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Impact of Phonological Processes of Vowel Shortening on Standard Kiswahili

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ABSTRACT

This work examines the vowel shortening processes that take place initially, medially or finally in Kiswahili. The general objective of this study is to describe the extent to which these phonological processes result in vowel shortening. It uses extended models of generative phonology as a theoretical framework. A quick examination of a random sampling of words and/or morpheme tends to suggest that different languages have phonological processes that determine well-formed sound sequences and combinations. To this effect, within a phonological system, a language has restrictions that inhibit the appearance of succession of two vowels. In most cases, lengthened vowels in standard Kiswahili are not acceptable at the surface level, thus necessitating employing a process of vowel shortening. Vowel shortening is one of the strategies that are employed in order to yield an acceptable form of standard Kiswahili. It is concluded that the surface representations that we observe in most of the lexicons are subject to well-formed conditions which include, inter alia, vowel shortening.

***Keywords**: Phonological process, vowel shortening, standard Kiswahili, language*

INTRODUCTION

Before proceeding with the discussion, it is important to review briefly, on phonological process and how this process affects the standard Kiswahili. In identifying and discussing the phonological processes that are affecting vowel sounds in any language, one must know what the term phonological processes mean. According to Massamba (2010), phonological processes are processes that convert phonological representations into phonetic representations. Ashton (2001) adds that such processes are local and non- arbitrary, in that there must be a clear connection between a process and its environment. Also, Massamba (2004) asserts that natural phonological processes are held to be innate. Vowels, according

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to Crystal (1980) can be defined both phonetically and phonologically. Phonetically, vowels are sounds articulated without a complete closure in the mouth or a degree of narrowing which would produce audible friction. From a phonological stand point, vowels are units which function at the centre of syllables. The representations here mean underlying representation (phonological level) and surface representations (phonetic level). Chomsky and Halle (1968) assert that the surface structure must meet two independent conditions: first, it must be appropriate for the rules of phonological interpretation; second, it must be "syntactically motivated," that is, it must result from the application of independently motivated syntactic rules. Thus, three are two concepts of surface structure: input to the phonological component and output of the syntactic component (Clement, 1984). These processes are sometimes called natural processes (Massamba, 2010).

Phonological processes affect consonants and vowels. This work aims at identifying and discussing phonological processes that affect vowels, which include nasalization, deletion, glide formation, vowel coalescence and high vowel deletion, particularly in Bantu languages. There are several processes that affect the phonetic realization of phonemes in different contexts. In other words, there are several general processes which result in different allophones of the same phoneme. Phonological processes may yield to affect both vowels and consonants. In this work, the main concern is on phonological processes, which affect vowels. Phonological process is a linguistic process used by the speakers of the language to simplify the production of complex words, by deleting or omitting some of the phonemes in the word, or combining two phonemes in the production of a word (Massamba, 2010). It is important to note that the processes are not randomly practised rather they follow some rules.

Standard Kiswahili can be taken as the standard dialect called Kiswahili Sanifu (or Kisanifu) which is a result of the inter-territorial language (Kiswahili) Committee which was founded in 1930 (Whitely, 1956). It was this committee that defined standard Kiswahili as being that of Zanzibar (Kiunguja) dialect, (Whitely 1959). Standard Kiswahili is *lingua franca* in the African Great Lakes region and other parts of eastern and south-eastern Africa, including Tanzania, Kenya, Uganda, Rwanda, Burundi, Mozambique, and the Democratic Republic of the Congo (DRC) (Massamba, 2017). Estimates of the total number of Swahili speakers vary widely, from 50 million to over 100 million (Massamba, 2017). A significant fraction of Swahili vocabulary is derived from Arabic through contact with Arabic-speaking Muslim inhabitants of the Swahili Coast (Massamba, 2017).

