

## Consonantal Adaptation of Arabic Loanwords in Kiswahili and Kisukuma: A Phonological Explanation

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### ABSTRACT

Based on three lists of well-established Arabic lexical borrowings in Standard Kiswahili and Standard Kisukuma, the study attempts to answer two questions. First, the study explores what consonantal repair strategies are triggered by both Standard Kiswahili and Standard Kisukuma to ensure the conformity of the Arabic consonants with the consonantal inventories of the two borrowing languages. Second, it investigates whether these repair strategies are phonological operations. It was found that nine of the ten consonantal repairs employed by both Standard Kiswahili and Standard Kisukuma are governed by the hypothesis and principles proposed by Paradis and LaCharité (1997, 2001, 2005), that is, the Non-Availability Hypothesis, Category Proximity and Preservation Principles, and the Threshold Principle. These findings lend strong support to the argument that loanword adaptation processes are phonologically motivated. In conclusion, the paper aims to contribute primarily to the research on loanword adaptation in general, and to the literature relevant to the consonantal repair strategies in Standard Kiswahili and Standard Kisukuma, in particular.

### INTRODUCTION

When a word is borrowed into a language, it may undergo modification to conform to the sound system of the borrowing language. Such modification can target either the segmental units, suprasegmental features, or syllabic structures. The goal of this paper is two-fold. First, it explores the various consonantal adaptation processes targeting the Arabic loanwords upon entering Standard Kiswahili and Standard Kisukuma. Second, by relying on the feature geometry model, it shows that the repair strategies triggered by the above two borrowing languages are mainly phonological processes, corroborating the hypothesis and principles proposed by Paradis and LaCharité (1997, 2001, 2005). In doing so, the study aims to contribute to the field of loanword phonology generally, and particularly to Kiswahili and Kisukuma loanword phonologies.

The paper is organized as follows. Section 2 provides a brief socio-historical account of the language contact situations between the Arabs and the indigenous people of East Africa. Section 3 describes the phonemic consonantal inventories of Modern Standard Arabic, Standard Kiswahili, and Standard Kisukuma. Section 4 introduces the main arguments of the phonological approach. Section 5 describes

the sources of the data used in this study and lists the attested consonantal changes in Standard Kiswahili and Standard Kisukuma. Section 6 carefully examines the attested adaptations of Arabic consonants in Standard Kiswahili and Standard Kisukuma respectively. Section 7 discusses the key findings and the main generalizations drawn from the analyses and concludes the discussion

### LANGUAGE CONTACT SITUATIONS

Kiswahili is a Bantu language and derives its name from Arabic *sawahil* 'coasts'. It is spoken as a first and second language by nearly 100 million people in many parts of East and Central Africa, including Tanzania, Kenya, Mozambique, Uganda, and the Congo. Kiswahili has been in intensive contact with many languages, the most influential of which is Arabic (Tucker, 1946; Kharusi, 1994; Conti-Morava, 1996; Coate, 2006; Schadeberg, 2009). Therefore, in this section, an account is presented of the Arabs' socio-historical impact on East Africa, particularly in Tanzania, during the period between 800 and 1970.

Swahili people have been the ultimate suppliers and consumers of many trade goods coming to and from Africa,

Europe, and Asia. According to Schadeberg (2009), the first contact with Arabic was through the Arab seafarers/merchants, principally in the Swahili town of Zanzibar. Arabic was the primary language of the Indian Ocean trade. Toward the start of the second millennium, Islam became an important feature of early Swahili society, and, by the fifteenth century, it had been strongly established along the eastern coast of Africa (Hollingsworth, 1960; Middleton, 1992; Kharusi, 1994; Baldi, 2012). Today, because of Islam, the Swahili Muslim population does not consider Arabic a foreign language but a sacred one, that of the Qur'an, and the chosen language of God and His Prophet.

At the end of the seventeenth century, led by Imam Saif bin Sultan, the Omani Arabs arrived and succeeded in expelling the Portuguese and taking over their dominions on the Swahili coast. Nearly twenty years later, according to Kharusi, Muscat and Zanzibar were administered as two separate entities within the Omani Empire. The Arab influence lasted in the region until the independence of Zanzibar and the union of Tanganyika and Zanzibar in the 1960s (Ball, 1971; Schadeberg, 2009).

In sum, the Arabs contributed much to the Swahili social, cultural, and political fabric. What is more, Arabic was held high in esteem by the Swahili Muslims; it was the language of the elite (i.e., the Arab ruling class) and a marker of prestige and sophistication (Contini-Morava, 1996). The superstrate influence of Arabic is noticeable in the infiltration of a plethora of Arabic words into Kiswahili, making Arabic its largest donor language. According to Zawawi (1979), based on the Johnson dictionary (1939), Arabic loans account for approximately 84% of non-Bantu words in Kiswahili. The Arabic borrowings enrich Kiswahili daily vocabulary and designate novel concepts and objects, pertaining to religion, law, commerce, literature, and science.

Regarding Sukuma people, being further inland, it is assumed that they did not have any direct contact with the Arabs. It was only through their encounters with the Standard Kiswahili-speaking population that the Kisukuma speakers were introduced to Arabic borrowings. Due to the lack of sources on the language contact situation between the Sukuma people and the Arabs and/or Swahili people, the discussion in this section is limited to Standard Kiswahili only.

