Epenthetic Vowels in Swahili Loanwords

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Abstract

When loans are adapted into Swahili, a series of vowels are inserted, resulting in forms that differ from those in the source languages (etymons). This paper 1) identifies the nature of these inserted vowels, and 2) develops an explanation of the system behind the various phonetic realizations of these vowels. The vowels examined here are (as the title suggests) epenthetic rather than excrescent. Typically, when Swahili loanwords are adapted via epenthesis, features cannot cross from one side of the stressed syllable (which in Swahili is the penult). Therefore, word-final epenthetic vowels must appropriate features from adjacent consonants. Consonant spreading coronal features will result in a coronal epenthetic vowel [i], consonants spreading labial features will result in a labial epenthetic vowel [u], and consonant spreading pharyngeal features will result in a pharyngeal vowel [a]. Dorsal consonants do not contribute a feature, and the feature [coronal] is inserted by default. In pre-stress environments, both vocalic and consonantal material is available for Feature-Spreading. Features of vowels spread more freely than features of consonants, so vowel-vowel feature spreading is more prevalent. Several idiosyncratic forms exist in which vocalic material that existed in the etymon seems to have survived in the realization of epenthetic vowels. A handful of suppletive forms exist which seem to break the constraint on crossing from one side of the stressed vowel to the other.

Keywords: *epenthesis, vowels, Swahili, loanwords, feature spreading*

Introduction

When loans are adapted into Swahili, a series of vowels are inserted, resulting in forms that differ from those in the source languages (etymons). This paper 1) identifies the nature of these inserted vowels, and 2) develops an explanation of the system behind the various phonetic realizations of these vowels.[1]

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Following an explanation of the data collected, the first objective of this study is to provide evidence determining the nature of the vowels concerned. The conclusions drawn by Hall (2006) will help us to show that the vowels examined here are (as the title suggests) epenthetic rather than excrescent. Expanding upon these conclusions, observations are made based on the collected data, ascribing the trio of Swahili epenthetic vowels (namely [i], [u], and [a]) to three characteristic environments. Given that most languages usually avail of only one vowel for epenthesis, an examination of the phonetic implementation of this vowel trio has been undertaken. If we appeal to the notions of Feature-Spreading and Domains, we can show that these multiple epenthetic vowel forms are a result of a vowel-vowel feature-spreading phenomenon word-medially, and a combination of consonant-vowel feature-spreading as well as coronal feature-insertion word-finally. It will be argued that, since features cannot spread beyond the stress-carrying syllable (the penult), word-final epenthetic vowels must use features from consonants, whereas word-medial (pre-stress) epenthetic vowels may appropriate features from vocalic elements, as well as occasionally from consonants. Idiosyncratic forms will be examined, and comments will be made on the remaining suppletive forms.

Epenthetic Vowels in Swahili Loanwords

Methodology and Data

Swahili, a Bantu language spoken in central and eastern Africa by more than 50 million people, has been in contact with a wide variety of different languages for hundreds of years. In his examination of Swahili as it emerged as a national language, Whitely 1969 notes that "its coastal habitat has brought it into contact with Arab, Portuguese, Indian, British, and German traders and colonizers, so that its lexicon, like that of English, has been enriched by many hundreds of loan-words" (8). Current estimates place the amount of Arabic loanwords that have passed into Swahili at 30 per cent of the entire lexicon, with a considerable wealth of English borrowings, and lesser contributions from languages such as Portuguese, Hindi-Urdu, and Persian (Baldi, 2005).

For this paper, approximately 180 words that have passed into Swahili were collected from previous scholarship (Baldi, 2005; Batibo, 1996; Schadeberg, 2014) and compared with their etymons[2]. Vowels that have been inserted (i.e. that occur in environments where no previous vocalic material had existed) were highlighted for further evaluation. Within the data, vowels have been inserted in a variety of environments (i.e. following

[2] The full list is included as an appendix.

a near exhaustive range of sounds, as well as word-initially, word-finally, and word-medially). Below is a series of selected loanwords and their etymons[3]:

(1) a. Ar. kaid [kaid] -> Sw. kaidi [kaid**i**] 'disobedient'
b. Ar. iarab [iara:b] -> Sw. irabu [irab**u**] 'vowel'
c. Pr. barf [barf] -> Sw. barafu [bar**a**f**u**] 'ice'
d. Ar. lauh [lauh] -> Sw. laha [lah**a**] 'sheet of paper'
e. Ar. huzn [huzn] -> Sw. huzuni [huz**u**n**i**] 'grief'

Exrescence or Epenthesis? An Examination of Inserted Vowels

In Hall's (2006) cross-linguistic analysis of vowel insertion, the major division was drawn between excrescent and epenthetic vowels. Excrescent (intrusive) vowels are labeled as 'phonologically invisible' in that they seem unable to play a role in the repair of illicit structures. Epenthetic vowels, on the other hand, are 'phonologically visible' and participate in the phonology by "repair[ing] structure[s] that [are] marked, in the sense of being cross-linguistically rare. The same structure[s] [are] also likely to be avoided by means of other processes within the same language" (Hall, 2006:391).

Swahili tolerates syllables consisting of (V) *u-* of ***u**tu* 'character', (CV)*–ki* of *ha**ki*** 'right', (N) *m-* of ***m**tu* 'person', (NC) *–nda* of *pe**nda*** 'to love' and CGV pwa- of ***pwa**ni* 'coast'[4](Ashton 1947). The vowel may be either monomoraic (short) – consisting of one timing unit, or bimoraic (long) – consisting of two timing units. This makes Swahili a language in which syllabic quantity is contrastive (Batibo & Rottland, 1994). Indeed, this long-short differentiation is crucial for such minimal pairs as *kanga* 'guinea-fowl' and *kaanga* 'to fry'[5].

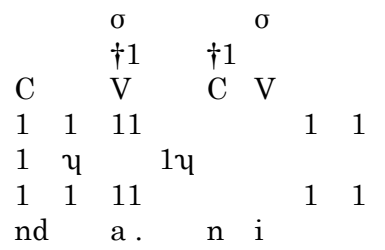
With this said, approximately 15 per cent of the data collected displayed instances of consonant clusters. The bulk of this data comes from research conducted by Batibo (1994) into consonant cluster tolerance. While Batibo claims that such clusters are entering Swahili, many of the words he examines come from fields such as schooling, bureaucracy, and mechanized technology[6] – domains so recently introduced to the East African context

[3] Throughout this paper, all inserted vowels are bolded. Names of languages are abbreviated in examples as follows: Arabic (Ar.), Chinese (C.), English (Eng.), Hindi-Urdu (HU), Persian (Pr.), Portuguese (Pt.), and Swahili (Sw.).
[4] Where: V = vowel, C = consonant, N = nasal, and G = glide
[5] For more on contrastive vowel length in Swahili, see (Batibo, 1990)
[6] See such loans as *masta* 'master', *deski* 'desk', and *petrol* 'petrol' for example.

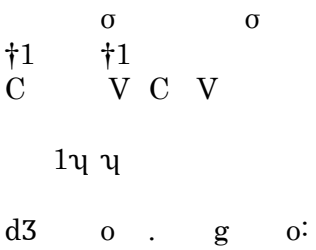
that I would contend that most of these words simply have not been around long enough to have undergone complete nativization.

Accepting these ideas, I can posit that Swahili has a(C)V syllable structure, where V may hold the value of one timing unit (ɥ) or two timing units (ɥɥ). The (native) words *ndani* [ndani] 'inside' and jogoo [d3ogoː] 'rooster' would be syllabified as follows[7]:

(2) a.

