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Feeding Rule Order: A Study of Vowel Deletion and Consonant Insertion in Atsam Language

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Abstract

This paper examines the feeding relationship that exists between deletion and insertion in Atsam, a Benue-Congo language spoken in Kaduna State, Nigeria. Specifically, we discuss the operation of the processes involving numeral formation. It is observed that insertion of /n/ is motivated by vowel deletion. From the data on deletion and insertion in Atsam, feeding relation is observed. For example, V_1 deletion (i.e. the first vowel at morpheme boundary), necessitates the introduction of /n/ in the formation of ten plus any number (i.e.10+n, where n is 1-9). This process which is influenced by a similar process in Hausa is used to enrich the lexicon of Atsam. The conceptual frameworks used are deletion and insertion. The two processes are innovatively employed in forming new words in the language under study. The study concludes 'that though phonological rules do not operate in a vacuum, when they are used, some are motivated by the other in a particular order as observed in Atsam language.

Keywords: phonological process, deletion, insertion, rule, feeding order.

Introduction

Deletion and insertion are common phonological processes in natural languages. They are used to rectify well-formedness condition. Deletion removes sounds from initial, medial or final positions in words. Sometimes it occurs across word boundary. Insertion introduces new segments into words. It is a common practice in African languages, especially when borrowed words do not conform to the word structure of the host languages.

In this study, we do not only look at deletion and insertion as phonological processes in Atsam language, we examine the relationship between the two in the quest to form new words in the language. In other words, we discuss rule interaction in a *feeding role* between deletion and insertion. Further in this work is the discussion of other phonological processes in Atsam.

Brief Historical Notes of Atsam

Kaduna State forms a portion of the country's cultural diversity because representatives of the six major ethnic groups in the country are found in the state. Apart from this fact, there are also present over twenty other ethnic minority groups, each with its language and art or religion different from the other.

The works of art and pottery (e.g. the "Nok Terracotta") found in the southern parts of Kaduna State suggest that it is a major cultural centre. Among the major ethnic groups are Kamuku, Gwari, Kadara in the west, Hausa and Kurama to the north and Northeast. "Nerzit" is now used to describe the *Jaba, Kaje, Koro, Kamanton, Kataf, Morwa* and *Chawai* (study group) instead of the derogatory term "southern Zaria people". Also, the term "Hausawa" is used to describe the people of *Igabi, Ikara, Giwa* and *Makarti* LGAs, which include a large proportion of rural dwellers who are strictly "Maguzawas."

Population Structure and Distribution: The 2006 census provisional result puts the population of Kaduna State at 6,066,562. Although majorities live and depend on the rural areas, about a third of the state's population is located in the two major urban centres of Kaduna and Zaria.

However, except in the northwestern quadrant, the rural population concentration is moderate, reaching a height of over 500 persons per sq. km. in Kaduna/Zaria and the neighbouring villages 350 in *Jaba, Igabi* and *Giwa* and 200 in Ikara LGAs. Despite the provisional nature of the census results, observation of movements of young able bodied male labourers in large numbers from rural villages to towns during the dry season and back to rural agriculture fields during the wet season, suggest a sizeable seasonal labour force migration in the state.

The state is divided into 23 Local Government Areas. *Kauru* is one of the 23 Local Government Areas of Kaduna State with its headquarters in *Kauru*. Kauru Local Government has an area of 2,810 km² and a population of 170,008 (2006 census).

Conceptual Frameworks

The conceptual frameworks adopted for this work are deletion and insertion as discussed under the general theory of phonology. They

are phonological processes that explain some of the behaviours of sounds in connected speech.

Deletion or elision explains loss of sounds in speech. Deletion is not brought about by laziness but by efficiency in speech most especially in casual speech. For example, in the phrase *you and me*, the [d] sound is not realised while in some instances the [a] sound is elided (Yule, 1996). All these make speech production smooth. Almost all sounds of language could be deleted so far it is within what a language allows. Systematic elision occurs when a language specifies which sound disappears when it gets in contact with a particular sound either within or across morpheme boundary.

