

## Misrepresentations and Omissions in Kiswahili Phonology

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### Abstract

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Kiswahili is one of the most studied and documented African languages. Whereas we must commend those who have authored books and papers on Kiswahili linguistics using either English or Kiswahili as the medium, it is important to point out that some of the works have misleading claims on the language. Such claims tend to, at best, confuse students of Kiswahili linguistics and, at worst, reverse gains already achieved in the study of the language. In this paper, I look at misrepresentations in the works on Kiswahili phonology. I show that some of the claims on the production of Kiswahili sounds are incorrect from a phonetic point of view. I also show that a number of rules formulated for Kiswahili phonological processes are incorrect and, therefore, untenable. Such rules pertain to consonant weakening, palatalisation, liquid hardening, “vowel coalescence” and glide formation. I also show that rules that are convincingly part of Kiswahili phonology are omitted in most if not in all works in the language. I conclude the paper by making the claim that thorough grounding in articulatory phonetics and a good grasp of phonological theory are prerequisites in delivering a credible phonological analysis of Kiswahili and, indeed, of any other language.

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### 1. Introduction

Kiswahili is one of the most studied and documented African languages. We commend those who have authored books and papers on Kiswahili linguistics using either English or Kiswahili as the medium. However, it is important to point out that some of the works have weaknesses in the form of omissions or misleading claims on Kiswahili. Such omissions and misleading claims tend to, at best, slow down the scientific study of Kiswahili and, at worst, reverse gains already achieved in the linguistics of the language. In this paper, I look at omissions and misrepresentations in works on Kiswahili phonology. I show that some of the claims on the production of Kiswahili consonants are incorrect and, from a phonetic point of view, actually impossible for any language. Some of those claims pertain to the route taken by the airstream during the production of nasal consonants. I counter the claims by showing what is possible or impossible during the production of sounds as well as by making reference to other articulatory features of nasal consonants. I also argue that several phonological processes and rules for Kiswahili as currently formulated are misleading. Such processes and rules pertain to consonant weakening, palatalisation, liquid hardening, vowel coalescence and glide formation. There is little or no mention in Kiswahili phonological analyses of the role of morphology and semantics either in motivating or blocking phonological rules. Yet, certain phonological rules in the language must contain morphological specifying features in order to generate correct surface forms. Kiswahili phonology also exhibits several exceptions to the operation of phonological rules. Whereas there has been little effort in explaining the exceptions, some of them can be shown to result from the blocking of the rules by semantic considerations. I conclude the paper by making the claim that thorough grounding in articulatory phonetics and a good grasp of phonological theory are prerequisites in delivering a credible phonological analysis of any language.

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## 2. Phonectic Vagueness and Misrepresentation

Our concern in this paper is Kiswahili phonology. However, since credible phonological analysis can only be founded on a good grasp of phonetics, I have chosen to begin my exploration on the weaknesses of the current studies on Kiswahili phonology with a look at some of the comments made on phonetic issues by Kiswahili scholars. In one of his studies, Mbaabu (1999:1) observes that:

“The tongue can be raised [or] it can be in the middle or the bottom of the mouth when producing a vowel. Likewise, the tongue can be in the front part of the mouth or at the back part of the mouth. The lips can also be open or they can be made to be round in the production of a vowel.”

Elsewhere, he observes that:

“When the tongue is in the upper part of the mouth, we produce /i/ and /u/.  
When the tongue is in the middle part of the mouth, we produce /e/ and /o/.  
Vowel /a/ is produced when the tongue is at the bottom of the mouth”

(Mbaabu, 1999:2)

In both quotations, we have very casual treatment of the production of vowels. Ideally, production of specific vowels should be described in terms of specific parts of the tongue. There is no time when the entire tongue is raised or lowered to the bottom of the mouth in the production of a vowel as the above observation suggests. In the production of front vowels one refers to the blade of the tongue. High front vowels are produced with the blade of the tongue is raised. A mid-high front vowel is produced with the blade of the tongue raised mid-way. Finally, a low front vowel is produced with the blade of the tongue on the floor of the mouth. Description of the back vowels is informed by different levels of the height of the back part of the tongue. Talking about the height of the tongue without specifying the part involved is giving incomplete information.

The author commits yet another error of misinformation when he observes that:

“When we produce i and e, the tongue is in the front part of the mouth. And when we produce u and o, the tongue is at the back of the mouth.

(Mbaabu, 1999:2)

With regard to the production of i and e, the issue is not whether or not the tongue is in the front part of the mouth. At any rate, the tip and the blade of the tongue are always in the front part of the mouth! During the production of [i] and [e] is that the front part of the tongue is raised. For the production of [i] the blade is fully raised whereas for the production of [e] the blade is raised mid-way. Similar comments can be made with regard to the back part of the tongue in connection with the production of [u] and [o]. As with the above observations that we made regarding the production of vowels, the author still refers to the tongue rather than a part thereof being fully raised, raised halfway or being at the base of the mouth. Once again, the height of specific vowels should be described, not in terms of the height of the (whole) tongue but, rather, the height of the blade, the middle, or the back of the tongue.

The final observation by Mbaabu that I would like to comment on is:

“Other characteristics such as saying that i and u are more tense than other vowels, are not very important because generally they depend on the individual or his/her dialect.” (Mbaabu, 1999:3) It is not correct to say that the tenseness or laxity of a vowel, that is, the presence or absence of the feature [+ATR] (presence or absence of advanced tongue root) is not important and that it depends on “on the individual or his/her dialect. [+ATR/-ATR] is a very important phenomenon in the phonology of some languages such as Kalenjin, Igbo and Turkish. In such languages, the features [+ATR/-ATR] are functional aspects of the language and they are not dependent on the individual.

Arguably, one of the most bizarre statements in Kiswahili phonology is the one made by Mgullu. He says that:

“Although many Kiswahili language researchers have claimed that Kiswahili has allophones, we believe that Kiswahili language does not have allophones.” (Mgullu, 2002: 60) Contrary to Mgullu’s claim, Kiswahili, and probably all the other natural languages have allophones. Indeed, in the same work where the author claims that the Kiswahili does not have allophones, he has described several phonological processes one of which leads to different surface realizations of phonemes producing, therefore, allophones. Kiswahili has allophones. Let us look at a few phonological processes. Kiswahili /r/ changes into [d] when it is preceded by /n/. That is, the language has the rule /r/ → [d] /n-. As a consequence of this phonological rule, the phoneme /r/ has two allophones, that is, [r] and [d].

