THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

The Syllable Structure of Gbari

Dr. Roseline Ihuoma Alerechi
Senior Lecturer, Department of Linguistics and Communication Studies,
University of Port Harcourt, Port Harcourt, Rivers State, Nigeria
Onyinye Anulika Chiemezie
Ph.D. Student, Department of Linguistics and Communication Studies,
University of Port Harcourt, Port Harcourt, Rivers State, Nigeria

Abstract:
The Gbari syllable structure is attested in literature to be V,N,CV, CNV (C^nV and CV̩) CNGV, OGNV or ONGV (Hyman and Magaji,1970; Rosendall, 1990) using articulatory and perceptual measures. This work revisits the syllable structure of Gbari language, a Nupoid language of the new Benue Congo phylum, using an added measure- the acoustic parameter, arguing some stand point of the previous researchers. It examines the doubtful segments finding best justifiable interpretations for proper labeling. The 1700 SIL Comparative African Wordlist (SILCAWL) 2006, a Nexton digital audio recorder is used to elicit data from six respondents (two females and four males) of 30-70 age range. Phonological observation and analysis coupled with articulatory, perceptual and acoustic parameters are instrumental in the research. The analysis shows ambiguous and questionable CNV structures: a CCV (with C_2 as a palatal nasal consonant, a product of coalescence), a nasally released consonant followed by a vowel (C^nV) and a consonant followed by a nasalized vowel (CV̩). It is in an attempt to resolve this ambiguity and investigate the status of these structures that the researchers came up with a more validating pattern for the Gbari syllable structure summarized as V, CV and CGV. Where V represents the vowel and the syllabic nasal, CV a consonant (with or without secondary articulation) and a vowel (oral or nasalized); and a CGV (all consonant types realized as a segment followed by a glide and a vowel). Gbari language is rich in phonology and is an interesting area for further research.

Keywords: *Syllable structure, segmentation, gliding, coalescence, Gbari language*

1. Introduction

Language change can be observed and studied at the different levels of linguistics. Our focus here is phonology. Language change can also be inter or intra dialectal. In the Igbo language, the word 'pus' is realized as /ábú/ by an Onitsha dialect speaker, /ávú/ by an Awka dialect speaker and /áwú/ by an Akpo dialect speaker (all dialects from Anambra state, the Inland eastern region of Nigeria). Likewise, the 'future marker' /gà/ is realized as /ɣà/ or /jà/ in some dialects. These examples however do not affect the syllable structure in the Igbo language (Eme, 2008). At another instance, some processes have been attested to affect the syllable structure of Igbo. According to Ugorgy (2000), in the Ikwo dialect of Igbo, Ebonyi state, elision has tampered with the attested structure of the Igbo language. The word /ḿkpórō/ 'seed' an NCVCV structure in most dialects of Anambra state is realized as /ḿkprə̄/ an NCCV structure in Ikwo dialect.

However, in Gbari language, some sound changes have also been observed across dialects. These changes may or may not be significant enough to influence the syllable structure of the language. It is in view of these continuous language change that the need to revisit the statutory syllable structure of the Gbari language already attested in the literature (Hyman and Magaji, 1970; Rosendall 1992) is emphasized in this paper. The study is aimed at reexamining the syllable structure to ascertain if there are significant changes using sound instruments and not just natural auditory/perceptual measures.

1.1. The Gbari Language

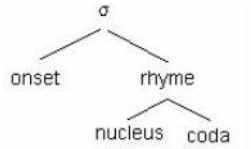
The language is known as Gbari and the people, Agbari. It is a Nupoid language, belonging to the larger Niger-Congo and Niger-kordofanian phylum.It is closely related to Gbagyi.Gbari and Gbagyi identity crisis is a known phenomenon in central Nigeria (Je'adayibe 2003, 2005). Other related languages are Nupe, Egbira and Gade (Blench 1987and Williamson 1989). There are two main dialects in Gbari, the Southern and the Northern Gbari with lexical similarity of about 89%–98%. Names of otherminor dialects inGbari include Kwali, Izem, Gayegi, Paiko, Botai, Jezhu, Kong, Kwange (Agbawi, Kangye, Wake, Wi), Wahe (Lewis, Garry & Charles 2015). The population of the Gbari speakers is about 350,000 (2002 SIL). They are located at Niger state: from Zungeru to Kaduna river north, southeast through Minna, Kwakuti, Chanchaga, Paiko, Suleija, Agaie, Rafi, and Lapai LGAs; Abuja, the Federal Capital Territory, Gwagwalada, Kwali then down to Kogi LGA in Kogi state.