In Guthrie's (1967) geographic classification, Swahili is in Bantu zone G. It has become a second language spoken by tens of millions in three African Great Lakes countries (Tanzania, Kenya, and the Democratic Republic of Congo) where it is an official or national language (Maho 2008). Vowel shortening is the change that affects sound segments when vowels are juxtaposed at a morpheme and/or word boundaries (Hyman, 1975). Essentially, phonological processes convert phonological representations into phonetic representations. In phonological rules, we construct paradigms of words to look for regular alternations and/or derivations in the phonetic shape of the stem as different affixes are added; as well as for systematic differences in the realization of the affix as a function of the stem. These rules may also study variations in the pronunciation of a word as the phrasal context changes (Hyman, 1975).

In standard Kiswahili, as in the case with other Bantu languages, gliding and coalescing processes operate at the morpheme boundaries within words (Massamba, 2011). Some processes, however, operate at a word boundary within phrases (Massamba, 2011). We will now delve into these processes more closely and discuss their impacts on standard Kiswahili. The types and levels of representation involved in phonological derivations that will be applied in this study are those which are standard in generative approach, that is, underlying representation (UR) "//" and surface representation (SR) "[ ]" (Massamba, 2011). The phonological processes affecting vowels in the language being discussed that have the impact on shortening one of the vowels are glide formations, coalescence and high vowel deletion (Chomsky and Halle, 1968). The phonological processes result into a compensatory vowel lengthening (Chomsky and Halle, 1968). The processes yield unacceptable forms in standard language in question. Therefore, vowel shortening is an imposed strategy to the lengthened vowel in order to yield acceptable form in the language under study (Chomsky and Halle, 1968).

Theoretical Framework

The approach to this study is from the point of views of Standard and Extended Models of Generative Phonology. As a theory, Generative Phonology (henceforth GP) is part of a more general theory of grammar propounded by Chomsky (1957) and which came to be known later as Generative grammar (Chomsky, 1965). According to this theory, a grammar of a language is to be defined as a set of rules, which enable speakers to produce an infinite number of sentences in their

language. This grammar also should be able to adequately analyse each sentence in the language. Generative grammar is rule-based in that it is based on the assumption that when one knows a language it means one has internalised a set of finite rules that operate at the different levels of the language in question. The most authoritative and comprehensive presentation of the theory of generative phonology is articulated in the Sound Pattern of English (SPE), by Chomsky and Halle (1968) which is generally regarded as the Standard Model of Generative Phonology. This includes the observational, descriptive and explanatory adequacies. According to Chomsky (1965), observational adequacy is achieved when the theory observes and transcribes the data correctly. Descriptive adequacy is achieved when the theory in addition to observing and transcribing the data correctly, it also accounts for the linguistic competence of the native speaker. Finally, explanatory adequacy is achieved when a principled basis is established for deciding between alternative solutions to a problem leading us to choose the one solution, which captures the native speakers competence. An evaluation procedure is used in which one out of a range of possible descriptions can be chosen and justified as being correct for a given data. Generative Phonology attempts to make explicit the relationship between the physical actualization of the utterance and what underlies it. Massamba (2011) summarizes the major issues of emphasis thus:

(a) The need for making explicit the formal character of phonological and phonetic representations.
(b) The need for an explicit notational system in describing sound structure of language.
(c) The operational procedures of mapping one representation onto another.
(d) The need for providing empirical reasons as to why a particular description of a given set of data was to be preferred over other possible ones.

MATERIALS AND METHOD

This study employed two methods for data collection, namely, self-data generation and documentation via library search. For some of the data used in this study, the author relied on his own native intuition of which 50 lexicons was generated. For checking data and confirming various facts, two Kiswahili speakers were involved. Relevant literature from different sources were consulted so as to obtain linguistic information about the standard Kiswahili. Maganga (1992) presented one of the document for data collection, through his Ph.D dissertation on a study

of morphophonology of Standard Kiswahili, Kipemba, Kitumbatu and Kimakunduchi, a total of 50 lexicons and LOT, Lexical Questionnaire (2003) were made available. This was done by randomly picking any word from the first page of the list to the last one. Sometimes, two or more pages were opened and no word was chosen. This was the case throughout the pages. Through such rechecking, we noted that some of the vocabulary is either outdated or not in the standards Kiswahili despite the dictionary being a very valuable tool for identifying words and other phrases necessary for supporting phonological issues raised in this work. In this study, the lengthened vowel will be represented as [vv] and a shortened one as [v].

