

## References

- Albright, W. F. (1935). *The Archaeology of Palestine and the Bible*. New York: Flaming H. Revel Co.,
- Burns, E. (1988). *World Civilizations: Their History and Their Culture* New York: W. W. Norton & Company, Inc.
- Chiera, E. (1939). *They Wrote on Clay*. Chicago: Phoenix Books.
- Davidson, M. B. (Ed.) (1962). *The Golden Book of Lost Worlds: Great Civilization of the Past*. New York: Golden Press.
- Dorsey, G. (1931). *The Story of Civilization: Man's Own Show*: New York Haley on House Empires of the Bible. Copy with the author without date and publishers
- Graves, F. P. (1925). *A History of Education: Before the Middle Ages*. New York: The Macmillan Company.
- Horn, S. (1955). *Light from the Dust Heap*. Washington D.C.: Review and Herald Publishing Association.
- Huddon A.C. (1934). *History of Anthropology*. London: Watts and Co.
- Johnston, H. H. (1910). *The Negro in the New World*. London Methuen & Co.
- Kramer, S. N. (1959). *History Begins at Sumer*. Garden City: Doubleday Anchor.
- Kramer, S. N. (1961). *Mythologies of the Ancient World*. Garden City: Doubleday Anchor.
- Mallowan, M. E. L. (1965). *Early Mesopotamia and Iran*. London: Thames andHudson.
- Mazour, A., Mazour, G. & Peoples, J. M. (1990). *World Civilization. People and Nations*. Orlando: Harcourt- Brace Jovano rich Publishers.
- Osei, G. K. (1968). *Europes' Gift to Africa* London: African Publication Society.
- Pritchard, J. B. (1950). *Ancient Near Eastern Texts Relating to the Old Testament*. Princeton: Princeton University Press.
- Rawlinson, G. (1878). *The Origins of Nations*. New York: Scribner, Welford &Armstrong.
- Seignobon, C. (1910). *History of Ancient Civilization*. London: T. Fisher Unwin.
- Thomas, D. W. (1961). *Documents From Old Testament Times*. New York: Harper.
- Wilds, E. (1970). *The Foundations of Modern Education*. New York: Holt Rinehart and Winston. Inc.
- Williams, C. (1971). *The Destruction of Black Civilization*. Chicago: The Third World Press.
- Woolley, L. (1929). *The Sumerians*. Oxford, England: Clarendon Press.

## NASAL CONSONANT PROCESSES IN STANDARD KISWAHILI

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### Abstract

This paper discusses four phonological processes that are evident in Standard Kiswahili nasal consonants. The natural generative phonological theory (NGP) has been used in the analysis of the various processes. Both formal and general rules have been posited for each of the processes in order to show the environments under which they occur.

**Key words:** Phonological processes, homorganic nasal assimilation, nasal deletion, Ganda law, Kiswahili.

### Introduction

Standard Kiswahili has five underlying nasal consonants. These nasals are /n/, /ɲ/, /ŋ/, /m/ and /ɱ/. All these phonemes are involved in various phonological processes that lead to the realization of different variants at the phonetic level. Some of the processes are fairly natural and are motivated by the anatomy of the articulatory organs while others are not so natural. At the same time,

some processes are still quite productive while others seem to have been blocked. In this paper, all these angles concerning Standard Kiswahili nasal consonants are explored.

### Nasal Palatalization

One process evident in Standard Kiswahili nasal consonants is the palatalization of the alveolar nasal. According to both Meinhof (1968) and Guthrie (1970/71),

most Bantu nouns in classes 9 and 10 have {n-} as the class prefix. When this class prefix is followed by the vowel /i/, and /i/ is in turn followed by another vowel the alveolar /n/ is palatalized; put simply,

$$(1) \quad /n/ \rightarrow [ɲ] / - /i/, [\text{syll}]$$

When the rule is formalized it appears thus:

$$(2) \quad \left[ \begin{array}{c} +\text{const} \\ +\text{nas} \\ +\text{alv} \\ +\text{voice} \end{array} \right] \rightarrow [+ \text{pal}] / - \left[ \begin{array}{c} +\text{syll} \\ +\text{high} \\ -\text{back} \end{array} \right], \left[ \begin{array}{c} \\ \\ \\ +\text{syll} \end{array} \right] \text{ (not /i/)}$$