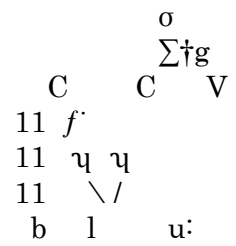


b.



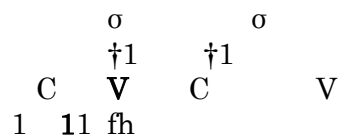
The main insight to draw from this model is that Swahili (with some very rare exceptions) requires open syllables with simple onsets (usually made up of one and only one consonant phoneme each). This information should be sufficient to determine whether the inserted vowels to be examined are excrescent or epenthetic. Consider the following:

(3) a. Eng. [blu^{w}] 'blue'



In English, the word [blu^{w}] is a one-syllable word, consisting of a complex onset [bl]. The nativization of the word from English into Swahili requires the superposition of this word upon the Swahili syllable structure.

b. Eng. [[blu^{w}] 'blue'-> Sw. ?



[7] This paper's analysis of prenasalized consonants follows that of Mwita (2007). As such, the /nd/ of *ndani* will be analysed as one unit (analogous to [tʃ]). However, not all such combinations parse as such. For example, the /mb/ of *mtoto mbaya* 'a bad child' would be analysed as two separate phonemes. The /mb/ of *nyumba mbaya* 'a bad house' would be analysed as one (ibid.:59).

```
1  ɥ  1   ɥɥ
1  11   \ /
 b    ? .  l     uʷ
```

As illustrated, since Swahili does not allow consonant clusters, one way to deal with this structural mismatch is to insert a vowel, thus effectively breaking up the illicit [bl]- cluster. In the case of [bluᵂ], this is exactly what occurs, resulting in the Swahili [b**u**luː][8]

.

c. Eng.: [bluʷ] -> Sw.: [b**u**luː] *buluu* 'blue'

```
         σ          σ
         †1       †1
   C     V     C         V
1  11  fh
1  ɥ  1   ɥɥ
1  11   \ /
 b    u .  l     uː
```

Of epenthetic vowels, Hall (2006) further states that "the same structure is also likely to be avoided by means of other processes within the same language." This is the case with Swahili consonant clusters, a significant amount of collected data exhibiting what Batibo (1996) refers to as "extrasyllabic consonant truncation":

(4) Eng. [pIktʃɚ] 'picture' -> Sw. [pi_tʃa] *picha* 'picture, photograph'
k ->∅

In this section, evidence was presented for viewing inserted vowels in Swahili loanwords as phonologically visible and thus epenthetic. We shall now examine these epenthetic vowels of Swahili loanwords in depth.

Analysis of Epenthetic Vowels Present in the Data.

In the 178 tokens collected, approximately 186 instances of vowel epenthesis were observed. Of these, 1 instance occurred word-initially[9], while 30% of epenthesis was word-medial, and just under 70% word-final. Examination will be centered on word-final and word-medial epenthetic forms.

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[8] Since the (bimoraic) sound /uʷ/ does not exist in Swahili, it is adapted to /uː/, thus preserving the bimoraic quality of the vowel.

[9] [**u**sukan**i**] *usukani* 'rudder' from Ar. [sukːaːn] 'rudder'.

Word-Final Epenthesis

Of these examples of word-final epenthesis, there are 84 cases of epenthetic [i], and 31 cases of epenthetic [u]. Epenthetic [a] accounts for 9 of these cases, and [e] and [o] appear in one and two casesrespectively[10]. The main discussion will therefore be centered on the epenthetic vowels [i], [u], and [a]. The following are examples of word-final epenthesis.

(5) a. Eng. [stæmp] 'stamp' -> Sw. [stɛmp**u**]*stempu* 'stamp'

b. Ar. [am:] 'uncle' -> Sw. [am**u**] *amu* 'paternal uncle'

c. Ar. [baqu:l] 'bowl' -> Sw. [baku**li**] *bakuli* 'bowl'

d. Eng. [gaun] 'gown' -> Sw. [gaun**i**] *gauni* 'gown, dress'

e. Ar. [wasah] 'pus' -> Sw. [usah**a**] *usaha* 'pus'

f. Ar. [lauh] 'sheet of paper'-> Sw. [lah**a**] *laha* 'sheet of paper'

In the case of word-final epenthetic [u], it was observed that, in all but two cases, the [u] was preceded by a labial consonant. Word-final epenthetic [i] displayed a slightly more disparate distribution, sometimes appearing after a vowel or a guttural, but appearing most reliably following a consonant that is coronal in nature. Word-final epenthetic [a] most reliably appeared following sounds that are pharyngeal. But given that [a] appeared in a (comparatively) smaller number of instances, a generalization should not be made without some degree of reservation.

(6) a. Word-final epenthetic [u] preceded by a labial consonant

i. Ar. [aawa:m] 'inception' -> Sw. [awam**u**] *awamu* 'inception'

ii. Eng. [nIb] 'nib' -> Sw.: [nib**u**] *nibu* 'nib'

b. Word-final epenthetic [i] preceded by a coronal consonant

i. Ar. [bud:] 'alternative' -> Sw.: [bud**i**] *budi* 'alternative'

ii. Eng. [ko^{w}t] 'coat' -> Sw. [kot**i**] *koti* 'coat'

c. Word-final epenthetic [a] preceded by a pharyngeal consonant.

i. Ar. [wasah] 'pus' -> Sw. [usah**a**] *usaha* 'pus'

ii. Ar. [lauh] 'sheet of paper' -> Sw. [lah**a**] *laha* 'sheet of paper'

[10] [tareh**e**] *tarehe* 'date' from Ar. [tarikh] 'date', [dʒaʃo] *jasho* 'sweat' from Ar. [dʒa:ʃ] 'sweat', and [taulo] 'towel' from Eng. towel.

This pattern has been well-documented for Swahili (see Lodhi (2000) specifically as it pertains to loanwords from Indic, and Batibo (1996) as it applies more generally). Mwita (2009) states that "it is possible to predict what kind of vowel will be added in word-final position during epenthesis. Words […] which end in a consonant acquire vowels whose type is determined by the nature of the final consonant; after labials, [u] or [o] is added, and after coronals and dorsals, [i] or [e] is added" (55). For the purposes of this paper, the Mwita generalization will be updated to appear below:

(7) Word-Final Epenthesis in Swahili
[coronal], [dorsal] = [i]
[labial] = [u]
[pharyngeal] = [a]

There are, however, exceptions to this generalization (7):

(8) a. ([coronal] triggers [u])

Eng. [spejd] 'spade' -> Sw. [sep**e**t**u**] *sepetu* 'spade, shovel'

b. ([labial] triggers [i])

Ar. [maʏrib] 'the west' -> Sw. [mag**a**rib**i**] *magaribi* 'the west'

c. ([pharyngeal] triggers [i])

Ar. [al.subh] 'morning' -> Sw. [asub**u**h**i**] *asubuhi* 'morning'

Given that, Swahili makes use of three different vowels according to the environment in which they occur, the central challenge thus lies in a phonological description. Why does this multiplicity of forms exist? Before we examine the mechanics of this phenomenon, word-medial data are considered.

