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

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CHAPTER 4

4. Picture-word tasks support plural as a category of gender instead of number in Konso

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Abstract

Konso, a Cushitic language, has a third gender class sometimes called "plural" gender since it takes the same agreement form as the third person multiple-reference (plural) number even for words that refer to a single entity. We investigated whether this feature ("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.

4.1. Introduction

This study examines how grammatical gender and number, specifically how the so-called plural gender, are processed online during speech production in Konso, a Lowland East Cushitic language of Ethiopia. The study also provides additional evidence for two theoretically interesting issues: the locus and the scope of the so-called gender congruency effect.

Speech production generally involves multilevel processes of conceptualization, formulation and articulation (Levelt, 1989). As speakers, we first determine what to say at the highest message-level representation (conceptualization). Then, we translate this conceptual representation into a linguistic form (formulation). Finally, we transform this linguistic form into utterances that involve detailed phonetic and articulatory planning (articulation). To produce a word, for instance, we need to access its conceptual, syntactic and phonological information from our mental lexicon. To produce phrase level utterances, we may also need to access gender, number and other grammatical elements of a word. For instance, in Konso each noun has a specific grammatical gender. However, gender is not explicitly marked on the noun itself. Gender is expressed in terms of agreement outside the noun, for example, by definite marking or verb inflections. The noun's gender determines the form of the definite marking and verb inflections, and hence they are syntactically dependent on the noun. This means that a word´s syntactic information, such as its gender, has to be accessed in order to produce gender-marked elements, such as definite nouns or sentences in Konso.

Research on the syntactic processing of gender in speech production has received a reasonable attention after Schriefers' (1993) pioneering work on Dutch noun phrase production (NP), in which he used the picture-word interference (PWI) task to examine the syntactic processes involved in selecting gender-marked determiners (Experiment 1) and adjectival inflection (Experiment 2). In the PWI task, participants respond to a picture while ignoring a distractor word presented either visually or auditorily. In both Experiments 1 and 2, Schriefers observed significantly longer naming latencies in the gender-incongruent condition compared to the gender-congruent condition. 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 (*competitive grammatical feature selection hypothesis*). 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.

Miozzo and Caramazza (1999) pointed out that the congruency effect might stem from lexical competition between determiner forms at the phonological level instead of at the syntactic level. They failed to observe a gender congruency effect in Italian and the effect was not found in other Romance languages, either (e.g. Costa, Sebastinan-Galles, Miozzo, & Caramazza, 1999, in Catalan and Spanish; Alario & Caramazza, 2002, in French). Note that in all these Romance languages, unlike the determiner system in Dutch, the selection of the appropriate determiner form is not determined by a noun's gender alone, but it also depends on the local phonological environment wherein the determiner occurs. This will make the

selection of the determiner in these languages a relatively late process in NP production because the production system has to wait with the selection of the determiner form until the phonological context is known. As a result, a vital cross-linguistic distinction was made between Dutch and other Germanic languages on the one hand where the so-called gender congruency effect has been observed (*early selection languages*); and Italian and other Romance languages on the other where such an effect has not been found (*late selection languages*; Miozzo & Caramazza, 1999; Caramazza, Miozzo, Costa, Schiller, & Alario, 2001). This shows that language-specific features affect the gender congruency effect, which suggests the necessity of examining further the cross-linguistic differences in a gender and other grammatical feature selection processes. In this regard, the present study provides additional evidence as to whether the gender congruency effect reflects competition at the syntactic (abstract gender nodes) or at the phonological level (word forms) in Konso.

Miozzo and Caramazza (1999) were the first to propose that the gender congruency effect reflects processing at the phonological level and not at the syntactic level following their failure to find the effect in Italian. Their initial argument was that the effect would have to be visible in the bare noun production as well if the congruency effect mirrors competition between grammatical features at the grammatical encoding level and not between the word forms at the phonological encoding level. In support of this position, La Heij, Mak, Sander, and Willeboordse (1998) failed to observe a gender congruency effect in bare noun naming although they found the effect in determiner plus noun production in Dutch. Levelt et al. (1999), however, maintained that grammatical gender is selected only when required for production and thus the absence of a gender

congruency effect in bare noun naming does not undermine the *competitive grammatical feature selection hypothesis*. The selection of the gender feature is not needed in bare noun naming in Dutch since determiners are not part of the utterance.

It is Schiller and Caramazza (2003) who provide stronger evidence in support of the proposal that the congruency effect occurs at the phonological encoding level instead of at grammatical encoding level. They investigated 'single-reference' (singular) and 'multiple-reference'2 (plural) NP productions in German and Dutch. These languages show interesting property that determiners are gender marked in the single-reference but not in the multiple-reference. Thus, although there are three different forms in the single-reference in German (*der, die* & *das*) and two (*het* & *de*) in Dutch, there is only one definite article form for the multiple-reference nouns (*die* in German & *de* in Dutch).

Schiller and Caramazza carried out a number of experiments and they consistently reported the congruency effect only for single-reference NPs and not for multiple-reference NPs. They hypothesized that the congruency effect should have been observed both in the single-reference and multiple-reference NP productions if the congruency effect occurred at the level of grammatical feature selection (*Gender Selection Interference Hypothesis*, GSIH). According to Schiller and Caramazza, the fact that the effect is found only in the single-reference but not in the multiple-reference context supports the position that the congruency effect occurs at the

2 To avoid confusion with the use of plural as a value of gender, we will consistently use the terms 'single-reference' and 'multiple-reference' to refer to the number values representing single reference nouns (singular number) and multiple reference nouns (plural number), respectively, following Hayward (1981, 2004) and Mous (2008).

phonological encoding level (*Determiner Selection Interference Hypothesis*, DSIH). This means that, in the production of single-reference NPs, determiner forms and not their abstract gender nodes compete for selection. In the production of multiple-reference NPs, however, there is no such competition as there is only one determiner form available for selection, and therefore no congruency effect was obtained. We examine if this is also the case in a genetically and geographically unrelated language, Konso.

As will be shown later, similar to German and Dutch determiners, Konso's gender-inflected definite markers on nouns and gender markers on verbs are identical for one gender class in the single-reference and multiple-reference, but differ for the other gender classes. Thus, although Konso has two different definite markers in the single-reference (*–si?* & *–sini?*), it has only one definite form for multiple-reference (*–sini?*). In the subject agreement on the verb, Konso has three different gender-marking suffixes in the single-reference. The three gender markers are *–t* for feminine, *–ay* and *–n* for masculine and plural gender, respectively. Nonetheless, it has only one verb ending (*–n*) in the multiple-reference for all, which corresponds with that of the so-called plural gender of the single-reference. Unlike the determiner forms in German and Dutch, all the gender-inflected forms in Konso are suffixes that occur at the end of the definite noun or the verb. The present research also investigates whether the gender congruency effect is observed in utterances ending in gender-marking suffixes in a language where gender information is solely provided by a suffix (a bound morpheme).

Previous studies on the production of gender-marking bound morphemes provide inconsistent evidence and the question regarding the retrieval mechanisms of gender-marked inflections are not

adequately answered yet. Schriefers (1993) observed a congruency effect in the production of gender-marked adjectives and nouns (Experiment 2) in Dutch. Similarly, Bordag and Pechmann (2008) have obtained effects of gender congruency in the production of gender-marked numerals (bound morphemes) plus noun in Czech. On the other hand, Schiller and Caramazza (2003) did not observe an effect of gender congruency in gender-marked bound morpheme production in either Dutch or German. The absence of a gender congruency effect in bound morpheme production was also reported in Croatian (Costa, Kovacic, Fedorenko, & Caramazza, 2003). Relatedly, Schiller and Costa (2006) found a significant congruency effect only in the production of freestanding gender-marked morphemes (a definite determiner plus noun) but not in bound gender-marked morpheme production (indefinite determiner plus noun) in German.

On the other hand, using a different experimental paradigm, namely the simple picture naming (SPN) task that involves no distractors, Schriefers, Jescheniak, and Hantsch (2005) have demonstrated that bound morphemes involve competition. In the SPN task, participants produce single-reference or multiple-reference NPs with gender-marked elements. Schriefers et al. found a gender by number interaction effect in German when participants produced an adjective followed by a gender-marked bound morpheme plus a noun (Experiment 3), which indicates that the selection of gender-marked bound morphemes takes place in a competitive manner (see also Schriefers, Jescheniak, & Hantsch, 2002; Janssen & Caramazza, 2003; Lemhöfer, Schriefers, &

Jescheniak, 2006)3. In the present study, however, we use PWI tasks to investigate whether or not gender congruency effects are present in Konso bound morpheme production.