Besides /r/, Kiswahili also has the lateral liquid /l/. Not surprisingly, because /r/ and /l/ belong to the same natural class and sounds of the same natural class undergone similar phonological processes (Hyman, 1975), /l/ is also affected by a phonological rule similar to the one that affects /r/. /l/ changes to [d] when it is preceded by /n/; that is, /l/ → [d]/ n-. It is correct to say that Kiswahili phoneme /l/ has two allophones, that is, [l] and [d]. Mgullu himself acknowledges the existence of a rule that changes /l/ to [d] consequently leading to two surface realizations, that is, [l] and [d]. He says:

“The liquid /l/ changes and becomes voiced stop /d/- in the noun *ulimi*. *Ulimi* is a noun which is in the U-N noun class. Its singular should be *U-limi* ..... But the plural of this word is currently not /N-limi/ but /ndimi/. Here is whereby we say that that phoneme /l/ has changed to become /d/ because a liquid is level sixteen whereas the voiced stop /d/ is above in the fourth position. Therefore we say that the liquid has changed from the lower level to that uses little energy up to higher level which uses more energy. Here /l/ changing to /d/ is an act of consonant strengthening”. (Mgullu, 2002:83)<sup>1</sup> There are many other phonological processes in Kiswahili that lead to phonemes having different surface and Mgullu’s contention is, therefore, untenable. Among other processes in Kiswahili phonology that lead surface realizations of the same phoneme are consonant weakening, homorganic nasal assimilation, consonant voicing, palatalisation, glide formation and vowel harmony. Mgullu seems to confuse the notion of consonant strength hierarchy as expounded by Foley (1977) cited in Katamba (1979) with the level of energy used in the articulation of sounds. In other words, he mistakes the strength hierarchy with the notion of amount of energy used in distinguishing between fortis and lenis consonants. At least that is the impression one gets after reading the above quotation on /l/ changing to [d]. He explains that the plural form /N-limi/ is pronounced as [ndimi]. He then concludes that: “Here is whereby we say that phoneme /l/ has changed to become /d/ because a liquid is at level sixteen whereas the voiced stop /d/ is above in the fourth position. Therefore we say that the liquid has changed from the lower level that uses little energy up to a higher level which uses more energy. The change of /l/ to /d/ is an act of consonant strengthening”. (Mgullu, 2002:83)

As Mgullu states, /l/ changing to [d] is, indeed, an instance of consonant strengthening. However, it is incorrect to state that “the liquid has changed from a lower level that uses less energy to a higher level which uses more energy”. The change from /l/ to [d] is not about the change in energy level. It is a change in the manner of articulation. It is not clear how Mgullu arrives at his levels of consonant strength. He says the liquid /l/ is at level sixteen as compared to /d/ which, according to him, is at level four. He does not state whether he is using his own strength scale or whether he is using scales used by other linguists such as Vennemann (1972) cited in Hyman, (1975), or Foley (1977), extensively cited in Katamba (1979). Whatever the case may be, Mgullu’s strength hierarchy range is too big as compared to what other linguists have proposed. Vennemann’s grading of Icelandic consonant strength (cited in Hyman, 1975) is from 1 to 8 with /l/ placed at position 3 and /d/ placed at position 4. Foley’s consonant strength rankings for both place and manner of articulation have a much shorter range than the range implied in Mgullu’s ranking of /l/ and /d/.

Elsewhere, Mgullu claims that a phoneme cannot be produced at two different points. In his words:

“One sound (that is a phoneme) cannot be articulated in two different points. Allophones must be articulated at the same point. (One of the characteristics of an allophone is that the allophones of a single phoneme are phonetically very similar” (Mgullu, 2002:60) Contrary to the above claim, it is possible for the allophones of the same phoneme to be articulated at different points. Let us look at the data in (1):

(1)

Cl. 9/10 Marker	Nominal Stem		Surface Form	Gloss
(a) /n	+ b□ga/	→	[mb□ga]	“cabbage/vegetables”
(b) /n	+ buga/	→	[mbuga]	“wilderness”
(c) /n	+ limi/	→	[ndimi]	“tongues
(d) /n	+ rε fu/	→	[ndεfu]	“long/tall”
(e) /n	+ vua/	→	[m̥vua]	“rain”
(f) /n	+ jia/	→	[njia]	“way/path”

(g)	/n	+	tʃi/	→	[ntʃi]	"country"
(h)	/n	+	gɔ̄ma/	→	[ɛ̄gɔ̄ma]	"drum/dance"
(i)	/n	+	gumu/	→	[ɛ̄gumu]	"hard/difficult"

In the above data, phoneme /n/ manifests itself at the surface level at different points of articulation. It surfaces as a bilabial, labio-dental, alveolar, palatal and velar sound. In other words, contrary to Mgullu's claim, the phoneme is articulated at five different points. The five allophones of the phoneme differ phonetically only in terms of points of articulation.