Word-Medial Epenthesis

Of the data collected of word-medial epenthesis, the distribution of vowels seems more equal: 11 instances of [i], and 15 cases of [u]. [a] was epenthesized word-medially 22 times and [e] was epenthesized 5 times. [o] was epenthesized once. Word-medial epenthesis is exemplified below:

(9) a. Ar. [aql] 'intelligence' -> Sw. [ak**i**l**i**] *akili* 'intelligence'

b. Pr. [harqi] 'type of grain' -> Sw. [har**a**gwe] *haragwe* 'bean'

c. HU. [godro] 'mattress' -> Sw. [god**o**ro] *godoro* 'mattress'

d. Ar. [kibri:t] 'match' -> Sw. [kib**e**rit**i**] *kiberiti* 'match'

e. Ar. [qidr] 'jug' -> Sw. [gud**uli**a] *gudulia* 'jug'

In addition to word-medial epenthesis showing less of a marked distribution than word-final epenthesis, individual epenthetic vowels show less of a trend with regard to the type of consonant they directly follow. However, if we expand our analysis to include both vowels that preceede as well as vowels that follow the epenthetic form[11], a clearer pattern emerges. That is, word-medially, epenthetic vowels are generally realized as copies of nearby vowels. As a counterpart to (7), we can describe word-medial epenthesis as follows:

(10) Word-Medial Epenthesis in Swahili

When an epenthetic vowel is inserted word-medially, it is realized as a copy of a nearby vowel. Epenthetic [i] is variable in its occurrence, epenthetic [e] less so.

(10) should not, however, be taken as a "rule", but rather as an imperfect generalization. Exceptions are quite common, as shown below:

(11) a. Ar. [markab] 'ship' -> Sw. [mer**i**keb**u**] *merikebu* 'ship'

b. Eng. [fIlm] 'film' -> Sw. [fil**a**m**u**] *filamu* 'film'

c. Ar. [sifr] 'zero' -> Sw. [sif**uri**] *sifuri* 'zero'

As different as (7) and (10) appear, it will be demonstrated that, by appealing to Feature-Spreading and Domains, the realization of epenthetic vowels is largely systematic and predictable.

The Phonetic Implementation of Swahili Epenthetic Vowels
Swahili possesses the following five vowels:

(12) **[i] [u]**
[e] [o]
[a]

The most important detail here is that that the featureless [ə] does not exist in Swahili. If the choice of a featureless form is not available, vowels can only be realized (i.e. pronounced) with features. Epenthetic vowels must therefore acquire features.

[11]In both cases, a consonant often intervenes.

It has already been established that this process is affected by adjacent sounds: word-finally, these are consonant sounds that directly precede the epenthetic vowel; word-medially, these are vowel sounds that may precede or follow the epenthetic vowel, usually with a consonant intervening.

Evidence for adjacency-triggered change is widespread. Clements (1985) cites work by Ladefoged that draws attention to three different English articulations for the sound [t], all seemingly affected by the following sound's place of articulation (Clements, 1985:236). Below are different articulations for English [t].

(13) a. "eighth" -[θ] [eʲt̪θ] -[t] is interdental

b. "cheer" -[ʃ] [tʲʃɹ] -[t] is palatalized

c. "tree" -[ɹ] [ʈɹiʲ] -[t] is retroflex

[t] is composed of a set of different features: [+consonantal], [-sonorant], [coronal], [+anterior], and [-distributed]. Each of these features exists upon a structured schema, each structured schema being unique for each separate sound (Kenstowicz, 1993). Clements' (1985) main argument is that during phonological processes of assimilation, feature bundles pass some of their features to nearby feature bundles, a process by which the nature of the recipient feature bundle is changed. Therefore, when the [t] of "eighth" is pronounced, place features from the nearby [θ] are acquired, resulting in a [t] that is interdental, or [+distributed]. Assimilation as feature-spreading (e.g. "eighth") is illustrated below:

(14) [t] -> [t̪] / ___ C [+distributed]

[t]		[θ]
[coronal]		[coronal]
~~e~~	**O**eu	
[+anterior]	[-distributed] **[+distributed]**	[+anterior]

Feature-Spreading and Swahili Word-Medial Epenthesis

When applied to vowel-vowel interactions, a similar mechanism applies. One well-known example is Turkish vowel harmony[12] (shown in (15)), where alternations found in allomorphs of several different types of suffix are realized as a result of assimilation.

[12] Turkish data are from Bubenik (1999).

(15) a. [ev] -> [evi] "bare accusative morpheme" [i]
b. [oda] -> [odayI] [i] -> [I] / V[low] ____
c. [gøz] -> [gøzy] [i] -> [y] / V[round] ____

Under a feature-spreading model, this can be explained as the spread of one vocalic feature to the vowel present in the accusative morpheme. Turkish vowel harmony as feature-spreading (e.g. gøzy) is shown below.

(16) [i] -> [y] / V[round] _____
[ø] [i]
[front] [front]
g E~~g~~
[+round] [-round]

Applied to Swahili word-medial vowel epenthesis, this process of feature-spreading has very good illustrative value, accounting for 72% of the data.

(17) a. Pr. [harqi] 'type of grain' -> Sw. [har**a**gwe] *haragwe* 'bean'
b. Ar. [huzn] 'grief' -> Sw. [huz**u**ni] *huzuni* 'grief'
c. Eng. [spejd] 'spade' -> Sw. [s**e**petu] *sepetu* 'spade, shovel'

Given that the Swahili syllable structure disfavours consonant clusters (3), the phonology inserts a featureless mora (ɥ) between consonants to repair the illicit structure. Since the absence of a featureless vowel in the Swahili vocalic inventory (12) requires that vowels have features in order to be pronounced, features must be appropriated (in this case, from a nearby vowel) to the mora. The mora is then realized as a "copy of a nearby vowel" (as per (9)). The process can occur from left to right, as in (18), or from right to left, as in (19). Word-medial feature-spreading is exemplified using *haragwe* 'bean' in (18) and *sepetu* 'spade, shovel' in (19).

(18) Pr. [harqi] 'type of grain' -> Sw. [har**a**gwe] *haragwe* 'bean'
[har**a**gwe]
[a] [ɥ]
1 ~~*(featureless)*~~
1 E
[feature set for [a]]
[ɥ] -> [**a**]

(19) Eng. [spejd] 'spade' -> Sw. [s**e**petu] *sepetu* 'spade, shovel'

[s**e**petu]
[ɥ] [e]
(*featureless*) 1
O 1
[feature set for [e]]
[ɥ] -> [**e**]

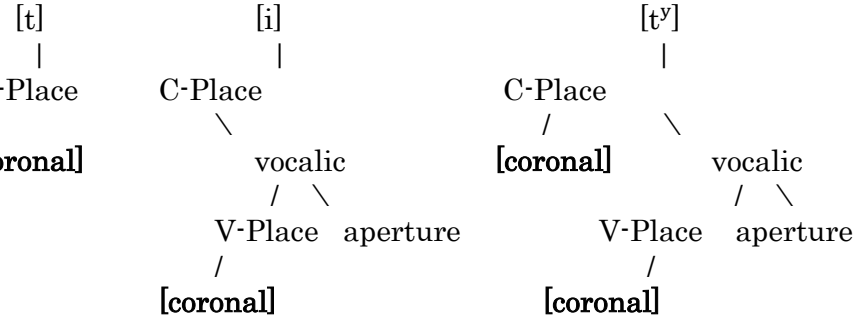
Feature-Spreading and Swahili Word-Final Epenthesis

According to Clements' 1991 analysis of Kirundi (86), the Feature-Spreading process is also active between vowels and consonants. [13] Examples of [i]+[e]-triggered palatalization in Kirundi (infinitive -> perfective) are given below:

(20) a. [raa**b**a] 'to look at' -> [raa**vy**e] 'looked at'
labial [b] -> labiodental (palatalized) [vy]
b. [te**k**a] 'to rule' -> [te**t^{s}**e] 'ruled'
dorsal [k] -> palatalized [t^{s}]

That these vowel-consonant (or, in the case of the Swahili word-final data which concerns us in this section, consonant-vowel) interactions should occur signals that certain features of vowels and of consonants are shared. In fact, Clements' (1991) work[14] posits that place features of consonants (C-features) and place features of vowels (V-features) are identical, and are simply present in different parts of the structured schema (ibid.:78).