**CONSONANTAL INVENTORIES**

In this section, brief accounts are provided of the phonemic consonantal systems of Modern Standard Arabic, Standard Kiswahili, and Standard Kisukuma.

**Modern Standard Arabic**

As shown in Table 1, partly based on Bateson (1967) and Ryding (2005), Modern Standard Arabic (MSA<sup>1</sup>) has twenty-eight phonemically distinct consonants, classified according to two voicing qualities, ten places of articulation, and seven manners of articulation. In addition, the emphasis feature is employed to further differentiate among the interdental and alveolar obstruents. The phonological term 'emphasis' refers to a secondary articulation in the pharynx, plus

**Table 1.** The phonemic consonantal inventory of MSA

	Bilabial	Labio-dental	Interdental	Alveolar	Alveo-palatal	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	b			t d			k	q		ʔ
				tʰ dʰ						
Fricative		f	θ ð	s z	ʃ		x	ħ	ʕ	h
			ðʰ	sʰ						
Affricate										dʒ
Nasal										
Trill	m			n						
Central approximant				r						j
Lateral approximant				l						w

a primary articulation in the vocal tract. To capture the pharyngealization of the emphatic consonants, Al-Ani (1970), Ghazeli (1977), and Watson (2007) use the IPA superscript symbol of the voiced pharyngeal consonant [ʕ] (e.g., [tʕ]).

**Standard Kiswahili**

Standard Kiswahili was developed from the Kiunguja dialect, principally spoken in the town of Zanzibar, and it officially became the language of government, education, and media (Myachina, 1981; Vitale, 1981; Perrott, 1992; Kharusi, 1994; Contini-Morava, 1996; Mohamed, 2001; Coate, 2006; Schadeberg, 2009; Maganda & Moshi, 2014). The Standard Kiswahili phonemic system consists of thirty consonants, grouped according to two voicing qualities, eight places of articulation, and seven manners of articulation, as shown in Table 2 (adapted from Polomé, 1967; Ball, 1971; Kharusi, 1994; Contini-Morava, 1996; Mohamed, 2001; Coate, 2006):

Standard Kiswahili differs mainly from other Kiswahili dialects in the presence of /θ/, /ð/, and /ɣ/ in its sound system (Polomé, 1967; Ball, 1971; Kharusi, 1994; Contini-Morava, 1996; Mohamed, 2001; Coate, 2006; Schadeberg, 2009; Baldi, 2012). These three consonants were imported from Arabic and are peculiar to Arabic loanwords only (hence the parentheses). They are mostly evident in the formal speech of educated Muslim native speakers of Standard Kiswahili; otherwise, in other Kiswahili dialects as well as other Bantu languages, they are replaced by their closest native correspondents in the consonant inventory of the borrowing dialect/language (Polomé, 1967; Contini-Morava, 1996).

**Standard Kisukuma**

Kisukuma is a Bantu language spoken by over five million people near Lake Victoria in Tanzania. As demonstrated in Table 3 (adapted from Batibo, 1985), the Standard Kisukuma phonemic consonantal system is smaller than those of Modern Standard Arabic and Standard Kiswahili. It has twenty-two consonants, divided according to two voicing qualities, seven places of articulation, and six manners of articulation.

**THEORETICAL BACKGROUND**

Among the proponents of the phonological stance are Paradis and LaCharité (1997, 2001, 2005) who hold that loanword adaptation is a phonological process done by bilingual speakers who have access to the phonologies of the source and native languages. For example, Paradis and LaCharité (1997, 2005) strongly maintain that loanword adaptation is guided by the following four principles:

- Preservation Principle: Segmental information is maximally preserved within the limits of the Threshold Principle (Paradis & LaCharité, 1997).
- Threshold Principle: a) all languages have a tolerance threshold to the amount of repair needed to enforce segment preservation, and b) this threshold is the same for all languages: two steps (or two repairs) within a given constraint domain (Paradis & LaCharité, 1997).
- Category Preservation Principle<sup>2</sup>: If a given L2 phonological category (i.e., feature combinations) exists in L1, this L2 category will be preserved in L1 despite phonetic differences (Paradis & LaCharité, 2005).

**Table 2.** The phonemic consonantal inventory of Standard Kiswahili

	Bilabial		Labio-dental		Interdental		Alveolar		Alveo-palatal		Palatal	Velar		Glottal
Stop	p	b					t	d			ɟ	k	g	
	p <sup>h</sup>						t <sup>h</sup>					k <sup>h</sup>		
Fricative			f	v	(θ)	(ð)	s	z	ʃ				(ɣ)	h
Affricate									tʃ	ɟʃ				
									tʃ <sup>h</sup>					
Nasal		m						n			ɲ		ŋ	
Trill								r						
Central Approximant											j		w	
Lateral Approximant								l						

**Table 3.** The phonemic consonantal inventory of Standard Kisukuma

	Bilabial		Labio-dental		Alveolar		Alveo-palatal		Palatal	Velar		Glottal
Stop	p	b			t	d				k	g	
Fricative		β	f	v	s	z	ʃ					h
Affricate							tʃ	ɟʃ				
Nasal		m				n			ɲ		ŋ	
Central approximant									j		w	
Lateral approximant						l						

- Category Proximity Principle: a) if a given L2 phonological category (i.e., feature combinations) does not exist in L1, this L2 category will be replaced by the closest phonological category in L1, even if the L1 inventory contains acoustically closer sounds, and b) category proximity is determined by the number of changes (in terms of structure and features) that an L2 phoneme must undergo to become a permissible phoneme in L1 (Paradis & LaCharité, 2005).