2. Literature Review

The syllable is often viewed either from the phonetic or phonological perspective. Phonetic correlates of a syllable see it as a rhythmic organization of sounds within pulses produced by chest contractions. This definition is typical of Stenton's Chest pulse theory of the syllable. Roach (2007) refers to the syllable as a phonetic unit with free flow of air at the nucleus and perturbance at the extreme. Prasad2008 (cf. Ikhimwe 2015) further simplified this in his definition that a syllable is a unit of pronunciation uttered without interruption, forming the whole or part of a word and usually having one vowel sound with a consonant or consonants before or after it. Trubetzkoy first proposed syllable to constitute internal structures which enhance the view of syllable as a domain for phoneme sequences. This institutes the syllable as a basis for phonological structure of a language such that the number of segments in a syllable or the sequence, in which they are structured, is language specific. Roca & Johnson (1999) define the syllable as a unit of pronunciation made up of a cluster of segments defined by a peak of sonority which acts as a structural magnet to other lower sonority elements surrounding the peak. This peak (nucleus), they referred to as the syllabic and the lower sonority elements as marginal and non-syllabic elements.

The foregoing definitions suggest that the basic feature of a syllable is the segment that has the sonority peak. This segment is usually a vowel. The structure of the syllable projects into two places - the onset and the rhyme (Kahn 1976, Fudge 1987). The rhyme is further classified into two parts: the nucleus and the coda as a three-tier representation (Clement and Keyser, 1983) as shown in schema 1:

Schema 1



The onset is the initial consonant(s), while the coda accounts for the final consonant(s). These however, are not obligatory elements of the syllable, in the sense that either or both may be absent in a syllable. This places the nucleus as the only obligatory element of the syllable, which bears the sonority peak and is mainly a vowel and sometimes a syllabic consonant (Abiodun 2006). The presence of the onset and the coda depends on the syllabic structure options of the language. While some languages exploit most of the syllabic structure options, other languages may be conservative. A word is made up of one syllable or strings of syllables. Observe the examples from the Igbo language in (1):

Example 1:	Igbo Language	Gloss
a)	dʒí	'yam'
b)	rì.é	'eat'
c)	kwù.é	'talk'
d)	é. dè	'cocoyam'
e)	rí.bà	'crawl into'
f)	bà. ɲé	'enter'
g)	á.kwú.kwɔ́	'book'

Table 1

The examples in (1) demonstrate that Igbo language does not allow the coda position and also disallows consonant cluster at the onset. On the contrary, there are no such restrictions in English as shown in (2):

Example 2:	English Language	Syllable break
a)	skɪp	'skip'
b)	entə(r)	'en.ter'
c)	ma:kɪt	'mar.ket'
d)	straɪd	'stride'

Table 2

To maintain its syllable structure, a language naturally permutes, deletes or inserts sounds that will make the borrowed word, compound word or segments at word boundaries etc., conform to its syllable structure(s) pattern. Oyebade (1998) attested that when morphemes are put together, the constraints defining well-formedness in utterances are usually violated. These violations are taken care of by phonological rules which the language involved introduces as some mechanism. The Yoruba language, for an instance, does not allow consonant clusters either at onset or coda position, therefore, when such words are borrowed, a typical native speaker intuitively inserts a vowel between the clusters. See examples taken from Oyebade (2006) in (3):

Example 3:	Yoruba Language	Gloss
a)	tí.réè	'tray'
b)	dí.rɛ́.bà	'driver'
c)	bɛ́.lí.ìtì	'belt'

Table 3

The native speaker in the above example succeeded in splitting the syllables in each of the English words through vowel inserting just to adhere to the syllable structure of his language. This kind of manipulation (and many others, as seen later in this work) in speech phenomenon are good manifestations of phonological processes and phonological rules. Oyebade (1998) defines phonological processes as 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.

2.1. The Status of the Sound Constituents of a Syllable

Generally, it is view as discussed above that the syllable has an onset, nucleus and coda pattern. However, this research bothers more on what are the phonetic or phonemic statues of the sound segments in the syllable. Does this status determine their validity as speech segments of a syllable? In most examples given in syllable study, the phonemic speech sounds in the language are used. It is not surprising since only the phonemic sounds are represented in the written forms of the language. The first attempt to identify the speech sounds in a syllable was in the introduction of the segmental tier, followed by the CV tier of generative phonology (Clements and Keyser, 1983). The introduction of segmental and moraic theories also suggests phonological representations. Duanmu (2009) made a huge stride in his CVX theory to analyse and classify syllable structures with regard to features. Complex sounds which are the main focus of this paper was captured in his analysis.

Complex sounds are traditionally two sounds that share one timing slot in their production. As recorded in Duanmu (2011), Selkirk (1982) identified such sounds as sC where C is an obstruent e.g. sp, st, sk, arguing that the fricative /s/ when in adjacent position with an obstruent can collapse to form a complex sound. Sagey (1983) classified them as contour features reasoning that sounds with opposite features can only occur simultaneously as two unitse.g. st, ts, nt, tn… while Borowsky (1989) gave examples such as NC, that is. mp,nt, ns where homorganic nasal with the counterparts can be produced as complex sounds.