(21)



[13] A similar process is productive in Swahili when deriving agentive nouns from verbs:
a) [tʃeka]*cheka* 'to laugh' -> [mtʃeʃi] *mcheshi* 'a funny person'
b) [pika] *pika* 'to cook' -> [mpiʃi] *mpishi* 'a cook'

[14] For the purposes of this investigation, a greatly simplified representation of Clements' (1996) "Place" will be used. But both higher and lower branching will be omitted.

The Swahili vowel inventory should be revised to appear with features as follows:

(22) Swahili Vowel Inventory (with Features)

[i] [coronal, +high] **[u]** [labial, +high]

[e] [coronal, -high] **[o]** [labial, -high]

[a] [pharyngeal, +low]

This claim is substantiated by research cited in Kenstowicz (1993) who notes that x-ray tracings from a number of languages (German, Canadian French, Russian, and Hungarian) indicate that "front vowels (when compared with the corresponding back vowels) are articulated with a raising of the front of the tongue toward the hard palate" (466), which seems to indicate a coronal quality of front vowels. This appears to be corroborated by the regular occurrence of word-final epenthetic [i] following coronal consonants in the Swahili data.

(23) a. Ar.: [bud:] 'alternative' -> Sw.: [bud**i**] *budi* 'alternative'

b. Ar.: [ja:su:s] 'spy' -> Sw.: [d^{j}asus**i**] *jasusi* 'spy'

c. Eng.: [ko^{w}t] 'coat' -> Sw.: [kot**i**] *koti* 'coat'

(24) Word-Final Feature-Spreading of Coronality (e.g. *budi*)

Ar.: [bud:] 'alternative' -> Sw.: [bud**i**] *budi* 'alternative'

[bud**i**]

[d] [ɥ]

[C-Place] ~~*(featureless)*~~

1 E

[coronal]

[ɥ] -> **[i]**

[u] as a labially articulated vowel can be supported with historical data from Proto-Bantu. Clements (1991) notes that Proto-Bantu **tu* is realized as [fu] in many daughter languages. This change can be understood as spread of the vowel's labial articulation to the preceding consonant, displacing the original coronal articulator. The reverse of this process (i.e. the spreading of a [labial] feature from a consonant to a word-final epenthetic vowel) appears in the majority of relevant environments in the Swahili data.

(25) a. Ar. [aawa:m] -> Sw. [awam**u**] *awamu* 'inception'

b. Eng. [nIb] -> Sw. [nib**u**] *nibu* 'nib'

c. Eng. [sto^{w}v] -> Sw. [stov**u**]*stovu* 'stove'

(26) Word-Final Feature-Spreading of Labiality (e.g. *nibu*)

Eng. [nIb] -> Sw. [nib**u**] *nibu* 'nib'

[nib**u**]

[b] [ɥ]

[C-Place] ~~*(featureless)*~~

1 E

[labial]

[ɥ] -> [**u**]

Clements (1985:461) cites data from McCarthy on Syrian Arabic as evidence for a pharyngeal articulation for [a]. Word-final suffixal vowels are realized as [a] when following pharyngeals such as [h] and [ɣ]. In a majority of cases, word-final epenthetic vowels behave similarly.

(27) a. Ar.: [wasah] 'pus' -> Sw.: [usah**a**] *usaha* 'pus'

b. Ar.: [lauh] 'sheet of paper' -> Sw.: [lah**a**] *laha* 'sheet of paper'

(28) Word-Final Feature-Spreading of Pharyngeality (e.g. *lauh*)

Ar.: [lauh] 'sheet of paper' -> Sw.: [lah**a**] *laha* 'sheet of paper'

[lah**a**]

[h] [ɥ]

[C-Place] ~~*(featureless)*~~

1 E

[pharyngeal]

[ɥ] -> [**a**]

Feature-Insertion

Given that the palatal consonants [tʃ] and [dʒ] pattern as coronals, the only place of articulation yet to be examined is that located between the palate and the uvula: the dorsal place. According to Clements (1991), a vocalic realization of the dorsal place of articulation should be [a]. In the data, however, this occurs only once, and [i] is the most common realization.

(29) a. Eng. [o^{w}k] 'oak ' -> Sw.: [muok**i**] *muoki* 'oak'

b. Eng. [bu^{w}mə-æŋg] 'boomerang' -> Sw. [bumareŋg**i**]

bumarengi 'boomerang'

c. Eng. [plæstik] 'plastic' -> Sw.: [plastik**i**]*plastiki* 'plastic'

In this case, no features are being appropriated from nearby sounds. Instead, it appears as if a default set of features is being assigned to the mora. This last-minute operation is known as Feature-Insertion. Word-final feature insertion is illustrated below with the word *plastiki* 'plastic'.

(30) Eng. [plæstik] 'plastic' -> Sw.: [plastik**i**] *plastiki* 'plastic'

[plastik**i**]
[k] [ɥ]
[C-Place] (*featureless*)
1
[dorsal]
-no feature spreading, [coronal] inserted by default
[ɥ] -> [**i**]

Having [coronal] as the default feature is a common pattern and can be observed in Clements' (ibid: 461) Syrian Arabic data, in which "[e] and [i] variants arise by default rules filling in the empty vowel".

Segregation of the Phenomena
The system of Swahili epenthesis in loanwords appears thus far as follows:

(31) Word-Medially [ɥ] -> V_X / ____ V_X
/ V_X ____ via V-V Feature-Spreading

Word-Finally [ɥ] -> V_X / C_X____ via C-V Feature-Spreading
-> $V_{[coronal]}$ / $C_{[dorsal]}$ via Feature-Insertion
*Where X = a feature

Having formulated the generalizations as above, we will now examine why word-medial vowel epenthesis patterns differently from word-final epenthesis.

Consider the following:

(32) Eng. [skɹuw] 'screw' -> Sw. [s**u**k**u**rub**u**] *sukurubu* 'screw'

Given the current set of rules (31) for word-medial epenthesis, and assuming that some degree of adjacency applies when morae assimilate features, it appears that epenthetic vowels (namely the second **[u]**, having already been valued by the underlying [u]) can spread their own features to other epenthetic vowels (i.e. the first **[u]**). If this premise is accepted, the following loans could be (theoretically) realized in two ways:

(33) a. Pr.: [barf] 'ice'
-> Sw.:[bar ʯfu]
given: [ʯ] -> V_X / ____ V_X= Sw.: [bar**u**fu]
/ V_X ____ = Sw.: [bar**a**fu]
actual form = [bar**a**fu] *barafu* 'ice'

b. Ar.: [fahl]
-> Sw.: [fah ʯli]
given: [ʯ] -> V_X / ____ V_X= Sw.: [fah**i**li]
/ V_X ____ = Sw.: [fah**a**li]
actual form = [fah**a**li] *fahali* 'bull'

c. Ar.: [sahm]
-> Sw.: [seh ʯ mu]
given:[ʯ] -> V_X / ____ V_X = Sw.: [seh**u**mu]
/ V_X ____= Sw.: [seh**e**mu]
actual form = [seh**e**mu] *sehemu* 'place'

In fact, nowhere in the data does a word-final vowel (either epenthetic or inherent in the structure) appear to have contributed to word-medial epenthesis. Therefore, not only do the two environments display separate feature-valuation systems, but both environments appear segregated from each other into separate domains.