By virtue of the above four principles, the phonological structure of the foreign<sup>3</sup> sound is retained as much as possible, and that foreign sound is replaced with the phonemically closest sound in the sound inventory of the borrowing language, provided that the consonantal adaptation is done within two steps of repair. In their analysis of the Fula adaptations of French loanwords, Paradis and LaCharité (1997) show, for example, that the French /v/ is adapted into a native Fula consonant in 81.8% of its occurrences, but in only 9.1% of the occurrences it is deleted. In Fula, the French /v/ can be adapted as [w] by inserting a [+sonorant] feature to the feature tree, as [b] by delinking its [+continuant] feature, or as [f] by delinking [+voice]. Paradis and LaCharité (1997) explain that the above three variations in adapting the French /v/ in Fula are due to the fact that there is more than one repair that adheres to the Preservation Principle (prohibiting deletion of consonants) and the Threshold Principle (allowing adaptation to take place within two steps only, by inserting a new feature and/or delinking a feature in the sound structure). According to Paradis and LaCharité (1997), deletion of the foreign sound is triggered only when its adaptation requires more than two steps of repair.

Moreover, by surveying 12 corpora of French and English loanwords in several different languages, Paradis and LaCharité (2005) show that, based on phonemic proximity, the English voiced stops /b, d, g/ are preserved in Mexican Spanish by integrating them as /b, d, g/. As explained by the two authors, if the phonetic closeness were to play a role, the English voiced stops /b, d, g/ would be matched with their voiceless Spanish stops /p, t, k/, on the grounds that the VOT (Voice Onset Time) values of English voiced stops and their Spanish voiceless counterparts are nearly the same.

Furthermore, Paradis and LaCharité (2001) observe that /h/ is systematically deleted in some languages, but it is consistently preserved in others. The authors contend that /h/-deletion cannot be attributed to Paradis and LaCharité's (1997) Threshold Principle, according to which /h/ should be adapted (i.e., preserved), rather than deleted, because its adaptation would not exceed two steps of repair. Considering the failure of the Threshold Principle to account for /h/-deletion, Paradis and LaCharité (2001) propose the Non-Availability Hypothesis, stated below:

The laryngeal /h/ contains an unavailable (unemployed) primitive -the Pharyngeal node-in borrowing languages without pharyngeal node consonants in their phonological inventories. The laryngeal /h/ cannot be phonologically treated by these languages and thus cannot be interpreted phonetically (Paradis & LaCharité, 2001).

As per the above hypothesis, the systematic deletion of /h/ in languages such as French, Italian, and Portuguese is ascribed to the absence of the pharyngeal node that is an integral distinctive feature of /x, χ, q, χ, ɣ, ħ, ζ, h/ as well

as emphatic consonants. Considering that these languages lack Pharyngeal-node consonants, including /h/, the systematic deletion of /h/ is triggered. However, as predicted by the above hypothesis, /h/ is constantly preserved in languages, such as English, Fula, Russian, and Mandarin Chinese, among others, whose consonantal inventories contain one or more consonants with a pharyngeal node.

## DATA

The data used in this study have been drawn from Baldi (2008), Kharusi (1996), and Dr. M. Matondo (personal communication, April 17, 2010). Baldi (2008) is a comprehensive etymological dictionary of Arabic loanwords in Kiswahili and 130 West African languages. Kharusi (1994) contains 1470 Arabic loanwords in Standard Kiswahili with their original equivalents in Modern Standard Arabic, all transcribed in IPA. Matondo's data, moreover, comprise many words borrowed from Arabic, Hindi, Turkish, Persian, Portuguese, French, German, Greek, and English, into Standard Kiswahili and Standard Kisukuma.

The attested consonantal correspondences between each source consonant with its adapted form in the borrowing language are presented in Table 4.

## ANALYSES

This section examines the attested consonantal mappings in Standard Kiswahili and Standard Kisukuma from a phonological perspective. The analyses discussed in this section are couched in the feature geometry model as represented by Rose (1996) and Paradis and LaCharité (2001). For each sound mapping presented here, three lists are provided: two lists of word examples (from the source language and the borrowing language) transcribed in their phonemic forms, and a third list of the English glosses. For the Arabic-Kiswahili consonantal correspondences, an additional list is included, exhibiting the orthographic representations of the exemplified Arabic loanwords in Standard Kiswahili<sup>4</sup>. Next, the feature representation of each mapped consonant is drawn to demonstrate the type of change.