### 3. Consonant Weakening

One phonological process on which many Kiswahili scholars have written is consonant weakening. The process is featured in works by authors such as Myachina (1984), Polome (1967), Mbaabu (1999), Habwe and Karanja (2004) and Iribemwangi (2008). In the works of these scholars, it is claimed that obstruents become fricatives when they are followed by /i/. The rules in (2) below are formulated to account for the weakening process:

(2)

- (a) p → f/- i
- (b) t → t/- i
- (c) k → f/- i
- (d) b → z/- i
- (e) d → z/- i
- (f) g → z/- i

The rules are exemplified, respectively, by the type of the data in (3) showing the underlying representation (UR) and surface representation (SR):

(3)	UR	SR	Gloss
(a)	/m+lap+i/	→ [mlafi]	"glutton"
(b)	/m+fua+i/	→ [mfuasi]	"follower"
(c)	/mu+ak+i/	→ [mwafi]	"builder"
(d)	/mu+ib+i/	→ [mwizi]	"thief"
(e)	/m+pɛnd/	→ [mpɛnzi]	"love"
(f)	/m+ jɛŋgi/	→ [mjɛnzi]	"builder"

If, indeed, the rules in (2) are part of Kiswahili grammar, the surface forms in (4) would not be allowed in the language:

(4)	Lexical Item	Gloss
(a)	kibibi	"peacock"
(b)	wapi	"where"
(c)	kikundi	"group"
(d)	samawati	"blue"
(e)	kigiŋgi	"post"
(f)	samaki	"fish"

Instead of the forms in (4), we would have the forms in (5):

(5)

- (a) \*kizizi instead of [kibibi]
- (b) \*wafi instead of [wapi]
- (c) \*sikunzi instead of [kikundi]
- (d) \*samawasi instead of [samawati]
- (e) \*sizinzi instead of [kigiŋgi]
- (f) \*samaji instead of [samaki]

A look at Swahili lexicon reveals the existence of words such as:

6) Lexical Item	Gloss
(a) silipi	"I am not paying / I do not pay"
(b) wapi	" where"
(c) wakati	"time"
(d) hawafuati	"they are not following / They do not follow"
(e) haiandiki	"it is not writing / it does not write"
(f) mkuki	"spear"
(g) kibibi	"peacock"
(h) mkandi (tree)	"walking palm"
(i) hawafuḡgi	" they are not closing / they do not close"
(j) mtuḡgi	" liquid container"

The existence of the forms in (4) and (6) suggest that the rules in (2) are incorrectly formulated. When we reflect on the data in (1) and those in (4) and (6), we discover that all the forms in (1) are nouns derived from verbs whereas the forms in (4) and (6) are not. Furthermore, all the forms in (1) have the nominalising morpheme {i} (phonologically /i/) whereas the /i/s in (4) and (6) are either part of the root or the negating morpheme {i} (phonologically /i/).

The data in (7) below show forms in which /i/ is part of the root whereas those in (8) show forms in which /i/ is the negating morpheme:

(7) Lexical Item	Gloss
(a) kiti	"chair"
(b) mtuḡgi	"liquid container"
(c) wapi	"where"
(d) kindi	"ground squirrel"
(e) wimbi	"finger millet"
(f) mkuki	"spear"

  

(8) Lexical Item	Gloss
(a) siibi	"I am not stealing / I do not steal"
(b) silipi	"I am not paying / I do not pay"
(c) hapḡndi	"He/she/it (Cl. 1) does not like/ want"
(d) hatufuati	"We are not following / We do not follow"
(e) sitaḡgataḡgi	"I am not loitering / I do not loiter"
(f) hawa:ndiki	"They are not writing/ they do not write"

Taking cognisance of the above observations, we are led to the conclusion that the conditioning vowel for the changes in (1) is a specific vowel, that is, the nominalising morpheme /i/. Unfortunately, the rules in (3) imply that /p, t, k, b, d, g/, weaken when followed by any /i/. We have seen that not every /i/ in the language brings about obstruent weakening. Weakening takes place only when an obstruent is followed by an /i/ functioning as the nominalising morpheme. The rules as currently formulated do not contain that important information. They are formulated as though they are purely phonetically-motivated. Consequently, besides the rules generating acceptable forms, they also generate incorrect and unacceptable forms such as those in (5) above. Part of the problem with the current formulation of consonant weakening rules is the theoretical inadequacy of the Standard Generative Phonology. It treats the rules of phonology as though sounds are not affected by issues outside phonology. The rules are formulated as though the consonant weakening process is triggered by only a phonetic environment and, yet, part of the environment is describable in morphological terms.

I turn to another theory, Natural Generative Phonology, to resolve the wrongly-formulated rules of consonant weakening in Kiswahili. Natural Generative Phonology (NGP), (Hooper, 1976), takes as its area of study the interaction between phonology and morphology.

In the words of Hooper, NGP is a 'theory of morphophonology'. The theory made great strides in addressing the inadequacies witnessed in the Standard Generative Phonology including introducing the True Generalization Condition that eliminates abstract underlying forms and the No-ordering condition that advocates for intrinsic rather than extrinsic rule ordering. It also recognizes different rule categories. The theory operates with five rule categories, namely, rules that are phonetically-conditioned (P-rules); morphophonemic rules (Mp-rules); morphological spell-out and word formation rules; and via rules. P-rules are specifiable in purely phonetic terms, that is, they make use of phonological features that have intrinsic phonetic content. They take into account phonological boundaries, namely the syllable boundary and the pause. Syllabification rules, that is, rules that assign syllable boundaries to a string of morphemes, are a sub-set of P-rules. The second category of the rules of phonology is that of morphophonemic rules (MP-rules). Unlike P-rules whose environments are described in phonetic terms, the environments of MP-rules are described in morphosyntactic or lexical terms. In other words, MP-rules make reference to morphological or syntactic information such as morpheme boundaries, morpheme classes and lexical groups. These rules take part in the sound-meaning correspondence of an individual language; they are, therefore, language specific. Another set of rules within the phonological component of grammar consists of sandhi rules. These rules resemble MP-rules in that they take word-boundary into account. Word-boundaries are not determined in phonetic terms. They are determined quite arbitrarily by the syntax and semantics of a language. On the other hand, sandhi rules resemble P-rules in that a word-boundary has the potential to coincide with either a syllable boundary or a pause. When a word-boundary coincides with a phonological boundary – that is a syllable boundary or a pause – sandhi rules behave like P-rules. Thus, like P-rules, sandhi rules may be regular, productive and unsuppressable.