RESULTS AND DISCUSSION

Vowel shortening as the result of glide process

Vowel shortening in Standard Kiswahili can be as a result of the gliding process (Massamba 2004). The glide is a phonological process which has the effect of changing /u/ into /w/ and /i/ into /y/. This process does not affect the identical vowel sequences such as */a+a/, /e+e/ /i+i/, /o+o/* and */u+u/* since in such sequences, one of the identical vowels get deleted and the remaining vowel lengthens or may remain unchanged as */u+u/* to yield *[mu+ungano] ~"union"*. In standard Kiswahili, both glides [w-] and [y-], may occur. Let us begin our discussion by considering a 'w' glide. The back glide [w] is formed when a high back vowel precedes a non-identical vowel. Observe the following examples in example 1:

Example 1.	a)	*/mu+alimu/*	*[mwalimu]*	"a/the teacher"
	b)	*/mu+ezi/*	*[mwezi]*	"the moon"
	c)	*/mu+izi/*	*[mwizi]*	"a/the thief"
	d)	*/mu+ongo/*	*[mwongo]*	"the/a lier"
	e)	*/mu+uzaji/*	*[muuzaji]*	"the/a seller"

Several occasions, the sound may have similar combinatory vowels along morpheme boundary but does not glide or it may yield unacceptable forms in standard Kiswahili as in example 2:

Example 2.	a)	*/mi+ezi/*	*[*myezi]*	"months"
	b)	*/mi+aka/*	*[*myaka]*	"years"
	c)	*/mi+onzi/*	*[*myonzi]*	"rays"

In example 2, no glide formation has taken place and what happens is copping

similar words as they appear in underlying representation. Therefore, in standard Kiswahili, it is difficult to tell the context of which such a process is prohibited to take place as in example 3.

Example 3.

a) */mi+ezi/* *[miezi]* "months"
b) */mi+aka/* *[miaka]* "years"
c) */mi+onzi/* *[mionzi]* "rays"

We can expand our discussion by observing the following data of which the gliding has resulted in unacceptable forms in standard Kiswahili.

Example 4.

a) */mu+alimu/* *[*mwaalimu]* *[mwalimu]* "a/the teacher"
b) */mu+izi/* *[*mwiizi]* *[mwizi]* "a/the thief"
c) */mu+aka/* *[*mwaaka]* *[mwaka]* "a year"
d) */mu+ezi/* *[*mweezi]* *[mwezi]* "the month"
e) */u+embe/* *[*weembe]* *[wembe]* "a razor blade"
f) */vi +akula/* *[*vyaakula]* *[vyakula]* "the food"

The process also takes place in verb and adjective clusters. Observe the following data.

Example 5.

a) */ku+enda/* *[*kweenda]* *[kwenda]* "to go"
b) */mu+izi/* *[*mwiizi]* *[mwizi]* "a/the thief"
c) */mu+aka/* *[*waazimu]* *[wazimu]* "madness"
d) */ku+engine /* *[*kweengine]* *[kwengine]* "another place"
e) */ku+ingine/* *[*kwiingine]* *[kwingine]* "another place"

Also, adverbial forms may attract gliding processes as in the following data in example 6 suggest:

Example 6.

a) */u+ekundu/* *[*weekundu]* "reddish"
b) */u+endawazimu/* *[*weendawazimu]* "madness"
c) */u+eupe/* *[*weeupe]* "whiteness"

Before we make a discussion on the above data, let us expand our discussion by considering a front glide /y/. A front glide [y] is formed when a high front vowel is followed by a non-identical vowel. This takes place across morphemes and/or word boundaries. Observe the following data in example 7:

Example 7.

a)	*/vi+eti/*	*[*vyeeti]*	*[vyeti]*	"certificates"
b)	*/vi+ura/*	*[*vyuura]*	*[vyura]*	"frogs"
c)	*/vi+ungu/*	*[*vyuungu]*	*[vyungu]*	"pots"
d)	*/vi+upa/*	*[*vyuupa]*	*[vyupa]*	"bottles"
e)	*/vi+umba/*	*[*vyuumba]*	*[vyumba]*	"rooms"
f)	*/vi+uma/*	*[*vyuuma]*	*[vyuma]*	"iron "

