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Patti Spinner\* and Jamie A. Thomas

# L2 learners' sensitivity to semantic and morphophonological information on Swahili nouns

**Abstract:** Previous research demonstrates that L2 learners are sensitive to morphophonological and semantic information regarding grammatical gender in European languages (e.g., Spinner & Juffs, 2008). In this study we examine the use of morphophonological and semantic information by two groups of English-speaking learners acquiring Swahili gender (noun class). The results of an oral agreement-marking task, a written gender assignment task, and interviews indicate that learners are sensitive to morphophonological information regarding gender in Swahili. The findings for semantic information are more complex; learners appear to be sensitive to animacy but not to other “minor” semantic information such as TREE OR ACTIVE BODY PART. We propose the Semantic Core Hypothesis, which suggests that core semantic principles such as biological sex, animacy and humanness may be more easily accessible to L2 learners than other semantic principles.

**Keywords:** grammatical gender, Swahili, semantics, morphology

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## 1 Introduction

The acquisition of grammatical gender is well known to be problematic for second language learners (e.g., Spinner & Juffs 2008). One characteristic of the grammatical gender feature that makes it difficult is that it cannot be observed directly, but rather has to be inferred through distributional information: syntactic, semantic and morphophonological information in the input. For instance, with the phrase *el viejo amigo*, a beginning learner can infer the masculine gender of the noun *amigo* by attending to the agreement information on the determiner *el*<sub>(MASC)</sub> and the adjective *viejo*<sub>(MASC)</sub>. This syntactic information is a nearly

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infallible indicator of gender, since gender is generally defined in terms of agreement patterns (e.g., Corbett 1991). However, another source of information about grammatical gender is the form and meaning of the nouns themselves. Many languages have phonological, morpho(phono)logical, and/or semantic patterns on nouns that can be exploited to determine the gender of individual nouns. For example, Spanish has word markers at the end of nouns, *-o* and *-a*, that generally correspond to masculine and feminine gender, respectively (e.g., *chico* ‘boy’, masc.; *chica* ‘girl’, fem.). There are also semantic principles guiding the assignment of gender on some nouns in Spanish: male animates tend to be masculine, and female animates tend to be feminine.

A number of studies have provided evidence that learners can and do make use of this information. For instance, it has been demonstrated that L2 learners of Spanish are more successful at marking gender agreement with nouns that follow typical morphophonological patterns (i.e., *-o* for masculine and *-a* for feminine) than they are with nouns that do not follow this pattern, and that learners are also more accurate with nouns with “natural gender,” that is, nouns denoting male or female animates (e.g., Franceschina 2005) than those that do not.

However, it does not appear that L2 learners acquiring languages with gender will use all available information to determine the gender of nouns. Instead, learners’ use of information regarding gender seems to depend on specific properties of the target language. For instance, Kempe and Brooks (2001) found that L2 learners of Russian were faster at learning the gender of nouns that were marked with a diminutive suffix that makes gender transparent. However, similar morphology may be less useful to learners of Dutch; Unsworth (2008) found that L2 learners were not more successful at marking nouns with a diminutive suffix, even though it also makes gender transparent. In a similar contrast, although Franceschina (2005) showed that L2 learners of Spanish were more successful at marking gender on nouns with the endings *-o* and *-a*, Spinner and Juffs (2008) found that two L2 learners of German were no more successful at marking nouns with an *-e* ending that cues feminine gender. Thus it appears that it is not simply the type of information that is important, but rather the language-specific features of the input that learners receive. As Carroll (1999: p. 72) puts it, “not all patterns are created equal.”

Unfortunately, it is not yet clear which patterns in gender systems are the most easily exploited by learners. The best way to learn what factors make this information more accessible is to study learners’ behavior with a variety of linguistic systems. However, virtually all the research in this area to date has been conducted with European languages, specifically Spanish (Alarcón 2006; Andersen 1984; Cain et al. 1987; Fernández-García 1999; Finnemann 1992; Franceschina

2001, 2005; Schlig 2003), French (Carroll 1999; Hardison 1992; Holmes and de la Batie 1999; Holmes and Segui 2006), and German (Bordag et al. 2006; Delisle 1985; Spinner and Juffs 2008). Note that the gender systems in these languages share certain properties. That is, they all have either two or three genders; the genders are partially categorized by biological sex but appear otherwise largely arbitrary in terms of semantics; and most of the morphophonological and phonological cues to gender are suffixes.

As researchers of grammatical gender move towards approaches that focus on language-specific properties rather than simply the presence or absence of the gender feature (see, e.g., Lardiere 2008) it is important to examine learner behavior with a variety of L2s in order to determine which learner behaviors are language-specific and which are universal. To this end, we chose to investigate the acquisition of an understudied gender system, that of the Bantu language Swahili, with the intent of discovering if learners are able to exploit morphophonological and semantic information when assigning gender to nouns. We chose Swahili because its gender system differs from that in European languages in two major ways. First, the morphophonological information regarding gender is expressed as prefixes rather than at the ends of words. This issue is of particular interest because it has been suggested that language learners pay special attention to the ends of words (Slobin 1973, 1985 for L1; Cain et al. 1987 and Hardison 1992 for L2; but see Carroll 1999 for contrasting arguments). Second, the semantic information regarding gender is not related to biological sex as in European languages, but is instead organized by loose semantic principles such as TREE OR ACTIVE BODY PART, OR FORCE OF NATURE, as well as ANIMACY. We wanted to know whether our L2 learners would be sensitive to many of the abstract semantic distinctions in Swahili, or whether the binary nature of sex-based gender distinctions that exist in European languages may have a privileged cognitive status for L2 learners.

## 2 Previous research

### 2.1 The acquisition of the grammatical gender feature by L2 learners

A great deal of research in the past decade has focused on whether L2 learners are able to acquire formal features such as tense, number and gender if their first language lacks them. The Representational Deficit Hypothesis (Hawkins & Chan 1997; Smith & Tsimpli 1995) proposes that the acquisition of new features is

not possible after the critical period, but a number of researchers (e.g., Prévost & White 2000; Schwartz & Sprouse 1996) have proposed that native-like acquisition of a new feature is indeed possible (although “mapping” problems may cause problems with surface morphophonology). Research on the L2 acquisition of the grammatical gender feature has been mixed, with some supporting the Representational Deficit Hypothesis (e.g., Franceschina 2005) and some refuting it (e.g., White, et al. 2004). It is likely that a more nuanced approach, perhaps the Feature Reassembly approach suggested by Lardiere (2008, 2009), will provide more insight into this issue. The Feature Reassembly approach takes the specific properties of the first and second language into consideration, with the goal of determining how the contrast between the particular assembly of features in the native and target languages can make accurate production and comprehension easier or more difficult. For example, Chinese marks plural in limited ways with the marker *-men*, which is used in definite contexts. In order to acquire plural and definiteness in English, Chinese speakers must reassemble the two features onto English articles and the *-s* suffix.

While this study does not specifically examine feature reassembly, we hope to contribute to this area of research by providing clearer information about the language-specific properties that can affect the acquisition of gender.

## 2.2 Morphophonological and semantic information about gender

The most robust findings on learners’ use of nominal cues to gender come from research on Spanish, probably the best studied language with grammatical gender. L2 learners of Spanish appear to use both semantic and morphophonological information when acquiring gender.