A possible solution to this "two-domain" system lies in Swahili stress patterns. Cross-linguistically, post-stress vowels are often of a low prominence (cf. Kaplan (to appear); Walker, 2014). Since stress in Swahili always lands on the penultimate syllable (and is thus carried by the penultimate vowel), it can be posited that, after the stressed vowel, vocalic features cannot be spread. This is not a property solely of Swahili loanwords, but of native words as well – Swahili vowel harmony operations have no effect on the final vowel (Marten, 1996).

(34) Post-Stress Segregation (e.g. *barafu*)
Pr. [barf] 'ice' -> Sw. [bar**a**f**u**] *barafu* 'ice'
[bar**a**f**u**]
[b] [a] [r] '[ʯ] || [f] [u]
1(~~*featureless*~~) || 1
1 W || 1
[feature set for [a]] || [feature set for [u]]

-feature spreading from [u] blocked by Post-Stress Segregation (| |)
-features spread from [a]
-[ʯ] -> [**a**]

This is particularly attractive for two main reasons. First, if it is accepted that features cannot spread across the stressed penultimate syllable, then features from the ultimate vowel will be unavailable for spreading as in (34). Secondly, if features preceding and including the penultimate vowel are unavailable for feature spreading, then this will explain why the ultimate (word-final) vowel must appropriate features from the adjacent consonant (the only other 'feature bundle' available to it) and not from the nearby vowel. The word *sehemu* 'place' is used below to exemplify post-stress segregation.

(35) Pr. [sahm] 'ice' -> Sw. [seh**e**m**u**] *sehemu* 'place'

[seh**e**m**u**]

[s] [e] [h] '[e] || [m] [ɥ]

1 ||[C-Place] ~~*(featureless)*~~

1 || 1W

[feature set for [e]] || [labial]

-feature spreading from [e] blocked by Post-Stress Segregation (||)
-features spread from [m]
-[ɥ] -> [**u**]

In the introduction to Clements (1991:77), it is stated that "place features of vowels and glides [...] spread more freely than place features of consonants". This serves as a good explanation as to why feature-spreading occurs mainly with vowels in the pre-stress environments (where vowels are present). Revisiting pre-stress (i.e. word-medial) data, we can note that a minority of data display vowels that result from C-V feature spreading. Pre-strees C-V feature-spreading is illustrated below:

(36) a. Ar. [alasr] 'afternoon' -> Sw.: [alas**iri**] *alasiri* 'afternoon'

b. Eng.: [bɹʊʃ] 'brush' -> Sw.: [b**u**raʃ**i**] *burashi* 'brush'

c. Ar.: [sifr] 'zero' -> Sw.: [sif**uri**] *sifuri* 'zero'

Idiosyncratic Forms

Three forms in the data are idiosyncratic in that the epenthetic vowel present cannot be explained synchronically, but diachronically.

(37) a. Ar. [ibd.adam] 'human being' -> Sw. [b**i**nadamu] *binadamu* 'human being'

b. Ar. [ibn.am] 'cousin' -> Sw. [b**i**namu] *binamu* 'cousin'

c. Ar. [urs] 'wedding' -> Sw.: [ar**u**si] *arusi* 'wedding'

In each of these cases, it can be posited that, in the underlying form, the characteristic vowel has remained from the etymon. Unrealized in its original position, the features are still present. Therefore, when epenthesis occurs, these are the features that are appropriated.

(38) Idiosyncratic Forms (e.g. *binamu*)
Ar. [ibn.am] 'cousin' -> Sw. [b**i**namu] *binamu* 'cousin'

~~[i]~~	[b]	[ɥ]	[n]	[a]	[m]	[u]
1	~~(*Featureless*)~~					
1W						

[feature set for [i]]
[ɥ] -> [**i**]
-Feature appropriation from residual etymon vowel.

Suppletive Forms
Following this description of the data collected, there remain several forms for which there is no satisfactory explanation.

(39 a. Ar. [uʃr] -> Sw. [uʃur**u**] 'tax'
b. Ar. [salib] -> Sw. [msalab**a**] 'cross'
c. Ar. [qahbat] -> Sw. [kahab**a**] 'prostitute'

The cases in (39) could constitute a set of features that have disregarded post-stress segregation, thus contributing to a relatively small list of suppletive forms.

Conclusion

Swahili loanword adaptation makes use of a series of different and sometimes conflicting strategies (cf. Batibo (1996), extrasyllabic consonant truncation, for example). Typically, when Swahili loanwords are adapted via epenthesis, features cannot cross from one side of the stressed syllable (which in Swahili is the penult). Therefore, word-final epenthetic vowels must appropriate features from adjacent consonants. Consonants spreading coronal features will result in a coronal epenthetic vowel [i], consonants spreading labial features will result in a labial epenthetic vowel [u], and consonants spreading pharyngeal features will result in a pharyngeal vowel [a]. Dorsal consonants do not contribute a feature, and the feature [coronal] is inserted by default. In pre-stress environments, both vocalic and consonantal materials are available for feature-spreading. Features of vowels spread more freely than features of consonants, so vowel-vowel feature spreading is more prevalent. Several idiosyncratic forms exist in which vocalic material that existed in the etymon seems to have survived in the realization of epenthetic vowels. A handful of

suppletive forms exist, which seem to break the constraint on crossing from one side of the stressed vowel to the other.

This study has examined the spread of features in Swahili loans by appealing to Feature-Spreading and Domains, and provided a data-driven account that corroborates well with the existing body of theoretical literature. The inability of features to spread beyond the stressed vowel is emerging as a common constraint cross-linguistically, and may benefit from some further research in both other Bantu languages and other languages in general.

References

Ashton, E. O. (1947). *Swahili Grammar (including Intonation).* (2nd ed.). London : Longmans, Green & Co.

Baldi, S. (2005). The Influence of the Arabic Language in Africa. *Lingua Posnaniensis* 47: 7–19.

Batibo, H. (1990). Vowel Length: The Forgotten Distinctive Feature in Swahili? *Afrikanistische Arbeitspapiere*, 23: 53–72.

———. (1996). Loanword Clusters Nativization Rules in Tswana and Swahili: A Comparative Study. *South African Journal of African Languages*,16 (2): 33–41.

——— & Rottland, F. (1994). The Markedness Principle and Swahili Syllable Structure. *Afrikanistische Arbeitspapiere*, 40 (Dec.): 49–81.

Bosha, I. (1993). *Influence of Arabic on Kiswahili with a Trilingual Dictionary*. Dar es Salaam: Dar es Salaam University Press.

Bubenik, V. (1999). *An Introduction to the Study of Morphology*. LINCOM Coursebooks in Linguistics. LINCOM.

Mwita, L. C. (2009). The Adaptation of Swahili Loanwords from Arabic: A Constraint-Based Analysis. *The Journal of Pan-African Studies* 2: 46–61.

Clements, G. N. (1985). The Geometry of Phonological Features. *Phonology Yearbook*, 2: 225–52.

——— (1991). Place of Articulation in Consonants and Vowels: A Unified Theory. *Working Papers of the Cornell Phonetics Laboratory*, 5 (Sept.): 77–123.