This formal rule maybe summarized as:

$$(2 a) \quad \begin{array}{c} C \\ \left[ \begin{array}{c} +\text{nas} \\ +\text{alv} \end{array} \right] \end{array} \rightarrow \left[ \begin{array}{c} \\ \\ +\text{pal} \end{array} \right] / - \begin{array}{c} V \\ \left[ \begin{array}{c} +\text{high} \\ -\text{back} \end{array} \right], \left[ \begin{array}{c} \\ \\ \\ \text{syll} \end{array} \right] \text{ (not /i/)}$$

In comparison with other vowels, /i/ may be termed as ‘more palatal’ since it is a high front vowel. /i/ therefore influences the nasal /n/ to gain the feature [+palatal]. However, before reaching the final form, [i] first hardens into [j]; itself a palatal glide. The rule expressed in (2) above is in force in the forms in (3) below:

- (3) /ni+umba/ → [njumba] → [ɲumba] house  
 /ni+unɣu/ → [njunɣu] → [ɲunɣu] pot  
 /ni+ama/ → [njama] → [ɲama] meat  
 /ni+ag / → [njag ] → [ɲagɔ] thighs
- /ni+ ɛɲ ɛr ɛ/ → [nj ɛɲ ɛr ɛ] → [ɲ ɛɲɛr ɛ]  
 black ant  
 /ni+ɔŋga/ → [njɔŋga] → [ɲɔŋga] hip  
 /ni+undɔ/ → [njundɔ] → [ɲund ɔ] hammer

One necessary condition for this type of palatalization is that the high, front vowel must be followed by a different vowel, that is, it should not be itself. However, as is usually the case, exceptions do abound as is evident in:

$$(4) \quad /ni+aba/ \rightarrow [njaba] \text{ on behalf}$$

In (4), the process is blocked at the stage of the palatal glide and therefore the palatal nasal is not realized. All the same, palatalization does still take place. This nasal palatalization process, was earlier noted by Polome (1967:70) where he argues that /n/ → [ɲ] before a noun or adjective stem with an initial vowel. He gives examples such as:

- [ɲama] meat  
 [ɲɔta] star  
 [ɲuki] bee  
 [ɲɛupɛ] white

It is thus evident that, as a process, palatalization is fairly well evident in Standard Kiswahili especially as pertains to classes 7-8; 9-10 nouns and adjectives.

### Homorganic Nasal Assimilation

Abercrombie (1967) states that homorganic nasal assimilation is a natural process whose occurrence is dictated by the anatomy of the articulatory tract. This process at times blurs the underlying segment which gives rise to the assimilation of the nasal to the following obstruent, especially in cases where a segment has been deleted. Katamba (1989) observes that such deletion often leads to loss of “naturalness”, and refers to this phenomenon as “telescoping”.

Research shows that homorganic nasal assimilation occurs in reference to obstruents, and where a resonant1 occurs, then, through additional processes, it is realized as an obstruent. As with most other phonological processes, homorganic nasal assimilation aims at, among other factors, simplifying articulation of various phonological items and doing away with complexities. NGP theory argues that these processes eliminate the less natural segments and replaces them with more natural ones [see Katamba (1989: pp.114-115)]. Homorganic nasal assimilation is one of the most natural processes, [see Bakari (1982: p.125) and Mberia (1993: p.124)], consequently, it is evidently phonetically motivated and thus broadly exceptionless. In Kiswahili, this process is quite widespread, Bakari (1982: p.115) observes,

To a significant degree, the assimilation of the nasal to the following obstruent is uniform in virtually all the Swahili dialects that we have investigated.

Although Standard Kiswahili is not one of those dialects investigated by Bakari, this study does confirm that the feature is no less widespread in the standard dialect as will be exemplified below.

However, unlike Katamba (1989) is of the view that the homorganic nasal assimilation rule in Kiswahili is “morphologised”. He observes that it is not automatically triggered by phonetic information and thus, it requires

morphological information. Although there is a problem with his data (where he places some class 1/2 nouns in class 9/10), Katamba correctly observes that any class 1 or class 3 nasal prefix is syllabic but a class 9/10 prefix is syllabic only if the root to which it is attached is monosyllabic. To him, the distinction between monosyllabic and longer roots is clearly phonological but information concerning noun class membership is morphological.