Duanmu (2011) views complex sounds as gestural or articulatory overlap evident in all CC onsets. He defers from Sagey (1983) in that in his CVX theory, sounds with opposite features cannot form a complex sound. His argument is based on the fact that sounds with opposite features will require the end of one production before the beginning of another which is too lengthy to be accommodated as one time slot. For pre and post nasal stops, Duanmu (2011) claims that they cannot be seen as complex sounds since they possess opposite features of [+nasal] and [-nasal]. He also argued they can be seen as contour features too given that that will require two timing slots CC thus violating his maximal CVX structure. He validated his argument with Herbert (1975, 1986) conditions of a true pre/post nasalized stops which include (1) the supposed sounds are not clusters (2) the supposed sounds have a four-way contrast in the language e.g. p, b, m, mb (and we suppose bm for post nasal stops). and this cannot be attributed to (3) its shedding effect. Note that these criteria are with regard to them not seen as contour features. Aniagboso et al (2018a) agrees that the nasally released consonants in the Gbari language are not contour features but rather complex sounds. The authors argue that the two-timing slots proposed by Duanmu (2011) may not be necessary though the sounds have opposite features [-nasal][+nasal]. They explained that in the speech mechanism of nasally released plosives, the velum is raised during total blockage by articulators in the buccal cavity and is lowered in place of the outburst thus having the built-up air escape through the nasal cavity. The nasal feature does not require extra time slot but uses the time scheduled for the outburst. Additionally, Duanmu (2011) posits that acoustically independent duration is captured in the spectrogram space slot while gestural overlap is not. Aniagboso et al (2018) represented this idea in a spectrogram using Gbari words.

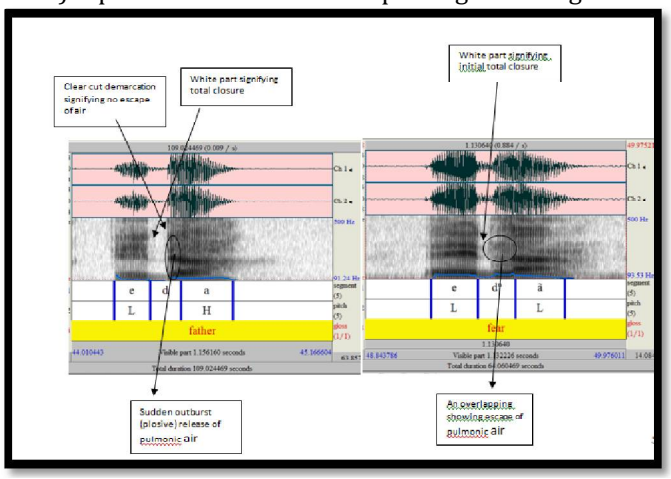


Figure 1: Segmentation of Words with Oral / Nasally Released Plosives
Adapted from Aniagboso Et Al (2018:41)

The spectrograms show a total closure in the beginning of the production of the plosive (the white part of the spectrogram). In spectrogram for [eda] father, we see a clear demarcation showing the end of the closure followed by a release outburst (the dark part within the [d] segment. In the spectrogram for [ed^{n}a] fear, though there is total closure, there is no clear demarcation rather overlap showing a closure that is accompanied by a lowering of the velum. One may argue the existence of the nasal consonant immediately after the plosive but the playback was perceived more as a nasal

release rather than a full-blown segment. Moreover, the acoustic representation of sounds in the spectrogram does not identify the nasal as an independent entity but recognizes its feature within the time slot allocated for the plosive.

2.2. Gbari Syllable Pattern

A word may have more than one syllable structure. Words in Gbari language are made up of one, two or more syllables. Monosyllabic words comprise structures such as N, V and CV as the examples in (4) show:

Example 4:	Gbari monosyllabic words	Gloss
a)	ń	'a relative pronoun'
b)	tú	'vomit'
c)	a	3rdpersonplural pronoun'(indefinite)
d)	gì	'give'
e)	mi	'me'

Table 4

Disyllabic words record structures such as CVCV and VCV as given in (5)

Example 5:	**Gbari disyllabic words**	**Gloss**
a)	gé.rí	'visitor'
b)	bè.rè	'neck'
c)	é.dí	'vein'
d)	è.mí	'faeces'
e)	tú.sò	'quarrel'

Table 5

Examples of Trisyllabic words are shown in (6)

Example 6:	**Gbari trisyllabic words**	**Gloss**
a)	lá.zā.gì	'traitor'
b)	sè.ʃí.bà	'dwell'
c)	nű̃.ɓá.tā́	'abdomen (external)'
d)	ɓé.dò.fī	'annoy'
e)	kpa.kpa.dù	'kidney'

Table 6

Examples of Polysyllabic words shown in (7)

Example 7:	Gbari polysyllabic words	Gloss
a)	mù.nù.mú.nú	'tickle'
b)	ká.tè.rē.rē'lung'	'bedroom'
c)	fā́.gā́.fā́.gā́	'lung''

Table 7

2.3. Previous Works on Gbari Syllable Structure

Hyman and Magaji (1970) twenty-five consonants and five vowels of Gbari language

Phonetic representation	p	b	ɓ	f	v	m	t	d	s	z	l	n	tʃ	ʒ	ʃ	dʒ	j	wʲ	nʲ	k	g	kp	gb	ŋw	w
Orthographic representation	p	b	ɓ	f	v	m	t	d	s	z	l	n	c	j	sh	zh	y	Wy	ny	k	g	kp	gb	nw	w

Table 8

They also identified five (5) oral vowels and one (1) nasal vowel. The oral vowels are /a, e, i, o, u/ and the nasal vowel is /ĩ/.Philips and Sheshi (2004) presented five (5) vowels /a, e, i, o, u/ and twenty-six (26) consonants, making a total number of thirty-one (31) phonemes.