As in the case we observed in example 2, once again example 7 suggests that a glide formation does not apply in the following forms:

Example 8.

a)	*/vi+unzi/*	*[*vyuuzi]*	*[viuzi]*	"fibers or strings"
b)	*/vi+ungo/*	*[*vyuungo]*	*[viungo]*	"spices/ organs"
c)	*/vi+umbe/*	*[*vyuungu]*	*[vyungu]*	"pots"
d)	*/vi+upa/*	*[*vyuumbe]*	*[viumbe]*	"living organisms"
e)	*/vi+azi/*	*[*vyaazi]*	*[viazi]*	"potatoes"

The example 8 suggests that words in standard Kiswahili may undergo gliding which results into unacceptable forms. In this context, Underlying Representations (UR) are similar to the Surface Representation (SR). If vowel shortening applies to these forms, still will yield unacceptable forms in standard Kiswahili as in example 9.

Example 9.

a)	*/mi+ezi/*	*[*myeezi]*	*[*myezi]*	"months"
b)	*/mi+aka/*	*[*myaaka]*	*[*myaka]*	"years"
c)	*/mi + onzi/*	*[*myoonzi]*	*[*myonzi]*	"rays"

The discussion on gliding formation and vowel lengthening in standard Kiswahili leads us to the following observations: Sounds /w/ /y/ are the result of glide formation. These processes can affect any vowel within the morpheme syllable except its identical vowel. The output of glide formation yields words that can be acceptable to some dialects of Kiswahili but they are not acceptable to standard Kiswahili. We take note that as a standard in generative phonology that unacceptable form is indicated by a star on a preceding sound (Chomsky and Halle 1968) as in examples 5 to 9. Therefore, for the acceptability forms of the language, dictates yet other phonological processes to apply that will delete the lengthened vowel to remain only one, thus shortening of a vowel. In order to form a Standard Swahili language, the vowel shortening process is applied as shown everywhere in this work. Now, what arguments we can put forward that

actually the acceptable forms we claim in standard Kiswahili is a result to gliding and not otherwise? We can discuss this phenomenon by borrowing one of our examples in this work to draw our point home.

Example 10

/mu+alimu/ *[mwalimu]* "a teacher"

Compare with example 11:

Example 11.

/mu+alimu/ *[*mwaalimu]* *[mwalimu]* "a teacher"

In example 10, it is taken for granted that the surface representation of */mu+alimu/* is *[mwalimu]*. Therefore, it is a one level relationship. In example 11, it suggests that the surface representation of */mu+alimu/* is *[*mwaalimu]* and then in the second level within *[mwaalimu],* one vowel among the two gets deleted and thereafter it shortens to *"mwalimu"*. Theoretically, the derivation in example 10 is less explanatory. The reason is that universally, it is well known that the output of gliding is lengthening and the lengthening takes place as a strategy of compensating the duration for the lost vowel in the gliding process (Chomsky and Halle (1968) . The application of vowel shortening rule, deletes the lengthened vowel in order to yield acceptable forms in standard Kiswahili. Therefore, the derivation example 11 can be urged as self-explanatory and descriptively acceptable in standard Kiswahili.

We can expand our discussion now by considering formal rules that capture the generalization as discussed in this study. The processes are gliding, lengthening and deletion. The general phonological rules that capture glides *w* is formulated in Rule 1 below:

Rule 1: [w] formation

$$\begin{matrix} V_1 & & V_2 \end{matrix}$$

$$\begin{bmatrix} -\text{cons} \\ +\text{high} \\ +\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{syll} \\ -\text{cons} \\ +\text{lab} \\ -\text{cor} \\ +\text{high} \\ +\text{back} \end{bmatrix} \Big/ ([+\text{cons}])-\begin{Bmatrix} + \\ \# \end{Bmatrix}[+\text{syll}]$$