As the above review of previous research shows, there clearly is a lack of consensus among researchers in the field regarding the locus and the scope of the gender congruency effect. The question of whether the congruency effect occurs at an abstract lexical level (Schriefers, 1993; Levelt et al., 1999) or a word form level (Miozzo & Caramazza, 1999; Caramazza et al., 2001), and whether it can be observed in bound morpheme production (Schriefers, 1993; Schriefers, Jescheniak, & Hantsch, 2005; Bordag & Pechmann, 2008) or not (Schiller & Caramazza, 2002, 2003; Costa et al., 2003; Schiller & Costa, 2006) have not yet been resolved. Furthermore, the evidence accumulated so far about the cognitive representation of gender and number features is largely based on Germanic and Romance languages, and is in need of cross-linguistic confirmation from non-Indo-European languages. The present study investigates the above-mentioned issues in an understudied language within experimental psycholinguistics: Konso, which has a unique grammatical feature (plural as a value of gender) that provides further insight into the cognitive processes of gender and number features.

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3 The matter of whether or not selection of gender-marked bound morphemes takes place competitively was part of the discussion in recent works by Jescheniak, Schriefers, and Lemhöfer (2014), as well as Janssen, Schiller, and Alario (2014). Jescheniak et al. argue that the available data from the SPN task support the view that the selection of gender-marked closed-class elements (including bound morphemes) follows competitive processes. In a response to this argument, Janssen et al. argue that this conclusion is overtly optimistic and they suggest that the pattern of the available and new data is less consistent than what has been described by Jescheniak et al. when these data are analysed from a different and more appropriate viewpoint, namely analysing the Number (single-reference vs. multiple-reference) by Format (NP vs. bare noun) interactions for each gender class separately.

Konso is a Lowland East Cushitic language spoken in southwest Ethiopia. In Konso and some other related Cushitic languages, nouns are categorized into three gender classes according to the agreement they trigger on the verb (Mous, 2008). These three gender classes are feminine (F), masculine (M) and plural (P) genders (Hayward, 1979; Mous, 2008). The use of the term plural as a value of gender is not uncommon in Cushitic language studies (e.g. Hayward, 1979, for Bayso but see also Corbett & Hayward, 1987; Pillinger & Galboran, 1999, for Rendille; Savà, 2005, for Ts'amakko; Mous, 1993, 2008, for Iraqw; Orkaydo, 2013, for Konso). This analysis is based on the fact that nouns in this class trigger the same agreement form as third person multiple-reference irrespective of their number values (single-reference or multiple-reference).

Nevertheless, the analysis of 'plural' as a value of gender has been challenged and an alternative analysis has been proposed (Corbett & Hayward, 1987; Corbett, 1991, 2005, 2006, 2012). This alternative analysis is based on typological and theoretical studies on gender and number features, which effectively eliminate plural as a gender feature and treat it as a number feature that shows irregularity in number agreement. According to Corbett (2012), nouns that take plural agreement for single-reference number instead of the expected agreement, such as *iloo* a word in Bayso for 'eye', should be lexically marked as exceptions similar to *pluralia tantum* nouns. The reason is that analyzing plural as a value of gender is taken to be a challenge for the typology of morphosyntactic features, which is based on the general principle of "exclusiveness — a value belongs to just one feature" (Corbett, 2012, p. 223). Accordingly, gender cannot take plural as its value and thus the analysis of plural as a

value of gender is ruled out (for details see Corbett, 2012, pp. 223-233).

In this study, we put the aforementioned two competing analyses (*plural-as-a-gender feature vs. plural-as-a-number feature*) to test using the picture-word interference (PWI) paradigm. In other words, we investigate whether the so-called plural gender is processed in the same way as the other genders (masculine or feminine), which are already accepted as values of gender in the language, or in the same way as regular multiple-reference number during on-line speech production. If the so-called plural gender indeed represents a gender feature, it should behave similarly as the other genders. If, however, it is rather a value of number, then it should behave like regular multiple-reference number.

Cushitic is a branch of the Afro-asiatic language family that hosts more than 30 languages, of which at least 11 arguably have the so-called plural gender in addition to feminine and masculine gender (Mous, 2008). We choose Konso to investigate whether plural is a value of gender or number for practical reasons. Among other things, there are the availability of relatively large wordlist (stimuli) and an adequate number of non-derived plural gender nouns in the language (245 masculine, 135 feminine, and 96 plural gender nouns; Orkaydo, 2013). Furthermore, a detailed analysis of the grammar of the language is available (Orkaydo, 2013) and a relatively large number of native Konso speakers are accessible (250,000 speakers, Central Statistics Agency of Ethiopia, 2009). Moreover, previous experimental work has shown evidence for the presence of a so-called gender congruency effect in the language (Tsegaye, Mous, & Schiller, 2013; submitted).

According to Orkaydo (2013), Konso distinguishes three genders in the noun system, i.e. feminine, masculine, and plural. 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 (*e.g. *lafta-si? i=akk-am-**t**-i* /bone-DEF.M/F 3=show-PAS-3F-PF/ 'The bone was shown'). Masculine nouns take the same agreement form as the third person male subject, marked by the suffix *–ay (*e.g. *ɠoyra-si? i=akk-am-**ay*** /tree-DEF.M/F 3=show-PAS-PF.3M/ 'The tree was shown'). Plural gender nouns take the same agreement form as the third person multiple-reference subject, marked by the suffix *–n* (e.g. *kosaa-sini? 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 (Orkaydo, 2013, p. 60). For instance, *i=akk-am-**t**-i* /3=show-PAS-3F-PF/ 'She was shown'; *i=akk-am-**ay*** /3=show-PAS-PF.3M/ 'he was shown'; *i=akk-am-i-**n*** /3=show-PAS-PF-3**P**/ 'They were shown'.

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').

Number is usually thought of prototypically inflectional category based on, among others, the criteria of productivity, semantic

regularity and obligatoriness. The design of experiments reported in this chapter took into account this widespread notion. However, this assumption has been questioned and an alternative analysis that treat number as a derivational category has been proposed for Cushitic languages (Mous, 2008). Thus number is said to be a derivational category in Konso and it involves the derivation of multiple-reference nouns from non-derived single-reference nouns and to some extent the derivation of single-reference nouns from non-derived multiple-reference nouns (Orkaydo, 2013). Attaching multiple-reference suffixes, reduplicating the base-final consonant and geminating the last consonant of the base mark the derivation of multiple-reference (Orkaydo, 2013). All of these derivational processes impose plural gender agreement on the verb in the language (Orkaydo, 2013). Although there are five multiple-reference suffixes in Konso, *-ɗɗaa* and *-ɗaa* are the most productive ones (Orkaydo, 2013), and they both are used in the production of the multiple-object picture naming condition of the experiments reported in the present research. 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 this study, we report a series of experiments with native speakers of Konso in which we examined whether the so-called plural gender is processed as a gender or a number feature and whether gender-marked inflections are subject to competitive process. The study also provides additional evidence as far as the locus of the congruency effect is concerned, i.e. whether it occurs at the phonological level or at syntactic level. In Experiments 1a and

1b, participants named the pictures by means of a single-reference or a multiple-reference definite noun (noun + gender-marked definite suffix) while ignoring a simultaneously presented auditory distractor with single-reference (Experiment 1a) or multiple-reference (Experiment 1b). In Experiments 2a and 2b, they responded to one (single-object) or two (multiple-object) pictures by using a sentence consisting of an overt subject (name of the picture) and a verb (*iakkam*-M/F/P suffix 'was/were shown') while ignoring a simultaneously presented auditory distractor with single-reference (Experiment 2a) or multiple-reference (Experiment 2b). Experiments 3a and 3b are the same as Experiments 2a and 2b, respectively, with the exception of the utterance format; here they produced a null subject sentence with only a gender-inflected verb (*iakkam*-F/M/P suffix 'she/he/they was/were shown').

Thus, in our experimental scenarios, 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*, on the other hand, 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 genders. Similarly, the *competitive grammatical feature selection hypothesis* predicts a gender congruency effect in both single-object (pictures of one object) and multiple-object (pictures of two objects) picture naming conditions. Presence of the effect only in the single-object picture naming condition, where there are distinct markers for all, and absence of the effect in the multiple-object picture naming condition, in which there is only one form for all, would support the hypothesis

that the congruency effect reflects processes at the phonological encoding level rather than at the grammatical encoding level (*competitive phonological form selection hypothesis*). The experiments reported in this study can also provide evidence in support of the bound morpheme competition hypothesis if any of them yield congruency effects since all gender-marked elements are bound morphemes in Konso.