In Standard Kiswahili, this process mostly (but not exclusively) involves the archiphoneme /N/ and falls in the category of regressive assimilation. /N/ is realized either as [n], [ŋ], [ɲ] or [m] under different environments. This is most pronounced in class 9-10 nouns but is also evident in nouns in other classes including 1-2. In fact, Katamba (1989) notes that in Kiswahili a word-medial nasal or a nasal prefix marking classes 9/10 must be homorganic with the following consonant but that a nasal consonant marking classes 1 and 3 does not necessarily have to be homorganic (as is the case with /mtu/ person and /mti/ tree.). Further, he remarks that while the assimilation of a nasal to the place of articulation of the following consonant is itself a natural process, its implementation in Kiswahili, as observed above, is sensitive to non-phonetic factors. The changes are:

a) /N/ is realized as [n] when it precedes an alveolar obstruent<sup>2</sup>, thus,

$$(5) \quad /N/ \rightarrow [n] / \_ [+alv]$$

examples include:

(6)	/n+zigiɛ/ → [nziɛ]	locust
	/n+zumari/ → [nzumari]	clarinet
	/n+sɔ/ → [nsɔ]	kidney
	/n+swi/ → [nswi]	fish
	/n+ta/ → [nta]	wax
	/n+ti/ → [nti]	ear ornament
	/n+dama/ → [ndama]	calf
	/n+dɛge/ → [ndɛge]	bird/aeroplane
	/n+dwɛɛ/ → [ndwɛɛ]	illness
	/n+lɔa/ → [ndɔa] → [ndɔa]	marriage
	/n+rɛfu/ → [ndɛfu] → [ndɛfu]	long

In most of these forms, the deep structure is very much like the surface structure. The reason for this is that since /t/, /d/, /s/, /z/, /r/ and /l/ are all alveolar consonants, just as /n/ is, then there is no phonological condition dictating the change of /n/ at the surface level. The articulation of these sounds vis-à-vis /n/ is quite natural.

b) /N/ is realized as [ŋ] when it is followed by a velar obstruent, for example:

(7)	/n+gaɔ/ → [ŋgaɔ]	shield
	/n+galawa/ → [ŋgalawa]	canoe

/n+gɛli/ → [ŋgɛli]	noun class
/n+gɔɔ' → [ŋgɔɔ]	catfish
/n+gɔma/ → [ŋgɔma]	drum/dance
/n+guvu/ → [ŋguvu]	strength/force
/n+gwɛna/ → [ŋgwɛna]	crocodile
/n+gwɛnɛ/ → [ŋgwɛnɛ]	(coin) money

The reasoning here is that articulation of /n/, an alveolar nasal, in the environment of preceding a velar obstruent is complex; therefore, the alveolar is harmonized to the velar leading to /ŋ/, a velar nasal, consequently,

$$(8) \quad /N/ \rightarrow [ŋ] / \_ [+velar]$$

c) /N/ is realized as /ŋ/ in the environment of preceding a palatal obstruent as in:

(9)	/n+t a/ → [ɲt a]	tip
	/n+t i/ → [ɲt i]	country
	/n+tɔrɔ/ → [ɲtɔrɔ]	canoe
	/n+ } aa/ → [ɲ } aa]	hunger/famine
	/n+ } ia/ → [ɲ } ia]	way, path
	/n+ } ama / → [ɲ } ama]	conspiracy
	/n+ } zi/ → [ɲ } zi]	dream
	/n+ } uga/ → [ɲ } uga]	ankle bells
	/n+ } umu/ → [ɲ } umu]	shoe cleats

Like /t/ and / }/, /ɲ/ is a palatal consonant and thus is the nasal that appears more naturally in place of /n/ which is an alveolar in a palatal neighbourhood. The phonological process may be shown thus:

$$(10) \quad /N/ \rightarrow [ɲ] / \_ [+pal]$$

It is, however, important to note that in the cases where the nasal is followed by a vowel with the features [+HIGH, -BACK] and the vowel is in turn followed by another vowel (which is not itself), the process of glide formation precedes that of homorganic nasal assimilation. This is evident in lexical items such as:

(11)	/ni+umba/ → [njumba] → [ɲumba]	house
	/ni+unɔ/ → [njunɔ] → [ɲunɔ]	pot
	/ni+ama/ → [njama] → [ɲama]	meat
	/ni+agɔ/ → [njagɔ] → [ɲagɔ]	thighs