Phonetic representation	p	b	ɓ	ɗ	f	v	t	d	s	z	ts	l	ɾ	m	n	tʃ	ʒ	ʃ	dʒ	j	k	g	kp	gb	w	h
Orthographic representation	p	b	ɓ	ɗ	f	v	t	d	s	z	ts	l	ɾ	m	n	ch	zh	Sh	J	y	k	g	kp	gb	w	h

Table 9

Philips and Sheshi (2004) introduced additional forty-nine (49) consonant clusters that must be learnt as a prerequisite for the reading and writing of the language making a total number of eighty(80) letters. Imam (2011) discovered twenty-eight consonant sounds in Gbagyi Nkwa dialect (that is Gbari language). He agreed with Hyman and Magaji (1970) but included three (3) more consonants: /gw, ŋ, dz/. Hyman and Magaji (1970) established the syllable structures of Gbari language as V, C, CNV, CGV and CMYV, where V stands for vowel, C for consonant, N for nasal consonant and G for glide using the Kuta dialect. Gbari, like most African languages, is a tonal language. According to Hyman (1970) there are three basic tones in Gbari language: [̀] low, [̄] mid, and [́] high. He noted other tones such as: [ ] low-mid tone (a tone level lower than the mid tone), [̌] a rising tone and [̂] a falling tone.

These scholars described Gbari based on their linguistic knowledge and available data. The findings are commendable; however, there are sounds and phonemes not represented in the various sound systems presented. Some other decisions on the sound structure are not based on the perceptual reality but on mechanical manipulation. The syllable structure was stated without adequate explanation thereby generalising the consonant cluster phenomenon within the syllable structure. This is rectified in this research using relevant data, perceptual and acoustic parameters.

3. Methodology

The 1700 SIL Comparative African Worldlist (SILCAWL) 2006 English version only was used to elicit data from the respondents. The authors worked with three (2) main respondents, all males of about 30-50 years of age, born in Kwalifrom Kilankwa Ward II, resident in Kwalitown. There were other six (6) respondents, four(4) males and two(2) females, about 60-80 years of age who confirmed the data and supplied forgotten words. Most Gbari women are not disposed to serve as respondents and often would refer one to their husbands. This, in the authors' opinion may be due to less exposure, no education or sheer cultural conservativeness. Kwalidialect, a variant of Gbari language in Kwali, Kwali LGA,Abuja was used for this research. Data was collected through written and digital recording. Descriptive Phonological and acoustic observation and analysis were used to achieve results. Data are presented using the International Phonetic Alphabet symbols.

4. Verifying the Syllable Structure Attested in Gbari

Five basic syllable structures have been attested in the literature (Hyman and Magaji, 1970; Rosendall 1992). These are:

- V syllable structure type
- N syllable structure
- CV syllable structure type
- CNV
- CNGV

These structures at some instances stand to form words on their own but they can also combine to form words in the language.

4.1. The V Syllable Structure

The V syllable structure consists only of a vowel. The only independent V structure is 'a' an inherent plural form of the 3person indefinite pronoun. Other V structures are dependent and function mostly as word initial syllable, plural prefix a- and word final syllable. Examples of V structure at word initial are shown in (8)

Example 8:	**V structures in Gbari words**	**Gloss**
a)	**é**.ré	'sleep'
b)	**è**.ná	'goat'
c)	**é**.jé	'year'
d)	á.jé	'years'
e)	**ā**núk^{W}ódò (núk^{W}ódò, singular)	'friends'
f)	**a** si eti	'They are buying yams'
g)	bù.bù.í	'white'
h)	dá.dà.é	'sweet'
i)	á.mū.ā	'enough'

Table 10

From example (8), it is observed that the plural prefix 'a' is attached to a word without a vowel prefix as seen in (8e) above. And in (8c-d), replaces the vowel prefix of the singular form of the word. Examples (8g-i) demonstrate that the V structure type can occur at the final position of some words in Gbari.

4.2. The CV Syllable Structure Type

This is made up of the onset and the nucleus. The words that are characterized with this structure type are mostly verbs and some nouns. Consider the examples in (9):

Example 9:	CV Structures in Gbari words	Gloss
a)	jé	'suck'
b)	wó	'hear'
c)	mí.tʃí	'blow (nose)'
d)	zà.ʃì	'hatred'
e)	kpa.kpa.dù	'kidney'

Table 11

The examples in (9) demonstrate that the CV structure can occur alone to form a word and more than one of such a structure is possible in the words of the language.