Insertion is the introduction of an extraneous segment into a word. It could be to break an unwanted sequence or to open up a syllable. Whichever one it is there is a phonetic appearance of a sound that is not present at the underlying level. What is however popular in African languages is insertion of segments into foreign words in order to domesticate such words. Example is found in Yoruba (Kwa language) in which vowels are introduced to break up consonant clusters as well as open closed syllables.

In Atsam, deletion and insertion are not targeted at foreign words but native words, especially in the formation of words in the language.

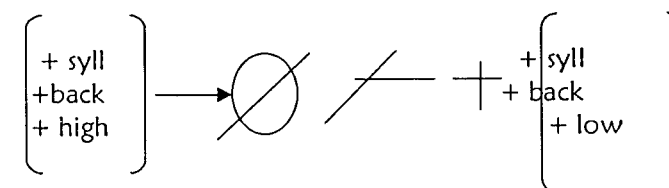## Feeding Rule Relation between Vowel Deletion and Consonant Insertion in Atsam Language

Deletion
According to Oyebade (2008 p.69), deletion "involves the loss of a segment under some language – specifically imposed conditions". He submits further that deletion could involve vowels or consonants. In Atsam language, vowel deletion is more prominent than consonant deletion based on the present research. Instances where vowel is deleted in Atsam are considered below:

/kúrú	x	ábáá /	→ [kúrabáá]	'twenty'
ten		two		

/kúrú	x	átáák /	→ [kúratáák]	'thirty'
ten		three		

/kúrú	x	anasi /	→ [kúranasi]	'forty'
ten		four		

/kúrú	x	atuwon /	→ [kúratuwɔn]	'fifty'
ten		five		

/kúrú	x	atʃirim /	→ [kúratʃirim]	'sixty'
ten		six		

In the above numeral formation in Atsam, it is observed that the final vowel of the first word disappears when it is joined to another word beginning with a vowel. On this premise, a phonological rule which will account for this is postulated as follows:

$$\begin{bmatrix} +\text{syll} \\ +\text{back} \\ +\text{high} \end{bmatrix} \longrightarrow \varnothing \Big/ \underline{\quad} + \begin{bmatrix} +\text{syll} \\ +\text{back} \\ +\text{low} \end{bmatrix}$$

Insertion
Following Oyebade (2008 p.74), "insertion is a phonological process whereby an extraneous element not present originally is introduced into the utterance usually to break up unwanted sequences". In Atsam language, it is discovered that in some numeral formation, when two morphemes are combined to form words such that the last vowel of the first word is deleted before the second word beginning with a vowel as shown in deletion process above, there will then be an insertion of a consonant after the deletion process. This observation can be buttressed empirically using the following data for exemplification:

/kúrú	+	ábáa /	→[kúrnábáá]	'twelve'
ten		two		

/kúrú	+	átáak /	→ [kúrnátáak]	'thirteen'
ten		three		

/kúrú	+	ánásí /	→ [kúrnánásí]	'fourteen'
ten		four		

/kúrú	+	átúwón /	→ [kúrnátúwón]	'fifteen'
ten		five		

/kúrú +	atʃirim /→ [kúrnatʃirim]	'sixteen'
ten	six	
/kúrú +	áta:ríbá /→ [kúrnáta:ríbá]	'seventeen'
ten	seven	
/kúrú +	áwúrú /→ [kúrnáwúrú]	'eighteen'
ten	eight	

From the data given above, it is observed that there is an insertion of an extraneous consonant after the deletion process in the final derivation of the numerals. Therefore, we can postulate a phonological rule which will account for such phonological process in the following way: Insert an alveolar nasal consonant before a low back unrounded vowel at morpheme boundary.