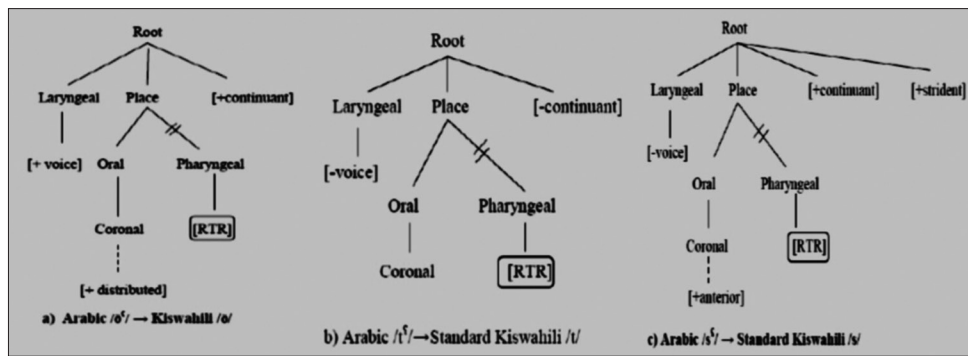
As shown in Table 4 below, upon entering Standard Kiswahili phonology, the following Arabic consonants necessitate

**Table 4.** Consonantal mappings as observed in the analyzed data.

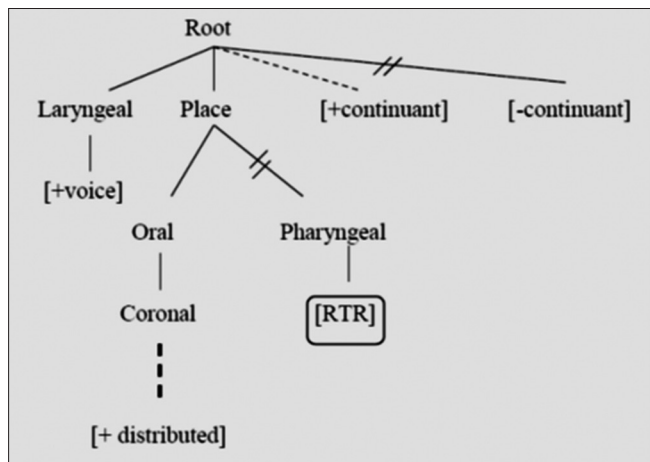
MSA	→	Standard Kiswahili	Standard Kiswahili	→	Standard Kisukuma
/ð <sup>s</sup> /	→	(/ð/)	(/ð/)	→	/z/
/d <sup>s</sup> /	→	(/ð/)	(/θ/)	→	/s/
/t <sup>s</sup> /	→	/t/	(/ɣ/)	→	/g/
/s <sup>s</sup> /	→	/s/			
/q/	→	/k/			
/x/	→	/h/			
/ħ/	→	/h/			

**Table 5.** Adaptation of the Arabic emphatic interdental /ð<sup>s</sup>/ and alveolar /d<sup>s</sup>, t<sup>s</sup>, s<sup>s</sup>/

MSA	Standard Kiswahili	Spelling	Gloss
/ð <sup>s</sup> ulm/	/ðuluma/	<dhuluma>	‘oppression’
/d <sup>s</sup> amin/	/ðamini/	<dhamini>	‘bail’
/d <sup>s</sup> arurah/	/ðarura/	<dharura>	‘emergency’
/t <sup>s</sup> araf/	/tarafu/	<tarafu>	‘part’
/ʃart <sup>s</sup> /	/ʃarti/	<sharti>	‘condition’
/s <sup>s</sup> anam/	/sanamu/	<sanamu>	‘statue’
/ʃa: s <sup>s</sup> i/	/asi/	<asi>	‘disobedient’



**Figure 1.** Phonological mapping of the Arabic /ð<sup>s</sup>/, /t<sup>s</sup>/, and /s<sup>s</sup>/ in Standard Kiswahili



**Figure 2.** Phonological mapping of the Arabic /d<sup>s</sup>/ onto the Standard Kiswahili /ð/

structural repairs to their feature representations: /ð<sup>s</sup>/, /d<sup>s</sup>/, /t<sup>s</sup>/, /s<sup>s</sup>/, /x/, /q/, and /h/. Similarly, the Swahilized (i.e., imported) Arabic /ð, /θ/ and /ɣ/ are adapted in Standard Kisukuma by modifying their source feature structures.

**Standard Kiswahili Adaptation**

Arabic emphatic /ð<sup>s</sup>/, /t<sup>s</sup>/, and /s<sup>s</sup>/ are consistently replaced with their phonologically similar Standard Kiswahili plain counterparts, namely /ð/, /t/, and /s/, as illustrated in Table 5.

Unlike their plain counterparts, the PLACE NODE of the Arabic emphatics is subdivided into two parts: the Oral node dominating the [coronal] articulator feature and the pharyngeal node with dependent [RTR] (i.e. retracted tongue root) feature. The [RTR] feature only comes under the Pharyngeal

node and is specific to uvulars, pharyngeals, and emphatics, on the basis that the tongue root is retracted in their production (Rose, 1996). The mappings of /ð<sup>s</sup>/, /t<sup>s</sup>/, and /s<sup>s</sup>/ onto the Standard Kiswahili /ð/, /t/ <sup>5</sup>, and /s/ are demonstrated in Figure 1.

Since the dependent [RTR] feature is not an available primitive in Standard Kiswahili, owing to the lack of emphatic consonants, it is rendered untreatable (hence, circled<sup>6</sup>) by virtue of the Non-Availability Hypothesis. While the branching of the place node is allowed (i.e. phonologically treatable) in Arabic, it is prohibited in Standard Kiswahili, as stated below by the No Place Node Branching Constraint (proposed by and adapted from Batais (2013)<sup>7</sup>).