Particularly robust is the finding that L2 learners of Spanish are more successful with agreement marking with nouns that follow clear morphophonological patterns: an *-o* ending for masculine nouns and an *-a* ending for feminine nouns. This finding appears to hold regardless of methodology, e.g. with grammaticality judgments (Franceschina 2005), oral production data (Fernández-García 1999; Finnemann 1992), picture selection tasks (Cain et al. 1987; Franceschina 2005; White et al. 2004), written production data (Schlig 2003), sentence completion (Alarcón 2006) and a cloze task (Franceschina 2005). Unfortunately, very few studies have examined less frequent morphophonological cues to gender in Spanish, such as derivational suffixes *-dad* (e.g., *felicidad*, ‘happiness’, fem.) and *-ción* (e.g., *transportación* ‘transportation’, fem.). There is only one study of which we are aware: Finnemann (1992) showed that three

L2 learners of Spanish failed to demonstrate greater success at producing agreement with derivational suffixes or any morphophonological markers other than *-o* and *-a*. Olipant (1998) found similar results for Italian; L2 learners demonstrated strong performance on nouns ending in *-o* and *-a*, but poor performance on nouns with other word endings that signaled masculine or feminine gender.

A second clear finding in L2 Spanish research on gender concerns nouns with “natural gender,” that is, nouns referring to humans and animals with biological sex. For instance, *mujer* ‘woman’, *madre* ‘mother’, and *vaca* ‘cow’ are all feminine nouns, while *hombre* ‘man’, *padre* ‘father’ and *toro* ‘bull’ are masculine nouns. A number of studies have shown that learners have higher rates of accuracy on agreement when nouns have these kinds of semantic information<sup>1</sup> (Andersen 1984; Finnemann 1992; Fernandez-Garcia 1999; and see Oliphant 1998 for Italian). Learners are less successful on inanimate nouns that appear to have an arbitrary gender assignment, such as *silla* ‘chair’, fem. or *libro* ‘book’, masc<sup>2</sup>. Interestingly, however, it appears that the use of semantic information may be secondary to the use of morphophonological information *-o* and *-a*. Schlig (2003) found that learners tended to use masculine agreement with *-o* nouns and feminine agreement with *-a* nouns even if it conflicted with the natural gender of the noun. Franceschina (2005) had similar results when learners supplied nouns in a cloze task; she found that learners tended to use a noun’s morphophonology rather than its semantics to determine gender when the two cues conflicted.

Two studies have examined L2 learners’ use of cues to gender in French. French has little consistent morphophonological information regarding gender, so its gender system is often referred to as “opaque.” However, Hardison (1992) found that learners did attend to the ends of words for information about gender, such as [-ɛ̃] for masculine nouns and [-in] for feminine nouns. Learners were most successful with endings that were frequent in the input and that were consistently associated with a certain gender. Carroll (1999) had a somewhat different result in her investigation into the importance of input in L2 acquisition of French gender. In her study, English-speaking novice learners of French tried to learn the genders of a series of nouns with morphophonological,

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<sup>1</sup> But see also Bruhn de Garavito & White’s (2002) study which showed that French-speaking learners of Spanish actually had more errors on agreement with nouns with natural gender.

<sup>2</sup> Note, however, that recent research has indicated that noun animacy can inhibit the processing of gender in on-line tasks because they have higher processing demands, both for L1 and L2 learners (e.g., Sagarra & Herschensohn 2011).

semantic or phonological information regarding gender. The most successful learners were those who studied nouns with semantic information referring to biological sex – that is, “natural gender.” But learners were also successful with what Carroll referred to as “nonnatural” semantic information for French: COLORS and THINGS THAT FLY. Learners were also able to make use of morphophonology to remember gender: the derivational suffix *-ure* (which generally indicates feminine) and deverbal compounds beginning with *pare* (which are generally masculine). A third group was presented with a noun list with phonological cues to gender: nouns ending in a consonant were feminine and those ending with a vowel were masculine. However, this group generally took a longer amount of time to learn the noun lists, and some were even less successful than the control group, who received a list with no information about gender on the nouns.

A few studies have also examined cues to gender in Germanic languages. These studies have generally reported that learners use semantic but not morphophonological information in acquiring gender. Unsworth (2008) found that learners were not successful at marking gender agreement with Dutch nouns with a morphophonological cue to gender: the diminutive suffix. Spinner and Juffs (2008) similarly found that two learners of German had no greater success marking agreement with nouns with an *-e* ending, which indicates feminine gender, than with nouns with no morphophonological information regarding gender. On the other hand, learners appeared to attend to semantic information; they were more successful at marking agreement with natural gender nouns. Interestingly, Delisle’s (1985) study of German gender demonstrated that learners appear to use semantic information even when it conflicts with morphophonological suffixes (unlike Schlig’s [2003] and Franceschina’s [2005] findings for Spanish). The learners in this study assigned feminine gender not only to animate nouns with female sex, but also to nouns that are associated with women, even if the noun had a morphophonological suffix that is generally masculine. For example, learners labeled *Eyelinier* feminine, even though the *-er* ending indicates masculine gender.

To summarize, studies on the L2 attribution of gender to nouns in European languages have found that morphophonological information can potentially be used by learners to assign gender to nouns, but the usefulness of the information varies greatly, both within and between languages. Semantic information (that is, natural gender) seems to be consistently used by learners, although it may be overridden by strong morphophonological cues in some cases.

There is one issue that merits brief discussion here. It is somewhat unclear whether gender cues can improve learners’ ability to label nouns with gender in

the lexicon (gender attribution) or whether it actually improves the marking of agreement, or both. In fact, these two aspects of gender are often confounded in research, as when a task involves “assigning gender” to a noun by providing the appropriate definite article (and thus invoking agreement). Indeed, even when learners are asked to simply label the gender of nouns, they frequently try out determiners and adjectives with different agreements to see what “sounds right” (Hardison 1992), so practically speaking, it is difficult to separate the two. Since it is not crucial to the current study, we leave the issue aside for the time being.

## 2.3 The Swahili gender system

### 2.3.1 Morphology

Based on Carstens (1991, 1993, 2000, 2005) and Contini-Morava (2002), every noun root in Swahili is a member of one of six genders<sup>3</sup>, which are traditionally labeled with numbers. Each noun root takes one set of agreements for singular marking and a different set for plural marking. In this sense it is similar to Italian, which has gender-specific markers of number.

Traditionally, singular marking is labeled with odd numbers and plural marking with even numbers. Each gender consists of noun roots with both singular and plural agreement systems, so we will refer to each gender as 1/2, 3/4, and so on. Table 1 illustrates the gender agreement relevant to this study; note that only 5 of the 6 genders are included<sup>4</sup>.

Gender agreement is marked on adjectives, numerals, pronouns, and verb subject and object markers, among other elements. Gender agreement is also marked on the noun root itself, in the form of a prefix. For example, in (1), the noun root *-tu* ‘person’ has the noun prefix for gender 1/2 singular (here abbreviated with the traditional label ‘1’), *m-*. Agreement is marked on the adjective with the prefix *m-* and on the verb with the prefix *a-*. Note that there are no articles in Swahili.

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<sup>3</sup> Traditional labeling includes at least four more genders, but these serve grammatical functions and are not parallel to genders 1-11/14. Gender in Swahili is often referred to as ‘noun class’, but since there is no theoretical distinction between the two (Carstens 1991; Aikhenvald 2003; Kihm 2005) we will generally use the term ‘gender’.

<sup>4</sup> Only 5 genders are included because they are the first ones taught to these Swahili students.