It can, therefore, be argued that in such cases the palatalisation rule is actually a feeding rule to the homorganic nasal assimilation rule.

d) /N/ occurs as [m] when it precedes a bilabial obstruent as the following examples show:

(12)	/n+bari/ → [mbari]	clan
	/n+bingu/ → [mbingu]	heavens, sky
	/n+buzi/ → [mbuzi]	coconut grater
	/n+bɔni/ → [mbɔni]	eye pupil
	/n+binu/ → [mbinu]	method
	/n+barika/ → [mbarika]	castor nuts

/n+b ɛl ɛkɔ/ → [mb ɛl ɛkɔ] baby carrier

Although, as mentioned, most of these nouns belong to class 9-10, there are also others from different classes like [mbuzi] (goat) and [mbangɔ] (warthog) from class 1-2. In (12) above, /n/ is harmonized with /b/, a bilabial and is thus realized as /m/, the bilabial nasal. This process can be summarized thus:

$$(13) \quad /N/ \rightarrow [m] / \text{---} [+bilab]$$

However, homorganic nasal assimilation is not unique to the alveolar nasal. It is also evident in the articulation of the bilabial nasal especially when it precedes labio-dental obstruents. This happens to nouns of most classes as shown in (14) below:

(14) NOUN	GLOSS	CLASS
/m+vivu/ → [m̥vivu]	lazy person, idler	1-2
/m+vuvi/ → [m̥vuvi]	fisherman	„
/m+vjele/ → [m̥vjele]	old person	„
/m+f+u/ → [m̥fu]	a dead person	„
/m+fitini/ → [m̥fitini]	sower of discord	„
/m+vi/ → [m̥vi]	grey hair	9-10
/m+viza/ → [m̥viza]	an evergreen tree	3-4
/m+vule/ → [m̥vule]	wooden bowl	„
/m+vungu/ → [m̥vungu]	empty space	„
/m+vuke/ → [m̥vuke]	vapour	„
/m+fukɔ/ → [m̥fukɔ]	pocket; bag	„
/m+fanɔ/ → [m̥fanɔ]	example	„
/m+vua/ → [m̥vua]	rain	19

Here, the bilabial nasal changes place of articulation to be realized as a labio-dental nasal. Of course, it is noted that for the class 1/ 2 nouns given as examples above, the vowel /u/ which occur between the nasal and the voiced labio-dental is first deleted in order to form the sequence NC. The change maybe shown thus,

$$(15) \quad /M/ \rightarrow [m̥] / \text{---} [+lab-dent.]$$

So far, concerning this process, this paper has given examples mostly from nouns but it is important to note that whenever these sound segments (the nasals) precede obstruents even in other word categories, the same rules apply as exemplified in the following verbs:

(16) /unganɛni/ → [uŋganɛni]	unite
/ɔndɔa/ → [ɔndɔa]	remove
/nikunjiɛ/ → [nikunjiɛ]	fold (it) for me
/nɔɔ/ → [nɔɔ]	come
/mvamiɛ/ → [m̥vamiɛ]	attack him/her
/mviziɛ/ → [m̥viziɛ]	waylay him/her

The rule governing homorganic nasal assimilation in Kiswahili has been written in slightly different variations by different scholars, for example:

- Habwe (2004): [+nas] → [ <place ] / --- C

- Njuguna (1992):  

$$[+nas] \rightarrow [ <place ] / \left[ \begin{array}{l} + \text{const.} \\ - \text{syll.} \\ < \text{place} \end{array} \right]$$

C

- Bakari (1982): [+nas] → [ <place ] / --- [ <place ]

Although all these versions mean the same thing, some like Njuguna (1992) are more easily understandable and clear though not specific enough. However, this study also has a different variation to the rule, thus:

$$(17) \quad [+nasal] \rightarrow [ <place ] / \text{---} \left[ \begin{array}{l} + \text{const} \\ - \text{nas} \\ < \text{place} \end{array} \right]$$

The variation here is that this rule indicates that the consonant which assimilates the preceding nasal itself should not be a nasal.