The phonology of Standard Kiswahili/Standard Kisukuma bans the co-occurrences of two nodes under the place node: Oral node, and pharyngeal node with dependent [RTR]. Because dependent [RTR] is inaccessible in Standard Kiswahili and Standard Kisukuma, this will result in the automatic delinking of the whole pharyngeal node plus dependent [RTR] and the preservation of the oral node. However, if the secondary pharyngeal node does not have dependent [RTR], the oral node or pharyngeal node is optionally delinked provided the sound resulting from the deletion of either node exists in the consonant inventories of Kiswahili and Kisukuma and conforms with the phonological principles.

As per the No Place Node Branching Constraint, the pharyngeal node with its unreadable [RTR] feature is delinked in the three feature representations shown in Figure 1. It is also worth noting that the delinking of the pharyngeal node here does not suggest that it is not employed in Standard Kiswahili; it is only when it is secondary with the dependent [RTR] that the pharyngeal node is deleted. In addition to delinking the pharyngeal node, for the mappings /ð<sup>s</sup>/ → /ð/ and /s<sup>s</sup>/ → /s/, [+distributed] and [+anterior], respectively, are inserted (indicated by dotted lines) to distinguish between /ð/ and /z/

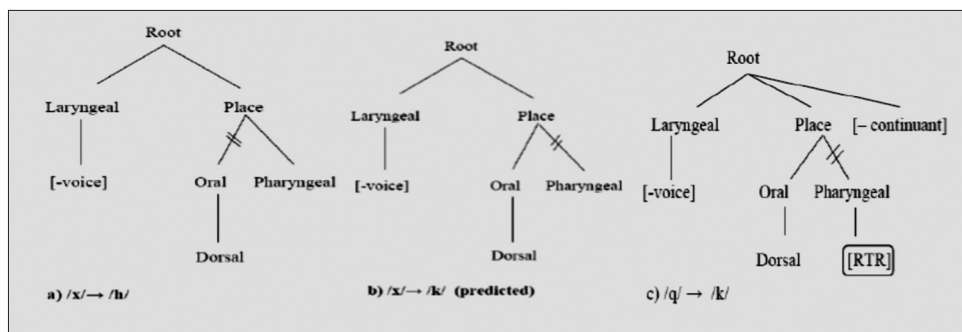


Figure 3. Phonological mapping of the Arabic /x/ and /q/ in Standard Kiswahili

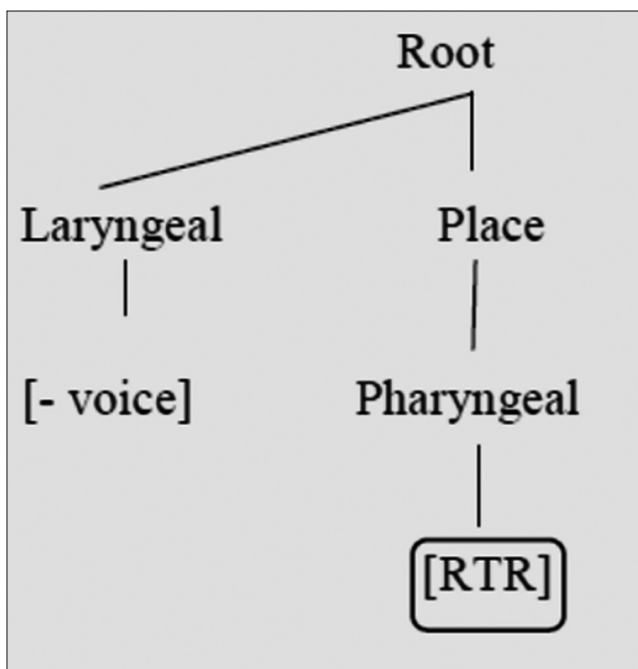


Figure 4. Phonological mapping of the Arabic pharyngeal /ħ/ in Standard Kiswahili

Table 6. Adaptation of the Arabic velar /x/ and uvular /q/ in Standard Kiswahili

MSA	Standard Kiswahili	Spelling	Gloss
/xabar/	/habari/	<habari>	‘news’
/xatʿar/	/hatari/	<hatari>	‘danger’
/raxi: sʰ/	/rahisi/	<rahisi>	‘cheap’
/qa: nu: n/	/kanuni/	<kanuni>	‘regulation’
/tʰalaq/	/talaka/	<talaka>	‘divorce’
/faqi: r/	/fakiri/	<fakiri>	‘poor’

Table 7. Adaptation of the Arabic pharyngeal /ħ/ in Standard Kiswahili

MSA	Standard Kiswahili	Spelling	Gloss
/huzn/	/huzuni/	<huzuni>	‘sorrow’
/ha: sid/	/hasidi/	<hasidi>	‘envious’
/sʰahn/	/sahani/	<sahani>	‘plate’

<sup>8</sup> and between /s/ and /ʃ/ in the phonemic consonantal inventory of Standard Kiswahili.

Regarding the Arabic /dʕ/, as displayed in the examples in Table 5, it is mapped onto /ð/ in Standard Kiswahili. Based on phonemic similarity, /dʕ/ would be mapped onto /d/ (Paradis & LaCharité, 1995, 2001, 2005; Batais, 2013). Even accounting for its attested mapping onto /ð/, employing the phonological hypothesis and principles plus the feature geometry, as illustrated in Figure 2, would require more than two repairs, thus resulting in the unattested deletion of the Arabic /dʕ/. A phonetic explanation which regards [ðʕ], not [dʕ], as the actual source input is presented in Section 7.

