# Phonological processes in Ọrọ compound nouns 

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#### Abstract

This paper deals with the phonological processes that occur because of compounding in Orọ. The author concentrates on two processes - consonant weakening and assimilation. The data for the study were elicited from three selected native speakers of Orọ using the 1700 SIL Comparative African Wordlist, as well as a structured wordlist. The data were carefully coded and transcribed for analysis. Analyzing the data within the moraic phonological framework clearly brought out the modifications that segments undergo, thereby making explicit, the alteration in the syllable internal structure of the compounds as maintained in this paper. From the results of the analysis, the phonological processes entail that Orọ phonotactics play a major role in defining structurally preferred lexical items in the Orọ language. It is therefore opined that compounding in Orọ is defined by the phonotactic constraints of the language.


Keywords: Compounding; compound nouns; syllable weight, moraic phonology; internal structure; phonological processes.

### 1.0 Introduction

Compounding, like derivation, creates new items of vocabulary (that is, lexemes known as compounds). Compounds are sequences of lexemes. A compound consists of two or more words. In other words, a classic compound is a word made up of at least two roots which can occur elsewhere as independent words (Crystal, 1991; Katamba, 1993; Ndimele; 2008). This means that compounding is a word formation process which involves the joining of two or more formerly independent lexemes (or roots) to form a single word. The fact that it is with nouns that compounding really comes into its own as a word-forming process in many languages is irrefutable. As avered by Udoh and Udosen (2014, p. 175), "these lexemes
$\left(\mathrm{N}_{1}+\mathrm{N}_{2}\right)$ - where $\mathrm{N}_{1}$ stands for the first noun, $\mathrm{N}_{2}$ for the second noun - have some literal and or non-literal relationship when they function as co-compounds in a compound word".

Compounding has links with morphology, syntax as well as with phonology hence, a reflection of some processes which are morphophonologically motivated. This is not in doubt, as certain segmental processes tend to happen between two morphemes - either a word with an affix, or two words. Fabb (2001, p. 66) avers that compounds are "subject to phonological and morphological processes, which may be specific to compounds or may be shared with other structures, whether derived words or phrases". Compounding process often undergoes certain phonological processes activated when a morphological condition is met. These processes may sometimes affect the internal structure of the language in obeisance to its phonotactic requirements. Little wonder that Michael (2000) points out that the principles guiding the pronunciation of words and their internal structure are accounted for by phonological processes.

Phonological processes are linguistic mechanisms that reflect the distributional patterns of sounds in a particular language and the phonological activities that take place because of sound combinations (Katamba, 1993). Moreover, it is pertinent to point out that sounds produced in discrete form are different from strings of segment produced in a stretch of utterance. This divergence is caused by the effect of features of the sounds which are contiguously placed together, the effect of which leads to phonological processes.

This study seeks to establish if compound nouns in Orọ trigger certain phonological processes, and examines the phonological processes which take place within the compound nouns. Another objective of this paper is to establish the structure of these compound nouns before and after the application of these processes using the moraic theoretical approach, thereby showing clearly, the alteration in the syllable weight and internal structure.

The Orọ language is the third dominant language in Akwa Ibom State. The native speakers call it Ọrọ language but in amplified (colonial) version, it is Orọn language (O. E. Okwung, general interview, August 1, 2018). Orọ belongs to the Lower-Cross Subgroup of the Delta group of the Cross River Sub-branch of the (New) Benue-Congo-branch of the Niger Congo language family (Greenberg, 1963 classification). It is spoken as a native language in five Local Government Areas of Akwa Ibom State viz: Ọron, Udung Uko, Mbo, Urue Offong/Oruko and Ọkọbọ. It is also spoken in Bakassi Local Government Area in Cross River State. Orọ is genetically related to the varieties of the Lower-Cross group such as Ibibio, Anaañ, Iko, Ekịd, Ewang-Uda, Itu Mbon Usọ, Ọkọbọ, Efai, Ibenọ, etc., spoken in Akwa Ibom State.