4.2. Experiment 1: Definite noun naming

In Experiment 1, participants named pictures of one object (single-object picture naming condition) or two objects (multiple-object picture naming condition) by using either a single-reference definite noun or a multiple-reference definite noun, while ignoring simultaneously presented auditory distractors. Distractor words were single-reference nouns in Experiment 1a whereas they were multiple-reference nouns in Experiment 1b (see Table 14 for examples of utterances). *The plural-as-a-gender hypothesis* predicts that relative to multiple-reference definite nouns production (e.g. *furaa-ɗɗaa-sini?* /key.P-MULT-DEF.P/ 'The keys' vs. *kuta-ɗɗaa-sini?* /dog.M-MULT-DEF.P/ 'The dogs') the production of single-reference definite nouns (e.g. *furaa-sini?* /key.P-DEF.P/ 'The key' vs. *kuta-si?* /dog.M-DEF.M/F/ 'The dog') should yield a gender congruency effect. If we do find a gender congruency effect in the production of single-reference definite nouns where the selection of definite suffixes is governed by the target´s gender, but not in the multiple-reference definite nouns production where the definite suffix is identical for all, this would also suggest that the gender congruency effect occurs at the word form level instead of at lexical syntactic level, and gender-marked bound morphemes are subject to competitive processes.

Table 14 Examples of utterances in Experiment 1a and 1b

	Target picture name	Target Gender	Utterance	Distractor word		
				Distractor Condition	Experiment 1a (Single-reference)	Experiment 1b (Multiple-reference)
Single-reference						
	furaa	Plural	*furasini?*			
	'key'		'The key'	Congruent	*aataa* 'culture'	*aataɗɗaa* 'cultures'
				Incongruent	unta 'grain'	*untaɗɗaa* 'grains'
				Neutral	Pink-noise	Pink-noise
	kuta	Non-plural	*kutasi?*			
	'dog'		'The dog'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaɗɗaa* 'cliffs'
				Incongruent	elalaa 'cowrie'	elalaɗɗaa 'cowries'
				Neutral	Pink-noise	Pink-noise
Multiple-reference						
	furaɗɗaa	Plural	*furaɗɗasini?*			
	'keys'		'The keys'	Congruent	*aataa* 'culture'	*aataɗɗaa* 'cultures'
				Incongruent	*unta* 'grain'	*untaɗɗaa* 'grains'
				Neutral	Pink-noise	Pink-noise
	kutaɗɗaa	Non-plural*	*kutaɗɗasini?*			
	'dogs'		'The dogs'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaɗɗaa* 'cliffs'
				Incongruent	elalaa 'cowrie'	elalaɗɗaa 'cowries'
				Neutral	Pink-noise	Pink-noise

*The gender value of the target in multiple-reference and all distractors in Experiment 1b would be plural according to the position that all multiple-reference suffixes impose plural gender.

Method

Participants

Experiment 1a had 24 participants and Experiment 1b had 25 participants. All participants were native Konso speaking students from Karat High School, Karat being the major town in the Konso speaking area of Ethiopia. They were paid for their participation. All participants had normal hearing and vision.

Materials

Twenty-four pictures corresponding to non-derived Konso nouns were selected for naming. A single instance of a picture was presented during the single-object picture naming condition whereas two instances of a picture were presented side by side during the multiple-object picture naming condition. Table 14 contains examples of utterances that were used in this experiment. For instance, following the presentation of a key in one trial (single-object picture naming condition), participants should produce *furasini?* 'the key' but they should say *furaɗɗasini?* 'the keys' when two pictures of a key were presented side by side in another trial (multiple-object picture naming condition).

Each picture was presented with a gender-congruent and a gender-incongruent distractor word as well as a gender-neutral pink noise— this was to make sure participants were processing the distractor words. Target picture names were semantically and phonologically unrelated to their respective distractor words. Distractor words were presented in their single-reference form in Experiment 1a whereas they were presented in their multiple-reference form in Experiment 1b. The complete list of target pictures

and distractor words can be found in Appendix A. Pictures were simple black line drawings of everyday objects presented on a white background. Distractor words were presented auditorily at the same time as the target pictures (SOA = 0 ms).

Each experimental picture occurred once in the single-object and once in the multiple-object picture naming condition, producing the following distribution of definite suffixes: 36 occurrences of *–si?* and 108 of *–sini?* (36 occurrences of *–sini?* from single-reference definite noun with plural gender nouns and 72 of *–sini?* from the multiple-reference definite nouns from both plural and non-plural gender classes). To equate the probability of occurrence for the two definite suffixes, we added another 24 filler items, half with names of masculine gender and half with names of feminine gender. Each of these filler items, along with its distractor word, occurred twice in a single-object naming condition. As a result, both definite suffixes occurred an equal number of times for the whole set of items, 108 times each.

Design

There were three crossed factors: the two-level factor Target Gender (plural vs. non-plural), the two-level factor Distractor Condition (gender-congruent vs. gender-incongruent), and the two-level factor Target Number (single-reference vs. multiple-reference). All factors were tested within participants (F1). Target Gender was tested between items (F2), and Distractor Condition and Target Number were tested within items (F2).

Procedure

Participants were tested individually in a quiet room. They sat in front of a 15.6-inch DELL laptop screen at a viewing distance of 60

cm. Pictures appeared in the center of the screen. On each trial, a fixation point (a plus sign) appeared for 500 ms followed by the picture and the distractor word. Participants were instructed to focus on the fixation point and to name the target picture as quickly and as accurately as possible with the appropriate definite noun in Konso.

Picture and distractor word were presented simultaneously, and disappeared from the screen after a response was provided and the voice key was triggered. Then, the next trial was started automatically. The next trial also began automatically if no response was recorded within two seconds. If the voice key was triggered wrongly, if an incorrect gender-marked suffix or incorrect picture name was used, or the response contained a speech error or it exceeded the time limit of two seconds, then the response was considered invalid. Invalid responses were not included in the statistical tests. The E-prime software package was used for designing and presentation of trial sequences, and a serial response box was used to measure the reaction time from picture onset to utterance onset.

Results

Three-hundred thirty-four (8.3%) observations in Experiment 1a and 362 (8.6%) observations in Experiment 1b had naming latencies smaller than 350 ms or longer than 1,500 ms, and were considered outliers. Utterances other than the designated one and non-fluent speech were considered as erroneous, 351 observations (8.7%) in Experiment 1a and 508 (12.1%) observations in Experiment 1b were marked as such. The mean naming latencies and error rates are summarized in Tables 15 and 16. Analyses of variance were run with factors Target Gender (plural vs. non-plural), Distractor Condition

(gender-congruent vs. gender-incongruent), and Target Number (single-reference vs. multiple-reference). Separate analyses were carried out with participants (F1) and items (F2).

Experiment 1a

In Experiment 1a, definite noun naming with single-reference noun distractors, pictures were named almost equally fast in the single-reference (1,023 ms) and in the multiple-reference (1,020 ms) definite noun productions. There was an overall 17 ms advantage in the gender-congruent condition over the gender-incongruent condition. This effect of Distractor Condition was significant by participants, ($F_1(1, 23) = 6.056$, $p < .02$), but not by items, ($F_2(1, 22) = .919$, $p < .35$). Similarly, the factor Target Gender was significant by participants but not by items, ($F_1(1, 23) = 8.148$, $p < .009$; $F_2(1, 22) = 2.625$, $p < .12$). However, the effect of Distractor Condition was modified by the factor Target Number indicated by a significant interaction between Target Number and Distractor Condition, ($F_1(1, 23) = 18.383$, $p < .0001$; $F_2(1, 22) = 38.325$, $p < .0001$).

Table 15 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 1a (Definite noun naming, single-reference distractor)

Target Number	Distractor Condition	Target Gender				Mean	
		Non-Plural		Plural			
		RTs	%e	RTs	%e	RTs	%e
Single-reference	Congruent	981	3.5	1008	4.9	995	4.2
	Incongruent	1024	4.5	1078	6.8	1051	5.6
	Neutral	951	3.1	956	3.3	953	3.2
Multiple-reference	Congruent	1015	3.1	1056	5.9	1030	4.5
	Incongruent	1004	5.7	1016	5	1010	5.4
	Neutral	956	4	961	1.7	959	2.9

In the single-object picture naming condition, there was 56 ms gender congruency effect, whereas in the multiple-object picture naming condition, there was a reverse 24 ms advantage of the

gender-incongruent over the gender-congruent condition. Analysis of the simple effects revealed that the congruency effect in the single-object (but not in the multiple-object) picture naming condition was reliable, ($F_1(1, 23) = 19.375$, $p < .0001$; $F_2(1, 22) = 11.506$, $p < .003$). There were no reliable effects in the error rate data (all Fs < 1).

Experiment 1b

In Experiment 1b, when definite noun naming had multiple-reference noun distractors, the effect of the factor Target Number (single-reference: 1,028 ms; multiple-reference: 1,033 ms) was not significant (both Fs < 1). Similarly, there was no effect of Distractor Condition (gender-congruent: 1,032 ms; gender-incongruent: 1,028 ms; both Fs < 1). The factor Target Gender was not significant (both Fs < 1), and none of the interaction effects were significant (all Fs < 1). The error rate analyses mainly mirrored the results of the response latency data. In the error rate data, only the factor Target Gender was significant, ($F_1(1, 24) = 7.471$, $p < .01$; $F_2(1, 22) = 5.923$, $p < .02$). Participants made slightly more errors in the plural gender definite noun naming (7.7%) than in the non-plural gender definite noun naming (5.4%).