With respect to the Arabic velar /x/ and uvular /q/, they are systematically mapped in Standard Kiswahili onto /h/ and /k/ respectively, as exemplified in Table 6.

The phonological hypothesis and principles do not predict only the above two consonantal correspondences but also the unattested mapping of /x/ onto /k/. As illustrated in the feature representation of the Arabic /x/ <sup>9</sup> (see Figure 3), following Paradis and LaCharité (2001) and Batais (2013), because the pharyngeal place node has no dependent [RTR], either the oral place node or pharyngeal place node is optionally delinked, as stipulated by the No Place Node Branching Constraint. As a result, detaching the oral place node yields /h/, while delinking the pharyngeal place node generates /k/ in Standard Kiswahili. The adaptation of /x/ in Kiswahili is elaborated on in Section 7. Concerning the adaptation of /q/ into /k/, as shown in Figure 3, it occurs by detaching the pharyngeal place node due to the circling of dependent [RTR].

With respect to the mapping of the Arabic uvular /ħ/ onto the Kiswahili /h/, as exemplified in Table 7 and demonstrated in Figure 4 below, it is triggered as a result of circling dependent [RTR]; hence, the remaining bare pharyngeal place node with [-voice] laryngeal specification is interpretable in Standard Kiswahili, yielding /h/.

### Standard Kisukuma Adaptation

Arabic loanwords infiltrated the Kisukuma lexicon via Standard Kiswahili. That is, the Kisukuma speakers borrowed the Arabic words that had already been Swahilized (i.e. imported) into Standard Kiswahili whose speakers were in close contact with the Sukuma people in mainland Tanzania.

Since they do not exist in the phonemic consonantal inventory of Standard Kisukuma (see Table 3), the Standard Kiswahili (or Swahilized) /θ/, /ð/ and /ɣ/ are always substituted in Standard Kisukuma. To begin with, as shown

in Table 8, /θ/ and /ð/ are consistently mapped onto the Kisukuma /s/ and /z/, respectively, as predicted following from phonological similarity between the Swahilized consonants and their native counterparts in Standard Kisukuma.

The feature representations in Figure 5 account for the mappings of the Standard Kiswahili /θ/ and /ð/ onto the Kisukuma /s/ and /z/. Both mappings occur as a result from simultaneously delinking [+distributed] and inserting [+anterior] as a dependent feature of the coronal place node, to differentiate between /s/ and /ʃ/ and between /z/ and /ʒ/ in the phonemic consonantal inventory of Standard Kisukuma.

Finally, because /ɣ/ and /g/ are phonemically similar, the Standard Kiswahili /ɣ/ is consistently replaced by /g/ in the phonemic consonantal inventory of Kisukuma. The words in Table 9 exemplify the observed phonological adaptation of /ɣ/ into the Standard Kisukuma /g/:

The phonological Kisukuma substitution of /g/ for Standard Kiswahili /ɣ/, demonstrated in Figure 6, takes place by only detaching the pharyngeal place node, in accordance with the No Place Node Branching Constraint. The remaining structure after such dissociation is that of the Kisukuma /g/. It is also worth noting that the optional detachment of the oral place node, as stated by the same constraint, cannot occur here because the consonant (i.e. voiced glottal fricative /ɦ/) yielded by such repair does not exist in the phonemic consonantal system of Standard Kisukuma. Moreover, the representation is not specified by [+continuant], because [ɣ] is the only consonant in Standard Kiswahili whose place node is divided into [dorsal] oral node and pharyngeal node. Therefore, [+continuant] is redundant.

**DISCUSSION AND CONCLUSION**

As examined in Section 6 and summarized in Table 10, nine out of the attested ten consonantal repairs of Arabic loanwords in Standard Kiswahili and Swahilized Arabic loanwords in Standard Kisukuma are governed by the phonological hypothesis and principles advanced by Paradis and LaCharité (1997, 2001, 2005).

First, they comply with Paradis and LaCharité’s (2001) Non-Availability Hypothesis, which stipulates that the

source consonant is retained, not deleted, if its place node or primitive feature is phonologically interpreted in the borrowing language. Consequently, the nine source consonants are replaced because their Place nodes (oral or pharyngeal) are employed by Standard Kiswahili and Standard Kisukuma.