### 2.0 Theoretical approach

The history of moraic phonology could probably be traced back to the 20th century when Han (1962, in Hoequist, 1985) defined a mora as a unit equal to a short syllable. David MaCawley, an American linguist in 1968 defined the term 'mora' as something of which a long syllable consists of two, and short syllable consists of one. In 1984; 1985, Hyman also contributed to the development of moraic phonology. In 1985, McCarthy and Prince made their contributions, as well as Hayes in 1989.

The representation of syllable-internal structure has also played a significant role in establishing syllable weight. For example, a branching model such as that in McCarthy (1979) acknowledges that only segments dominated by the rhyme node can determine the syllable weight, whereas the onset contributes no weight to the syllable. However, syllable weight has been elegantly accounted for within moraic theory (e.g., Hyman, 1985; Hayes, 1989).

In moraic theory, the traditional weight unit, mora ( $\mu$ ), has been used as both a weight unit, which distinguishes between light syllables and heavy syllables, and as a phonological position (Hayes, 1989). Thus, in a moraic representation of the internal structure of the syllable, the mora is a phonological unit.

Moraic theory, in general, assumes that prevocalic segments (onset consonants) are moraless and are dominated directly by the syllable node, a vocalic element is linked via a mora, and postvocalic segments may be assigned moras in a language-specific manner. An example of the moraic representation of a syllable of the shape CVV is given in Figure (1).


Fig 1
Syllable-Internal Structure (Moraic Model)
Hayes 1989

In terms of syllable weight, a distinction is made between light, heavy, and super heavy syllables based on the number of moras the syllable has. Since only segments in the
traditional rhyme position can contribute to syllable weight, it has been proposed that a light syllable contains one mora ( $\mathrm{CV}, \mathrm{V}$ ), a heavy syllable contains two moras (CVV, CVC), and a super heavy syllable contains more than two moras (CVVC, CVCC) (Hyman, 1985, pp. 910). In general, monomoraic syllables are called light syllables; bimoraic syllables are called 'heavy syllables' and trimoraic syllables (in language that have them) are called 'super heavysyllables'.

However, moraic studies e.g., Hyman, 1985; McCarthy \& Prince, 1986; Hayes, 1989) have agreed on the observation that languages differ in their moraic structures. While CV syllables are light, and CVV syllables are heavy, some languages treat CVC syllables as light, and others treat them as heavy. For instance, in some languages (such as Latin, English) CVV and CVC syllables count as heavy and CV as light; whereas in others (such as Lardil, Cahuilla) only CVV is heavy and both CVC and CV are light. According to Hayes (1989), the claim of moraic theory is that these languages for instance, differ in their rules for assigning moraic structure; CVC is assigned two moras in English and Latin, and one mora in Lardil and Cahuilla.

In his contribution to moraic theory, Hayes (1989) has distinguished between universal principles and language-specific parameters in terms of syllable weight. Universally, a short vowel is assigned one mora, a long vowel two moras, a geminate consonant one mora, but an ordinary short consonant is moraless. Since ordinary short consonants are underlyingly moraless, the prevocalic consonants (onset) remain non-moraic when syllabification applies, but postvocalic consonants (coda) may be assigned moras by the application of the Weight-by-Position rule (WBP), which assigns moras to coda consonants. Thus, in languages in which the WBP rule, or some specific version of it, applies, postvocalic consonants become moraic, rendering a syllable of the shape CVC, for example, as bimoraic and heavy. Since short vowels are assigned one mora and long vowels two moras, then CV syllables are monomoraic and light and CVV syllables are bimoraic and heavy. Based on the prosodic system of some languages, however, CVC syllables can also become monomoraic and light.

The notion of weight receives primary theoretical statue in moraic theory to the exclusion of skeletal slots and syllable internal constituents of the previous non-linear models. Moraic theory captures the functional equivalence of CVV and CVC syllables through bimoraicity (instead of the disjoint notions of branching nucleus and branching rhyme, While the cases where CV and CVC syllable belong together as opposed to CVV syllables) fall under monomoraicity. This implies that in languages sensitive to the CV/CVV distinction, CVC syllables do not necessarily pattern with CVV syllables, but may instead pattern with CV syllables, thus counting as light rather than heavy.