$$\emptyset \longrightarrow \begin{bmatrix} + \text{cons} \\ + \text{ant} \\ +\text{cor} \\ + \text{nas} \end{bmatrix} / \underline{\quad\quad} + \begin{bmatrix} + \text{syll} \\ - \text{cons} \\ +\text{low} \\ +\text{bak} \end{bmatrix}$$
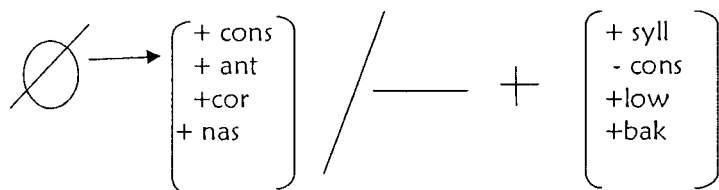
From the consideration of deletion and insertion rules, we can posit that deletion motivates the insertion of /n/ in base ten of numeral formation in Atsam. Re-orde ring of the rules will result in wrong or ill-formed words in the language.

Rule Relation in a Feeding Order

If two rules are in feeding order, rule A creates new contexts in which rule B can apply. It would not have been possible for rule B to apply first. When this happens, feeding order is said to be in place. For example, if we have two rules which look like:

Rule A: x>y
Rule B: x>z

Example of feeding order in English is observed in the fortis stop insertion before a word-final /s/ as in: 'prince' [prints] and preglottalisation as a result of the new phonological environment created by fortis stop insertion, hence [prinʔts].

From the data on deletion and insertion in Atsam, feeding relation is observed. Deletion of V_1 (i.e. the first vowel at

morpheme boundary), necessitates the introduction of /n/ in the formation of ten plus any number (i.e. 10+n, where n is 1-9). For instance,

	/kuru+ abáa/	
V_1 deletion	/kur + abáa/	
/n/ insertion	/kur+n+abáa/	
Surface form	[kurnabáa]	'twelve'

This process is influenced by a similar process in Hausa which is also spoken in the study area. E.g.

/baba + gida/		babangida
/n/ insetion		/baba + n + gida/
Father	AGENTIVE	house
Surface form [babangida]		'head of the family'

Note that /n/ in the case of Hausa is an agentive marker.

Other Phonological Processes in Atsam

When morphemes are combined to form words, the segments of neighbouring morphemes become juxtaposed and sometimes undergo changes. Changes also occur in environments other than those in which two morphemes come together – for example, word initial and word final positions, or the relation of a segment vis-à-vis a stressed vowel. All such changes will be called phonological processes (Schane, 1973 p.49). From another perspective, Oyebade (2008 p.61) maintains that phonological processes are sound modifications motivated by the need to maintain euphony in a language or to rectify violations of well-formedness constraints in the production of an utterance. He observes further that phonological processes come about so as to maintain the musical quality of the utterance or to make its production smooth and easy to release the articulatory contact in the production of one sound and to initiate a different articulatory contact for a contiguous sound.

In essence, phonological processes are the processes that characterize the changes which occur in the sound system of a language most especially when morphemes are combined to form

words as Schane (1973) has rightly observed. It is worthy of mention that the phonological processes of a language are explicitly characterized by the phonological rules converting underlying representations to derived ones (Schane, 1973). He clearly opines that, "if we can state the exact conditions under which a phonological process takes place, we have in effect given a rule". To this end, it is the phonological rules that explain and formalize the processes (changes) occurring in a given language.

Assimilation processes

Oyebade (2008 p.62) observes that, when two contiguous sounds which have different modes of production become identical in some or all of the features of their production, assimilation has taken place. Likewise, Schane (1973 p.49) claims that, in assimilatory processes, a segment takes on features from a neighbouring segment. By this, a consonant may pick up features from a vowel, a vowel may take on features of a consonant, one consonant may influence another, or one vowel may have an effect on another. In his own opinion, Katamba (1989) considers assimilation as the modification of a sound to become more like the sound in its neighbourhood.

Again, Oyebade (2008 pp.62-63) states that assimilation may be total, converting the changing segment to become identical to the other segment or it may be partial such that only some feature of the changing consonant (or vowel) becomes identical with that of the initiating segment.