; Condition: where $V_1 \neq V_2$

That is to say, a high front vowel becomes a front glide in morpheme boundary before a non-identical vowel. Now, let us formulate the /y/ glide in (vv) below:

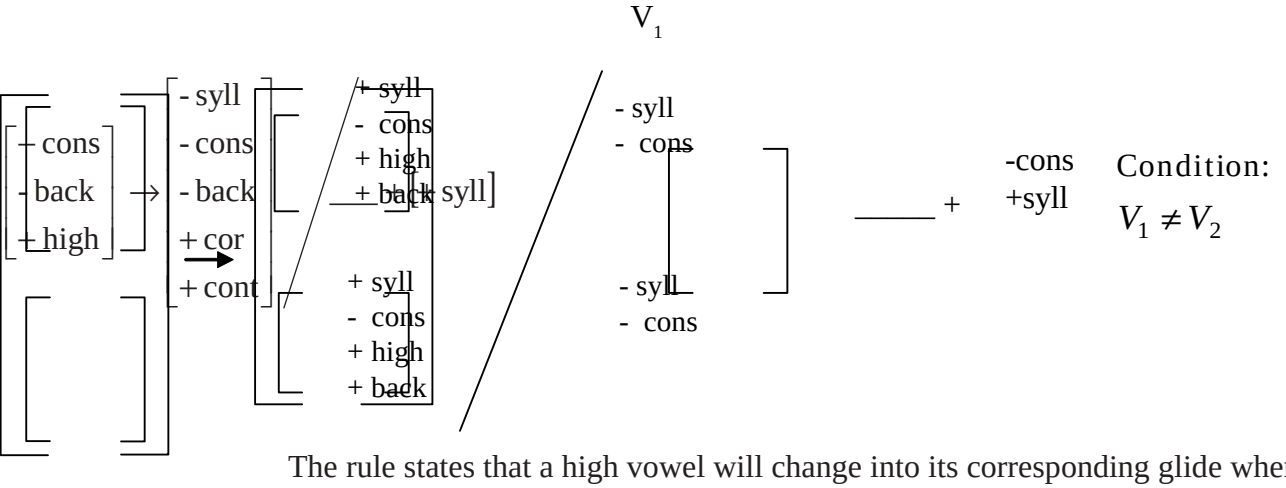
Rule 2: [y] formation

V_1 V_2

Condition: where $V_1 \neq V_2$

That is to say, a high back vowel becomes a back glide in word or morpheme boundary position before non-identical vowels.

Rule 3: Glide formation (collapsed)

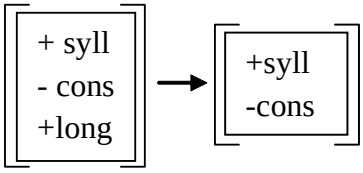


The rule states that a high vowel will change into its corresponding glide when immediately followed by any non-identical vowel across a morpheme boundary. As we have observed in examples 4, 7, 8, 11, the glide formation processes trigger yet another process known as compensatory vowel lengthening by which the duration of the non-identical vowel is increased in order to compensate for the duration of the underlying syllable which was represented by the vowel which has changed into a glide (Chomsky and Halle, 1968) . We now formulate a compensatory vowel lengthening in this way:

Rule 4: Vowel Lengthening

As shown here, the vowel is lengthened.
Now, what happens after vowel lengthening in order to yield acceptable forms in standard Kiswahili? We have employed the vowel shortening, the process of which rule 5 is formulated as follows:

Rule 5: Vowel shortening



As shown here, the vowel is shortened.

Vowel Shortening as a result of Coalescence
Vowel shortening in Swahili language can be revealed as a result of coalescence process. Vowel coalescence is a phonological process in which two adjacent vowels affect one another to the extent that they get neutralized and result in a vowel which is not identical to either one of the two underlying vowels (Chomsky and Halle, 1968). The neutral vowel is consequently lengthened (Massamba, 2011. This neutral vowel is sometimes referred to as a 'Compromise' vowel (Massamba, 2011). Consider the following data in example 12.