It has been indicated that this is *regressive assimilation* since the obstruent influences the nasal coming before it. However, this study notes the presence of a *progressive assimilation* rule in Standard Kiswahili in which case the nasal also plays a central role. This usually happens when a resonant precedes the nasal. The resonants, which are essentially continuants, acquire the feature [-CONTINUANT] and consequently are harmonized with the nasal (which in most cases is the alveolar one). Since in this case the resonant is influenced by the nasal before it, then this is progressive assimilation. Examples include:

(18) /n+ɔanɔ/ → [ndɔanɔ]	fish hook
/n+ɔimi/ → [ndimi]	tongues
/n+ɔa/ → [ndɔa]	marriage
/n+ɔɔɔ/ → [ndɔɔɔ]	dream
/n+rɛfu/ → [ndɛfu]	long, tall

It can therefore be summarised thus:

$$(19) \quad \left[ \begin{array}{l} 1 \\ r \end{array} \right] \rightarrow [d] / /n/ \text{---}$$

This leads to the formalisation of the following rule:

$$(20) \quad \left[ \begin{array}{l} + \text{const} \\ - \text{syll} \\ + \text{reson} \end{array} \right] \rightarrow [-cont] / /n/ \text{---}$$

Notable in all these cases is the simplification in articulation of neighbouring sounds. As Mberia (1993) states, homorganic nasal assimilation results from the early adjustments of the articulators in anticipation of the following consonant, consequently, the points of articulation of the nasal and the following consonant are harmonized leading to this articulatory simplification.

In conclusion, as noted by Katamba (1989), the nasal prefix /N/ in Kiswahili undergoes homorganic nasal assimilation whereby the nasal class prefix adjusts to the place of articulation of the nominal base if it begins with a voiced consonant. Consequently, as has been illustrated, the nasal is either labial, labio-dental, alveolar, palatal or velar depending on whether the first consonant of the nominal base is bilabial, labio-dental, alveolar, palatal or velar. Based on this observation, he posits the

following general rule:

$$C \rightarrow \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \\ \gamma \text{ back} \end{bmatrix} / - \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \\ \gamma \text{ back} \end{bmatrix}$$

[+nasal]

Where the Greek *alpha*, *beta* and *gamma* mean that the nasal and the consonant after it share the same features, for example both may be [+ant] or [-ant].

Clark & Yallop (1995:146) even extend this general rule on assimilation further by inclusion of the feature [HIGH] and consequently the addition of the Greek *delta* to cater for the additional shared feature. They posit the rule as:

$$\begin{bmatrix} +\text{cosnt.} \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \\ \gamma \text{ high} \\ \delta \text{ back} \end{bmatrix} / - \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \\ \gamma \text{ high} \\ \delta \text{ back} \end{bmatrix} \#$$

This rule is not essentially different from the one posited in this study to denote (regressive) homorganic nasal assimilation in (17) above.

### Nasal Deletion

Investigation has revealed that there exists a nasal deletion rule in Standard Kiswahili. In the previous section (2.2), it was noted that homorganic nasal assimilation occurs when a nominal base begins with a voiced consonant. However, where a nominal base is preceded by a nasal prefix begins with a voiceless stop or any other obstruent, be it a fricative or an affricate, homorganic nasal assimilation does not occur (Katamba 1989). The rule posited in (17) above is blocked. Instead of being assimilated, in this case, the nasal is dropped. It is deleted. A few examples from class 9-103 nouns will be useful in understanding this process:

- (21) /N+sufuria/ → [sufuria] metal pan (not [nsufuria]\*)  
 /N+silaha/ → [silaha] weapon (not [nsilaha]\*)  
 /N+filimbi/ → [filimbi] whistle (not [mfilimbi]\*)  
 /N+fimbɔ/ → [fimbɔ] stick (not [mfimbɔ]\*)  
 /N+tai/ → [tai] neck tie (not [ntai]\*)  
 /N+tabu/ → [tabu] misery (not [ntabu]\*)  
 /N+pɛrɛmɛndɛ/ → [pɛrɛmɛndɛ] peppermint  
 (not [mpɛrɛmɛndɛ]\*)

This phenomenon is also evident in other word categories like adjectives as in:

- (22) /N+sufuria N+kubwa/ → [sufuria kubwa] a big pan  
 /N+pɛrɛmɛndɛN+tamu/ → [pɛrɛmɛndɛ tamu]

sweet peppermint

The rule used, therefore, reflects the fact that the alveolar nasal is deleted in the environment of occurring before a

voiceless obstruent, thus:

$$(23) \begin{bmatrix} +\text{nasal} \\ +\text{alv} \end{bmatrix} \rightarrow \emptyset / - + \begin{bmatrix} -\text{cont} \\ -\text{voice} \end{bmatrix}$$