**Table 1:** Gender Agreement in Swahili Relevant to This Study

Gender / Number	Noun Prefix	Example noun	Adj and Numeral Agr.
1/2 sing.	m(w)- (& others)	m-tu 'person'	m-
1/2 pl.	wa- (& others)	wa-tu 'people'	wa-
3/4 sing.	m-	m-ti 'tree'	m-
3/4 pl.	mi-	mi-ti 'trees'	mi-
5/6 sing.	∅, ji-	tunda 'fruit'	∅, ji-
5/6 pl.	ma-	ma-tunda 'fruits'	ma-
7/8 sing.	ki-, ch-	ki-tabu 'book'	ki-, ch-
7/8 pl.	vi-	vi-tabu 'books'	vi-
9/10 sing.	∅, n-	ndizi 'banana'	∅, n-
9/10 pl.	∅, n-	ndizi 'bananas'	∅, n-

- (1) M-tu        m-refu a-    na-    soma.  
 1- person 1- tall 1.3rd-PRES-read  
 'The tall person is reading'  
 (PRES = present tense)

Example (2) illustrates the agreement markers for gender 1/2, plural (traditionally labeled class 2). Note that the agreement marker *wa-* is used on adjectives, numerals and verbs.

- (2) wa-tu        wa-refu wa-wili wa-    na-    soma.  
 2-person 2- tall 2- two 2.3rd-PRES-read  
 'The two tall people are reading'

Agreement markers for adjectives and numerals are presented in Table 1. Note that genders 1/2 and 3/4 share a common noun prefix and adjective/numeral agreement for singular nouns, but have different prefixes and agreement markers for plural nouns. Note also that genders 5/6 and 9/10 both contain some nouns with no prefix (e.g., *basi* 'bus' gender 5/6; *motokaa* 'car' gender 9/10). Many nouns without prefixes are loan words.

Of the agreement markers, the only ones that show significant variability are the noun prefixes for gender 1/2. Although most gender 1/2 nouns take the prefix *m(w)-*, they can also take prefixes that generally indicate other genders. For instance, *m-jusi/mi-jusi* 'lizard(s)' has prefixes of gender 3/4 nouns; *∅-daktari/ma-daktari* 'doctor(s)' has prefixes of gender 5/6 nouns; *ki-jana/vi-jana* 'teenager(s)' has prefixes of gender 7/8 nouns; and *∅-twiga/∅-twiga* 'giraffe(s)' has prefixes of gender 9/10 nouns. On all other agreement markers, such as those on adjectives

and verbs, these nouns take agreement with the 1/2 gender. Because gender 1/2 has the most variability in its morphophonological marking on the noun, we chose to investigate learners' sensitivity to morphophonological canonicity with gender 1/2 nouns<sup>5</sup>.

### 2.3.2 Semantics

Africanists are somewhat divided on the extent to which Swahili gender is organized by semantic properties. However, many agree that for most genders there are both nouns that adhere to certain semantic principles and nouns that belong to the gender for seemingly arbitrary reasons, possibly because a more coherent system has broken down over time (Nurse and Hinnebusch 1993; Zawawi 1979). This view is reflected in textbooks for Swahili, which often provide generalizations for each gender but note that a large number of nouns fail to fit the pattern (see, e.g., Wilson 1985). Contini-Morava's (2002) careful analysis of the Swahili gender system demonstrates that some nouns adhere to a few central semantic principles and others are more "peripheral," related to the center through chains of metaphor or metonymy that may not be readily apparent. For instance, one of the central semantic properties of gender 3/4 is TREES; the words for 'tree' (*mti*) and 'banana tree' (*mgomba*) are in this gender. However, also in gender 3/4 are words such as 'bag'/'pocket' (*mfuko*) and 'loaf of bread' (*mkate*), which are not part of the semantic center. Table 2 lists the semantic center for each gender relevant to this study and provides examples of central as well as peripheral nouns.

The gender with the most transparent and consistent semantics is 1/2, animates. Any human and nearly all animals are in this gender, and there are no inanimate objects in it. The gender with the least consistent semantics is – arguably – gender 9/10, which Contini-Morava points out is the "default" for loanwords (although some are also in 5/6).

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<sup>5</sup> It is important to point out that in this study, we view noun prefixes as morphophonological cues to gender, even though they are thought to be agreement markers (Carstens 1991, 1993, 2003, 2005). Our reasoning is based on arguments made elsewhere (Spinner and Thomas 2008) that English-speaking L2 learners do not treat noun prefixes as agreement but rather as a word marker, much like the *-o* and *-a* endings in Spanish. This view is possible because the nouns do not appear in speech or text in root form, but always have a prefix (which in some cases is a null or zero prefix). However, another way to view this contrast is as one between canonical or non-canonical agreement patterns.

**Table 2:** Semantic Aspects of Swahili Gender. (Adapted from Contini-Morava 2002)

Gender	Semantic center	Examples	Exceptions
1/2	Animates	woman, student, cat	-none-
3/4	Non-human/non-prototypical animal entities with vitality: Active body parts (generally paired) & trees.	tree, banana tree, hand	ball
5/6	Plant offspring (fruits & leaves)	apple, leaf, lemon	ear
7/8	Utilitarian objects small enough to hold in hand	book, cup, knife	Swahili
9/10	Default for loanwords	soccer ( <i>soka</i> ), car ( <i>motokaa</i> )	banana ( <i>ndizi</i> )

To what extent L2 learners will make use of this information is not clear. One possibility is that there is something about the male/female distinction typical of European languages which makes it more accessible to learners than a principle such as TREE OR ACTIVE BODY PARTS. For one thing, the male/female distinction is binary and therefore arguably simpler. Second, it is possible that there are three distinctions that are more “core” to gender, or to human language, than other semantic distinctions: male/female, human/non-human, and animate/inanimate. Corbett (1991: p. 30) observes that these three distinctions are common to languages with grammatical gender, even those that are totally unrelated, such as Dravidian and Northeast Caucasian. Even systems that are mostly organized around formal properties, such as morphophonology, have some members that can be classified according to semantic principles, again, generally one of these three core principles.

There is some evidence that both L1 and L2 learners may respond more readily to these semantic distinctions than to others. Carroll (1999) found that L2 learners were more successful at marking agreement with nouns with natural gender (that is, the male/female distinction) than with nouns with arbitrarily chosen semantic patterns such as COLOR or THINGS THAT FLY. Children, too, may be more likely to use core semantic patterns; Gagliardi, et al. (2009) found that children acquiring Tsez appeared to use animacy and biological sex to assign gender to nouns, but they ignored “minor” semantic patterns such as PAPER and CLOTHING. It also appears that children may often acquire animate gender marking first; Suzman (1980) observed that children acquiring Zulu generally begin using gender 1a noun prefixes first (that is, the human class) along with a default noun prefix (from class 5).

Based on this evidence from language typology and language acquisition, it appears that the distinctions human/non-human, animate/inanimate, and male/female may be less marked and thus easier for L2 learners to access, while other semantic patterns, such as TREE OR ACTIVE BODY PARTS, PAPER OR CLOTHING may be more marked and thus more difficult to access.

## 3 The current study

### 3.1 Research questions

Our research questions are:

1. Are learners sensitive to morphophonological information regarding gender in Swahili: i.e., noun prefixes?
2. Are learners sensitive to semantic information regarding gender in Swahili? In particular, are they sensitive to both core semantic patterns and minor ones?
3. When morphophonological and semantic information conflict, which is favored by L2 learners?

Based on the previous research outlined above, we predicted that learners would be sensitive to both morphophonological and semantic information regarding gender in Swahili, although it was not clear if it would be the same for all genders, since the consistency and type of the information differs for each class. Based on findings from Schlig (2003) and Franceschina (2005), we predicted that morphophonological cues might supercede semantic cues when they conflicted, but again it was not clear if that would be the case for all of the genders. In terms of semantics, we predicted that learners would be sensitive to core semantic patterns (specifically, animacy) but not as sensitive to minor semantic patterns such as TREE OR ACTIVE BODY PART.