12.	a)	*/mai+no/*	*[*meeno]*	"teeth"
	b)	*/wa+ingi/*	*[*weengi]*	"many"
	c)	*/wa+izi/*	*[*weezi]*	"thieves"
	d)	*/mai+ko/*	*[*meeko]*	"stove"
	e)	*/pa+ingi/*	*[*peengi]*	"many"

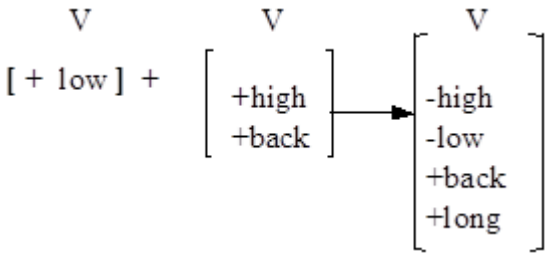
In example 12, we note that what results from coalescence is not acceptable form in standard Kiswahili, therefore, we invoke another process namely vowel shortening and this is what happens in example 13:

13.	a)	*/ma+ino/*	*[*meeno]*	*[meno]*	"teeth"
	b)	*/wa+ingi/*	*[*weengi]*	*[wengi]*	"many"

c)	*/wa+izi/*	*[*weezi]*	*[wezi]*	"thieves"
d)	*/ma+iko/*	*[*meeko]*	*[meko]*	"stove"
e)	*/pa+ingi/*	*[*peengi]*	*[pengi]*	"many"

In the example13, we note that, a juxtaposition of the vowels /a/ and /i/ results in the disappearance of both vowels and instead a new lengthened compromise mid back vowel [ee] appears. Therefore the /a + i/ VC rule can be expressed in the following way:

Rule 6: Vowel coalescence



That is to say, when a low vowel and a high back vowel are juxtaposed, the two vowels coalesce resulting into a lengthened mid-back vowel.

Vowel shortening as the results of High Vowel Deletion

Vowel shortening in Standard Kiswahili can be a result of vowel deletion (Maganga, 1992). When two vowels meet in morpheme boundary, the first vowel among the two deletes and the remaining one gets lengthened (Campbell, 1999). By lengthening the vowel yields unacceptable forms in standard Kiswahili (Maganga, 1992. Let us consider the following data in example 14:

14.	a)	*/ku+ote/*	*[*koote]*	*[kote]*	"all parts/places"
	b)	/mu+oto /	*[*mooto]*	*[vyura]*	"frogs"
	c)	*/vi+ungu/*	*[*vyuura]*	*[moto]*	"fire"
	d)	*/mu+oyo/*	*[*mooyo]*	*[moyo]*	"heart"
	e)	*/mu+ote/*	*[*moote]*	*[mote]*	"all position"

In the example 14, we observe that vowel /u/ is deleted when it is preceded by vowel /o/ and after deletion of the high vowel /u,-/ the remaining vowel get lengthened. In order to yield standard Kiswahili forms, the lengthened vowel shortened again as the result of vowel deletion. The rules we need to capture data in example 14 is formulated in rule 7 below:

Rule 7: High vowel deletion

$$\begin{bmatrix} +\text{syll} \\ +\text{high} \\ +\text{back} \end{bmatrix} \rightarrow \phi \; / \; \begin{bmatrix} +\text{nas} \\ -\text{syll} \\ +\text{ant} \\ -\text{cor} \end{bmatrix} \_\_ + \begin{bmatrix} +\text{cons} \\ -\text{syll} \end{bmatrix}$$

A high back vowel is deleted when it appears between an anterior nasal and a non-syllabic consonant across a formative boundary.