4.3. The N Syllable Structure Type

A syllabic nasal is a nasal that bears a syllable peak. A syllabic nasal functions as a vowel. It has a definite tone attached to it and, therefore, constitutes a syllable nucleus as vowels, giving the structure N. Thus, the V position of the syllable is filled by either a vowel or a syllabic nasal. Examples of N syllable structure are in (10):

Example 10:	N structures in Gbari words	Gloss
a) Ndori	ǹ.dô.rí	'female name'
b) Nkwaa	ŋ̀.kwá.à	'greeting'
c) Nba	m̀.bā	'welcome'

Table 12

4.4. The CGV Syllable Structure

The CGV structure isa consonant-glide-vowel syllable structure. It is originally a CVV structure. Gliding formation process is a language phenomenon that occurs in a vowel sequence where the $V_1$is a high vowel adjacent to the other vowel (Katamba 1989:140). The initial vowel which is a high vowel acquires a consonant feature closest to its phonetic nature, such that the front close unrounded vowel /i/ glides to the palatal approximant /j/ and the close back rounded vowel /u/ glides to velar approximant /w/. While palatalization and labialization outputs may perceptually sound like outputs of glide formation, palatalization and labialization are conditioned by the neighboring high and round vowels. In glide formation, the said high vowels glide and are realized as approximants. A trail of glide formation is seen in the word /kᵑjàrì/ - 'red'(as produced by a Gbari speaker of Dobi dialect), realized as /kᵑjàrì/ in knatse dialect and finally as /kɲàrì/ in the kwali dialect. All dialects within the Gwagwalada local government region of the Federal Capital Territory. These glides when replaced with the supposed glided vowels do not bring about a change in meaning. Let's consider the following examples in (11)

Example 11:	VSeq	Glide Formation	Gloss
a)	fiã̀	fjã̀	'to join
b)	ɓiâké	ɓjâké	'child'
c)	édìá	édj̀á	'blood'
d)	bᵐĩa	bᵐja	'to be beautiful'
e)	ɓuànúbò	ɓwànúbò	'be patient'
f)	èɓuá	èɓwá	'hand'
g)	fuã̀	fwã̀	'become white'

Table 13

It is observed in example (11a-d), the close front vowel [i] strengthened to its closest approximant [j]. Likewise, in 11(f-h), we have the back close rounded vowel [u] assimilating to its closest feature approximant [w].
Again, glides contrast in the language under study as seen in the following examples in (12)

Example 12:		Gloss		Gloss
a)	ɓwa	'get'	ɓa	'to beg'
b)	ɓwa	'to grow'	Mã	'to give birth'
c)	eɓwa	'hand'	Eba	'a place'
d)	kwa	'sticking on something'	Ka	'write'
e)	ekwa	'spear'	Eka	'snail'
f)	epja	'month/moon'	epa	'urine'
g)	bja	'blow fire'	Ba	'read/count'

Table 14

On the other hand, labialization, an additional lip rounding in the production of a consonant sound while palatalization is an additional raising of the front of the tongue on a primary stricture (Yul-Ifode 2008:41) are phonetically conditioned and do not contrast. In the Gbari language, labialization is not considered in the syllabic structure because it is

phonetically inclined, and its environment, predictable and phonetically explainable. They also do not constitute contrasts in the language. Consonants that come before close back rounded vowel /u/ and close-mid back rounded vowel/o/ are often labialized. See examples in (13):

Example 13		
a)	lù.g^{W}ó	'flour'
b)	òk^{W}ú	'mouse'
c)	ò.g^{W}ù	'fight'
d)	nú.k^{W}ó.dò	'friend'

Table 15

Examples (13a– d) show the labialization of the voiced and voiceless velar plosive [k]and [g], respectively, before the back rounded vowels [o] and [u]. This shows that -[g^{w}]. occurs in a predictable phonetic environment in the language. Given this environment, labialization is said to be phonetic in the language and not phonemic. Palatalization, attested in the language, that consonants that come before the close front unrounded vowel /i/and the close-mid front unrounded vowel/e/ tend to be palatalized (Hyman and Magaji,1970, Rosendall 1992) is not consistent in identical environments and have been argued to be more of vowel hiatus, vowel length and phonemic status (Aniagboso et al, 2018).

4.5. The CNV Structure

It has been attested that Plosives are nasally released and fricatives not nasalized in nasal environments (A proposal for the Orthography of the Gbari Language: 2000, Hyman and Magaji, 1970). Examples in (14) attest to this fact.

Example 14		
a)	k^{n}ĩ	'pick, choose'
b)	kág^{n}ã̀	'revive'
c)	náp^{n}ĩ	'slap'
d)	ʃã̀	'imitate'
e)	éʃĩ́	'waist'
f)	dasṹ	'rest'
g)	fĩ̀	'to sweep'

Table 16

The CNV structure is a product of the CVNV structural pattern for the origin of nasalized vowels (Hyman 1972) .The origin of nasalized vowels in Gbari is summarized in the structure - CVNV>CNV>CN∀>C∀ where the first vowel is lost by syncope, then nasalization takes place followed by the loss of the nasal consonant. Following Hyman and Magaji (1970)'s conclusion, our data will have the final syllables represented as CNV where (14a-c) is classified with the structure CN∀ and (14d-g) as C∀.