Hall, N. (2006). Cross-Linguistic Patterns of Vowel Intrusion. *Phonology*, 23: 387–429.

Kaplan, A. (To appear). Maximal Prominence and a Theory of Possible Licensors.

Kenstowicz, M. J. (1993). *Phonology in Generative Grammar*. Blackwell Textbooks in Linguistics. Cambridge, Mass.; Oxford : Blackwell.

Lodhi, A. Y. (2000). *Oriental Influences in Swahili : A Study in Language and Culture Contacts*. Orientalia et Africana Gothoburgensia; Göteborg, Sweden : Acta Universitatis Gothoburgensis.

Marten, L. (1996). Swahili Vowel Harmony. *SOAS Working Papers in Linguistics and Phonetics*, 6: 61–75.

Mwita, L. C. (2007). Prenasalization and the IPA. *UCLA Working Papers in Phonetics*, 106: 58–67.

Schadeberg, T. (2014). Swahili. In M. Haspelmath & U. Tadmor (eds.). *World Loanword Database*. Leipzig: Max Planck Institute for Evolutionary Anthropology. Accessed November 6 http://wold.clld.org/vocabulary/1.

Walker, R. (2014). Prominence-Control and Multiple Triggers in Vowel Harmony: An ABC Analysis. *University of Southern California*.

Appendix: Loanwords in Swahili						
Word (Origin)	**Phon. Realiz.**	**Swahili**	**Phon. Realiz.**	**Meaning**	**Nota**	**Source**
stamp (E)	[stæmp]	stempu	[stɛmp**u**]	"stamp"	* Word does not appear to be fully nativized.	Batibo 1996
stove (E)	[sto^{w}v]	stovu	[stov**u**]	"stove"	* Word does not appear to be fully nativized.	Batibo 1996
iblis (Ar)	[ibli:s]	iblisi	[iblis**i**]	"devil"	* Word does not appear to be fully nativized.	Baldi 2005
ibriq (Ar)	[ibri:q]	birika	[b**i**rik**a**]	"kettle"	* [k] realized as [q] in the etymon	Baldi 2005
adhuhr (Ar)	[adhuhr]	adhuhuri	[að**u**hur**i**]	"midday"		Baldi 2005
adh (Ar)	[adh]	ahadi	[ah**a**d**i**]	"promise"		Baldi 2005
urs (Ar)	[urs]	harusi	[har**u**s**i**]	"wedding"	* Case of "underlying feature-spreading"	Baldi 2005
milk (Ar)	[milk]	miliki	[mil**i**k**i**]	"property"		Baldi 2005
waqt (Ar)	[waqt]	wakati	[wak**a**t**i**]	"time"		Baldi 2005
amm (Ar)	[am:]	amu	[am**u**]	"uncle"		Baldi 2005
asquf (Ar)	[asquf]	askofu	[askof**u**]	"bishop"	* Word does not appear to be fully nativized.	Baldi 2005
ibd Adamu (Ar)	[ibd.adamu]	binadamu	[b**i**nadamu]	"human being"	* Case of "underlying feature-spreading"	Baldi 2005
aawam (Ar)	[aawa:m]	awamu	[awam**u**]	"inception"		Baldi 2005
ibn amm (Ar)	[ibn.am:]	binamu	[b**i**nam**u**]	"cousin"	* Case of "underlying feature-spreading"	Baldi 2005
iarab (Ar)	[iara:b]	irabu	[irab**u**]	"vowel"		Baldi 2005
taab (Ar)	[taab]	taabu	[tab**u**]	"trouble"		Baldi 2005

Appendix: Loanwords in Swahili						
ahd (Ar)	[ahd]	ahadi	[ah**a**d**i**]	"promise"		Baldi 2005
ammar (Ar)	[am:ar]	amiri	[amir**i**]	"begin"		Baldi 2005
al subh (Ar)	[al.subh]	asubuh i	[asub**u**h **i**]	"morning "		Baldi 2005
budd (Ar)	[bud:]	budi	[bud**i**]	"alternati ve"		Baldi 2005
iddaaa (Ar)	[id:aa:]	dai	[dai]	"demand"		Baldi 2005
ghass (Ar)	[ghas:]	ghasia	[ɣasia]	"confusio n"		Baldi 2005
hadd (Ar)	[had:]	hadi	[had**i**]	"until"		Baldi 2005
saffa (Ar)	[saf:a:]	safi	[safi]	"clean"		Baldi 2005
unwan (Ar)	[unwan]	anwani	[anwan**i**]	"address"		Baldi 2005
izz (Ar)	[iz:]	enzi	[enz**i**]	"power"		Baldi 2005
aib (Ar)	[aib]	aibu	[aib**u**]	"shame"		Baldi 2005
baia (Ar)	[baia]	bei	[bei]	"price"		Baldi 2005
kaid (Ar)	[kaid]	kaidi	[kaid**i**]	"disobedi ent"		Baldi 2005
naam (Ar)	[naam]	naam	[nam]	"certainly "		Baldi 2005
zaid (Ar)	[za:id]	zaidi	[zaid**i**]	"more"		Baldi 2005
waqf (Ar)	[waqf]	wakfu	[wakf**u**]	"endowm ent"	* Word does not appear to be fully nativized.	Baldi 2005
wafaq (Ar)	[wa:faq]	afiki	[afik**i**]	"to agree with"		Baldi 2005
aqd (Ar)	[aqd]	akidi	[ak**i**d**i**]	"to celebrate"		Baldi 2005
aql (Ar)	[aql]	akili	[ak**i**l**i**]	"intellige nce"		Baldi 2005
tarikh (Ar)	[ta:rikh]	tarehe	[tareh**e**]	"date"		Baldi 2005
yaqut (Ar)	[ya:qu:t]	yakuti	[yakut**i**]	"ruby"		Baldi 2005
akhar (Ar)	[akhar]	ahirisha	[ah**i**r**i**ʃa]	"postpone "		Baldi 2005
baht (Ar)	[bakht]	bahati	[bah**a**t**i**]	"luck"		Schadeber g 2014
ahl (Ar)	[ahl]	ahali	[ah**a**l**i**]	"family"		Baldi 2005
alasr (Ar)	[alasr]	alasiri	[alas**i**r**i**]	"afternoo n"		Schadeber g 2014
asl (Ar)	[asl]	asili	[as**i**l**i**]	"source"		Baldi 2005

