference and multiple-reference trials increased to two-thirds (Experiments 2a & 2b), this cost effect disappeared and turned into a benefit effect for multiple-reference trials for which single-reference and multiple-reference suffixes were identical. The finding of multiple-reference costs for diverging single-reference and multiple-reference gender-marked definite nouns of Experiment 1a in Chapter 5 goes with the prediction of the competitive model, which 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 (see Jescheniak et al., 2014). These patterns of results suggest that bound gender-marked morphemes in Konso are selected in a competitive fashion. This is in accordance with theories of language production that assume gender-marked morphemes are selected competitively (see, Schriefers, 1993; Schriefers, Jescheniak, & Hantsch, 2005; Lemhöfer, Schriefers, & Jescheniak, 2006; Bordag & Pechmann, 2008; Jescheniak et al., 2014).

Another issue investigated in this thesis 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 conducted 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 it has some challenges compared to running

experiments in a standardized lab. Conducting experiments on under-studied languages in rural areas requires, among other things, coping with less accessible and less conducive environments, working with small numbers of participants, and dealing with scarcity of stimulus materials.

Overall, 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 noncompetitive selection mechanism. The studies presented in the 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.