Via rules express phonological relationship between two (or more) forms in a situation whereby none of the forms can be justifiably be said to be derived from the other synchronically. For instance, although there is definitely a phonological relationship between the English words 'drink' and 'drench' it would be incorrect to say that one is derived from the other through a synchronic phonological rule. Such a relationship as exists between these two forms is expressed through a via rule. The last category of the rules of phonology consists of morphological spell-out rules. These rules give phonological shape or phonological realization to abstract morphemes. Closely related to these rules are the word- formation rules that specify the order and the type of morphological elements that can constitute a word. With the understanding of rule categories within NGP, let us go back to the issue of how to correctly formulate rules for consonant weakening in Kiswahili. The rules must include not only phonetic but also morphological information. In other words, they should be formulated not as P-rules but rather as MP-rules. They must indicate that not just any /i/ in the language that will occasion consonant weaken but a specific /i/ functioning in the morphology as a nominalization morpheme specifically deriving nouns from verbal roots.

Thus:

9)

- (a) /p/ → [f] /- i  
[nominalisation]
- (b) /t/ → [t] /- i  
[nominalisation]
- (c) /k/ → [j] /- i  
[nominalisation]
- (d) /b/ → [z] /- i  
[nominalisation]
- (e) /d/ → [z] /- i  
[nominalisation]
- (f) /g/ → [z] /- i  
[nominalisation]

#### 4. Palatalisation

Certain consonants are palatalized in Kiswahili. One of the consonants affected by palatalisation is /k/. Commenting on the palatalisation of /k/, Polome states that, "The class prefix {ki} appears as a rule as /c/, realized as [tʃ] before nominal stems with initial vowel, except before /i/ where it appears as /ki-/ , realized as [kɪ] followed by a syllable boundary" (Polome,19 67:63)

The data in (10) is typical of examples of palatalisation of /k/:

(10)

- |     |            |            |                      |
|-----|------------|------------|----------------------|
| (a) | /ki+□mb□ / | → [t□mb□]  | “vessel, utensil”    |
| (b) | /ki+umba/  | → [tjumba] | “room”               |
| (c) | /ki+εma/   | → [tjεma]  | “good (class. 7)”    |
| (d) | /ki+ama/   | → [tjama]  | “party, association” |

In some books, the palatalisation rule is formulated as /ki → [tj]/ - This formulation is erroneous because it makes /i/ part of the structural description; it is not. It is part of the conditioning environment; a fact that should be captured in the rule formulation. There are many instances whereby palatalisation does not take place even when it looks as though its structural description is met. Such exceptions are neither accounted for nor even mentioned. Such exceptions include:

(11)

- |     |           |              |
|-----|-----------|--------------|
| (a) | /ki+□:/   | → * [t□:]    |
| (b) | /ki+atu/  | → * [tjatu]  |
| (c) | /ki+uŋga/ | → * [tjuŋga] |
| (d) | /ki+εmbε/ | → * [tjεmbε] |

One possible way of accounting for the exceptions in (11) is to argue that the process is blocked on semantic grounds. If any of the underlying forms were to change to become the form to the right of the arrow, it would get a phonological shape identical to another word in Kiswahili thereby creating semantic problems. According to Batibo (personal communication), semantic blocking of the palatalisation may only account for some cases to distinguish pairs such as kioo/choo and kiatu/chatu. He observes that there are instances where semantic blocking of the palatalisation rule may not hold true. He gives examples of forms that do not undergo palatalisation and yet undergoing the process would not result in phonological merger between two words thereby creating a challenge at the semantic level. He gives the forms in (12):

(12)

	<b>Item</b>	<b>Gloss</b>
(a)	kiaga	“animal pen”
(b)	kiango	“peg”
(c)	kiapo	“oath”
(d)	kiarifa	“verb phrase”
(e)	kiasi	“amount”
(g)	kiimbo	“tone”
(h)	kiinamizi	“a type of black lizard that bites”
(i)	kiingilio	“entrance fee”
(k)	kiongozi	“leader”
(l)	kiumbe	“creature”
(p)	kiungo	“organ, part of”

He observes that Kiswahili has historically lost some consonants such as /l/, /b/, /g/, /y/ and /r/ leaving in their place what he calls “dummy consonants”. He gives the data in (13) which, he says, according to comparative Bantu, lost consonants:

(13)

	<b>Item</b>	<b>Gloss</b>
(a)	ki-atu (*ki-latu)	“shoe”
(b)	ki-umbe (*ki-bumb-e)	“creature”
(c)	ki-oo (*ki-lolo)	“mirror”
(d)	kiunganishi (*ki-lunganishi)	“link”
(e)	ki-ungulia (*ki-lungulia)	“heartburn”
(f)	ki-embe (*ki-yembe)	“a small mango tree”
(g)	ki-aga (*ki-laga)	“animal pen”

(h)	ki-amu (*Ki-lamu)	"Lamu dialect of Kiswahili"
(i)	ki-onyo (*ki-bonyo)	"warning"
(k)	ki-azi (*ki-lazi)	"potato"
(l)	ki-ongozi (*ki-longozi)	"leader"

Batibo also says that, quite often, in words with Arabic origin, the stem-initial vowel was preceded by "alif". As examples, he gives as "kiCasi" and "kiCapo" Iribemwangi (2008:162-163) contends that palatalisation occurs when Class 7 concord {ki} is affixed to relativiser {o}. He gives the example [alitʃokinunua] and says that it is the surface form of an underlying form from which he posits as /alikionunua/ and which, he claims, has seven morphemes. A close scrutiny, however, reveals that Kiswahili does not have /alikionunua/ as an underlying form. Let us consider the data in (14):

(14)

Noun Class	Forms with {amba}	Forms without {amba}	Gloss
1. mtoto	ambaye ulimtuma	mtoto uliyemtuma	"the child whom you sent"
2. watoto	ambao uliwatuma	watoto uliowatuma	"the children whom you sent"
3. mbuyu	ambao uliupanda	mbuyu uliupanda	"the baobab that you planted"
4. mibuyu	ambayo uliipanda	mibuyu uliyoipanda	"the baobabs that you planted"
5. tunda	ambalo ulikula	ulilokula	"the tooth that you uprooted"
6. matunda	ambayo ulikula	matunda uliyokula	"the teeth that you uprooted"
7. kitabu	ambatʃ alinunua	kitabu alitʃununua	"the book that he bought"
8. vitabu	ambavyo ulipewa	vitabu ulivyopewa	"the books that he bought" <sup>3</sup>

As can be clearly seen from the column showing forms with {amba}, the relative pronoun in Kiswahili has only two morphemes, namely {amba} and the class agreement. When {amba} is not used as in the forms in the second column in the data above, the single morpheme representing the class is put within the verb immediately after the tense. Therefore, the [tʃ] in [alitʃununua] is in the underlying form and does not, therefore, come from /ki+ʃ/ through palatalisation. The final comment that I would like to make with regard to palatalisation rule as it currently formulated in works of Kiswahili phonology is that it does not discriminate against any sequence of /ki+VOWEL/. However, the palatalisation rule only operates on /k/ of the class 7 prefix when the prefix is functioning either as a nominal or a adjectival prefix. In other words, what is normally written as a purely phonetically-motivated rule is restricted by Kiswahili grammar. It ought, therefore, to be formulated as a morphophonemic rule restricted to nouns and adjectives.