Table 16 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 1b (definite noun naming, multiple-reference distractor)

Target Number	Distractor Condition	Target Gender					
		Non Plural		Plural		Mean	
		RTs	%e	RTs	%e	RTs	%e
Single-reference	Congruent	1010	3.3	1048	7.2	1029	5.3
	Incongruent	1020	5.0	1031	10.2	1026	7.6
	Neutral	963	3.2	984	4.2	973	3.7
Multiple-reference	Congruent	1042	5.5	1025	6.7	1034	6.1
	Incongruent	1013	5.7	1050	6.5	1031	6.1
	Neutral	993	7.2	991	4.3	992	5.8

Discussion

Unlike the results of Experiment 1a, the gender of the distractors in Experiment 1b did not affect the naming latencies. Recall that the only difference between the two experiments was the number value of the distractor words. All the distractor words were single-reference nouns in Experiment 1a but multiple-reference nouns in Experiment 1b. Note also that number in nouns is derivational in Konso and all distractor words in Experiment 1b were multiple-reference nouns derived from the single-reference nouns by attaching the multiple-reference suffixes and impose plural gender agreement (Orkaydo, 2013). Thus, there is no gender distinction in the multiple-reference nouns in Konso as such since they all trigger plural gender agreement. This might explain the presence of gender congruency effect only in the single-object picture naming condition with single-reference distractor words, where there was marked gender distinction, but the absence of the effect in all other conditions, where there was no marked gender distinction either in target picture names or in distractor words.

Moreover, similar to our study, picture-word interference studies in various utterance formats in Dutch and German have shown that the naming latencies of a target utterance were influenced by the gender value of a distractor word (e.g. Schriefers, 1993; Van Berkum, 1997; La Heij et al., 1998; Schriefers & Teruel, 2000; Schiller & Caramazza, 2003) but not the number values of the distractor (Schiller & Caramazza, 2003). And no effects of number congruency have been observed (Schiller & Caramazza, 2002). Moreover, Schiller and Caramazza (2003) have reported a gender congruency effect in the single-object but not in the multiple-object picture naming condition both with single-reference (Experiment 2a)

and multiple-reference distractor words (Experiment 3). Schiller and Caramazza use these findings to argue that the number value of the distractor has no influence in the picture-word interference task, which is consistent with our result. They further maintained that the number value of the target plays a role as well, which we did not observe in our Experiment 1b.

On the other hand, the results reported above in Experiment 1a are interesting for at least two main reasons. First, they provide further evidence that the gender congruency effect is a stable and robust effect in Konso, which has been reported previously under different conditions (Tsegaye et al., 2013; submitted). Recall that Tsegaye et al. (2013) reported a first indication of gender congruency effect in the language. Recently, Tsegaye et al. (submitted) found a robust gender congruency effect in the production of gender-marked definite nouns (Experiment 1), which was similar to part of the present experiment. They interpret the result as showing plural gender definite nouns processed in the same way as non-plural gender definite nouns. Here, we replicate this gender congruency effect in the single-object picture naming condition of Experiment 1a.

Second, our result goes beyond Tsegaye et al.'s (submitted) result because it shows that the gender congruency effect only occurs when pictures are named with their corresponding definite suffix in the single-object but not in the multiple-object picture naming condition. In the single-object picture naming condition, the appropriate gender-marked definite suffix has to be selected from the two competing suffixes, either *–si?* or *–sini?*. In the multiple-object picture naming condition, on the other hand, the definite suffix is the same for both definite nouns, which is always *–sini?*. This finding is also in line with the hypothesis that the congruency effect reveals

lexical competition at the phonological form level and not at the syntactic level (Miozzo & Caramazza, 1999; Schiller & Caramazza, 2003; Bordag & Pechmann, 2008). According to this hypothesis, the congruency effect, which is found in Konso single-reference definite noun naming, occurs in selecting the appropriate gender-marked definite suffix at the phonological form level but not in selecting the gender of the to-be-named picture at abstract syntactic level. This means that the two forms of definite suffixes (*–si?* vs. *–sini?)* in the gender-incongruent condition compete for selection during the single-reference definite noun production, which is why we observed longer naming latencies in this condition. This pattern of gender-marked definite suffix competition, however, was not observed in the multiple-object picture naming condition, as there is only one definite suffix form for all (i.e. *–sini?*). This demonstrates that the gender congruency effect indeed originates at the phonological form level; the competition is between gender-marked definite suffixes and not between abstract gender nodes. This position has largely received empirical support from a number of works (see, e.g. Schiller & Caramazza, 2003; Bordag & Pechmann, 2008). Note also that the finding of gender congruency in naming gender-marked definite nouns under the single-object picture naming condition (Experiment 1a) lends support for bound morpheme competition account as well (Schriefers, 1993; Schriefers et al., 2005; Bordag & Pechmann, 2008). This is because gender-marked elements in our experiment were also bound morphemes.

Experiment 1 compared the production of plural gender definite nouns with that of non-plural gender (feminine and masculine) definite nouns. This is because Konso definite markers on nouns distinguish only between plural and non-plural genders, *–sini?* for the

former and *–si?* for the later (Orkaydo, 2013). All three gender values in the language, namely feminine, masculine and plural genders, are distinctly marked on the concord between a noun in the subject position and the verb of the same sentence (Orkaydo, 2013). The aim of Experiment 2 was to examine if the results of Experiment 1 are replicable in a different utterance format (sentence naming), which examined all the three gender values at the same time.

4.3. Experiment 2: Overt subject sentence naming

In Experiment 2, native Konso speaking participants were asked to name a picture by producing a sentence with an overt subject. As in Experiment 1, pictures could either appear as a single object (single-object picture naming condition) or as two identical objects (multiple-object picture naming condition). In Experiment 2a, distractor words were presented in their single-reference form while in Experiment 2b, they were presented in their multiple-reference form. The number values of the distractors were manipulated to examine if the finding of a gender congruency effect only in the single-object picture naming condition with single-reference distractors in definite noun production (Experiment 1a) would be replicated in sentence production as well.

Table 17 Examples of utterances in Experiments 2a and 2b

Target Number	Target picture name	Target Gender	Utterance	Distractor word		
				Distractor Condition	Experiment 2a (Single-reference)	Experiment 2b (Multiple-reference)
Single-reference	*irroota*	Feminine	*irrootasiʔ iakkamti*			
	'mountain'		'The mountain was shown'	Congruent	*locʔta* 'leg'	*locʔtaddʔaa* 'legs'
				Incongruent	*ɢussa* ''wall'	*ɢussaddʔaa* 'walls'
	furaa	Plural	*furasiniʔ iakkamin*			
	'key'		'The key was shown'	Congruent	*aataa* 'culture'	*aataddʔaa* 'cultures'
				Incongruent	unta 'grain'	*untaddʔaa* 'grains'
	kuta	Masculine	*kutasiʔ iakkamay*			
	'dog'		'The dog was shown'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaddʔaa* 'cliffs'
				Incongruent	elalaa 'cowrie'	*elaladdʔaa* 'cowries'
Multiple-reference	*irrootaddʔaa*	Feminine*	*irrootaddʔasiniʔ iakkamin*			
	'mountains'		'The mountains were shown'	Congruent	*locʔta* 'leg'	*locʔtaddʔaa* 'legs'
				Incongruent	*ɢussa* 'wall'	*ɢussaddʔaa* 'walls'
	furaddʔaa	Plural	*furaddʔasiniʔ iakkamin*			
	'keys'		'The keys were shown'	Congruent	*aataa* 'culture'	*aataddʔaa* 'cultures'
				Incongruent	*unta* 'grain'	*untaddʔaa* 'grains'
	kutaddʔaa	Masculine*	*kutaddʔasiniʔ iakkamin*			
	'dogs'		'The dogs were shown'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaddʔaa* 'cliffs'
				Incongruent	*elalaa* 'cowrie'	*elaladdʔaa* 'cowries'

* The gender value of the target in multiple-reference and all distractors in Experiment 2b would be plural according to the position that all multiple-reference suffixes impose plural gender.

Method

Participants

Twenty native Konso speakers from Karat High School participated in Experiment 2a and 17 participated in Experiment 2b. None of the participants had participated in Experiment 1. They were paid for their participation in the experiment.

Materials

Stimuli were 30 black line drawings of everyday objects. There were an equal number of object names with feminine, masculine and plural gender. As in Experiment 1, a single instance of a picture was presented during the single-object picture naming condition whereas two instances of a picture were presented side by side during the multiple-object picture naming condition (see Table 17 for examples). Each picture was presented with a gender-congruent and a gender-incongruent distractor word. The distractor words were in their single-reference form in Experiment 2a whereas they were in their multiple-reference form in Experiment 2b. Distractor words were semantically and phonologically unrelated to the picture names. Appendix B contains the list of target pictures and distractor words used in this experiment. Similar to Experiment 1, distractor words and target pictures were presented simultaneously (SOA = 0).