We measured learners' use of morphophonological and semantic information in three ways: First, we measured their success at marking gender agreement with singular and plural nouns that follow semantic and morphophonological patterns versus those that do not follow these patterns (Part 1). Second, we asked learners directly about the semantic and morphophonological information that they use when learning Swahili nouns (Part 2). Third, we analyzed learners' responses on a written task in which they assigned gender to 80 imaginary Swahili nouns with conflicting or congruent cues to gender (Part 3).

## 3.2 Parts 1 and 2

### 3.2.1 Participants

Twenty-six English-speaking learners enrolled in Swahili courses at a large university in the United States were recruited to participate in the first and second parts of the study. The students received extra credit in their Swahili course for their participation. There were 12 students in their second semester of study and 14 students in their fourth semester of study. Ages ranged from 18–48 for the second semester group ( $M = 22.9$ ,  $SD = 8.3$ ) and 19–34 for the fourth semester group ( $M = 22.0$ ,  $SD = 4.0$ ). All of the learners had previously studied a language with grammatical gender: Spanish, French, German, Arabic or Russian. Five of the 4<sup>th</sup> semester students had spent some time in Africa. Four of these students had spent between three and eight weeks in a Swahili-speaking area, and one had spent four months, but reportedly with inconsistent exposure to Swahili.

### 3.2.2 Part 1 materials

To investigate research questions 1 and 2, we examined learners' agreement marking on adjectives to determine whether learners are more successful at marking agreement with morphophonologically canonical and semantically canonical nouns than with noncanonical nouns. For research question 1, regarding morphophonological information about gender, we included nouns from gender 1/2, because it is the only gender that has consistent semantic cues but inconsistent morphophonological cues to gender on the noun (the noun prefix). Morphophonologically canonical nouns have the prefix that is typically associated with gender 1/2 (*m-/wa*), while morphophonologically noncanonical nouns have prefixes that are typically associated with different genders (no prefix, *ki-/vi-*, etc.). In order to investigate research question 2, regarding semantic information about gender, we included nouns from gender 3/4, because it has a consistent noun prefix (*m-*) and has a clear semantic center as outlined in Contini-Morava (2002), but also contains a large number of nouns that do not appear to adhere to that semantic principle. Semantically canonical nouns adhere to the central principle of gender 3/4 as outlined by Contini-Morava (2002), (TREE OR ACTIVE BODY PART), while semantically noncanonical nouns do not.

Nouns were tested in a singular condition and a plural condition, since the agreement markers differ depending on number. In each condition, four groups of nouns were tested: morphophonologically canonical gender 1/2 nouns, morphophonologically noncanonical gender 1/2 nouns, semantically canonical gender

Table 3: Nouns Elicited in Part 1

Gender 1/2 mor. Canon	Gender 1/2 mor. noncanon	Gender 3/4 sem. canon.	Gender 3/4 sem. noncanon
mgonjwa 'sick person'	daktari 'doctor'	mti 'tree'	mlango 'door'
mfalme 'king'	simba 'lion'	msitu 'forest'	mfuko 'bag'
mwalimu 'teacher'	hakimu 'judge'	mgomba 'banana tree'	mkate 'loaf of bread'
mwanafunzi 'student'	twiga 'giraffe'	mguu 'foot'	mpira 'ball'
mkulima 'farmer'	paka 'cat'	*mchungwa 'orange tree'	*mto 'river'
mzee 'old person'	ndege 'bird'	*mkono 'hand'	*mchezo 'game'
mbwa 'dog' <sup>6</sup>	*kiongozi 'leader'	*mhogo 'cassava'	*mji 'city'
mbuzi 'goat' <sup>6</sup>			

\* = noun was included in plural condition only

3/4 nouns, and semantically noncanonical gender 3/4 nouns. Table 3 lists the nouns in each group.

The nouns were selected from the first several chapters of the learners' classroom materials, which were designed by the coordinator of the Swahili courses. The groups of nouns were also matched for learner familiarity. In order to achieve this, we had a comparable group of 20 English-speaking learners of Swahili at the same university with the same textbook (8 in their 2<sup>nd</sup> semester and 12 in their 4<sup>th</sup> semester) rate the nouns on a scale of familiarity from 1 to 3 (1 = I do not know this word; 2 = I've heard of this word, but do not know it well; 3 = I know this word). The nouns used in both the singular and plural condition were very familiar to the learners (singular condition  $M = 2.83$ ;  $SD = .44$ ; plural condition  $M = 2.87$ ;  $SD = .42$ ). Importantly, the familiarity ratings for each category were not significantly different based on a one-way ANOVA analysis (singular condition:  $F(3, 18) = .06$ ;  $p = .98$ ; plural condition:  $F(3, 24) = .34$ ;  $p = .79$ ).

In the singular noun task, the learners described the difference between two pictures. The difference was describable with common adjectives that required agreement marking. For instance, one pair of cards showed a tall teacher and a short teacher. To form a grammatical utterance, gender 1/2 singular agreement is required on the adjectives *-refu* 'tall' and *-fupi* 'short', i.e., *mrefu* and *mfupi*; therefore, the expected response involved the phrases *mwalimu mrefu* and *mwalimu mfupi*, indicating 'this teacher is tall' and 'this teacher is short.' Thus

<sup>6</sup> Mbwa 'dog' and mbuzi 'goat' appear morphophonologically canonical in the singular, but they do not take *wa-* as a noun prefix in the plural as do other class 1/2 nouns. For this reason, *mbwa* and *mbuzi* are not used in the plural numeral marking task.

each set of cards in the singular condition elicited two instances of adjective agreement. There were 14 sets of pictures for gender 1/2 singular nouns and 8 sets for gender 3/4 singular nouns<sup>7</sup>. Eight of the gender 1/2 picture pairs showed nouns with canonical morphophonology; six showed nouns with noncanonical morphophonology. All of the gender 1/2 nouns had canonical semantics. Of the eight picture pairs for gender 3/4 nouns, four showed nouns with canonical semantics and four showed nouns with noncanonical semantics. All had canonical morphophonology. The adjectives required for the task were ‘tall’, ‘short’, ‘big’, ‘small’, ‘white’, ‘black’, ‘red’, ‘fat’, and ‘thin’, all of which were taken from the classroom materials.

To elicit numeral agreement on plurals, we used pictures of plural nouns in each of the four categories (morphophonologically canonical and noncanonical, semantically canonical and noncanonical). Most of the nouns were repeated from the singular task; however, seven additional nouns (taken from the same course materials and matched for frequency as shown above) were included to increase the number of tokens of agreement marking (in that this task involved only single pictures, not pairs). We asked learners to describe the pictures by saying how many of each item they saw. This task elicits agreement on the numeral, e.g., *walimu wawili* ‘two teachers.’ The agreement on numerals is the same as agreement on adjectives. There were 13 pictures for gender 1/2, 6 morphophonologically canonical and 7 morphophonologically noncanonical. There were 14 pictures for gender 3/4, 7 semantically canonical and 7 semantically noncanonical. One semantically canonical card, *mhogo* ‘cassava,’ had to be discarded because few of the learners recognized the picture. The cards were piloted on two native speakers of Swahili, who produced the expected responses at 100% accuracy. The conditions for both the singular and plural elicitation tasks are summarized in Table 4.