The general rule for the above formal rule is:

$$(23a) N \rightarrow \emptyset / - + \begin{bmatrix} -\text{cont} \\ -\text{voice} \end{bmatrix}$$

This rule, however, does not appear to be exclusive as, for example, it does not apply to the following forms:

- (24) /N+tʃa/ → [ntʃa] tip  
 /N+tʃi/ → [ntʃi] country, land  
 /N+sɔ/ → [nsɔ] kidney  
 /N+ta/ → [nta] wax  
 /N+ti/ → [nti] ear ornament  
 /N+twɛ/ → [ntwɛ] stigma

One thing though is evident from these items; in the absence of the N prefix, they are all mono-syllabic. One is, therefore, tempted to argue that the exemption to the rule are mono-syllabic lexical items, but again this is rendered null by the following three examples:

- (25) /N+timbi/ → [ntimbi] water shore  
 /N+kindiza/ → [nkindiza] low tide  
 /N+tʃɔɔ/ → [ntʃɔɔ] a small canoe

Now, the issue of syllables may appear to be far fetched but a few remarks are in order. Firstly, in spite of broad research, these three are the only items that this study could identify in Standard Kiswahili that are not mono-syllabic but do not adhere to the nasal deletion rule despite the fact that they theoretically seem positively marked for it. There is no apparent phonetic (or morphological) justification for these items retaining the nasal. In fact, when one adds a semantic angle - the fact that all three items are associated with the coast, have something to do with water - the issue becomes even more interesting, and complex.

Since the rule still seems to be productive in Standard Kiswahili, then the only reasoning left is that the three items are historical residues which were by-passed by the rule and have since "refused" to adapt to it. For a rule to be productive, the assumption, usually, is that if new forms enter the lexicon of a language, then chances are that the rule will be observed, meaning it is still operational. This study observes that insofar as the nasal deletion rule is concerned, productivity is almost guaranteed. In fact, there are some items that, according to this study, are still in the process of adopting the rule, for example,

- (26) /N+si/ → [nsi] [fish]

may also be articulated as [isi]<sup>4</sup>

However, the best example is:

- (27) /N+swi/ → [nswi] or [swi] (fish)

Here, the nasal may (or may not) be dropped. Chances are that, with time, the nasal could be completely dropped. Of course syllabification factors are also very important when processes such as deletion occur in language.

Secondly, since the lexical items that do not subscribe to the deletion rule are few (and almost negligible), one may be tempted to dismiss their existence but this would be a grave mistake. The question that begs, therefore, is: is the nasal deletion rule a P-rule or an MP-rule? Strictly speaking, at least according to Hooper (1976), this may not be a P-rule since it has exceptions. However, by putting a caveat, that for the rule to apply, the lexical items involved should not be mono-syllabic, it may be possible to tie the rule within the P-rules, safe for the three lexical items in (25) above that are not mono-syllabic but still have retained the nasal. This is where NGP views such items as historical residues, a view that seems very useful in this particular case. In fact, NGP generally encourages the existence of residues as this is seen as incontrovertible evidence that a certain change did actually occur, hence the rule. It goes further to strengthen the NGP claim of naturalness as opposed to the “abstractness” evident in the standard model of GP.

**Ganda Law**

The other process denoting consonant deletion is the Ganda Law which is also referred to as “Meinhof’s Law” (for example by Meeuseen: 1963; Herbert: 1977). This is because the law was formulated by the outstanding Bantu languages linguist Carl Meinhof when he was analysing the Luganda language. In the law, Meinhof postulates that a stem-initial consonant is usually deleted when it follows a nasal consonant and is itself followed by a sequence of a vowel and another nasal consonant. Strictly speaking, the law does not denote a nasal process per se but the nasals are so crucial for this rule to operate that it is impossible to ignore them. As is evident in the above description, nasals are an integral part of the rule. This rule may be indicated simply as follows:

$$(28) \quad C \rightarrow [\emptyset] / N + \text{---}VN$$

The examples that follow show the existence of this phenomenon in Standard Kiswahili:

- (29) /n+gamba/ → [ŋamba] shiny part of turtles’ shell
- /n+gɔmbɛ/ → [ŋɔmbɛ] cow/cattle
- /n+gamb / → [ŋambɔ] across
- /n+ganda/ → [ŋanda] pip of playing cards
- /n+gɔnda/ → [ŋɔnda] dried fish

As is evident, most of these lexical items belong to class 9-10. However, there are a few from other different classes (like [ŋɔmbɛ], cow/cattle and [ŋɔnda], dried fish from class 1-2). One thing is common to all these items; in the morphological classification of nouns, their singular and

plural morphemes are always represented by the morph {Ø}. In all the above nouns, the nasal /n/ is followed by the consonant /g/ (which is [-nasal]). This consonant is then deleted. However, before the deletion occurs, /g/ is harmonized with /n/ through the process of homorganic nasal assimilation (see section 2:2) and consequently, phonetically, /n/ is realized as [ŋ]. This, therefore, is a case that denotes the *feeding rule* where homorganic nasal assimilation “feeds” the deletion process.

In this case, just as Katamba (1989) observed of Luganda, the implications for rule ordering are obvious. For this surface realization to occur, homorganic nasal assimilation must precede deletion. This is the only way that both rules may occur.<sup>5</sup> Katamba (1989: p.125) observes:

Technically, this kind of rule relationship where one rule opens the door to the application of another rule is called FEEDING ORDER.

As a result of these rules, /g/ is completely deleted leading to “absolute dissimilation” (Mberia: 1993) where the phonetic structure changes thus:

$$(30) \quad NCVN \rightarrow NVN$$

In Kiswahili, the phonemes involved are mostly /g/ and /n/. The process may thus be shown as:

$$(31) \quad /g/ \rightarrow \emptyset / N + \text{---}VN$$

and therefore:

$$(31a) \quad C \rightarrow \emptyset / C + \text{---}V C$$

-nas                    +nas                    +nas

Formally, therefore, the rule may be re-written thus:

$$(32) \quad \begin{bmatrix} C \\ + \text{back} \\ + \text{high} \\ + \text{plos} \\ + \text{voice} \end{bmatrix} \rightarrow \emptyset / \# \begin{bmatrix} + \text{cons} \\ + \text{alv} \\ + \text{back} \end{bmatrix} + \text{---}V [+nas]$$

This rule may then be simplified as follows:

$$(32a) \quad \begin{bmatrix} + \text{const} \\ + \text{nas} \end{bmatrix} \rightarrow \emptyset / \# \begin{bmatrix} + \text{const} \\ + \text{nas} \end{bmatrix} + \text{---} [+ \text{syll}] \begin{bmatrix} + \text{const} \\ + \text{nas} \end{bmatrix}$$

Written in full, the Ganda law then is:

$$(33) \quad \begin{bmatrix} + \text{const} \\ + \text{vel} \\ + \text{back} \\ + \text{high} \\ + \text{voice} \end{bmatrix} \rightarrow \emptyset / \# \begin{bmatrix} + \text{const} \\ + \text{alv} \\ + \text{back} \\ + \text{nas} \end{bmatrix} + \text{---} [+ \text{syll}] \begin{bmatrix} + \text{const} \\ + \text{nas} \end{bmatrix}$$

This rule reduces a nasal-consonant sequence into a nasal. This single nasal has no effect on the preceding vowel<sup>6</sup>. It is the root initial which is deleted.

One more remark concerning Ganda Law in Standard Kiswahili is in order. It is noted that there are items that appear marked for the rule but which deviate from it. Examples include /ŋganɔ/ (wheat; fable), /ŋgawira/ (booty), /ŋgɛ/ (scorpion), /ŋgiri/ (wild-boar; hernia), /ŋgɔgɔ/ (catfish), /ŋgumi/ (fist) and /ŋgwena/ (crocodile) among others. Since such items are many and diverse, they cannot be said to be exceptions or historical residues. The only viable justification under NGP is that Ganda Law may have been blocked and is, therefore, no longer productive in Standard Kiswahili. This is strengthened by the fact that the rule appears to be more of a P-rule than an MP-rule.

### Conclusion

It has been argued in this paper that Standard Kiswahili nasals are deeply involved in the realization of various phonological processes. In some processes, like homorganic nasal assimilation, all the nasals are actively involved while in others, like deletion only specific nasals are involved. It has further been observed that in Standard Kiswahili, both progressive and regressive types of assimilation are evident.