Every picture appeared once in the single-object and once in the multiple-object picture naming condition, which produces 20 appearances of *–t*, 20 appearances of *–ay*, and 80 appearances of *–n* (20 appearances of *–n* from single-object picture naming condition with plural gender nouns and 60 of *-n* from the multiple-object picture naming condition of all). We put in another 30 filler items (15 items with names of masculine gender and 15 items with names

of feminine gender) to balance the frequency of appearance for the three verb endings. Each of these filler items was presented with a gender-congruent and a gender-incongruent distractor word. Moreover, they were presented twice in the single-object picture naming condition. Thus, all the three verb endings occurred an equal number of times for the entire set of trials, which is 80 times each.

Design

There were three crossed factors: the three-level factor Target Gender (feminine, masculine, and plural gender), the two-level factor Distractor Condition (gender-congruent vs. gender-incongruent), and the two-level factor Target Number (single-reference vs. multiple-reference). All factors were tested within participants (F1). Target Gender was tested between items (F2), and Distractor Condition and Target Number were tested within items (F2).

Procedure

The procedure was the same as in Experiment 1 with the exception of the utterance format. Here, participants were instructed to respond to a picture by producing a sentence. For example, participants would produce *irrootasi? iakkamti* 'The mountain was shown' when a picture of a mountain appeared on the screen in the single-object picture naming condition. However, they would produce *irrootadd'asini? iakkamin* 'The mountains were shown' when two identical pictures of a mountain were presented side by side in the multiple-object picture naming condition (see Table 17 for more examples).

Results

The same criteria as in Experiment 1 were employed to analyze the data. Thus, 388 observations (16.2%) in Experiment 2a and 349 (16.2%) in Experiment 2b were marked as erroneous, and 129 observations (5.4%) in Experiment 2a and 139 (6.4%) were marked as outliers. Tables 18 and 19 show mean naming latencies and error rates broken down by Target Number, Distractor Condition and Target Gender.

Experiment 2a

In Experiment 2a, for overt subject sentence naming that had single-reference noun distractors, there was no systematic effect of gender in the naming latencies analyses; however, the factor Target Gender was significant by participants but not by items, ($F_1(2, 38) = 7.247$, $p < .002$; $F_2(2, 27) = 2.268$, $p < .12$). Participants were slightly slower in the single-object picture naming condition (997 ms) than in the multiple-object picture naming condition (990 ms), and this 7 ms difference was not significant (both Fs < 1). Pictures were named faster in the gender-congruent (985 ms) than in the gender-incongruent condition (1002 ms). This 17 ms advantage just failed to reach significant level, ($F_1(1, 19) = 3.686$, $p < .07$; $F_2(1, 27) = 2.194$, $p < .15$), but the interaction between Distractor Condition and Target Number was fully significant, ($F_1(1, 19) = 10.453$, $p < .004$; $F_2(1, 27) = 19.437$, $p < .0001$). This interaction demonstrates that target-distractor congruency had a different effect on single-object picture naming condition, compared to multiple-object picture naming condition. Single-object pictures were named 55 ms faster in the gender-congruent condition (969 ms) than in the gender-incongruent condition (1024 ms), whereas multiple-object pictures

were produced 21 ms slower in the gender-congruent (1000 ms) than in the gender-incongruent condition (979 ms).

Analyses of simple effects show that the effect of Distractor Condition was significant in the single-object picture naming condition, ($F_1(1, 19) = 9.008$, $p < .007$; $F_2(1, 27) = 17.042$, $p < .0001$) but not in the multiple-object picture naming condition, ($F_1(1, 19) = 1.595$, $p < .22$; $F_2(1, 27) = 1.923$, $p < .18$). In the error rate analysis, there were significantly more errors in the multiple-object picture naming condition (3.4%) than there were in the single-object picture naming condition (2.1%), ($F_1(1, 19) = 8.266$, $p < .01$; $F_2(1,27) = 14.587$, $p < .001$). None of the remaining analyses were significant (all Fs < 1).

Table 18 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 2a (sentence naming, single-reference distractor)

Target Number	Distractor Condition	Target Gender							
		Feminine	%e	Masculine	%e	Plural	%e	Mean	%e
Single-reference	Congruent	954	2.4	961	1.3	993	1.5	969	1.8
	Incongruent	995	3.3	1036	1.4	1041	2.3	1024	2.3
Multiple-reference	Congruent	965	3.3	1001	3.0	1033	2.5	1000	2.9
	Incongruent	971	4.3	965	3.3	1002	3.8	979	3.8

Experiment 2b

In Experiment 2b, for overt subject sentence naming that had multiple-reference noun distractors, pictures were named slightly faster in the single-object picture naming condition (1,071 ms) than the multiple-object picture naming (1,077 ms); and participants were slightly faster in the gender-incongruent (1,072 ms) than in the gender-congruent condition (1,076 ms). Nevertheless, these differences were not statistically significant (all Fs < 1). The main effect of Target Gender was not significant, either (both Fs < 1.2). The interaction between Target Gender and Distractor Condition,

however, was significant by participants, $F_1(2, 32) = 5.554$, $p < .009$, and was marginally significant by items, $F_2(2, 27) = 3.131$, $p < .06$). None of the remaining analyses was significant (all Fs < 1).

Table 19 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 2b (sentence naming, multiple-reference distractor)

Target Number	Distractor Condition	Target Gender							
		Feminine	%e	Masculine	%e	Plural	%e	Mean	%e
Single-reference	Congruent	1068	6.5	1048	3.9	1096	5.6	1070	5.3
	Incongruent	1054	6.3	1095	4.6	1068	5.4	1072	5.4
Multiple-reference	Congruent	1074	5.4	1062	7.0	1111	6.5	1082	6.3
	Incongruent	1082	3.7	1066	5.0	1067	4.8	1072	4.5

Discussion

Over all, the results of the present experiment are similar to that of Experiment 1. The effect of gender congruency was found only in the single-object picture naming condition but not in the multiple-object picture naming condition in Experiment 2a, which is exactly what we have observed in the definite noun production experiment (Experiment 1a). Similarly, no effect of gender congruency observed when the multiple-reference form of a noun was used as a distractor in Experiment 2b similar to that of Experiment 1b. This supports the argument that the number value of the distractor does not affect gender congruency effects (Schiller & Caramazza, 2003).

Our data in both Experiments 2a and 2b further show that gender congruency effect is manipulated by the gender of the noun only when producing single-reference utterances. In Konso, there are three different verb inflections in the single picture naming condition that have to agree with the gender of the head noun in the subject position. These gender-marked verb inflections are *–t* for feminine, *–ay* for masculine and *–n* for plural gender. In the multiple-object picture naming condition, however, there is only one verb inflection

for all, which is *–n.* The absence of the congruency effect in the multiple-object picture naming condition could be due to the use of one and the same gender marking element in this condition, which have masked the expected competition. The presence of a gender congruency effect only in the single-object but not in the multiple-object picture naming condition is also in line with the *competitive phonological form selection hypothesis* that assume competition arises at the phonological encoding level instead of the grammatical encoding level (Miozzo & Caramazza, 1999; Schiller & Caramazza, 2003).

Furthermore, the finding of a gender congruency effect in the single-object picture naming condition supports the analysis of plural as a value of gender instead of number since we observed similar congruency effect in producing plural gender nouns like that of feminine and masculine gender nouns. This result replicates the finding of Tsegaye et al. (submitted) Experiment 2. Once again, the results in Experiments 2a and 2b are consistent with bound morpheme competition hypothesis (Schriefers, 1993; Schriefers et al., 2005; Bordag & Pechmann, 2008).

4.4. Experiment 3: Null subject sentence naming

In Experiment 3, native Konso participants were asked to name a picture by producing sentences with null subjects (only the verb root with subject clitic and gender-marked suffixes). Recall that it is possible to omit the overt subject that can be understood from the gender agreement markers on the verb in Konso. Thus, in the sentence *ɠoyrasiʔ iakkamay* 'The tree was shown,' omitting the overt subject *ɠoyrasiʔ* 'the tree' and producing *iakkamay* 'he was shown' is perfectly acceptable in Konso.

Similar to the previous experiments, pictures could either appear as a single object (single-object picture naming condition) or as two identical objects (multiple-object picture naming condition). Participants responded to the target picture while ignoring the simultaneously presented auditory distractor word. The distractor words were in their single-reference form in Experiment 3a whereas they were in their multiple-reference form in Experiment 3b (see Table 20 for examples of utterances).