Hayes' (1989) model or aspect of moraic theory is adopted in this study. This model is also evident in studies by subsequent researchers such as Spencer (1996), Watson (2002), Gordon (2006), Al Kayed (2015), etc. Hayes (1989) elaborated on a model of syllabic phonology that incorporates a level of structure below the syllable; the mora.

This theory is widely considered as the concept representing the internal structure of the syllable, as mora plays a major role in syllable structure. As pointed out by Maeda (2001), Hayes' model could provide a better explanation of the contrast between syllabic and nonsyllabic segments in the same context, as association of morae in the underlying forms is considered. Hayes' (1998:257) model of moraic theory clearly specifies that: 'A selected sonorous moraic segment is dominated by a syllable node, an onset consonant is then associated to that syllable node, while a coda consonant is associated to the preceding mora, unless it is assigned a mora by a rule.'

The data for this study came through elicitation. The researcher resorted to the SIL Comparative African wordlist of about 1700 items as well as a structured wordlist containing compound nouns to elicit responses from Ọọ native speakers who were selected through a stratified sampling technique. However, to ensure its validity and reliability, the accuracy of the data was further confirmed by another competent native speaker. The consultants were purposely made to repeat each utterance three times for clarity. Relevant data were elicited, transcribed and used for analysis.

## 3. Phonological Processes in Orọ Compound Nouns

Although a compound noun, as in the case of Orọ often has a noun + noun syntactic structure, in this study, Orọ compound nouns exhibiting different syntactic structures such as adjective + noun, noun + gerund, and agentive construction + noun are also considered. These forms are seen in the data presented in this section.

### 3.1 Weakening or Lenition:

A consonant is assumed to be weakened if it gets less than its value on the strength scale due to some conditioning. This often happens when a consonant sound occur inbetween two vowel sounds at morpheme or word boundary (intervocalic environment).

This process in the Orọ compound nouns also results in the alteration of the internal structure of the syllable, where the coda of a preceding closed syllable is shifted to become an onset of a following onsetless syllable. This process is demonstrable in the data below:


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    v.cvc. v.cvc v.cv.cv.cvc
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|  | house | up |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 2. | /ò. gók + <br> v.cvc. <br> Specialist | í.bók/ <br> v.cve <br> medicine | [j̀. gó.yí.bj̀k] v.cv.cv.cve | 'native doctor' |
| 3. | /ú.vòk + v.cvc. house | í.bk/ <br> v.cve medicine | [ú.vò. ૪í.bòk] v.cv.cv.cve | 'hospital' |
| 4. | /ú.vj̀k + <br> v.cve. <br> house | á.gám/ <br> v.cve <br> prayer | [ú.vò.yá.gàm] v.cv.cv.cve | 'prayer house' |
| 5. | /ú. nék + v.cvc. quaking | í.zòn/ <br> v.cve <br> earth | [ú.né.yí.ż̀y] v.cv.cv.cve | 'earth quake' |
| 6. | /ń.dék + <br> c.cvc. <br> ice | á.ják/ v.cve fish | [ń.dé.yá.jàk] <br> c.cv.cv.cve | 'ice or fresh fish' |
| 7. | /ń.zík + <br> c.cvc. <br> young | $\begin{aligned} & \text { o.jó/ } \\ & \text { c.cv } \\ & \text { child } \end{aligned}$ | [ń.zq́..रó.jò] c.cv.cv.cv | 'baby' |
| 8. | /ú.bòk + <br> v.cvc. <br> hand | à.dài/ <br> v.cv <br> back | [ú.bò. Yá.dáì v.cv.cv.cv | 'bribe' |
| 9. | /ǹ.díśk + <br> c.cvvc. <br> bad | í.só/ <br> v.cv <br> face | [ǹ.dív.jì.só] <br> c.cvv.cv.cv | 'badluck' |
| 10. | lí.kád + v.cve. | ú.lú.ý.kpó/ v.cv.cv.cv | [í.ká.rú.lú.yó.kpò] v.cv.cv.cv.cv.cv | 'waste basket' |


|  | basket | dumping |  |
| :--- | :--- | :--- | :--- |
| 11. | lú.dìk <br> v.cvc <br> hoe | í.bíl <br> v.cv <br> weed | [ú.dì. fí.bì] <br> v.cv.cv.cv |$\quad$ 'weeding hoe'