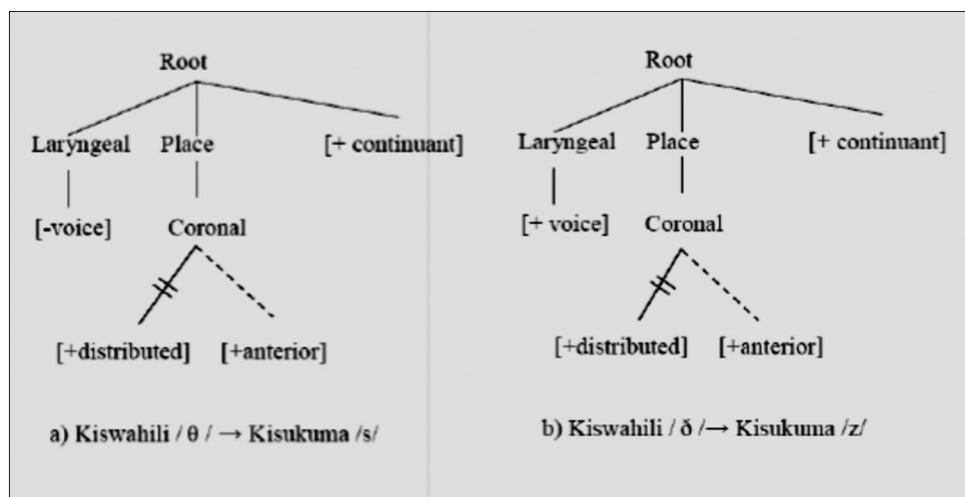
Second, the consonantal adaptations of Arabic loanwords in Standard Kiswahili and Swahilized Arabic loanwords in Standard Kisukuma adhere to Paradis and LaCharité’s (2005) Category Preservation Principle, as well as Paradis and LaCharité’s (1997) Preservation Principle, which states that that a source category is maximally preserved if it exists in the borrowing language. This is evidenced in the nine consonantal repairs. For instance, the [coronal] articulator feature of the Arabic /tʕ/ is maximally preserved in Standard Kiswahili by replacing it with the native coronal /t/. By the same token, the [+voice] laryngeal feature of the Standard

**Table 8.** Adaptation of the Standard Kiswahili /θ/ and /ð/ in Standard Kisukuma.

Standard Kiswahili	Standard Kisukuma	Gloss
/θabiti/	/sabiti/	‘firm’
/θamani/	/samani/	‘value’
/miraθi/	/milasi/	‘inheritance’
/hadiθi/	/hadiisi/	‘story’
/ðarura/	/zalula/	‘emergency’
/laða/	/laza/	‘flavor’
/haðari/	/hazali/	‘caution’
/hifaði/	/hifazi/	‘protect’

**Table 9.** Adaptation of the Standard Kiswahili /ɣ/ in Standard Kisukuma

Standard Kiswahili	Standard Kisukuma	Gloss
/ɣali/	/gali/	‘expensive’
/ɣuɣuli/	/ɟuguli/	‘business’
/ɣaðabu/	/gazabu/	‘rage’



**Figure 5.** Phonological mapping of the Standard Kiswahili /θ/ and /ð/ in Standard Kisukuma

Kiswahili /y/ is retained after being mapped onto the voiced /g/ in Standard Kisukuma. To ensure maximal preservation of segmental content, the Category Preservation Principle is combined with the third phonological principle, namely Paradis and LaCharité's (1997) Threshold Principle, which necessitates that the number of steps in a consonantal repair be no more than two; otherwise, the source consonant is deleted. The nine consonantal replacements obey the above set limit and occur by inserting and/or delinking a node/feature.

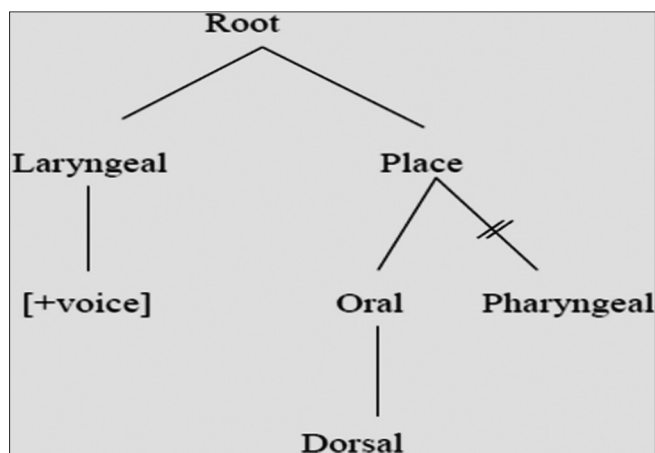
Finally, the attested consonantal adaptations are in accordance with Paradis and LaCharité's (2005) Category Proximity Principle. This principle emphasizes that the source consonant is replaced with the phonemically closest consonant in the borrowing language. In the nine consonantal adaptations, the phonological closeness is determined by the proximity of the source consonant to the Standard Kiswahili or Standard Kisukuma consonant in, most importantly, the place node with its dependent articulator feature (i.e. [coronal] and [dorsal]), and the laryngeal feature (i.e. [±voice]), followed next by the manner feature (i.e. [±continuant]). As shown in the nine phonological consonantal adaptations, each source consonant is systematically matched with an existing Standard Kiswahili and Standard Kisukuma consonant with the same place node and laryngeal specification. Regarding source continuancy, it is also maintained in the phonological consonantal repairs, except in /y/ → /g/.