Table 20 Examples of utterances in Experiments 3a and 3b

Target Number	Target picture name	Target Gender	Utterance	Distractor word		
				Distractor Condition	Experiment 3a (Single-reference)	Experiment 3b (Multiple-reference)
Single-reference	*irroota*	Feminine	*iakkamti*			
	'mountain'		'She was shown'	Congruent	*locʔta* 'leg'	*locʔtaɗɗaa* 'legs'
				Incongruent	*ɠussa* ''wall'	*ɠussaɗɗaa* 'walls'
	furaa	Plural	*iakkamin*			
	'key'		'It was shown'	Congruent	*aataa* 'culture'	*aataɗɗaa* 'cultures'
				Incongruent	*unta* 'grain'	*untaɗɗaa* 'grains'
	kuta	Masculine	*iakkamay*			
	'dog'		'He was shown'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaɗɗaa* 'cliffs'
				Incongruent	*elalaa* 'cowrie'	*elaladɗaa* 'cowries'
Multiple-reference						
	irrootaɗɗaa 'mountains'	Feminine*	*iakkamin*			
			'They were shown'	Congruent	*locʔta* 'leg'	*locʔtaɗɗaa* 'legs'
				Incongruent	*ɠussa* 'wall'	*ɠussaɗɗaa* 'walls'
	furaɗɗaa	Plural	*iakkamin*			
	'keys'		'They were shown'	Congruent	*aataa* 'culture'	*aataɗɗaa* 'cultures'
				Incongruent	*unta* 'grain'	*untaɗɗaa* 'grains'
	kutaɗɗaa	Masculine*	*iakkamin*			
	'dogs'		'They were shown'	Congruent	*hoʃʃa* 'cliff'	*hoʃʃaɗɗaa* 'cliffs'
				Incongruent	*elalaa* 'cowrie'	*elaladɗaa* 'cowries'

* The gender value of the target in multiple-reference and all distractors in Experiment 3b would be plural according to the position that all multiple-reference suffixes impose plural gender.

Participants, materials, and design

Experiment 3a had 18 and Experiment 3b had 12 participants from Karat High School, all of them were native Konso speaking students. They all had normal vision and hearing, and none of them participated in the previous experiments. The materials and design were the same as those used in Experiments 2a and 2b.

Procedure

The same procedure was used as the previous experiments but here participants were asked to produce null subject sentences. For instance, as shown in Table 20, in response to the presentation of a picture of a dog in the single-object picture naming condition, participants would produce *iakkamay* 'He was shown'. When two identical pictures of a dog were presented abreast in the multiple-object picture naming condition on a different trial, however, they would say *iakkamin* 'They were shown'.

Results

The raw data were handled using the same criteria as in Experiment 1. According to these criteria, 345 observations (16%) in Experiment 3a and 659 (22.9%) in Experiment 3b were marked as erroneous, and 55 observations (2.2%) in Experiment 3a and 42 (1.5%) in Experiment 3b were marked as outliers. Tables 21 and 22 show mean naming latencies and error rates broken down by Target Number, Distractor Condition and Target Gender.

Experiment 3a

In Experiment 3a, for null subject naming that had single-reference noun distractors, the main effect of Number was significant, ($F1(1,$

17) = 22.630, $p < .0001$; $F_2(1, 27) = 16.204$, $p < .0001$). Pictures were named 42 ms faster in the multiple-object picture condition (889 ms) than in the single-object picture naming condition (931 ms). Pictures were also named faster in the gender-congruent (906 ms) than in the gender-incongruent condition (914 ms). This 8 ms advantage, however, failed to reach significance (both Fs < 1). The factor Target Gender was significant, ($F_1(2, 34) = 22.617$, $p < .0001$; $F_2(2, 27) = 8.590$, $p < .001$). The interaction between Distractor Condition and Target Number was almost significant by participants, ($F_1(1, 17) = 4.407$, $p < .05$) but not by items, $F_2(1, 27) = 1.701$, $p < .20$).

Table 21 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 3a (null subject sentence naming, single-reference distractor)

Target Number	Distractor Condition	Target Gender							
		Feminine	%e	Masculine	%e	Plural	%e	Mean	%e
Single-reference	Congruent	916	4.7	889	1.6	963	3.5	922	3.3
	Incongruent	905	5.8	916	3.1	999	5.3	940	4.7
Multiple-reference	Congruent	868	1.5	871	1.8	930	0.6	890	1.3
	Incongruent	857	1.7	871	1.4	934	1.1	888	1.4

The error rate analysis, however, offers interesting results. Overall, there were more errors in the single-object picture naming condition (4.0%) than there were in the multiple-object picture naming condition (1.4%). This effect was highly significant ($F_1(1, 17) = 111.163$, $p < .0001$; $F_2(1, 27) = 22.702$, $p < .0001$). The factor Target Gender was significant by participants but not by items ($F_1(2, 34) = 8.639$, $p < .001$; $F_2(2, 27) = 2.424$, $p < .11$). Participants made significantly more errors in the gender-incongruent than in the gender-congruent condition ($F_1(1, 17) = 8.175$, $p < .01$; $F_2(1, 27) = 6.353$, $p < .02$). Importantly, however, the interaction between Distractor Condition and Target Number was significant

($F_1(1, 17) = 5.224$, $p < .03$; $F_2(1, 27) = 8.074$, $p < .008$). This interaction demonstrates that target-distractor congruency had a different effect on single-object picture naming condition, compared to multiple-object picture naming condition. In single-object picture naming condition, there was 1.4% higher error rate in the gender-incongruent condition (4.7%) than in the gender-congruent condition (3.3%), whereas in the multiple-object picture naming condition there were almost identical error rate in the gender-congruent (1.3%) and in the gender-incongruent condition (1.4%). Analyses of simple effects display that the effect of Distractor Condition was significant in the single-object picture naming condition, ($F_1(1, 17) = 8.541$, $p < .009$; $F_2(1, 27) = 10.870$, $p < .003$), but not in the multiple-object picture naming condition (both Fs < 1).

Experiment 3b

In Experiment 3b, for null subject naming that had multiple-reference noun distractors, both gender-congruent (875 ms) and gender-incongruent (875 ms) naming conditions were named equally fast. Multiple-object pictures (863 ms) were produced faster than single-object pictures (887 ms). This 24 ms advantage was reliable, ($F_1(1, 11) = 5.271$, $p < .04$; $F_2(1, 27) = 8.213$, $p < .008$). This could be due to the fact that participants had to produce the same verb in the multiple-object picture naming condition irrespective of the gender and number values of the picture name and the distractor word. In the single-object picture naming condition, however, they had to decide the verb inflection depending on the gender value of the picture name, which would presumably require more processing time. All of the other analyses did not yield any significant effects.

Table 22 Mean naming latencies (RTs) in ms and percentage errors (%e) in Experiment 3b (null subject sentence naming, multiple-reference distractor)

Target Number	Distractor Condition	Target Gender Feminine	%e	Masculine	%e	Plural	%e	Mean	%e
Single-reference	Congruent	880	9.2	858	5.3	933	11.4	890	8.6
	Incongruent	862	7.5	859	6.1	930	8.9	884	7.5
Multiple-reference	Congruent	847	5	840	4.4	893	2.2	860	3.9
	Incongruent	862	7.8	853	5.3	879	4.2	865	5.8

Discussion

Similar to the results of Experiments 1b and 2b, Experiment 3b did not show a significant gender congruency effect. This strengthens the argument that the number value of the distractor has no role in the picture-word task (Schiller & Caramazza, 2003). In the reaction times analysis of Experiment 3a, unlike the results of Experiments 1a and 2a, the Target Gender by Distractor Condition did not reach significance. This might be due to its utterance format. Note that in Experiment 3a picture names were not part of the utterance, and participants used them to select the appropriate gender-marking suffix of the to be named verb (i.e. a null subject sentence). In Konso, the gender-marking verb inflections for one gender class are identical in the single-object and in the multiple-object naming conditions, but differ for the other gender classes. More specifically, the suffix *–n* is used on the verb for plural gender in the single-object and for all in the multiple-object picture naming condition. However, *–t–* and *–ay*, respectively, are used as feminine and masculine suffixes on the verb in the single-object picture naming condition. Thus, participants produced *iakkamti*, *iakkamay*, and *iakkamin* if the presented picture had feminine, masculine and plural gender, respectively, in the single-object picture naming condition but only *iakkamin* for all in the multiple-object picture naming condition.

Only the final syllable of the verb alters depending on the gender of the picture name in the single-object picture naming condition but it remains the same for all in the multiple-object picture naming condition.

The fact that participants had to start with identical parts of the verb has masked the interference effect of the gender-incongruent distractors from being visible in the reaction times data, which was measured from the onset of the picture till the onset of utterance. The interference effect of gender-incongruent distractor words, however, was reliably visible in the error rate data. This could be due to the fact that the correctness of the response was mainly determined by the final syllable of the utterance (the gender-marking suffix). Thus, a response was counted as correct if the correct form of the verb inflection was used. This means that the gender-marking suffixes seem to have played a relatively greater role in the error rates than in the reaction times when the name of the picture is not part of the utterance. Similarly, Schriefers et al. (2005) argued that the position of gender-marking elements in an utterance could affect the visibility of gender congruency effects. Schriefers et al. maintain that competition processes might be hard to detect by measuring onset-naming latencies for elements that occur in non-initial positions of the utterance. Here, our data seem to suggest that detecting the reaction times might be hard when the name of the picture is not part of the utterance instead.