The CNV structure creates some problem in the general Gbari syllable phonological process and syllable structure. This is discussed in section (5.3-4).

4.6. The CNGV (CMYV) Structure

This structure occurs when a consonant with a nasal release is immediately followed by a vowel sequence with the V_1 as a high vowel. Its occurrence is rare in the language. See examples in (15)

15a) b^{m}ja 'to be beautiful' *contrasting with* b^{m}a 'to break'

This structure is also validated using segmentation under praat.

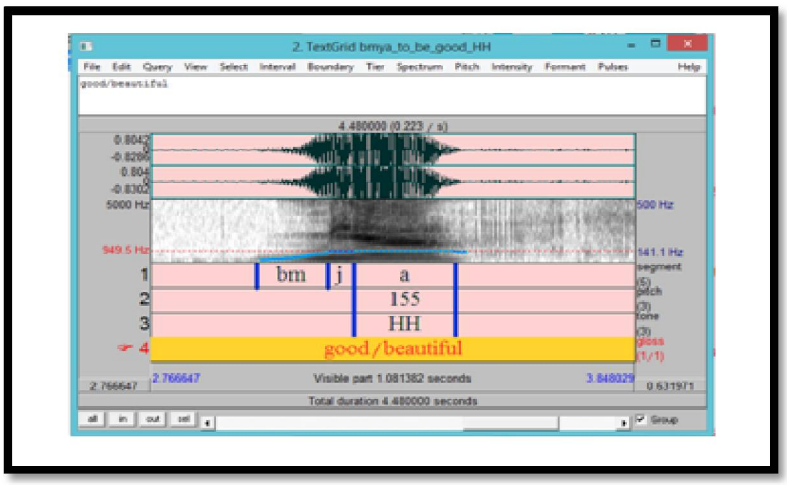


Figure 2: A Spectrogram of the Word 'Bmya'

In figure 2.we see the separate segments and the broad bands in the section for the production of the /j/ sound that characterize approximants in the spectrogram.

5. New Findings

This section will treat the other syllable structures observed in the language by the researchers. It will also discuss the challenges this new findings may give rise to, with reference to the existing CNV syllable structure. The researchers will also proffer solution to the challenges in this section.

5.1. The CVN Syllable Structure

It is important to note that in Gbari, some nasals that follow vowels within the syllable are not syllabic and therefore do not bear tone even though they are homorganic with the consonants that follow them. It is observed in this language that the CC cluster in (16) comprises the nasal (N) and another consonant.

Example 16			
a)	kuNgba	kùm.gbá	'deaf'
b)	zhaNge	ʒàŋ.gé	'betrothed'
c)	paceNkpe	pà.tʃém.kpē	'bath place/ urinary'
d)	zoNkpa	zòm.kpá	'doorway'
e)	zaNgo.ti	zàŋ.gò.tí	'human being'
f)	guNje	gùŋ.dʒé	'mild madness'
g)	baNtna	bàn.tã̀	'high fever'

Table 17

Apart from the pulse perception observed on these syllables, this syllable structure is also carved out based on the fact that there are no NC basic structures in the language where N is blocked from being a tone bearing unit. (see section 4.3). however, the CVN structure is not seen in mono and disyllabic words in the language. The only disyllabic word recorded in the data is /e.jem/ 'never' which is not substantial enough as an evidence. This limitation constrains it to be viewed as a univalent structure of the language.

5.2. The CNV (CCV) Syllable Structure

This is a structure that is a product of a phonological reaction on the nasal release and the sounds in its immediate environment. In the language certain sounds are proven to occur with post nasal feature. The Gbari language is attested to have plosives, implosives realized with nasal release in a nasal environment. (Williamson 1984, Hyman and Magaji 1970, Rosendall 1992). The nasal feature of the consonant and the glide /j/ adjacent to its fuses to a palatal nasal / ɲ/. This is witnessed in the trail mentioned before across some dialects of Gbari as presented in again (17)

Example 17	**Dobi Dialect**	**Knatse Dialect**	**Kwali Dialect**
a)	kⁿiàrì	kⁿjàrì	kⁿɲàrì

Table 18

From the data in (17), we notice a coalescence of the nasal feature with the approximant (or the high vowel/i/) to form a palatal nasal /ɲ/. The word /gɲagɲa/ 'tune to high pitch' records such segments. This phenomenon has taken root in Gbagyi, a sister language to Gbari as attested in the following example (18) :

Example 18	**Gbari**	**Gbagyi**	**Gloss**
a)	gⁿigⁿi	gɲiagɲi	stand
b)	kⁿi	kɲi	choose
c)	fĩba	fɲiba	broom

Table 19

We observe in (18a-b) that coalescence may be said to occur only with velar plosives. 18c on the other hand shows a clear CN segment structure which indicates that the palatal nasal is not an extended form of the nasal release observed in the language. Also, the nasal release homorganic with labial stops is the bilabial nasal /m/ (e.g.bᵐ,pᵐ,gbᵐetc). it is evident in existing sounds possible in languages that there is no such sound that can serve as a comprising ground for the union of /m/ and the approximant /j/. Thus, coalescence may be said to be blocked in labial stops, resulting to words such as bᵐja 'beautiful'. Aniagboso et al (2018) gives a spectrographic idea of the likely closest, the two sounds can co-exist.