As seen in the compound noun constructions above, the first elements in the constructs end with stop segments $/ \mathrm{k} /$ and $/ \mathrm{d} /$. These segments become weakened to their homorganic continuant (fricative) and tap respectively, as the second elements in the constructs begin with vocalic segments. The alteration in the syllabification as well as in the weight of the constructions is further illustrated in the moraic analysis below:
13.

14.

15.

16.


As in data 13 and 14 bove, there is a reduction in the weight of the second syllables from bimoraic structures to monomoraic structures, as the arresting orclosing segments become weakened thereby forming the onsets of the next syllables. This is also applicable in 15 and 16 where the second syllable, which underlyingly has two morae, becomes monomoraic, as the arresting segment weakens to become the onset of the following syllable. This is so because like in other related languages, continuants and tap in Orọ are not permitted to occupy the coda slot but may be permitted to be onsets of non-initial syllables. Therefore, when such segments appear at the coda position by virtue of some processes like weakening, they get repositioned to a syllable position meant for them.

### 3.2 Vowel Assimilation

Assimilation is a condition where one sound becomes identical to another because of the influence of another juxtaposed sound. As stated by Michael (2000, p. 9), the term assimilation "is a term used in describing the changes or modification of a sound in order to make it more similar to neighbouring sound".

In explaining vowel assimilation, Urua (2000) points out that:

Instead of outright vowel deletion, vowels may change their basic quality and become identical to a neighbouring vowel when they occur adjacent to the right or left of another vowel. In such instances, neither of the contiguous vowels is deleted. Rather, both vowel positions or slots are retained but the different vowel qualities merge to become the quality of one of the vowels. This is common in cases where vowel deletion is expected to occur but fails to do so (pp. 81-90).

This process may be partial or complete. However, cases of complete vowel assimilation at morpheme boundary are attested in the Orọ language as seen in the following compound noun constructions:

| 17. /è.kpè <br> v.cv. <br> bag | + | ú.bók/ <br> v.cve <br> hand | [è.kpùú.bòk] v.cvv.cve | 'handbag' |
| :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { 18. /ù.zè } \\ & \text { c.cv. } \\ & \text { cloth } \end{aligned}$ | + | ú.kú/ <br> v.cv <br> leg | [ù.zúú.kù] v.cvv.cv | 'trouser' |
| $\begin{aligned} & \text { 19. /è.kpè } \\ & \text { v.cv. } \\ & \text { bag } \end{aligned}$ | + | ì.gwé/ v.ccv cassava | [è.kpìi.gwé] v.cvv.ccv | 'cassava bag' |
| 20. /ù.zè <br> v.cv. cloth | + | ílé/ <br> v.cv <br> body | [ù.zîílè] v.cvv.cv | 'top wear' (shirt, polo etc) |
| $\begin{gathered} \text { 21. /m̀.kpá } \\ \text { c.cv. } \\ \text { death } \end{gathered}$ | + | ílé/ v.cv body | [m̀.kpíi.lé] <br> c.cv.v.cv | 'shock, surprise' |
| $\begin{gathered} \text { 22. /è.mè } \\ \text { v.cv. } \\ \text { egg } \end{gathered}$ | + | $\begin{aligned} & \text { ú.nì/ } \\ & \text { v.cv } \\ & \text { hen } \end{aligned}$ | [è.múú.nì] v.cvv.cv | 'fowl egg' |
| 23. /ú.kú v.cv. leg | + | $\begin{aligned} & \text { ófù/ } \\ & \text { v.cv } \\ & \text { goat } \end{aligned}$ | [ú.kúú.fù] <br> v.cvv.cv | 'goat leg' |
| $\begin{aligned} & \text { 24. /ú.kpè } \\ & \text { v.cv. } \\ & \text { foot } \end{aligned}$ | + | í.sàn/ v.cve walking | [ú.kpií.sàn] v.cvv.cvc | 'foot step' |
| 25. /i.kpè v.cv. surface | + | ว̀.nón/ <br> v.cve <br> up | [ì.kpèé.nóy] v.cvv.cve | 'sky' |