Rule 8: Mid vowel deletion

$$\begin{bmatrix} +\text{syll} \\ -\text{high} \\ -\text{back} \end{bmatrix} \rightarrow \phi \; / \; \begin{bmatrix} +\textit{syll} \\ -\textit{high} \\ -\text{back} \end{bmatrix} \_\_ + \begin{bmatrix} +\textit{syll} \\ -\text{high} \\ -\text{back} \end{bmatrix}$$

A high front vowel is deleted when it appears between an alveolar nasal and a non-syllabic consonant across a formative boundary. Note that high vowel lengthening is followed by deletion of the second lengthened vowel. Therefore, we apply rule 5 in order to yield acceptable form in standard Kiswahili. However, in some cases, this prediction may, superficially at least, not seem to hold true. Observe the following data in example 15:

Example 15.	a)	*/po+ote/*	*[*poote]*	"all part/s places"
	b)	*/yo+ote/*	*[*yoote]*	"all'

Compare with example 16:

Example 16.	a)	*/po+ote/*	*[*poote]*	*[pote]*"all places"
	b)	*/yo+ote/*	*[*yoote]*	*[yote]*"all"

Here, we observe that two identical vowels do not yield vowel deletion in its second stage of the derivation. Having discussed vowel shortening as a result of deleting vowel in a position rather than final, let us now describe the vowel shortening as the result of Final Vowel Deletion. Consider the following data in **example 17:**

17.	a)	*/pig+a/*	*[pigwa]*	"be hit or beaten"
	b)	*/chez+a/*	*[chezwa]*	"be played"
	c)	*/imb+a/*	*[imbwa]*	"be sung"
	d)	*Pik+a*	*[pikwa]*	"be cooked"

e) */lamb+a/* *[lambwa]* "be licked"
f) */chap+a/* *[chapwa]* "to be caned"
g) */kimbiz+a/* *[kimbizwa]* "to make somebody or something run"
h) */bembelez+a* *[bembelezwa]* "be pleaded"

Data in example 17 suggest that in standard Kiswahili language, the sound /w/ is inserted word final position in order to yield the applicative forms. In this study, it is argued that sound /w/ is more of glide in nature within these applicative but here in a final position. The gliding created a lengthened vowel of which such representation is unacceptable in standard Kiswahili, thus vowel shortening takes place through vowel deletion. Therefore we observe these forms as in example 18:

18. a) */pigu+a/* *[*pigwaa]* *[pigwa]* "be beaten/hit"
b) */chezu+a/* *[*chezwaa]* *[chezwa]* "be played"
c) */imbu+a/* *[*imbwaa]* *[imbwa]* "be sung"
d) */piku+a/* *[*pikwaa]* *[pikwa]* "be cooked"
e) */onju+a/* *[*onjwaa]* *[onjwa]* "be tested"
f) */lambu+a/* *[*lambwaa]* *[lambwa]* "be licked "
g) */chapu+a/* *[*chapwa]* *[chapwa]* "be caned with a stick"
h) */kimbizu+a/* *[*kimbizwaa]* *[kimbizwa]* "be made to run"
i) */bembelezu+a/* *[*bembelezwaa]* *[bembelezwa]* "be pleaded"

If we put together what happens in example 17 and that in example 18 we cannot but make the generalization that a sound /w/ which surfaces in these derivations is a result of vowel lengthening, the process that takes place in a word final position. In order to yield acceptable forms in standard Kiswahili, the second vowel is shortened by vowel deletion rule, thus we get the well-formed forms. The processes are captured under rules 1-8.

CONCLUSION AND RECOMMENDATIONS

In this study, we have discussed certain aspects of Standard Kiswahili which result into shortening of words. We have also formulated formal rules from phonological processes that affect vowels in Standard Kiswahili. As it turns out, the processes affecting vowels that yield unacceptable word in standard Kiswahili are glide formation, vowel coalescence, and high vowel deletion. These processes result into a lengthened vowel to compensate the lost duration, hence compensating it. Therefore, we employed vowel shortening in order to get acceptable Kiswahili forms. Other studies on related aspects need to be

undertaken. Further topics to be studied could include aspects on Phonology which may have some revelations on the phonology of Standard Kiswahili. It is also worth pointing out here that in order to come up with true generalizations on Standard Kiswahili phonology, there is need to carry out studies in other word categories. The availability of more dialects of Kiswahili using similar methodological models will make it possible to have valid generalization concerning the vowel shortening in Standard Kiswahili. It will perhaps also be possible to work out on valid 'universals' of vowel shortening in Kiswahili and other related languages in general.

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