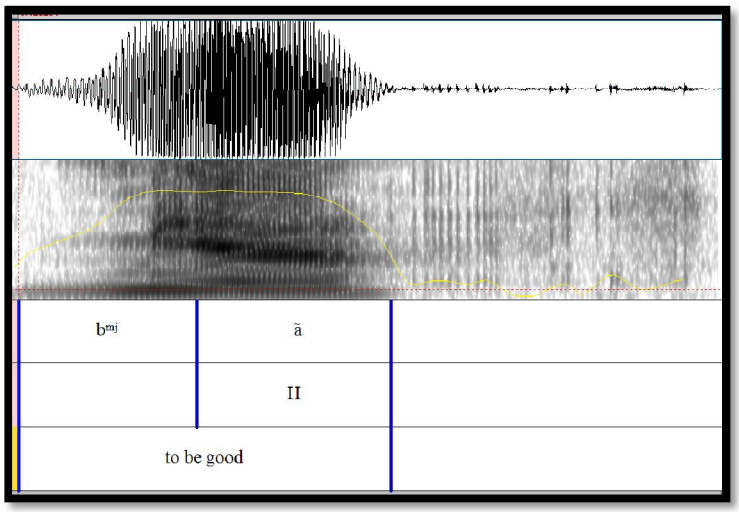


Figure 3: Spectrogram of the Word 'Bmya – to Be Good' Showing
A Colouration of Tongue Raising Feature Indicating Double Secondary Articulation
(Adapted From Aniagboso Et Al, 2018b:214)

This phenomenon is also phonetically motivated and rare in the language. And it is not considered in this paper as a type syllable structure.

5.3. Ambiguity in Hyman and Magaji's CNV Contrast Source

Minimal pairs contrast in one sound while maintaining identical forms in all other positions (Yul-Ifode 2007:26). With this definition, it is of interest to note that the words with CNV structure (C is a consonant with nasal release), may actually contrast with the oral counterparts depending on our views about the phonemes. Examples are shown in (19)

Example 19	**kⁿĩ**	**'pick, choose'**	**kí**	**'sew'**
a)	pⁿĩ	'peel'	pí	'drive' (car)
b)	tⁿĩ	'to rob(on body)'	tí	'small drops
c)	gⁿĩ	'to stand'	gì	'give'
d)	bᵐã̀	'break'	bà	'read/count

Table 20

The examples in (19) have two or more possible interpretations:

- The nasally released consonants (as a complex segment) contrast with their oral counterparts
- The nasalized vowels contrast with their oral counterparts (if we see the nasal release as a phonetic phenomenon).
- They are not minimal pairs (if we consider nasalized vowels and nasally released consonants phonemic in the language)

This ambiguity in the language structure was not straightened out in the existing literature.

5.3.1. Ambiguity in the Syllable Structure

It is obvious from the past and recent findings that the CNV structure has multiple interpretations.

- CNV as a consonant with a nasal release followed by a vowel
- CNV as a consonant followed by a nasalized vowel
- CNV as consonant followed by a palatal nasal

The first one is a product of the conclusion in Hyman and Magaji (1970:3), and the second and third interpretations, deductive conclusions of the researchers. For a precise and accurate representation, we will carefully examine the segmental structure that deserves to be allotted a CNV structure out of these three options. Also, the other structures will also be given appropriate representation using quality analysis.

5.4. Researchers' Argument

It is in the best interest of the research that the second ambiguity will be treated first. This is because it is the weakest CNV syllable representation derived from an orthographic point of view. Sheshi and Philips (2004) exemplified its written form as fricatives, affricates or an approximant followed by a nasalized vowel as in /sã̀/ *sna*'filter'. This structure is attested under praat to be made up of only two segments, a non- obstruent and a nasalized vowel. Perceptually too, it is the same. Again, this structure has contrasts with no complication or ambiguity. Aniagboso et al (2018a:40) as shown in (20)

Example 20				Gloss
a)	sa̰	'filter'	sá	'slice'
b)	sĩ	'drink'	si	'buy'

Table 21

This structure can economically be grouped under the CV structure since it has overt CV segments and show contrasts. Additionally, this structure confirms that nasalized vowels contrast in the language.