Appendix: Loanwords in Swahili						
dajn (Ar)	[dain]	deni	[den**i**]	"debt"		Schadeberg 2014
fihris (Ar)	[fihris]	faharasa	[fah**a**ras**a**]	"index"		Baldi 2005
ghaasha (Ar)	[jaash]	jasho	[jaʃ**o**]	"sweat"		Baldi 2005
jasus (Ar)	[ja:su:s]	jasusi	[dʲasus**i**]	"spy"		Baldi 2005
maadin (Ar)	[maadin]	madini	[madin**i**]	"mine"		Baldi 2005
duud (Ar)	[du:d]	mdudu	[mdud**u**]	"insect"		Schadeberg 2014
raad (Ar)	[raad]	radi	[rad**i**]	"thunder"		Schadeberg 2014
barf (Pr)	[barf]	barafu	[bar**a**f**u**]	"ice"		Schadeberg 2014
family (E)	[fæmɪliʲ]	familia	[familia]	"family"	* Possibly an incorrect etymon: origin is more likely to be Pt. "família" [familia]	Schadeberg 2014
soup (E)	[suʷp]	supu	[sup**u**]	"soup"		Schadeberg 2014
harqi (Pr)	[harqi]	haragwe	[har**a**gwe]	"bean"		Schadeberg 2014
batata (Pt)	[batata]	mbatata	[mbatata]	"potato"		Schadeberg 2014
caroço (Pt)	[karoço]	korosho	[koroʃo]	"nut"		Schadeberg 2014
vinho (Pt)	[viɲo]	mvinyo	[mvinjo]	"wine"		Schadeberg 2014
coat (E)	[koʷt]	koti	[kot**i**]	"coat"		Schadeberg 2014
shirt (E)	[shɚt]	shati	[ʃat**i**]	"shirt"		Schadeberg 2014
socks (E)	[sɑks]	soksi	[soks**i**]	"socks"	* Word does not appear to be fully nativized.	Schadeberg 2014
burkuh (Ar)	[burkuh]	barakoa	[bar**a**ko**a**]	"veil"		Schadeberg 2014
bangli (HU)	[baŋgli]	bangiri	[baŋgiri]	"bracelet"		Schadeberg 2014
lenço (Pt)	[lenço]	leso	[leso]	"rag"		Schadeberg

Appendix: Loanwords in Swahili						
						2014
brush (E)	[bɹʊʃ]	burashi	[b**u**raʃ**i**]	"brush"		Schadeberg 2014
ski (E)	[skiʲ]	skii	[ski:]	"ski"		Schadeberg 2014
qufl (Ar)	[qufl]	kufuli	[kuf**u**l**i**]	"padlock"		Schadeberg 2014
saqf (Ar)	[saqf]	sakafu	[sak**a**f**u**]	"floor"		Schadeberg 2014
falg (Ar)	[falʤ]	mfereji	[mfer**e**dʲ**i**]	"ditch"		Schadeberg 2014
spade (E)	[spejd]	sepetu	[s**e**pet**u**]	"spade"		Schadeberg 2014
oak (E)	[oʷk]	muoki	[muok**i**]	"oak"		Schadeberg 2014
lim (Ar)	[li:m]	limau	[lim**au**]	"citrus"		Schadeberg 2014
chenze (Ch)	[chenzə]	chenza	[chenza]	"citrus"		Schadeberg 2014
mikass (Ar)	[mikas]	mkasi	[mkas**i**]	"shears"		Schadeberg 2014
gond (HU)	[gond]	gundi	[gund**i**]	"glue"		Schadeberg 2014
gum (E)	[gʊm]	gamu	[gam**u**]	"glue"		Schadeberg 2014
axle (E)	[æksˌl]	ekseli	[eksel**i**]	"axle"	* Word does not appear to be fully nativized.	Schadeberg 2014
sledge (E)	[slɛʤ]	sleji	[sledʲ**i**]	"sledge"		Schadeberg 2014
markab (Ar)	[markab]	merikebu	[meri**k**e b**u**]	"ship"		Schadeberg 2014
sukkan (Ar)	[sukːaːn]	usukani	[**u**sukan **i**]	"rudder"		Schadeberg 2014
langar (Pr)	[laŋgar]	nanga	[naŋga]	"anchor"		Schadeberg 2014
haraba (Ar)	[haraba]	haribu	[haribu]	"to destroy"		Schadeberg 2014
dara (Ar)	[daːra]	dhuru	[dhuru]	"to damage"		Schadeberg 2014
sarf (Ar)	[sarf]	sarafu	[sar**a**f**u**]	"coin"		Schadeberg 2014
usr (Ar)	[ʔʃr]	ushuru	[uʃ**u**r**u**]	"tax"		Schadeberg 2014
wazn	[wazˌn]	uzani	[uzan**i**]	"to		Schadeberg

Appendix: Loanwords in Swahili						
(Ar)				weigh"		2014
mashriq (Ar)	[maʃriq]	masharikiki	[maʃ**a**rik**i**]	"the east"		Schadeberg 2014
magrib (Ar)	[magrib]	magharibi	[magh**a**rib**i**]	"the west"		Schadeberg 2014
salib (Ar)	[salib]	msalaba	[msalab**a**]	"cross"		Schadeberg 2014
mistara (Ar)	[mistara]	mstari	[mstari]	"line"		Schadeberg 2014
sifr (Ar)	[sifr]	sifuri	[sif**uri**]	"zero"		Schadeberg 2014
blue (E)	[blu^{w}]	buluu	[b**u**lu:]	"blue"		Schadeberg 2014
huzn (Ar)	[huzn]	huzuni	[huz**uni**]	"grief"		Schadeberg 2014
haqiqa (Ar)	[haqi:qa]	hakika	[hakika]	"certain"		Schadeberg 2014
qasd (Ar)	[qasd]	kusudi	[kus**udi**]	"intention"		Schadeberg 2014
hutba (Ar)	[hutba]	hotuba	[hot**u**ba]	"speech"		Schadeberg 2014
qartas (Ar)	[qartas]	karatasi	[kar**a**tas**i**]	"paper"		Schadeberg 2014
trombeta (Pt)	[trombeta]	tarumbeta	[t**a**rumbeta]	"trumpet"		Schadeberg 2014
malika (Ar)	[malika]	malkia	[malkia]	"queen"		Schadeberg 2014
qahbat (Ar)	[qahbat]	kahaba	[kah**a**ba]	"prostitute"		Schadeberg 2014
manara	[ma:nara]	mnara	[mnara]	"tower"		Schadeberg 2014
mahkama (Ar)	[mahkama]	mahakama	[mah**a**kama]	"court"		Schadeberg 2014
hukm (Ar)	[hukm]	hukumu	[huk**u**m**u**]	"judgement"		Schadeberg 2014
jail (E)	[ʤeil]	jela	[dʲel**a**]	"jail"		Schadeberg 2014
padre (Pt)	[padre]	padri	[padri]	"padre"		Schadeberg 2014
bicycle (E)	[bɑisikˌl]	baisikeli	[baisik**e**l**i**]	"bicycle"		Schadeberg 2014
sarkar	[sarkar]	serikali	[ser**i**kal**i**]	"government"		Schadeberg 2014
barwa (Ar)	[barwa]	barua	[barua]	"letter"		Schadeberg 2014

Appendix: Loanwords in Swahili						
musallan (Ar)	[musall an]	msala	[msala]	"toilet"		Schadeberg 2014
godro (HU)	[godro]	godoro	[god**o**ro]	"mattress "		Schadeberg 2014
screw (E)	[skɹʊw]	sukuru bu	[s**u**k**u**ru b**u**]	"screw"		Schadeberg 2014
peppermi nt (E)	[pɛpə˞mɪ nt]	pereme nde	[pereme nde]	"candy"		Schadeberg 2014
film (E)	[film]	filamu	[fil**a**m**u**]	"film"	* Etymon most likely to include excrescence: [filəm], thus resulting in an [ə]->[a] adaptation	Schadeberg 2014
darba (Ar)	[darba]	dhorub a	[dhor**u**b a]	"storm"		Schadeberg 2014
kibrit (Ar)	[kibriːt]	kiberiti	[kib**e**rit**i**]	"match"		Schadeberg 2014
fahl (Ar)	[fahl]	fahali	[fah**a**l**i**]	"bull"		Schadeberg 2014
faras (Ar)	[faras]	farasi	[faras**i**]	"horse"		Schadeberg 2014
bagl (Ar)	[bagˌl]	baghal a	[bagh**a**l**a**]	"mule"		Schadeberg 2014
gamal (Ar)	[ʤamal]	ngamia	[ngamia]	"camel"		Schadeberg 2014
ʔafiya (Ar)	[ʔafija]	afya	[afja]	"healthy"		Schadeberg 2014
wasah (Ar)	[wasah]	usaha	[usah**a**]	"pus"		Schadeberg 2014
baqul (Ar)	[baquːl]	bakuli	[bakul**i**]	"dish"		Schadeberg 2014
sahn (Ar)	[sahn]	sahani	[sahan**i**]	"plate"		Schadeberg 2014
qidr (Ar)	[qidr]	gudulia	[gud**u**l**i**a]	"jug"		Schadeberg 2014
djubun (Ar)	[ʤubun]	jibini	[dʲibin**i**]	"cheese"		Schadeberg 2014
mihraz (Ar)	[mihraz]	mahar azi	[mah**a**ra z**i**]	"awl"		Schadeberg 2014
gown (E)	[gɑun]	gauni	[gaun**i**]	"dress"		Schadeberg 2014
sirwal (Ar)	[sirwal]	suruali	[surual**i**]	"trousers"		Schadeberg 2014