4.5. General discussion

This study investigated the processes of grammatical gender and number in Konso during speech production. Some Cushitic languages have the interesting property that the third value of gender, beside

masculine and feminine, is plural— a class of nouns that take plural agreement form even when they represent single entities. Two different linguistic hypotheses have been proposed to analyze the status of the so-called plural gender: *plural-as-a-number feature* only (Corbett & Hayward, 1987; Corbett, 1991, 2005, 2006, 2012) versus *plural-as-a-gender feature* as well (e.g. Hayward, 1979; Pillinger, 1999; Savà, 2005; Mous, 2008; Orkaydo, 2013; Tsegaye et al., 2013; Tsegaye et al., submitted). We put these two competing hypotheses to an experimental test in Konso, an East Cushitic language that has this feature. In three picture-word experiments, pictures of one or two objects were presented along with a single-reference or a multiple-reference (plural number) distractor that had the same or different gender as the targets. In Experiment 1, participants responded to the pictures using gender-marked definite nouns. In Experiments 2 and 3, they responded by producing a sentence with an overt subject and a null subject, respectively.

In the context of the picture-word interference (PWI) tasks that we have conducted in Konso, the *plural-as-number feature hypothesis* would predict that the so-called plural gender produces a similar pattern of effect as that of regular multiple-reference nouns but a different effect from those of feminine and masculine genders. On the other hand, the *plural-as-a-gender feature hypothesis* would predict that a plural gender produces a similar pattern of effects as those of feminine and masculine gender but a different effect from regular multiple-reference nouns. The current study also provides additional evidence for two theoretically interesting issues: the locus and the scope of the so-called gender congruency effect.

The first issue is whether the gender congruency effect occurs at the phonological encoding level *(competitive phonological form*

selection hypothesis, Miozzo & Caramazza, 1999; Caramazza et. al., 2001; Schiller & Caramazza, 2002, 2003*),* or at the grammatical encoding level (*competitive grammatical feature selection hypothesis*, Schriefers, 1993; Levelt et al., 1999). In this regard, the *competitive grammatical feature selection hypothesis* predicts a gender congruency effect in both single-object and multiple-object picture naming conditions. The *competitive phonological form selection hypothesis,* on the other hand, predicts a congruency effect only in the single-object picture naming condition, where there are different forms for different genders, but not in the multiple-object picture naming condition, where there is only one form for all.

The second issue is whether the production of gender-marking bound morphemes is subject to competition: while some researchers have argued that the selection of gender-marking bound morphemes involves no competition (Costa et al., 2003; Schiller & Caramazza, 2003; Schiller & Costa, 2006), others have argued that the selection of gender marking bound morphemes does involve competition (Schriefers 1993; Schriefers et al., 2005; Bordag & Pechmann, 2008). Konso, similar to Dutch and German (languages in which most of the research on these issues have been conducted), has a characteristic that gender is marked in the single-reference (singular) but the gender marking is neutralized in the multiple-reference (plural number). Note that unlike Dutch and German, all the gender-marking elements in Konso are suffixes (bound morphemes) that occupy a non-initial position of an utterance. This gave us an interesting test case to investigate whether or not the production of gender-marked bound morphemes takes place in a competitive manner. Thus, if the selection of gender-marked bound morphemes does not involve competition processes, we should not observe the congruency effect

in any of the experiments reported in the present study since all of gender-marked elements in the present study were bound morphemes.

In Experiment 1, definite noun (noun + gender-marked definite suffix) naming with single-reference (Experiment 1a) and multiple-reference (Experiment 1b) nouns used as distractors, reliable effects of gender congruency were observed only in the single-object picture naming condition of Experiment 1a. In Experiment 2, sentences with overt subject (subject [name of the picture] + a verb with a gender-marked suffix [*iakkam*-M/F/P suffix 'was/were shown']) naming, single-reference and multiple-reference nouns were used as distractors in Experiments 2a and 2b, respectively. Here, we replicated the results of Experiment 1 with a different utterance format where participants produced a sentence instead of a definite noun, which examined the three gender classes simultaneously. Experiment 3 was the same as Experiment 2 but here participants produced a null subject sentence, only a gender-inflected verb, (*iakkam*-F/M/P suffix 'she/he/they was/were shown'). The error rate data of Experiment 3 support the findings of both of the previous experiments.

The finding of congruency effect only in the single-object picture naming condition, where there were different forms for different genders, has shown that the so-called plural gender produces a similar pattern of interference from gender-incongruent and/or facilitation from gender-congruent distractor words as feminine and masculine genders in Konso. The absence of a reliable effect of congruency in the multiple-object picture naming condition, where there are identical forms for all, indicates that plural gender produces a different effect from the regular multiple-reference (plural

number) nouns. This is clear evidence that plural is processed as a gender feature rather than a number feature in Konso.

One of the linguistic arguments against the analysis of plural as a value of gender is that treating plural as part of gender feature is said to be challenging for the general linguistic principle of Exclusiveness— values belong to one feature only (Corbett, 2012). According to this principle, values such as 'singular' and 'plural' belong only to the number feature and thus gender cannot take plural as its value. Corbett (2012), see also Corbett & Hayward (1987), identified only 11 nouns that take plural agreement for single-reference (unit reference) in Bayso, a Cushitic language. He 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 the single-reference similar to *pluralia tantum* nouns and thus plural should be detached from the values of gender. This analysis might help for tackling seemingly non-standard structures in the system at the price of marking only a few numbers of nouns with lexical features for exceptional behavior (Tsegaye et al., 2013). In Bayso, Haywards's (1979) list of nouns that take plural agreement is small. 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.

Furthermore, Orkaydo (2013) points out that there is a strong link between plural in gender and the multiplicity of number in

Konso. First, number is a derivational category in the language and most multiple-reference nouns are derived from non-derived single-reference nouns. For instance, the multiple-reference word *kosaɗɗaa* 'granaries' derived from non-derived single-reference noun *kosa* 'granary'. Nouns that are derived for number have predictable gender values. The suffixes that are used to form multiple-reference nouns always trigger plural gender agreement. To some extent, single-reference nouns can be derived from multiple-reference non-derived nouns and these derived single-reference nouns never take plural gender agreement. Based on the formative, and not on the gender of the base like that of Bayso, these derived single-reference nouns take masculine or feminine gender in Konso. For example, the single-reference noun *fillayyaata*$_{F}$ 'flea' is derived from non-derived multiple-reference noun *fillayyaa*$_{P}$ 'fleas'. Second, coordinated nouns show plural agreement on the verb irrespective of the gender values of the coordinated nouns in Konso (for examples, see Tsegaye et al., submitted).

There is also 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; Tsegaye et al., 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).

(26) waakkaa-ɗaa-siniʔ i=ɗeɗ~ɗer-i
wooden statue-MULT-DEF.P 3=RDP-be.tall-PF
'The wooden statues are tall.'

In the above example (26), the initial CVC of the adjective root *ɗer-* 'to be long' is reduplicated because the subject *waakkaa-ɗaa-siniʔ* 'the wooden statues' is a multiple-reference noun. However, in

the example below (27), the initial CVC of the adjective root *dɗer-* is not reduplicated because the subject *waakkaa-sini?* 'the wooden statue' is a single-reference noun.

(27) waakkaa-sini? i=dɗer-i
wooden statue-DEF.P 3=be.tall-PF
'The wooden statue is tall'

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? dɗer-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, the language examined in the analysis of Corbett (2012), since it does not show independent number agreement.

There are other important differences between the number and the gender features in Konso. Unlike the gender feature, the number feature is not obligatorily marked. Depending on the importance of the use of number markers in a given context, speakers choose between the use of a non-derived base noun or a derived noun marked for multiple-reference when denoting multiple objects. The hub of number agreement is mainly on the adjectives and it is

semantically motivated. For instance, a single-reference adjective could modify a multiple-reference head noun, which denotes a collective reference of that noun. Thus, the treatment of plural as a value of gender and not number is an appropriate one in Konso. Importantly, the present study showed that the so-called plural gender behaved as a gender type rather than a number type. In our experiments, significant effects of gender congruency were observed in naming single-object pictures where the selection of suffixes is determined by the target's gender, but not in naming multiple-object pictures where suffixes are identical for all.