### 3.2.3 Part 1 procedure

One of the two experimenters conducted the task one-on-one with each participant. Instructions were given in English, and learners performed the task with four sets of practice pictures before beginning. Learners received no feedback on their responses; however, they were reminded to be “as specific as possible” when referring to people. For instance, if learners used a term such as *mtu* ‘per-

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<sup>7</sup> A greater number of class 1/2 nouns were included because of a second research interest on agreement marking for class 1/2 verbs and adjectives. That analysis is not presented here.

**Table 4:** Categories of Elicited Nouns in Part 1

Gender & Number	Noun type	Number of tokens	Example
1/2 sg	Mor. canonical, sem. canonical	16 (8 sets of 2)	m-zee ‘old person’
1/2 sg	Mor. noncanonical, sem. canonical	12 (6 sets of 2)	daktari ‘doctor’
3/4 sg	Mor. canonical, sem. canonical	8 (4 sets of 2)	m-ti ‘tree’
3/4 sg	Mor. canonical, sem. noncanonical	8 (4 sets of 2)	m-pira ‘ball’
1/2 pl	Mor. canonical, sem. canonical	6	wa-zee ‘old people’
1/2 pl	Mor. noncanonical, sem. canonical	7	ma-daktari ‘doctors’
3/4 pl	Mor. canonical, sem. canonical	7	mi-ti ‘trees’
3/4 pl	Mor. canonical, sem. noncanonical	7	mi-pira ‘balls’

son’ to describe a picture of a king, they were asked to be more specific, and the relevant feature (e.g., a crown) was pointed out. If they could not produce the expected response, they were asked to simply say as much as they could and move on. There was no mention of gender before or during the presentation of stimuli. Pictures were presented in one of two random orders. Fillers were 13 sets of pictures that required no adjective agreement but instead elicited sentences with verbs (e.g., a picture of a woman singing and the same woman walking).

### 3.2.4 Part 2

After the tasks, there was a short, open-ended discussion about gender in Swahili. The investigators posed a number of questions about which genders seemed the easiest or hardest to learn and what techniques were used to try to remember genders. The purpose of this informal interview was to discover whether the learners were aware of semantic and morphophonological patterns in the gender system and to what extent they make use of them when trying to learn the gender of new nouns.

### 3.2.5 Analysis and results for part 1

Responses on the picture description task were transcribed by the two authors. Each response was coded as correct or incorrect for adjective agreement. Where there was disagreement about a learner’s response or where the response was



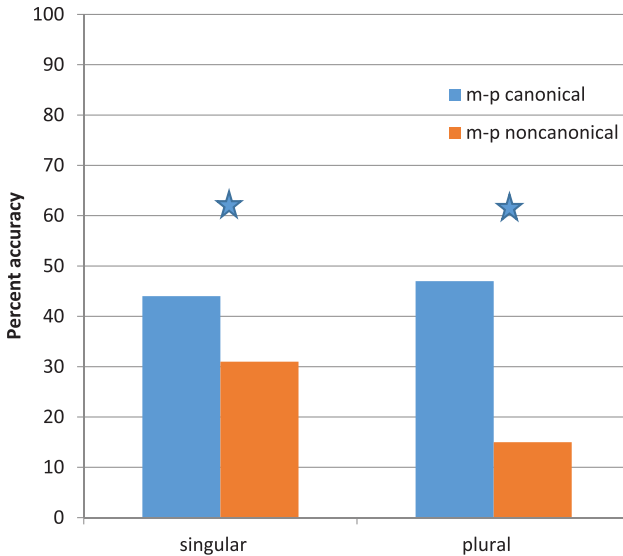
inaudible, the token was discarded (less than .5% of the data). Uses of incorrect adjectives or numerals (e.g., ‘black’ instead of ‘white’ or ‘four’ instead of ‘two’) were included in the result, as long as it did not affect the marking of agreement.

The learners produced some unexpected responses, particularly on the cards depicting humans in gender 1/2. For instance, one card showed a picture of a king, which was intended to elicit a morphophonologically canonical noun (*mfalme*); however, it also elicited morphophonologically noncanonical nouns (*kiongozi* ‘leader,’ *rais* ‘president’). Responses on the “king” card were therefore split as canonical or noncanonical depending on how the learner answered. Other answers that were plausible (e.g., *mvulana* ‘young man’ instead of *mwanafunzi* ‘student’) were also included in the scoring in the appropriate morphophonological category. These unexpected responses accounted for 6.5% of the data in the elicitation task but less than 1% of the responses were in a different category with respect to their canonicity.

First we present the results for the gender 1/2 nouns. Out of 1066 possible responses, there were 855 usable answers, 331 from the 2<sup>nd</sup> semester group and 524 from the 4<sup>th</sup> semester group. Six responses were discarded because the raters disagreed on the exact transcription of the response, and 205 other responses were unusable because the learner failed to provide an appropriate response (the noun and an adjective). The majority of these unusable responses (155) were in the 2<sup>nd</sup> semester group. An answer was considered to be correct if it had the correct agreement marking on the adjective, e.g., *mwanafunzi mrefu*, ‘student tall’. Nearly all of the errors involved the use of a default form (the citation form or class 9/10 form, *nrefu*) or a missing agreement marker, e.g., *refu*.

Because of the large number of unusable responses, it was determined that the percentage of accuracy for each learner was the best way to represent these data. A repeated measures ANOVA with morphophonological canonicity as a within-subjects factor was conducted. Because learners of different levels of instruction were combined, learner level (2<sup>nd</sup> or 4<sup>th</sup> semester) was included as a between-subjects factor to determine whether the pattern of responses changed as learners became more advanced. Singular and plural nouns were measured separately because the agreement marking differs depending on number. In order to be included, each learner had to produce at least four responses in each category (an arbitrary number): one 2<sup>nd</sup> semester learner had to be removed from the analysis because of a failure to produce any usable responses in both the singular noncanonical category and for class 3/4 nouns.

There was no interaction between canonicity and level for either singular or plural nouns, which indicates that the basic pattern of response is the same for learners at both levels of instruction (singular nouns  $F(1, 23) = .29, p = .60$ ; plural nouns  $F(1, 23) = .056, p = .82$ ).

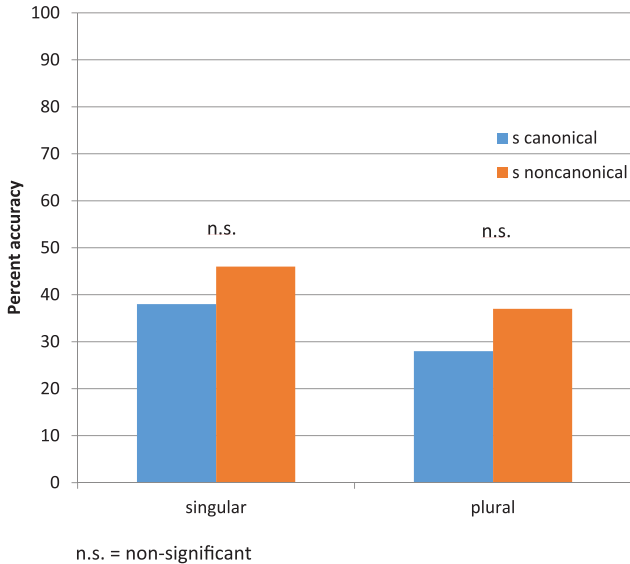


**Fig. 1:** Gender 1/2: Accuracy on Morphophonologically Canonical/Noncanonical Nouns

Figure 1 shows the findings for morphophonological canonicity. In general, learners were significantly more accurate at marking agreement on adjectives modifying morphophonologically canonical singular and plural nouns. On singular nouns there was a relatively small effect of canonicity,  $F(1, 23) = 13.2$ ,  $p = .001$ ;  $d = .38$ . However, on plural nouns, there was a somewhat larger effect;  $F(1, 23) = 20.7$ ,  $p < .001$ ;  $d = .52$ .