## 5. "Vowel Coalescence"

Polome (67:59) observes that:

"Morphophonemic changes involving vowel phonemes occur in contact or at distance. The most common change in contact is contraction, to which vocalization can be added. The following processes occur in the case of contraction:

(15)

- "/a/+a/ → /a/ (total assimilation, with loss of one mora)";
- "/a+/e/ → e (regressive assimilation, with loss of the mora)";
- "/a+/o/ → o (regressive assimilation, with loss of one mora)"<sup>4</sup>
- "/a+/i/ → e / reciprocal assimilation, with the intermediate mid front vowel e—with only one mora --- resulting from the assimilation process, upward from /a/ and downward from /i/". (\*\*\*\*\*)

The rule formulations in (15) are not tenable. An appropriate phonological rule should clearly spell out: a) structural description, b) structural change and, c) the environment under which the change takes place (Kiparsky, 1968). To achieve these requirements, a phonological rule should have one of the formalisms indicated in (16) below:

(16)

- A → B/C -
- A → B/- C
- A → B/ C - D



(d)  $A \rightarrow B$  [plural nouns, nominalization, etc.]

The rules in (15) spell neither the structural description nor the environment. They do not therefore qualify as acceptable rules of phonology.

The contention by Polome that assimilation is involved in (15)(a) to (15)(c) false. If we argue that the changes are as a result of assimilation, then, we run into the difficulty task of explaining why in (15) (a) we have reciprocal assimilation and in (15) (b) and (15) (c) we have regressive assimilation. Why not just one type of assimilation to account for (15)(a) to (15)(c)? At any rate, the three phenomena are related. As Iribemwangi (2014) has correctly observed, the phonological processes represented by the formulations such those in (15) (a) to (15) (c) are vowel deletions rather than “vowel coalescence”. The first of the two vowels in a sequence is deleted. The advantage of having just one rule, that is, vowel deletion, to account for all changes which Polome attributes to assimilation is that the one rule analysis simplifies grammar. As Chomsky (1965) observes, the fewer the rules in a grammar, the simpler it and, consequently, the more superior it as compared to a grammar that more rules. Furthermore, there is further data in Kiswahili to show that, indeed, in a number of instances, when a vowel in a sequence of vowels is deleted, the deletion affects the first vowel in the sequence.

A correct formulation of (15)(a), (15) (b) and (15) (c) is (15)(e), (15) (f) and (15) (g) respectively:

(16) (e)  $/a/ \rightarrow \emptyset / - a$

(f)  $/a/ \rightarrow \emptyset / - \varepsilon$

(g)  $/a/ \rightarrow \emptyset / - \square$

Iribemwangi (Opp. Cit.) takes no issue with the formulation  $/a/ + /i/ \rightarrow [\varepsilon]$ . Indeed, he says explicitly that it is a case of vowel coalescence. His view is not correct. At any, rate we have already noted that the formulation involved in unacceptable. The so-called “coalescence” is, in fact, the endpoint of three separate phonological processes, namely, vowel heightening, vowel lowering and vowel deletion. The rules for the three processes are intrinsically ordered, (Kiparsky, 1968; Hyman, 1975; and Hooper, 1976).

The rules operate as follows:

(15a)

Process 1:  $/a/ \rightarrow [\varepsilon] / - i$  (through regressive assimilation);

Process 2:  $/i/ \rightarrow [\varepsilon] / - \varepsilon$  (through progressive assimilation); and

{Process 3:  $/\varepsilon/ \rightarrow \emptyset / - \varepsilon$  (motivated by the need for preferred syllable structure),  
(Schane, 1972)}

Stated informally, the three processes would look as follows:

(15b)

Stage 1:  $/ai/ \rightarrow [\varepsilon i]$

Stage 2:  $[\varepsilon i] \rightarrow \varepsilon \varepsilon$

Stage 3:  $[\varepsilon \varepsilon] \rightarrow [\varepsilon]$

## 6. Consonant Hardening

Iribemwangi (2008) corrects points out that Kiswahili has two consonants, namely,  $/l/$  and  $/r/$ . He then quotes Mberia (1993:133) as saying that both  $/l/$  and  $/r/$  harden into  $[d]$  when they are preceded by  $/n/$ . He then states that he fully agrees with Mberia’s observation. He then proceeds to give the following examples:

(17) **Item**

**Gloss**

(a)  $/n+limi/ \rightarrow [ndimi]$

“tongues”

(b)  $/n+l \square a/ \rightarrow [nd \square a]$

“marriage(s)”

(c)  $/n+l \square t+\square/ \rightarrow [nd \square t \square]$

“dream(s)”

(d)  $/n+r \varepsilon fu/ \rightarrow [nd \varepsilon fu]$

“long, noun cl. 9 and 10)

He concludes that the process may be shown as (18):

$$(18) \left\{ \begin{array}{l} l \\ r \end{array} \right\} \rightarrow [d] / /n/ -$$

The phonological rule (18) does exist in Kiswahili and it successfully accounts for the forms in (a) and (d) in (18) above. However, it does not account for the surface forms in (b) and (c). There is evidence that the forms to the left of the arrows in (b) and (c) are part of the competence of speakers of Kiswahili. Consequently, the forms may not be posited as underlying and then be used to generate the surface forms in the data. The forms posited as underlying for (18) (b) and (c) are too abstract to be accepted. It is precisely these kind of forms that led to the rejection of the Chomsky and Halle's model of phonological analysis and led to the scholarly debate on abstractness and eventually resulted in the birth of Natural Generative Phonology as expounded by Hooper (1976). The nouns [ndɔ̄a] and [ndɔ̄tɔ̄] are nominalizations derived from the verbs roots /ɔ̄/ "marry" and /ɔ̄t/ "dream" respectively. The roots are not /l/ and /r/ respectively as purported by the forms to the left of the arrows in (17)(b) and (17)(c). There are simply no words in Kiswahili that have /l/ and /r/ as morphemes. Consequently positing them as underlying forms in the language is untenable.