These results are also in line with the *competitive phonological form selection hypothesis* that assume the so-called gender congruency effect originates from competition among gender-marked phonological forms rather than among abstract gender features (Miozzo & Caramazza, 1999; Caramazza et al., 2001; Schiller & Caramazza, 2002, 2003; Bordag & Pechmann, 2008). Schiller and Caramazza (2003) made use of the fact that single-reference definite determiners are gender-marked in Dutch (het_{N} & de_{COM}) and in German ($der_{M,}$ die_{F}, & das_{N}), whereas no gender distinction is made in the multiple-reference definite determiners (it is *de* in Dutch & *die* in German for all genders). They consistently found significant effects of gender congruency only in the single-object picture naming condition but not in the multiple-object picture naming condition. As a result, they argue that the so-called gender congruency effect is actually a determiner congruency effect since they found the effect when different determiner forms were used for different genders, and grammatical feature selection is non-competitive process as no effect was observed when the same determiner was used for all genders. This means that the locus of the gender congruency effect is at the

level of phonological form selection as stipulated by the *competitive phonological form selection hypothesis*. Similarly, the results of Experiments 1a and 2a in our study support the *competitive phonological form selection account,* in which we found a gender congruency effect in naming single-object pictures where different forms were used for different genders, but not in naming multiple-object pictures where the same form was used for all.

At variance with Schiller and Caramazza (2003), we did not observe a gender congruency effect in naming single-object pictures in all of our experiments that employed multiple-reference distractor words (Experiments 1b, 2b & 3b). This could be due to the fact that multiple-reference forming suffixes impose a plural gender value in Konso and hence only the gender feature matters in the picture-word naming task, and the number feature plays no part. Note that, unlike many Indo-European languages, Konso shows gender, not number, agreement in the subject inflection on the verb (Orkaydo, 2013). In other words, gender, not number, is used to control subject/verb agreement in verb phrases in Konso.

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

The results of the present study are in conflict with Experiments 1b and 4a of Schiller and Caramazza (2003) as well. Recall that they failed to observe a gender congruency effect when distinct suffixes were to be chosen in the gender-incongruent condition in the gender-inflected adjective (bound morpheme) and noun production with German (Experiment 1b) and Dutch (Experiment 4a) speakers. Schriefers (1993), however, obtained a gender congruency effect in the gender-marked adjective plus noun naming with Dutch speakers. The fact that there are two conflicting findings within one language (Dutch), however, suggests that further empirical evidence is necessary to determine the retrieval mechanisms of bound-morphemes in language production. Investigating the issue in languages where gender-marked elements are bound morphemes such as Konso is vital for understanding how bound morphemes are retrieved. As we have mentioned, most grammatical elements are bound morphemes in Konso, which provided us the opportunity to examine the processing mechanism of gender-marked bound morphemes during picture-word task in the language. As shown above, we consistently obtained gender congruency effects when participants produced gender-marked bound morphemes in different utterance formats at various experimental scenarios. Recall that Bordag and Pechmann (2008) reported a numerically larger gender congruency effect in bound morpheme compared to free-morpheme production in Czech. Thus, our data lend support to the view that bound gender-marking morphemes follow selection by competition. According to Jescheniak et al. (2014), since selection by competition can be used as a general umbrella to unite the selection mechanism

of closed and open class lexical elements, there is no need to hypothesize that closed class elements follow a different selection mechanism just because they surface as freestanding or bound morphemes.

Taken together, the experiments of the current study have shown that the so-called plural gender behaves as a gender type rather than as a number type, which provides evidence for the analysis that plural is indeed a value of gender in Konso. Secondly, the results provide further evidence for the view that the gender-congruency effect originates at the level of phonological form and not at a level of abstract gender features. Lastly, gender-marking bound morphemes are subject to competitive processes.

Needless to state, psycholinguistic studies of gender and other grammatical elements have been limited to a handful of Indo-European languages. Our study contributed to increasing the number of languages being researched in psycholinguistics. Importantly, it showed the feasibility of psycholinguistic experimentation in understudied languages within the field of psycholinguistics. This is a step forward to broaden our knowledge about language-specific properties of language production such as the one we have investigated, the so-called gender congruency effect, and about the retrieval mechanism of bound morphemes.

Table 23 Appendix A: Experiment 1: definite noun naming

Target name	Meaning	Gender	Congruent	Meaning	Incongruent	Meaning	Gender
farta	horse	feminine	pooyta	mourning, cry	paankaa	machete	plural
ilta	eye	feminine	kooɓta	tree sp.	pahnaa	example	plural
ritta	she-goat	feminine	ɗalta	seed	saaraa	poem	plural
taamta	branch	feminine	ɗamta	grass snake	χallaa	kidney	plural
tika	house	feminine	moonta	sky	urmalaa	market	plural
oχinta	fence	feminine	kusumta	navel	pohaa	contribution, tribune	plural
karma	lion	masculine	irnya	gum	torraa	speech, talk	plural
kuta	dog	masculine	hoʃʃa	cliff	elalaa	cowrie	plural
mottooɠɠaa	car	masculine	kanta	sub-village	kolkaa	ood without cabbage	plural
parɟuma	stool/chair	masculine	ɗuttana	belly	tiyyaa	dispute	plural
ɠupitta	finger	masculine	hoofa	hole	solaa	tail (of a bird)	plural
toma	bowl	masculine	kaɓa	canal for irrigation	tiraa	liver	plural
akataa	sugar cane	plural	kosaa	granary	koɗaa	work	masculine
filaa	comb	plural	oytaa	upper part of the compound	pirta	country	feminine
fulaa	gate, door	plural	unɠulaa	grain store from bamboo	χorma	ox, bull	masculine
furaa	key	plural	aataa	culture	unta	grain	feminine
innaa	boy	plural	hiippaa	a riddle	miinta	face	feminine
kiʔsaa	cricket	plural	marɟaa	hip	letta	day	feminine
ɲaaɲɲaa	tomato	plural	erkannaa	message	korkorta	sheath for knife or sword	feminine
rika	a tooth brush	plural	waakkaa	wooden statue	laha	ram	masculine
siinnaa	nose	plural	olsaa	dream	hirta	special men's knife	masculine
timɓaa	drum	plural	ʃahaa	honey comb	kurra	ear	masculine
ukukkaa	egg	plural	χaylaa	plant sp.	kuleenta	a threshold of gate	feminine
uwwaa	dress	plural	ɠolfaa	bark of trees	yooyta	jackal	masculine

Table 24 Appendix B: Experiments 2 & 3: Sentence naming

Target name	Meaning	Gender	Congruent	Meaning	Incongruent	Meaning	Gender
akataa	sugar cane	plural	kosaa	granary	koɗaa	work	masculine
filaa	comb	plural	oytaa	upper part of the compound	pirta	country	feminine
furaa	key	plural	aataa	culture	unta	grain	feminine
innaa	boy	plural	hiippaa	a riddle	miinta	face	feminine
kiʔsaa	cricket	plural	marɟaa	hip	letta	day	feminine
ɲaaɲɲaa	tomato	plural	erkannaa	message	korkorta	sheath for knife or sword	feminine
rika	a tooth brush	plural	waakkaa	wooden statue	laha	ram	masculine
siinnaa	nose	plural	olsaa	dream	hirta	special men's knife	masculine
ukukkaa	egg	plural	χaylaa	plant sp.	kuleenta	a threshold of gate	feminine
uwwaa	dress	plural	ɠolfaa	bark of trees	yooyta	jackal	masculine
karma	lion	masculine	irnya	gum	torraa	speech, talk	plural
kuta	dog	masculine	hoʃʃa	cliff	elalaa	cowrie	plural
mottooɠɠaa	car	masculine	kanta	sub-village	kolkaa	food without cabbage'	plural
parɟuma	stool/chair	masculine	ɗuttana	belly	tiyyaa	dispute	plural
ɠupitta	finger	masculine	hoofa	hole	solaa	tail (of a bird)	plural
toma	bowl	masculine	kaɓa	canal for irrigation	furoota	type of bead	feminine
arpa	elephant	masculine	ɗakaa	stone	moossuta	piece of bread	feminine
tuuma	onion	masculine	ɟapara	rig	yaakata	bead	feminine
tuyyuuraa	air plane	masculine	ammayitta	breakfast	keltoota	cattle louse	feminine
muuɠa	ladle	masculine	χorma	ox, bull	tampoota	tobacco	feminine
farta	horse	feminine	pooyta	mourning, cry	paankaa	machete	plural
ilta	eye	feminine	kooɓta	tree sp.	pahnaa	example	plural
ritta	she-goat	feminine	ɗalta	seed	saaraa	poem	plural
taamta	branch	feminine	ɗamta	grass snake	χallaa	kidney	plural
tika	house	feminine	moonta	sky	urmalaa	market	plural
oχinta	fence	feminine	kusumta	navel	matta	head	masculine
lafta	bone	feminine	ritta	young she-goat	tuuɗa	pillar	masculine
kaawwata	glass	feminine	harta	pond	konfa	short	masculine
kaharta	ewe	feminine	ikkirteeta	louse	parka	work team	masculine
irroota	mountain	feminine	loɠta	leg, foot	ɠussa	wall	masculine