The results for gender 3/4 nouns are presented in Figure 2. Out of 754 possible responses, 596 were usable (244 for 2<sup>nd</sup> semester learners and 352 for 4<sup>th</sup> semester learners). Three responses had to be discarded because the raters disagreed on the transcription of the response, and 155 other responses were unusable because the learners did not provide an appropriate response. The majority of these unusable responses (104) were in the 2<sup>nd</sup> semester group.

The same analysis, a repeated measures ANOVA, was conducted as with the class 1/2 nouns. The students did not perform significantly more accurately on the semantically canonical nouns,  $F(1, 23) = .10$ ,  $p = .75$ . The result for plural nouns is also nonsignificant,  $F(1, 23) = .83$ ,  $p = .37$ . As with the previous analysis, there was no interaction between canonicity and level for either singular nouns or plural nouns, indicating that the pattern of response is the same for the two learner levels (singular nouns,  $F(1, 23) = .36$ ,  $p = .55$ ; plural nouns  $F(1, 23) = .01$ ,  $p = .91$ ).



**Fig. 2:** Gender 3/4: Accuracy on Semantically Canonical/Noncanonical Nouns

### 3.2.6 Analysis and results for part 2

The interviews with learners were transcribed by the two investigators and analyzed for patterns in responses with regard to agreement marking and morphophonological and semantic information regarding gender.

In the interview, students talked about their experience learning gender in Swahili. All of the learners reported using morphophonology (the noun prefix) to help remember the gender of nouns. However, they added that certain genders were easier than others in this regard. For instance, many learners (14/26) noted that gender 7/8 (with noun prefixes *ki-* for singular and *vi-* for plural) is particularly easy to categorize for gender because the noun marking is so distinctive and consistent. In other words, no other gender uses *ki-/vi-* to mark gender, and only *ki-/vi-* is used with gender 7/8 nouns.

When asked whether they used semantics to guide their acquisition of Swahili gender, many learners (16/26) said that noun meanings were a good indicator of gender for gender 1/2 nouns, because those nouns are always animate. Only five learners appeared to be aware of any other semantic generalizations in genders; the rest of the learners said that the distribution of nouns was basically random except for gender 1/2. (Interestingly, the learners who were aware of se-

mantic generalizations in other genders did not appear to have any advantage in marking agreement with semantically canonical nouns.)

### 3.2.7 Discussion of parts 1 and 2

We found that learners were more accurate at marking agreement with class 1/2 Swahili nouns that are morphophonologically canonical rather than noncanonical, but not more accurate at marking agreement with class 3/4 nouns that are semantically canonical rather than noncanonical.

First, we take this finding as evidence that learners are sensitive to morphophonological information on Swahili nouns, and that they can use this information to facilitate the assignment of gender to nouns in Swahili. Learners confirmed this interpretation in interviews, where they acknowledged using noun prefixes to classify nouns. This finding is interesting because the morphophonological markers differ from those of previously studied languages in that they are prefixes, rather than suffixes. This study shows that learners attend to the beginnings of words for gender information, even if inflection in the learners' native language always follows the root, as it does in English. (One study has suggested that learners may even attend *more* to word beginnings than endings when acquiring gender; Frigo and McDonald [1998] found that adult English speakers acquiring an artificial language with two genders were more successful at using phonological information at the beginnings of words than at the end.)

We also found that the effect size for morphophonological canonicity was somewhat greater for gender 1/2 plural nouns than for gender 1/2 singular nouns. One possible explanation for this difference has to do with the form of the noun prefix. Remember that the noun prefix for gender 1/2 singular nouns is homophonous with the noun prefix for 3/4 singular nouns (*m-*). The prefix for these two genders is therefore a less reliable cue than the prefixes for other genders, which are each unique (see MacWhinney et al. [1989] on cue strength). On the other hand, the cues for gender 1/2 plural nouns and 3/4 plural nouns are distinct (*wa-* for 1/2 and *mi-* for 3/4). For these two genders, therefore, the morphophonological information on plural nouns is a much better indicator of gender than the cues on singular nouns, and it is not surprising if performance increases with better morphophonological information. (Native speakers are also sensitive to these kind of distributional issues; see e.g., Franck et al. [2008]).

In regard to semantic information, our findings differ somewhat from previous research. Although previous research has shown that L2 learners are more accurate at marking gender agreement with nouns with semantic information – that is, nouns indicating animates of either male or female biological sex – than with other nouns, these L2 learners do not appear to be significantly more

accurate on nouns with semantic information regarding gender. This finding is reinforced by the interviews, in which most learners claimed to be unaware of semantic generalizations other than the fact that gender 1/2 nouns are animates, despite instruction that outlines semantic patterns for each gender.

Why don't these learners use semantic information? There are several possibilities. First, the nouns in Swahili gender 3/4, which was examined here, do not uniformly follow a single semantic principle. Rather, there is a semantic center in a web of semantic relations (TREE OR ACTIVE BODY PART), which may or may not be evident to speakers or learners of the language. Presumably, it is difficult to detect the semantic patterns and to utilize them as an aid to gender assignment. However, this can only be part of the story, since the genders in European languages do not follow a single semantic principle, either, but learners are still able to make use of natural gender.

Note, however, that we are not arguing that it is impossible to use semantic information other than animacy, humanness or biological sex. Rather, it may simply be more difficult or take longer. It is possible that with a larger group, or with more advanced learners, we would see that learners are able to use this semantic information to classify 3/4 nouns. In her study, Carroll (1999) found that learners could use arbitrarily chosen patterns (COLORS OR THINGS THAT FLY) to acquire gender, just not as readily as with the core semantic pattern of biological sex. As Carroll (p. 73) argued, learners seemed to be guided by a natural ability to find semantic patterns: "it appears as if the participants were guided in their identification of cues for gender by internal resources of a symbolic sort . . . Participants were able to detect, encode, and generalize semantic patterns of an arbitrary sort, patterns that have no correlate in the L1."

The results from Part 1 and Part 2 leave some unanswered questions. First, although we found that learners were not significantly more accurate when marking nouns with semantic information in gender 3/4, we were unable to ascertain whether they used semantic information to acquire gender on 1/2 nouns, although in interviews they generally claimed that they did. Second, we did not know whether the morphosyntactic or the semantic information would be used the most by learners to assign gender, particularly when the two cues clashed. Part 3 was designed to look at gender assignment directly to examine these issues.

### 3.3 Part 3

#### 3.3.1 Materials and procedure

The task in Part 3 was to assign gender to a written list of 80 nonce nouns with brief definitions. The nonce nouns were existing Swahili words with initial and

final letters or syllables changed to make them unrecognizable. The definitions were obscure animals, objects, people and trees for which the learners were very unlikely to know a real Swahili word, e.g. ‘horse chestnut tree,’ ‘duchess,’ and ‘Siberian tiger’. The directions stated, “Decide which noun class each of the following imaginary Swahili words belongs in. Write the number in the blank. You will have to guess, since there is no right answer.” An example of each gender was provided, using traditional pedagogical terminology for noun class – that is, odd numbers for singular and even for plural. Most participants completed the task in less than 5 minutes.

The nonce nouns were designed to have either congruent or incongruent morphophonological and semantic information regarding to gender. An example of a congruent noun is *kisemi* ‘clasp,’ which has the typical prefix of gender 7/8 (*ki-*) and the typical meaning of a gender 7/8 noun: UTILITARIAN OBJECT SMALL ENOUGH TO HOLD IN HAND (Contini-Morava 2002). An example of an incongruent noun is *mname* ‘paring knife,’ which has a typical prefix of gender 1/2 or 3/4 (*m-*), but the typical meaning of a gender 7/8 noun. All central semantic meanings were taken from Contini-Morava’s (2002) list, as shown in Table 2. There were also nouns that were incongruent for number marking, but those results will not be discussed here.