According to Hooper (1976), all underlying forms must have surface manifestations. Absence of surface manifestation of a purported underlying form implies that the form is unjustified and, therefore, untenable on account of abstractness. According to Natural Generative Phonology's True Generalization Condition, (Hooper 1976) the rules of phonology that the native speakers formulate relate surface forms to other surface forms. Consequently, the rules cannot be abstract. Since the nouns [ndɔ̄a] and [ndɔ̄tɔ̄] are undoubtedly related, respectively, to the verbs roots /ɔ̄/ and /ɔ̄t/ and since [d] in the nouns cannot be accounted for by positing an underlying /l/, we need to look for a different but a convincing way of connecting the members of the two pairs. Natural Generative Phonology's way out is the way out. The rules connect forms that are related but whose relationship cannot be accounted for by a synchronic phonological rule connecting an underlying form to surface realization. The connection between the related forms can be shown as follows:

- (19)
- (a) /ɔ̄/ - /dɔ̄/ "marry/marriage"
- (b) /ɔ̄t/ - /dɔ̄t/ "dream (verb)/dream(noun)"

## 7. Glide Formation

Kiswahili has a glide formation process that changes /i/ and /u/ into [y] and [w] respectively when each of them is followed by a non-identical vowel. The data of the type in (20) are used to exemplify the glide formation process:

- (20)
- a) /vi+ɔ̄mbɔ̄/ → [vyɔ̄mbɔ̄] "vessels, utensils" (Noun Class 8)
- b) /Vi+ura/ → [vyura] "frogs" (Noun Class 2 but morphologically behaving like Noun Class 8)
- c) /mu+angwi/ → [mwangwi] "echo" (Noun Class 3)
- d) /mu+ana/ → [mwana] "child" (Noun Class 1)
- e) /mu+iŋginɛ/ → [mwɪŋginɛ] "another" (Noun Classes 1, 3, 11 and 14)"

These data show that the glide formation process is restricted to the /i/ and /u/ in Noun Classes 1, 3 and 8. Except for /ku+ɛnd+a/ → [kwɛnda] and may be two or so other forms, the process does affect /i/ and /u/ in verbs as data in (21) show:

- (21)
- (a) alinuma "she/he/it(animate) bit me"
- (b) alikiagalia "she/he/it (animate) looked at it (non-animate)"
- (c) tuliɛndɛlɛa "we continued"
- (d) walituɔ̄na "they saw us"
- (e) kuɔ̄ndɔ̄ka "to leave/depart"
- (f) kununua "to buy"

As we have seen with some other processes that are witnessed only in specific parts of Kiswahili grammar, the gliding of /i/ and /u/ is not language-wide process. Unfortunately, as the rule governing the process is currently formulated by authors of works in Kiswahili phonology, the rule gives the impression that it is a phonetically motivated rule operating across the board in the language. For instance, Iribemwangi (2008:2004-2005) formulates the two rules as (22a) and (22b)<sup>5</sup>

(22a)

$$/i/ \quad [j] / - + \left\{ \begin{array}{l} a \\ \square \\ \varepsilon \\ u \end{array} \right\}$$

(22b)

$$/u/ \quad [w] / - + \left\{ \begin{array}{l} a \\ \square \\ \varepsilon \\ u \end{array} \right\}$$

Kiswahili rules exemplified by (22a) and (22b) above give wrong predictions on the language's phonology. They are, therefore, incorrect and untenable. They need to be replaced by rules that clearly indicate that the glide formation process in the language is restricted to only some sections of the grammar. They need to be formulated as morphophonemic rather purely phonetically-motivated rules.

## 8. Consonant Insertion

Iribemwangi (2008) claims that the voiced palatal stop /j/ (to which he erroneously refers as an affricate) weakens into [z] when the final phoneme is the vowel /i/. He illustrates his contention with the examples in (23):

(23)	Gloss	Gloss
(a)	/m+tʃafu+a+ji/ → [m tʃafuzi]	"the one who makes dirty of pollutes"
(b)	/mtʃagu+a+ ji / → [mtʃaguzi]	"one elects or chooses"
(c)	/m+gɔmbɛ+a+ ji/ → [mgɔmbɛzi]	"contender, contenstant"

It is my view that there is not such a process in Kiswahili as /j/ → [z]/ - i. Were that process to be in Kiswahili phonology, we would not have forms such as the ones in (24):

(24)	Item	Gloss
(a)	wasɔmaji	"readers"
(b)	waimbaji	"singers"
(c)	watambaji	"narrators"
(d)	wasambazaji	"disseminators, those who spread"
(e)	waigizaji	"actors / actresses"

Instead of the forms in (24), the language would have the forms in (25):

- (25):
- (a) \*wasɔmazi
  - (b) \*waimbazi
  - (c) \*watambazi
  - (d) \*wasambazazi
  - (e) \*waigizazi

The surface forms in (23) result from an [z] insertion process which is rarely mentioned in Kiswahili phonological literature. In nouns created from verb roots by using the nominalising /i/, [z] is inserted before the /i/ if the verb root ends with a vowel. Thus:

(26) Item	Gloss
(a) /m+nunu+i/ → [mnunuzi]	“buyer”
(b) /m+tɛmbɛ+i/ → [mtɛmbɛzi]	“walker”
(c) /ma+tɛmbɛ+i/ → [matɛmbɛzi]	“ walk (noun) /walking”
(d) /m+kagu+i/ → [mkaguzi]	“inspector”
(e) /ma+lɛ+i/ → [malezi]	“upbringing”