Furthermore, the direction of assimilation occurring in a given language may be progressive, regressive or bi-directional. Assimilation is progressive when the first segment changes to become like the second one; it is regressive when the second segment changes to become like the first segment; it is bi-directional when the first and second segments influence each other simultaneously or reciprocally.
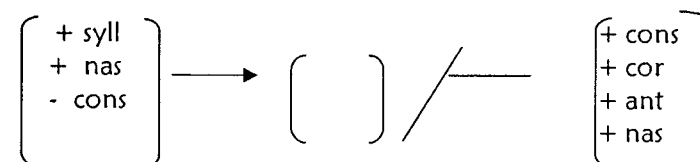
Finally, it should be noted that assimilation can occur both within and across morpheme(s). If the assimilation takes place within a morpheme, it is said to be intra-morphemic while it is inter-phonemic if it occurs between two morphemes i.e. when two morphemes are combined.
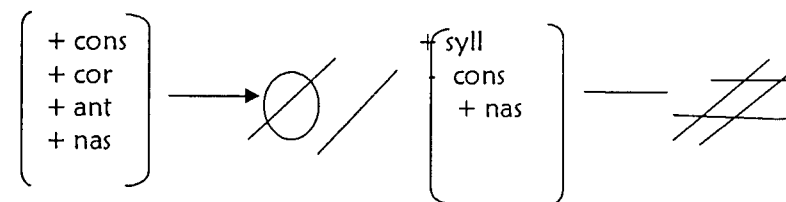
Nasalization

Nasalization is a consonant feature that is assimilated by a vowel whereby an oral vowel becomes phonetically nasalized when adjacent to a nasal consonant (Schane, 1973 p.50). Examples of this assimilatory process in Atsam language are provided below:

rũn [r ũ]		'knee'
ruwunt [r ù w ũ t]		'dry season'
yonk [j ɔ k]		'horn'
yunk [j ũ k]		'mosquito'
ĩnká [ĩ k á]		'mother'
ĩnbá [ĩ b á]		'father'
tʃãn [t ʃ ã]		'child'
anãn [a n ã]		'children'
atunwon [a t u n w ɔ]	'five'	
sũnzí [s ũ z í]		'sew'

From the above given data, it is observed that vowels [u, i, a, ɔ] become phonetically nasalized as a result of their occurrence in the environment of a nasal consonant. On this premise two phonological rules can be proposed to account for the above phonological phenomenon: Rule 1: *A vowel is nasalized if it occurs before an alveolar nasal consonant.*

$$
\begin{bmatrix} + \text{ syll} \\ + \text{ nas} \\ - \text{ cons} \end{bmatrix} \longrightarrow \begin{bmatrix} \ \end{bmatrix} \Big/ \underline{\qquad} \begin{bmatrix} + \text{ cons} \\ + \text{ cor} \\ + \text{ ant} \\ + \text{ nas} \end{bmatrix}
$$

Rule 2: *A word final alveolar nasal consonant becomes deleted after a nasal vowel.*

$$
\begin{bmatrix} + \text{ cons} \\ + \text{ cor} \\ + \text{ ant} \\ + \text{ nas} \end{bmatrix} \longrightarrow \emptyset \Big/ \begin{bmatrix} + \text{ syll} \\ \text{ cons} \\ + \text{ nas} \end{bmatrix} \underline{\qquad} \#\#
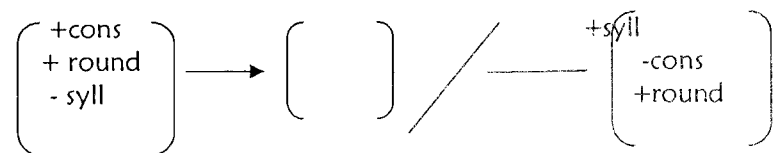$$