Appendix: Loanwords in Swahili						
boomerang (E)	[buʷməˑææŋ]	bumarengi	[bumareŋgi]	"boomerang"		Schadeberg 2014
gardjun (Pr)	[garʒun]	gurudumu	[gurudumu]	"wheel"		Schadeberg 2014
miskin (Ar)	[miskiːn]	maskini	[maskini]	"poor"		Schadeberg 2014
mushara (Ar)	[muʃahara]	mshahara	[mʃahara]	"wages"		Schadeberg 2014
sahm (Ar)	[sahm]	sehemu	[sehemu]	"piece"		Schadeberg 2014
al-fadjr (Ar)	[alfadʒr]	alfajiri	[alfadʲiri]	"dawn"		Schadeberg 2014
imam (Ar)	[ʔimam]	imamu	[imamu]	"imam"		Schadeberg 2014
danb (Ar)	[dʰanb]	dhambi	[dhambi]	"crime"		Schadeberg 2014
tasbih (Ar)	[tasbih]	tasbihi	[tasbihi]	"glorification"		Schadeberg 2014
lauh (Ar)	[lauh]	laha	[laha]	"sheet of paper"		Schadeberg 2014
kalbud (Pr)	[kalbuːd]	kalibu	[kalibu]	"model, mould"		Schadeberg 2014
beer (E)	[biaˑ]	bia	[bija]	"beer"		Schadeberg 2014
glass (E)	[glæs]	gilasi	[gilasi]	"glass"		Batibo 1996
station (E)	[steiʃˌn]	steshen i	[steʃɛni]	"station"	* Word does not appear to be fully nativized.	Batibo 1996
rough (E)	[rʊf]	rafu	[rafu]	"rough"		Batibo 1996
form (E)	[fɔˈm]	fomu	[fomu]	"form"		Batibo 1996
nib (E)	[nɪb]	nibu	[nibu]	"nib"		Batibo 1996
lab (E)	[læb]	lebu	[lɛbu]	"laboratory"		Batibo 1996
pump (E)	[pʊmp]	pampu	[pampu]	"pump"		Batibo 1996
jam (E)	[jæm]	jemu	[jɛmu]	"jam"		Batibo 1996
tape (E)	[teɪp]	tepu	[tepu]	"tape"		Batibo 1996
note (E)	[noʷt]	noti	[noti]	"note"		Batibo 1996
pass (E)	[pæs]	pasi	[pasi]	"passport"		Batibo 1996
tank (E)	[tæŋk]	tanki	[taŋki]	"tank"		Batibo 1996
bank (E)	[bæŋk]	benki	[beŋki]	"bank"		Batibo 1996
speaker (E	[spikaˑ]	spika	[spika]	"speaker"	* Word does not appear to be fully	Batibo 1996

Appendix: Loanwords in Swahili						
					nativized.	
hostel (E)	[hostəl]	hosteli	[hostel**i**]	"hostel"	* Word does not appear to be fully nativized.	Batibo 1996
spanner (E)	[spænɚ]	spana	[spana]	"spanner"	* Word does not appear to be fully nativized.	Batibo 1996
master (E)	[mæstɚ]	masta	[masta]	"master"	* Word does not appear to be fully nativized.	Batibo 1996
school (E)	[skul]	skuli	[skul**i**]	"school"	* Word does not appear to be fully nativized.	Batibo 1996
spare (E)	[spɛˑ]	spea	[spea]	"spare"	* Word does not appear to be fully nativized.	Batibo 1996
sister (E)	[sɪstɚ]	sista	[sista]	"nun"	* Word does not appear to be fully nativized.	Batibo 1996
desk (E)	[dɛsk]	deski	[dɛsk**i**]	"desk"	* Word does not appear to be fully nativized.	Batibo 1996
plastic (E)	[plæstik]	plastiki	[plastik**i**]	"plastic"	* Word does not appear to be fully nativized.	Batibo 1996
settler (E)	[sɛtlɚ]	setla	[sɛtla]	"settler"	* Word does not appear to be fully nativized.	Batibo 1996
April (E)	[eipɹˌl]	aprili	[epril**i**]	"April"	* Word does not appear to be fully nativized.	Batibo 1996
grade (E)	[greid]	gredi	[gred**i**]	"grade"	* Word does not appear to be fully	Batibo 1996

Appendix: Loanwords in Swahili						
					nativized.	
flute (E)	[flut]	fluti	[fluti]	"flute"	* Word does not appear to be fully nativized.	Batibo 1996
petrol (E)	[pɛtɹəl]	petroli	[petroli]	"petrol"	* Word does not appear to be fully nativized.	Batibo 1996
clinic (E)	[klınık]	kliniki	[kliniki]	"clinic"	* Word does not appear to be fully nativized.	Batibo 1996
brake (E)	[bɹeik]	breki	[breki]	"brake"	* Word does not appear to be fully nativized.	Batibo 1996
train (E)	[tɹein]	treni	[treni]	"train"	* Word does not appear to be fully nativized.	Batibo 1996
census (E)	[sensʊs]	sensa	[sensa]	"census"	* Word does not appear to be fully nativized.	Batibo 1996
cent (E)	[sɛnt]	senti	[senti]	"cent"		Batibo 1996
change (E)	[ʧeinʤ]	chenji	[ʧendʲi]	"change"		Batibo 1996
puncture (E)	[pʊnkʧəɾ]	pancha	[panʧa]	"puncture"	* Word does not appear to be fully nativized.	Batibo 1996
bench (E)	[bɛnʧ]	benchi	[benʧi]	"bench"	* Word does not appear to be fully nativized.	Batibo 1996
baptize (E)	[bæptɑiz]	batiza	[batiza]	"baptize"	* Possibly an incorrect etymon: origin is more likely to be Pt. "batizar" [batizar]	Batibo 1996

Appendix: Loanwords in Swahili						
contract (E	[kɑntɹæ kt]	kondrati	[kondrati]	"contract"	* Word does not appear to be fully nativized.	Batibo 1996
picture (E)	[pɪktʃəˑ]	picha	[pitʃa]	"picture"		Batibo 1996
nylon (E)	[nɑilon]	nailoni	[nailoni]	"nylon"		Batibo 1996
towel (E)	[tɑʊl]	tauli	[taulo]	"towel"		Batibo 1996
psychology (E)	[sɑikolo dʒi]	saikolog ia	[saikolodʒ ia]	"psycholo gy"		Batibo 1996