The process inserts [z] between the verb root final vowel and the nominalising vowel to create two CV syllables to avoid a CV-V syllable sequence. Reformulated in terms of [z] insertion process rather than the untenable /j/ weakening process advocated by Iribemwangi, the data (23) would look as (27) below:

(27)
(a) /m+tɛfɛ+i/ → [mtɛfɛzi]
(b) /m+tɛgɛ+i/ → [mtɛgɛzi]
(c) /m+gɔmbɛ+i/ → [mgɔmbɛzi]

On the surface of it, it looks as though the [z] insertion process is governed by rule belonging what Schane (1972) calls natural rules of phonology of the sub-category known as preferred syllable structure rules. However, to the extent that it operated only in nouns, a syntactic category, it has to be classified as an MP-rule. The rule may be formulated as follows as in (28):

(28) O → [z] / V - + i
[nominalisation]

Another omission in Kiswahili phonological literature is the [l] insertion process. Just as in the case of the [z] insertion, [l] insertion is motivated by the need for a preferred syllable. The process inserts [l] in verbs containing the applicative morpheme {i} (phonologically /i/) in verbs whose roots or stems end with a vowel. The data in (29) below show demonstrate the process:

(29) Item	Gloss
(a) /tɛmbɛ+i+a/ → [tɛmbɛlɛa]	“visit (a place / someone)”
(b) /kimbɪ+i+a/ → [kimbɪlɪa]	“run to / towards”
(c) /nunu+i+a/ → [nunulɪa]	“ buy on behalf of ”
(d) /li+i+a/ → [lɪlɪa]	“cry for”
(e) fuŋg+u+i+a/ → [fuŋgulɪa]	“open for”

The rule governing the process may be formulated as (30) below:

(30) O → [l] / V - + i
[applicative]

There are a few instances whereby there is an insertion of [l] in the applicative form of the verb even when the verb root ends with a consonant. [jikɪlɪa] from /jik+i+a/ is such a case. It is not clear why such forms acquire [l] on the surface. However, it is not too far-fetched to hypothesise that the forms have acquired [l] through analogy with the form of the type I have exemplified in (29). Still, I admit that this is one of the areas where more work needs to be done.

## 9. Mix-Up Between Synchronic and Diachronic Analyses

In a section subtitled “Morphophonemics”, Polome (1967:72-73), describes consonant weakening processes and exemplifies the changes by giving the current forms and the pre-Kiswahili forms from which they have emerged. He writes:

(28)
(a) “/pi/ → [fi], e.g., in mɪafi ‘glutton’ from the verb root {lap} which has been lost in Kiswahili”
(b) “/ti/ → [si], e.g., in kisima ‘well’ from the Proto-Bantu nominal theme *{tima}...”
(c) “/ki/ → [ji], e.g., in moshi “smoke” from proto-Bantu *{goki}...”
(d) “/bi/ → [vi] dialectically [zi], e.g., ngozi~ngovi (Mombasa) ‘skin’
(e) /di/ → [zi] (versus /di/ → [i] in intervocalic position, e.g., mwezi ‘moon’, originally ‘moonlight’ from proto-Bantu*/mogɛdi/, derived from the verbal root */gɛd/ ‘shine’ ”

- (f) /ku/ → [fu], e.g., mafuta 'fat' from the proto-Bantu nominal theme \*{kuta}...  
 (g) /du/ → [vu], e.g., in the adjective -bovu 'rotten' : -ovu 'evil' , both from earlier \*wovu ... derived from the Bantu verb root \*/bɔd/ 'rot', ..."

Looking at the seven instances of weakening, given the arrow, one would conclude that the process shown is a synchronic one. However, as can be seen from the Polome's commentary, the weakening is not synchronic but rather diachronic. Consequently, his notation using the (synchronic) arrow is a misrepresentation. Since the changes in (238) are diachronic, the correct way of showing the seven instances of weakening is as shown in (29):

(29)

- (a) /pi/ > [fi]  
 (b) /ti/ > [si]  
 (c) /ki/ > [ji]  
 (d) /bi/ > [vi]  
 (e) /di/ > [zi]  
 (f) /ku/ > [fu]  
 (g) /du/ > [vu]

## 10. Wrong Analyses

One of the phonological processes that Iribemwangi (2008) discusses is the consonant weakening. Although, unlike other authors who have written on Kiswahili phonology, he correctly observes that consonant weakening in Kiswahili is conditioned not merely by any /i/ in the language but only /i/ functioning as a nominalising morpheme, he nevertheless misses the point when he comments on what he considers to be weakening in verbs. He claims that weakening of plosives does not only occur in nominalisations but that it is also witnessed in some verbs. He then gives the following examples:

(30)

- (a) /ruk+i+a/ → /ruk+j+a/ → [ruʃa] "throw"  
 (b) /tʃɛk+i+a/ → /tʃɛ+j+a/ → [tʃɛʃa] "make to laugh"  
 (c) pit+i+a/ → /pit+j+a/ → [piʃa] "allow to pass"

Iribemwangi proceeds to write a rule (31) to account for the purported weakening:

(31)

$$\left\{ \begin{array}{c} k \\ t \end{array} \right\} \rightarrow \text{ʃ} / - a$$

Both the underlying forms in (30) as well as the rule (31) are incorrect. Semantically, all the three surface forms in (30) do not have the applicative morpheme {i} as claimed in the data. Instead, they contain the causative morpheme {iʃ} (phonologically /iʃ/). Consequently, the underlying representations of the three surface forms in (30) must indicate the causative morpheme as in (32). Thus:

(32)

- (a) /ruk+iʃ+a/ → [ruʃa] "throw"  
 (b) /tʃɛk+iʃ+a/ → [tʃɛkɛʃa] "make to laugh"  
 (c) /pit+iʃ+a/ → [piʃa] "allow to pass"