Labialization

Following the positions of Oyebade (2008) and Schane (1973), labialization is a feature of vowels that is superimposed on adjacent consonants. Oyebade (2008) considers labialization as the superimposition of lip rounding on a consonant. In labialization, the lip position of a rounded vowel induces a secondary articulation onto the consonant (Schane, 1973 p.50). In their account of labialization, Gussenhoven and Jacobs (1998 p.9) observe that, during the articulation of the consonant, the lips are rounded. This assimilatory process is demonstrated by some Atsam consonants when they occur before contiguous rounded vowels. Examples of this phonological process are given below:

[gʷùmù]   'short (of stick)'
[gʷorò]   'kolanut'
[kʷúù] 'okra'
[zʷom] 'body'
[kʷúp] 'bone'
[ʃʷuɔ] 'rat'
[sʷɔk]   'bee'
[sʷúsʷɔ]   'female'
[dʷòdʷó]   'fetish (juju)'
[wɔgʷùr]   'left'

In the above data, it is observed that consonants [g, k, z, s, ʃ, d] are superimposed with the labiality feature by their adjacent vowels. A phonological rule accounting for this is postulated thus: A consonant becomes labialized before a rounded vowel.

$$
\begin{bmatrix} +cons \\ +round \\ -syll \end{bmatrix} \longrightarrow \begin{bmatrix} \ \end{bmatrix} \Big/ \underline{\quad\quad} \begin{bmatrix} +syll \\ -cons \\ +round \end{bmatrix}
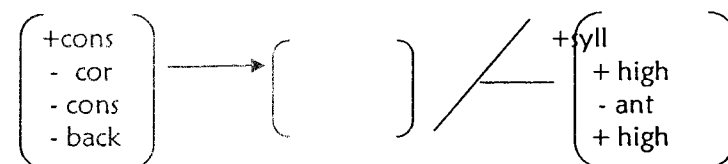$$

Palatalization

This assimilatory process is also a vowel feature that is assimilated by consonant. In palatalization, the tongue position of a front vowel is superimposed on an adjacent consonant (Schane, 1973 p.50). Gussenhoven and Jacobs (1998 p.9) describe palatalization

as the raising of the front of the tongue as for [i] or [j], during the pronunciation of a consonant. Similarly, Oyebade (2008 p.65) observes that, a consonant manifests a secondary articulation of palatality if the segment following it is a front vowel. Examples of this phenomenon in Atsam language are cited as follows:

[gʲjá] 'arrive'
[jìgʲìtòr]   'defecate'
[kʲì]   'grass'
[kʲìtsì]   'cover (in hand)'
[ʃùsɔgʲíra]   'dwell'
[tárkʲí]   'tear (tree)'
[pérkʲí]   'hot (as fire)'
[sùrùkʲí]   'in law'
[námgʲítʃe]   'animal'
[nágʲítʃe]   'buffalo (bush cow)'

The above cited examples from Atsam illustrate that the velar consonants [k and g] are secondarily modified with the palatality feature of the high front vowel [i] such that they become palatalized. This makes these consonants to be partly made at the palatal region since the high front vowel is contiguous to them. A rule accounting for the above therefore says that:

A velar consonant becomes palatalized before an adjacent high front vowel.

$$
\begin{bmatrix} +cons \\ -cor \\ -cons \\ -back \end{bmatrix} \longrightarrow \begin{bmatrix} \ \end{bmatrix} \Big/ \underline{\quad\quad} \begin{bmatrix} +syll \\ +high \\ -ant \\ +high \end{bmatrix}
$$

Conclusion

This work has examined deletion and insertion as innovative phonological processes in Atsam, a Benue-Congo language spoken in Kaduna State, Nigeria. The two processes are employed in forming numerals in Atsam. It is observed that their use is not arbitrary as the operation of one paves the way for the other-feeding rule relation, as data in the language have shown.

Specifically, the way deletion and insertion are used in the language to derive numerals in base ten (i.e. 10+n , thus yielding

numerals like 11, 12, 13, 14-19). Deletion in Atsam feeds insertion. The study has also presented and discussed some other phonological processes are: nasalization, palatalization and labialization.

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