There were five sets of five nouns each that were congruent for genders 1/2, 3/4, and 7/8. There were seven sets of five nouns each that were incongruent for the same genders. Also included were nouns without prefixes, which belong to either gender 5/6 or 9/10. The conditions are shown in Table 5. The list was presented in a random order.

**Table 5:** Part 3: Congruent and Incongruent Noun Conditions

Nonce word example	Morphological Information	Semantic Information	Type
mtako ‘coward’	1/2 or 3/4 sg.	1/2 sg.	congruent
mrobo ‘sassafrass tree’	1/2 or 3/4 sg.	3/4 sg.	congruent
kisemi ‘clasp’	7/8 sg.	7/8 sg.	congruent
waregoti ‘unwelcome people’	1/2 pl.	1/2 pl.	congruent
miruti ‘saplings’	3/4 pl.	3/4 pl.	congruent
fugaja ‘siberian tiger’	5/6 or 9/10 sg.	1/2 sg. (animal)	incongruent (but typical)
kiberi ‘tutor’	7/8 sg.	1/2 sg.	incongruent
kidata ‘evergreen forest’	7/8 sg.	3/4 sg.	incongruent
mdumu ‘pouch’	1/2 or 3/4 sg.	7/8 sg.	incongruent
kati ‘helpful person’	5/6 or 9/10 sg.	1/2 sg.	incongruent
tapo ‘white ash tree’	5/6 or 9/10 sg.	3/4 sg.	incongruent

### 3.3.2 Participants

For Part 3, we recruited 21 English-speaking learners enrolled in Swahili courses at the same university as in Parts 1 and 2. Ages ranged from 19 to 30 ( $M = 22.4$ ,  $SD = 3.7$ ). Of these learners, there were 12 students in their 2<sup>nd</sup> semester of study and 9 students in their 4<sup>th</sup> semester of study. All of the students had previously studied a language with grammatical gender, most commonly Spanish. Three 4<sup>th</sup> semester learners had spent some time in an African country, between three and six weeks. The students received extra credit in the course for their participation.

Five native speakers also completed the task. The native speakers were instructors at the university and their acquaintances, three from Tanzania and two from Kenya.

### 3.3.3 L2 learner and native speaker results

When the cues to gender were congruent, learners were quite accurate at using them to assign gender to nouns; learners were correct (in the sense that they choose the gender that matches the cues) 89% of the time (467/525). This result indicates that learners used semantic and/or morphophonological information to perform the task, since learners could not have used syntactic information (agreement marking) to label gender on these nonce nouns with no context.

When the cues to gender were incongruent, an interesting picture emerged. Overall, learners appear to favor morphophonological information to semantic information. They chose the gender corresponding with the morphophonological cue 69% of the time (506/735) and the gender corresponding with the semantic cue only 18% of the time (132/735). The rest of the responses (13%, 97/735) corresponded to neither one.

These results are parallel to the native speakers'. The native speakers were 98% (123/125) accurate on congruent nouns. On incongruent nouns, they used morphophonological information 71% of the time (107/150) and semantic information 14% of the time (21/150). The rest of the responses (15%, 22/150) corresponded to neither one.

Learners' use of semantic or morphophonological information depended strongly on the particular gender. Learners used semantic information to label gender 1/2 (animates) much more often than other genders. When nouns had a meaning corresponding to gender 1/2 nouns but a conflicting noun prefix (e.g., *ki-* or *ji-*), learners followed the semantic information and assigned gender 1/2 to the noun 36% (114/315) of the time. Additionally, learners were highly resistant to

assigning an inanimate noun to gender 1/2: not a single learner assigned nouns with the gender 1/2 prefix to gender 1/2 when the definition was an inanimate object (0/105).

Learners used semantic information much less often for other genders. With nouns that had a TREE OR ACTIVE BODY PART meaning (typical of gender 3/4) but a conflicting noun prefix, learners chose the gender corresponding to the semantic cue only 10% (22/210) of the time. On the other hand, learners appeared to use semantic information the least often with gender 7/8 nouns. In fact, not a single noun was assigned to gender 7/8 based solely on the meaning of the noun (0/210); rather, learners assigned gender 7/8 to nouns only on the basis of morphophonology, or chose a default gender (5/6 or 9/10). The results are summarized in Figure 3.

Again, these results parallel the native speakers' results. Animacy appeared to be the strongest semantic cue for these speakers; incongruent animate nouns were assigned gender 1/2 38% (19/50) of the time, and no speaker assigned inanimate objects to gender 1/2 (0/25). However, nouns with TREE OR ACTIVE BODY PART meanings were assigned on the basis of semantics only 4% of the time (2/50). Similarly to the L2 learners, no native speaker assigned gender 7/8 to nouns based on semantics alone (0/50). See Figure 3 for a summary.

Morphophonological information was important in the assignment of gender to all of the tested noun categories, both for L2 learners and for native speakers. We begin with the learner results. For incongruent nouns with a *ki-* prefix (typical

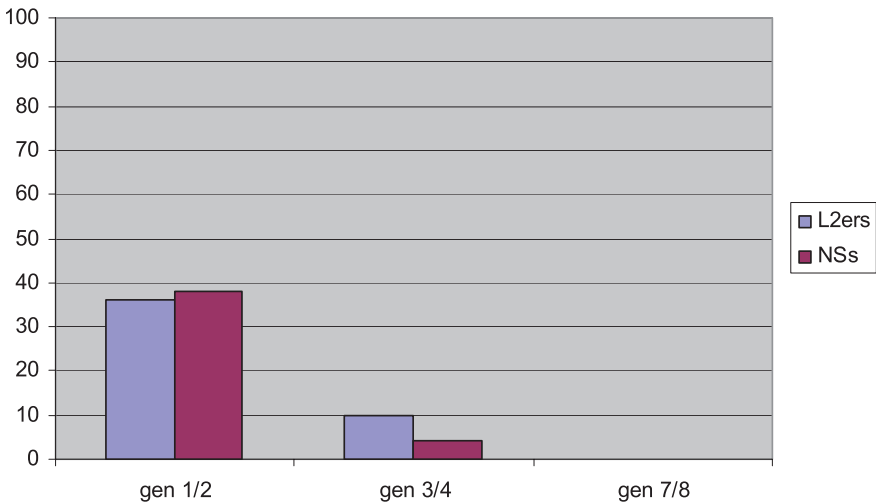


Fig. 3: Percent of Incongruent Nouns Assigned According to Semantic Information



of gender 7/8) learners assigned gender based on the morphophonological cue 70% of the time (147/210). For nouns with no prefix (typically either gender 9/10 or 5/6), learners also assigned gender based on the morphophonological cue 70% of the time (292/420). Morphophonological cues were used the least for nouns with the *m-* prefix, (typical of gender 1/2 and 3/4 nouns). Nouns with *m-* prefixes were assigned on the basis of morphophonology 53% (56/105) of the time.

There are probably two reasons that learners chose to assign gender less frequently on the basis of the *m-* prefix than other prefixes. First, animacy information for gender 1/2 appears to be very strong and may have “overridden” the morphophonological cue in this case. Second, because the *m-* prefix is shared between gender 1/2 singular and gender 3/4 singular, it is not as transparent as other cues in that there is not a one-to-one correspondence between the prefix and gender.