The task before scholars of Kiswahili phonology is to determine the series of deletion rules that link the underlying forms in (32) to their surface forms. Positing a weakening rule just won't do. As phonologists, we must ensure as a minimum, that the arrows of phonological changes link the same set of morphemes between the left and the right of the arrows. The data in (32) violates that requirement. The surface forms of the underlying representations in (32) are as shown in (33):

(33)

Item	Gloss
(a) /ruk+i+a/ - [rukia]	"jump at"

- |                |             |                |
|----------------|-------------|----------------|
| (b) /tʃɛk+i+a/ | → [tʃɛkɛɛa] | "laugh at"     |
| (c) /pit+i+a/  | - [pitia]   | "pass through" |

### 11. Misuse of Notations

Massamba (2011), under the heading "Tangamano Irabu", gives data to show that there is vowel harmony in Kiswahili. His examples take the following form:

(34)

- (a) piga → pig-i-a
- (b) pika → pik-i-a
- (c) leta → let-e-a
- (d) chenza → chez-e-a
- (e) soma → som-e-a
- (f) kata → kat-i-a
- (g) gawa → gaw-i-a
- (h) koma → kom-e-a
- (i) nuna → nun-i-a
- (j) fuma → fum-i-a

As a notation in Generative Phonology, an arrow has specific function. It links the underlying representations to the surface realizations. Consequently, it connects the same set of morphemes between the left and the right of the arrow; for instance, /n-limi/ → [ndimi]. In other words, /n-limi/ → [ndimi] would be interpreted as: "an underlying sequence of the morphemes {n} + {limi} is realized at the surface level as [ndimi]. For each pair of the forms connected by an arrow from (34) (a) through (34) (j), the relationship is not that of underlying and surface forms. In each pair, the set of morphemes to the left of the arrow is different from the set of morphemes to the right of the arrow. For each pair, the member to the right of the arrow has an extra morpheme compared to its counterpart to the left of the arrow. The arrow in the data does not, therefore, do what arrows are expected to do in Generative phonology. The convention is arbitrarily used, or rather, misused. Another example of arbitrariness in Kiswahili linguistics is to be found in Mgullu (1999:54). In trying to demonstrate that a phoneme as a segment distinguishes meaning in a language, he gives the following data:

- |                            |                                     |
|----------------------------|-------------------------------------|
| (35) (i) /s/+a/+a/ → (saa) | "watch"                             |
| (ii) /t/+a/+a/ → (taa)     | "lamp"                              |
| (iii) /p/+a/+a/ → (paa)    | "roof, gazzele"                     |
| (iv) /b/+a/+a/ → (baa)     | "bar"                               |
| (v) /k/+a/+a/ → (kaa)      | "crab, sitting, piece of charcoal " |
| (vi) /z/+a/+a/ → (zaa)     | "give birth"                        |
| (vii) /f/+a/+a/ → (faa)    | "be appropriate"                    |
| (viii) /j/+a/+a/ → (jaa)   | "be full"                           |

There are two problems with the data. The first is the unusual use of the plus sign. In linguistics, the sign is used to represent a morpheme boundary. The convention of showing forms in their underlying representation is to put the slash at the beginning and at the end of the sequence of the underlying segments. For instance, the underlying forms in (35)(i), (ii) and (iii) may be represented as /saa/, /taa/ and /paa/ respectively. Moreover, if we are sure that each of the forms has a long vowel rather than a sequence of two vowels, the correct way to represent the three forms would be /sa:/, /ta:/ and /pa:/

### 12. Conclusion

Kiswahili phonology is replete with misrepresentations and omissions. For some of the misrepresentations, I have proposed what I consider to be the correct analyses. In other cases, I have merely showed that the analyses are incorrect and, therefore, untenable and, in so doing, implied that there is more work to be done. I have also indicated instances of glaring omissions in the literature. These omissions have led to a situation of an incomplete description of Kiswahili phonology. The problem with the description of Kiswahili phonology and, indeed, of the other aspects of the structure of the language grammar is the indifference to crucial literature by those producing works on the language. With regard to phonology, some of the writers have no time, or interest, or both, for phonetics.

And yet, in my view, without a fairly good understanding of phonetics – especially articulatory phonetics – one can hardly bring any worthwhile rigour to bear on a phonological analysis and description. Moreover, some of the scholars who have worked on Kiswahili phonology have not given any adequate time and thought to theoretical literature. A meaningful phonological analysis and description of a particular language is only feasible when one has a good understanding of general phonology. To understand general phonology one needs to have a substantial depth in phonological theory. Which is the way forward for Kiswahili phonology? Well, to come up with papers and books that are convincing and, therefore, credible, those working on Kiswahili phonology will do better to appreciate the value articulatory phonetics and phonological phonological and to spend time and energy in the two areas as necessary ingredients to worthwhile phonological analyses and descriptions. Finally, it is evidently clear that the Standard Phonological Theory as expounded by Chomsky and Halle (1968) is grossly deficient in the description of Kiswahili phonology. As we have seen in a number of cases that described as misrepresentations, many phonological processes go beyond phonetic specification in their environment. And yet, the standard phonological Theory does not categorise phonological rules. Natural Generative Phonology does. According to natural phonological, many if not most of the phonological rules operational in Kiswahili are MP-rules and not P-rules. It appears to me, therefore, within the linear phonological analysis paradigm, Natural generative Phonology is the best tool for the description of Kiswahili phonology.

### Endnotes

1. Mgullu has used italics for some of the words. He also used slashes for both underlying and surface forms. I have reproduced his work without any changes.
2. Prof. Herman Batibo listened to me as I presented an earlier version of this paper at the International Conference on African Languages and Literatures in the 21<sup>st</sup> Century at Kenyatta University in August 2014. He made some pertinent observations and, subsequently, sent me data in support of the observations. I thank him for both the comments and the data. I have reproduced the data without modifying it in terms of transcription.
3. I have written the sentences in (14) orthographically except for the contentious [tʃ]. Writing the rest of the sentences phonetically would not have added value to the paper.
4. Polome's /e/ and /o/ are what in my data I write, respectively, as [e] and [o]
5. Iribemwangi transcribes the palatal glide as /j/. I write it as /y/ and reserve the symbol /j/ for the voiced palatal fricative.

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