| 26. /ú.wó <br> v.cv. <br> flowing out | + |  | [ú.wúù.bà.rà] v.cvv.cve | 'bleeding' |
| :---: | :---: | :---: | :---: | :---: |
| 27. /ù.zè v.cv. cloth | + | ú.sín/ <br> v.cve <br> waist | [ù.zúú.sìn] v.cvv.cve | 'wrapper' |
| 28. ग̀.kwó <br> v.ccv. <br> one who sings | + | í.kwó/ <br> v.ccv <br> song | [j̀.kwíí.kwò] v.ccvv.ccv | 'singer, musician' |

To further explain what is obtainable in the data above, a rule of application of the process is given thus: $\mathrm{V}_{1}+\mathrm{V}_{2} \rightarrow \mathrm{~V}_{1}+\mathrm{V}_{1}$ or $\mathrm{V}_{2}+\mathrm{V}_{2}$.

It is also pertinent to note here that the direction of assimilation is both leftward and rightward-driven depending on the height of the juxtaposed vowels.

As seen in data 17-28 above, non-high vowels assimilate completely to the higher ones in their respective domains. This means that vowel height constraint is critical here. It is also observed that consequent upon this process is syllabification and syllable weight alteration.
29.

30.

31.

32.


From the moraic analysis above, it is clear that the compound constructions are resyllabified from four syllabic structures to three, as segments in the third syllables are moved to the second syllables after the application of assimilation process, thereby increasing the weight of the second syllables, which on the surface form, become the third syllables.

### 4.0 Conclusion

This study has so far examined the phonological processes that occur during the formation of compound nouns in the Orọ language. The result of the study shows that compounding as a morphological process in Orọ usually triggers certain phonological processes, which include consonant weakening at morpheme boundary morpheme boundary and vowel assimilation.

In Oro compound nouns, there are cases of morpheme boundary consonants weakened to their homorganic fricatives and tap in their respective domains. This results in the coda of a proceeding syllable shifting to become the onset of the next syllable hence, an alteration in the syllable weight and structure. In the case of assimilation, vowel height constraint is critical, as non-high vowels assimilate completely to higher vowels. This is as a result of Ọrọ not allowing vowel hiatus in most cases hence, where there is any occurrence
of $\mathrm{V}_{1} \# \mathrm{~V}_{2}$, one of the $\mathrm{V}_{1} \# \mathrm{~V}_{2}$ as in this situation, gets completely assimilated to the contiguous vowel. The direction of assimilation may be rightward or leftward-driven depending on the height of the vowels at morpheme boundary. The result of this is syllable weight alteration.

It is expounded that these processes which apply to satisfy the morphophonological conditions of the Orọ language compound structure, set off when a morphological condition and a phonotactic rule of the language are met. The moraic phonology analysis adopted in the work clearly shows the alteration in the syllable structure and weight of the compound noun constructions at the surface level. Here, it is proposed that Oro is a rhyme-weight language, as the rhyme plays a crucial role in the distinction between heavy and light syllables.

Although not specifically presented in the analysis section of this paper, as it cannot be well captured within the theoretical framework guiding this study, it is pertinent to point out that tonal modification process is evident in most of the data analyzed in this study. As observed in many cases, the tones on the penultimate syllables are usually high, while the last syllables often take a low tone irrespective of the tonal patterns of the independent lexemes $\left(\mathrm{N}_{1}\right.$ and $\left.\mathrm{N}_{2}\right)$ in the underlying forms. This can be seen in data $2,3,4,7,8,10,11$, $17,18,20,27$ and 28. This process is recommended therefore, as a phenomenon worthy of scholarly engagement in subsequent descriptive researches in the Ọrọ language.

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