Native speakers performed similarly to the learners. Incongruent nouns with *ki-* prefixes (typical of gender 7/8) and no prefix (typical of genders 9/10 or 5/6) were assigned on the basis of morphophonology 85% (64/75) and 64% (33/50) of the time, respectively. On the other hand, incongruent nouns with *m-* prefixes (typical of gender 1/2 or 3/4) were assigned gender 1/2 or 3/4 40% of the time (10/25). Thus the native speakers, like the L2 learners, use morphophonological information less often for gender 1/2 nouns than for other genders. These findings are summarized in Figure 4.

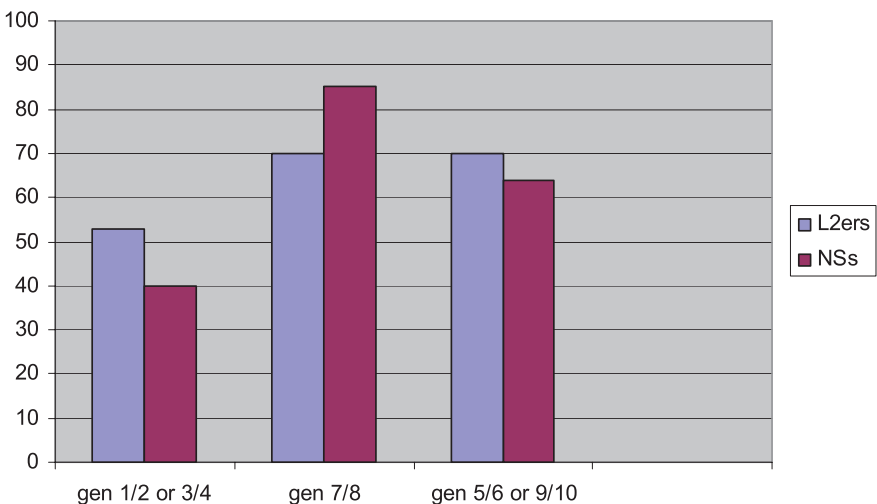


Fig. 4: Percent of Incongruent Nouns Assigned According to Morphophonology

### 3.3.4 Discussion of part 3

In Part 3, the learners' success at marking the congruent nouns, at 89% accuracy, indicates that learners do indeed use both morphophonological and semantic information to assign gender to nouns in Swahili. Since the task involved assigning gender to nouns out of context, no syntactic information could have been used; rather, learners were forced to rely on the meaning and form of the noun itself. Based on the results for incongruent nouns (69% assigned by morphophonology and 18% by semantics), learners appear to primarily rely on morphophonological information as opposed to semantic information to assign gender to nouns. Note that this behavior was similar to the native speakers', suggesting that they may respond in similar ways to semantic and morphophonological information in Swahili. The result also corroborates Schlig (2003) and Franceschina (2005)'s findings that learners of Spanish tended to assign gender to nouns on the basis of morphophonology, even when it conflicted with semantic information.

However, we found that in certain cases, strong semantic information can “override” this tendency to rely on morphophonological information. Specifically, this appears to be the case with ANIMACY. Learners use semantic information to assign gender much more for animate nouns than for nouns with meanings such as TREE OR ACTIVE BODY PART, OR UTILITARIAN OBJECT SMALL ENOUGH TO HOLD IN HAND. There are two possible explanations for this finding. First, learners are likely sensitive to the fact that animate nouns, which are all in gender 1/2, are more variable in terms of morphophonological cues, but less variable in terms of semantic cues, than other genders. Second, it is possible that semantic categories such as +/- ANIMATE, which are common to many languages, may have a privileged cognitive status for these L2 learners and are therefore more readily used to determine gender.

Based on these findings, as well as the findings from parts 1 and 2, we propose the Semantic Core Hypothesis (SCH). The SCH states that second language learners will be sensitive to three core semantic patterns in grammatical gender: animacy, male/female sex, or humanness, which are principles that operate in a large number of languages with gender. On the other hand, learners will be less sensitive to other types of semantic patterns.

We have also provided evidence that learners are sensitive to prefixes as well as suffixes as markers of grammatical gender. This is the case even when the learners' native language has no inflectional morphemes that are prefixes. In fact, the use of these morphophonological markers appeared to “override” a reliance on minor semantic patterns (but not core semantic patterns).

## 4 Conclusions, limitations, and directions for future research

We found that English-speaking learners of Swahili were sensitive to morphophonological information about gender on class 1/2 Swahili nouns in that they were more accurate on morphophonologically canonical nouns. This finding corroborates previous research that shows that learners of European languages are also sensitive to this information (e.g., Franceschina 2005), although note that in European languages, the cues to gender are suffixes, while in this case they are prefixes. Additionally, we found that, when assigning gender to nouns, learners appear use morphophonology primarily, as has been found for Spanish (Schlig 2003; Franceschina 2005). However, this is only the case when morphophonology does not conflict with a core semantic pattern.

We also found that learners were not sensitive to semantic information on class 3/4 nouns in that they were not more accurate on the semantically canonical nouns, a finding that is different than what has been reported for European languages (e.g., Franceschina 2005). There is evidence that learners use ANIMACY more than other semantic principles such as TREE OR ACTIVE BODY PART, or UTILITARIAN OBJECT SMALL ENOUGH TO HOLD IN HAND. Learners also report being more consciously aware of animacy than other semantic information, and they are more likely to assign gender based on animacy than other semantic principles. This trend may stem from two separate causes: first, animacy in Swahili is more consistently associated with a particular gender (1/2) than are other cues to gender, and learners may be sensitive to this fact; and second, categories such as BIOLOGICAL SEX, HUMANNESS and ANIMACY may have a privileged cognitive status relative to other semantic principles. We propose the Semantic Core Hypothesis, which predicts that learners will be more sensitive to these core semantic properties than to crosslinguistically marked or minor concepts such as TREE OR ACTIVE BODY PART.

Future studies could investigate this hypothesis. One approach would be to use an artificial language tailored to have various core or minor semantic principles acting as cues to gender. Another would be to examine gender assignment in a variety of Bantu languages, which often differ in terms of the consistency and distribution of semantic principles in each gender. For instance, Hobson (1999) investigated English-speaking learners of Xhosa, which has some animate nouns in both class 1 and class 9. Hobson suggested that the learners considered the class 1 gender agreement marker to be similar to the pronoun “he/she” – that is, human animates – and the class 9 marker to be similar to “it” for non-human animates. The class 1 marker was therefore overgeneralized to human referents

that fall into class 9. Thus it seems possible that some overgeneralization may take place depending on how learners analyze the core semantic principles of HUMANNESS and ANIMACY. On the other hand, Hobson does not report overgeneralizations based on minor semantic principles.

One important limitation to this study is that the selection of nouns used in Part 1 was matched for frequency by self-report (given that learners at this level are rarely exposed to authentic materials). However, given this rather crude measure, it cannot be certain whether the learners had the same amount of exposure to and practice with the canonical and noncanonical nouns. Considering the rather small number of learners in this study, it would of course be extremely useful to corroborate these findings with other groups of learners.

Much of the current research on the acquisition of grammatical gender has focused on whether or not it can be acquired by speakers of languages with and without gender. However, it is clear that it is not an all-or-nothing proposition; that is, even learners with gender in their first language make gender errors in target languages with gender, and many learners without gender in the first language are successful at marking gender in a variety of circumstances. This study attempts to expand our understanding of gender acquisition by examining language-specific properties to determine which properties learners are most sensitive to. It is hoped that by investigating these kinds of issues, we can better understand why learners may succeed or fail in their marking of gender in a second language.

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