To illustrate the phonemic proximity, Standard Kiswahili straightforwardly maps the Arabic /ð<sup>s</sup>/, /t<sup>s</sup>/, /s<sup>s</sup>/, /x/, /q/, and

/ħ/ onto /ð/, /t/, /s/, /h/, /k/, and /h/, respectively, thus primarily maintaining the same place node (and its articulator feature) and the laryngeal specification, plus continuancy. Likewise, the Standard Kiswahili /ð/ and /θ/ are matched with the closest consonants available in the Kisukuma phonology, in terms of [coronal] Place node, laryngeality, and continuancy (i.e., /z/ and /s/, respectively). In addition, when it comes to the Kiswahili adaptation of the Arabic /x/, /h/ is the only available consonant in Kiswahili that *fully* matches the source consonant in three phonological categories, namely the place node, laryngeality, and continuancy. Unlike /h/, the Kiswahili /k/ is phonemically close to the Arabic /x/ in two categories only: [dorsal] place node and [-voice]. Because the Kiswahili /k/ is phonologically less like the Arabic /x/ than /h/, the adaptation into /k/ is attested nowhere in the analyzed data. With respect to the assimilation of the Standard Kiswahili /y/ in Standard Kisukuma, although /g/ does not match the source continuancy, it is the closest available consonant in the phonemic inventory of Standard Kisukuma in terms of [dorsal] place node and laryngeality, hence upholding the Category Proximity Principle.

The only exception to the afore-mentioned phonological hypothesis and principles is the phonetic mapping of the Arabic /d<sup>s</sup>/ onto /ð/ in Standard Kiswahili. Such mapping is considered purely phonetic because it refers to the phonetic details of /d<sup>s</sup>/ in Gulf Arabic dialects, one of which is Omani Arabic. In these dialects, /d<sup>s</sup>/ and /ð<sup>s</sup>/ phonetically merged into [ð<sup>s</sup>] (Versteegh, 1999; Al-Balushi, 2016). Next, guided by the phonetic/perceptual similarity between [ð<sup>s</sup>] and [ð], the monolingual speakers of Standard Kiswahili phonetically perceived phonetic [ð<sup>s</sup>], not phonemic /d/, as [ð] (Peperkamp & Dupoux, 2003; Al Mahmoud, 2013; Lababidi, 2016; Binasfour et al., 2017).

In conclusion, casting the analyses in the theory of feature geometry, the study has provided an account of the repair strategies that are employed to adapt illicit Arabic consonants in Arabic loanwords entering Standard Kiswahili and Standard Kisukuma. Moreover, it has demonstrated that these consonantal repair strategies are overall phonological processes. That is, the attested Kiswahili adaptations of Arabic /ð<sup>s</sup>/, /t<sup>s</sup>/, /s<sup>s</sup>/, /x/, /q/, and /ħ/ and Kisukuma adaptations of the Swahilized Arabic /θ/, /ð/ and /y/ are phonologically guided and confirm Paradis and LaCharité's (1997, 2001, 2005) phonological hypothesis and principles, namely the Non-Availability Hypothesis, the Category Preservation Principle, the Category Prox-



**Figure 6.** Phonological mapping of the Kiswahili /y/ in Standard Kisukuma

**Table 10.** Attested phonological and phonetic adaptations of Arabic loanwords in Standard Kiswahili and Standard Kisukuma

Type	MSA	→	Standard Kiswahili	Standard Kiswahili	→	Standard Kisukuma
Phonological	/ð <sup>s</sup> /	→	(/ð/)	(/ð/)	→	/z/
	/t <sup>s</sup> /	→	/t/	(/θ/)	→	/s/
	/s <sup>s</sup> /	→	/s/	(/y/)	→	/g/
	/x/	→	/h/			
	/q/	→	/k/			
	/ħ/	→	/h/			
Phonetic	/d <sup>s</sup> /	→	(/ð/)			



imity Principle, and the Threshold Principle. In addition, these adaptations conform to the phonological stance in that the initiating borrowers were bilingual speakers, the repairs operate on the phonemic representation of the source input, and the source sound is always preserved owing to the existence of its place node in the phonology of the borrowing language. Finally, this study has endeavored to generally contribute research to the area of loanword phonology, and particularly to the rarely researched Standard Kiswahili and Standard Kisukuma loanword phonologies. While there are several studies on Kiswahili loanword phonology, none has yet been conducted examining loanwords in Kisukuma.

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### END NOTES

- 1 'MSA' and 'Arabic' are used alternatively throughout this paper.
- 2 This principle is like Paradis and LaCharité's (1997) Preservation Principle.
- 3 In this paper, 'foreign' is used interchangeably with 'source'.
- 4 Due to the lack of sources on Kisukuma orthography, the orthographic representations of the Swahilized Arabic loanwords (entering Kisukuma) are not provided.
- 5 Note that voiceless affricate /tʃ/ is not an option here since, according to Iverson (1989) and Lombardi (1990), the underlying representations of the affricates /tʃ/ and /dʒ/ are characterized by both [-continuant] and [+continuant].
- 6 Note that the circling of an unreadable feature (e.g., [RTR]) is not considered a step of repair.
- 7 Batais (2013) proposes the same constraint for the adaptation of Arabic consonants in Standard Indonesian.
- 8 Some Kiswahili dialects map the Arabic /ð/, as well as /ðˤ/, onto native /z/, according to Contini-Morava (1996) and as shared by Dr. Masangu Matondo (personal communication, April 17, 2010).
- 9 According to Paradis and LaCharité (2001), the representation of /x/ is equipped with a secondary pharyngeal place node because, in the articulation of the velar fricatives in general, the airstream is secondarily constricted at the pharynx. It is also important to add, as pointed out by the same authors, that the pharyngeal node is not specified by [RTR] since velar fricatives do not exert a lowering effect on vowels.

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