### Notes

1. At times resonants such as /r/ and /l/ may occur but these segments are realized as [d]. The process involved in such cases is progressive assimilation and denotes consonant strengthening.
2. For the other two alveolar consonants (resonants), see comment 1 above.
3. It is noted that this study prefers the use of an eclectic approach in nominal classification. Consequently, examples such as /N+pangɛ/ (gadfly) – class 1/2 and /N+tjumvi/ (salt) – class 19 as given by Katamba (1989:126/127) are avoided. However, the rule used is similar to the one posited by him.
4. Here, it seems, apart from nasal deletion, there is another process involved which gives rise to [i]. This other process is most likely epenthesis which leads to the insertion of /i/.
5. This statement is however not meant to imply that this study proposes limitless adherence to linear phonology. It only proposes the use of linearly ordered rules to the extent that they are intrinsically ordered. Extrinsically ordered rules are not relevant to this study. Most proponents of NGP including

Hooper (1976) have argued strongly against extrinsic linear ordering, proposing instead that intrinsic ordering is the only kind of rule interaction that should be allowed [Katamba (1989)]. However, even she, Hooper, argues a case for proper arrangement of rules (1976:53). As Katamba (1989:129) points out, this proposition is made out of the realisation that:

A (total) ban on linear rule ordering effectively means that only those underlying representations which require rules interacting in a straight forward way can be successfully mapped on phonetic representations.

Of course there are many parameters that may be used to describe and explain intrinsically ordered rules and these include Simultaneous Rule Application, Random Sequential Rule Application and Elsewhere Condition (Kiparsky (1973).

6. That is, no effect, save for the vowel nasalisation process.

### References

- Abercrombie, D. (1967). *Elements of General Phonetics*, Edinburgh: EUP.
- Bakari, M. (1982). *The Morphophonology of Kenyan Swahili Dialects* (Unpublished Ph.D dissertation). University of Nairobi, Nairobi.
- Clark, J., & Yallop, C. (1995). *An Introduction to Phonetics and Phonology*, 2nd ed, Malden: Blackwell Publishing.
- Guthrie, M. (1970/71). *Comparative Bantu*, Vols 2,3 &4, Farnborough: International Publishers Ltd.
- Habwe, J., & Karanja, P. (2004). *Misingi ya Sarufi ya Kiswahili*, Nairobi: Phoenix Publishers.
- Herbert, R. (1977). "Phonetic Analysis in Phonological Description: Prenasalised Consonants and Meinhof's Rule" in *Lingua* 43, 339-373
- Hooper, J. (1976). *An Introduction to Natural Generative Phonology*, New York: Academic Press Academic Press.
- Hyman, L. (1975). *Phonology: Theory and Analysis*, New York: Holt, Rinehart & Winston.
- Iribemwangi, P. I. (2008) A Synchronic Segmental Morphophonology of Standard Kiswahili. Unpublished PhD thesis, Nairobi: University of Nairobi.
- Katamba, F. (1989). *An Introduction to Phonology*, London: Longman.
- Massamba, D., Kihore, Y., & Msanjila Y. (2004). *Fonolojia ya Kiswahili Sanifu*, Dar es Salaam: TUKI.

- Mberia, K. wa (1993). *Kitharaka Segmental Morphophonology With Special Reference to the Noun and the Verb*, Unpublished PhD dissertation, Nairobi: University of Nairobi.
- Meinhof, C. (1968). *Introduction to the Phonology of the Bantu Languages*, Berlin: Dietrich Reimer.
- Mgullu, R.S. (1999, 2002). *Mtalaa wa Isimu: Fonetiki, Fonolojia na Mofolojia ya Kiswahili*, 1st & 2nd eds, Nairobi: Longhorn.
- Njuguna, M. (1992). *Mofofonolojia ya Kiswahili Sanifu na Kikuyu Sanifu: Mathalani Kikuyu cha Kabete: Ulinganish*, (Unpublished M.A. Thesis), Nairobi: University of Nairobi.
- Polome, E. (1967). *Swahili Language Handbook*, Washington D.C: C.A.L..
- Trubetzkoy, N.S. (1969). *Principles of Phonology*, Los Angeles: University of California Press.