The second focus is the first option, a CNV structure made up of a consonant with a nasal release followed by a nasalized vowel. Quite understood is the fact that the said consonants are different in their release and would be detailed and great if well represented. However, this structure, CNV, suggests three segments just like CVN which is misleading. On the other hand, the consonant followed by a palatal nasal, though it is still in the nursery stage is made up of three segments. The spectrogram in Figure 1 shows that a consonant with nasal release makes just one segment as discussed earlier under literature review. However, the counterpart in Figure 4, shows a time slot for the nasally released plosive and the palatal nasal.

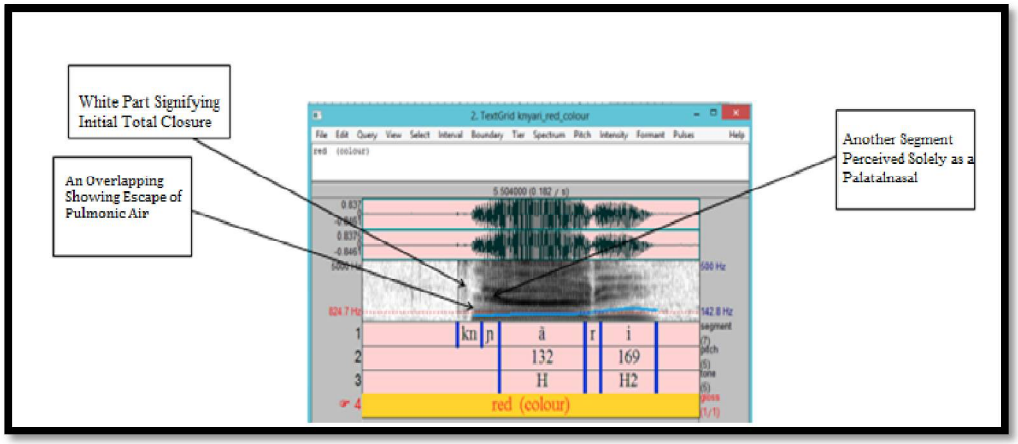


Figure 4: Spectrogram of the Word [Kⁿɲàrì]

Therefore, structurally speaking as descriptive linguists, we say that nasally released consonants do not possess enough structure to usurp the position of a full fledge segment. Williamson (1984) recommended a Cn in the orthography for the nasally released which should not leave the shores of that boundary, interfering with a language's syllables structure.

The nasally released consonants in the first option are complex sounds, oral sounds with superimposed nasal feature. The second option is made up of two single consonants a velar plosive and a palatal nasal. Descriptively, it behooves that the option represented both perceptually and segmental should be considered first in the syllable structure of the language

If we go by these terms and suggestions, we will have the first ambiguity problem solved. The CV structure will house the nasally released consonants classified as phonetic complex structures, and considered as varieties of their phoneme counterparts. Then we can say, the contrast lies with the nasalized vowels.

6. Conclusion

We have successfully gone round the syllable structure of the Gbari language. we observed that all the established syllable structure in the literature are evident in the language owing to the similar structures from our data found in the language. This research also discovered two other syllable structures, one from a natural state of the language and the other a product of a phonological process. The latter creates an ambiguity with an already existing structure in the language. Both however are not considered syllable structure patterns in the language. The nasally released consonants are collapsed under the CV pattern since they are complex sounds. The coalescence, though with two time slots is a product of a phonological process critically limited only to the voiceless velar plosive. It does not feature in the univalent structure of the language or engage any form of contrast, just as seen with the CVN structure. The CNGV is seen as a merge of two patterns – the CNV (now under CV) and the CGV. Therefore, any CNGV automatically adjusts to a CGV structure. Finally, the researchers conclude that Gbari language is said to have V, CV, and CGV syllable structures. The syllable structure is then summarized as:

V

C(G)V

T

Where V = a vowel or a syllabic nasal,
CV =a consonant (with/without secondary features) and a vowel (nasalized and non-nasalized),
CGV = all consonant types realized as a segment followed by a glide and a vowel).
T = placed under tone bearing units
( ) = optional

7. References

i. Abiodun. 2006.Yoruba Phonology. In Ore Yusuf(ed) *Introduction to Linguistics*. Ilorin: University of Ilorin Press.
ii. Aniagboso O. A, R.C. Alerechi and E. Obikudo. 2018a.Gbari orthography: a misrepresentation. *International Journal of Humanities and Social Studies*, Vol.6 Issue 11 pp 37-43.www.theijhss.com
iii. Aniagboso O.A, E.F Obikudo and R.I. Alerechi .2018b. On the status of palatalization in Gbari Language. *Journal of the Linguistic Association of Nigeria*, Vol 21, No 1, pp 202-216. jolan.org.ng.
iv. Blench, R.M.1987.Nupoid. In John Bendor-Samuel(ed.), *the Niger-Congo languages*,305-322 Lanham, Maryland: University Press of America.
v. Cairns E. and Rairmy E.(eds). 2011.Handbook *of the Syllable*. Boston: Brill's Handbook in Linguistics Vol 1
vi. Clements, G. N and S. JKeyser, 1983.CV *phonology: a generative theory of the syllable*. Cambridge, MA: MIT Press
vii. Duanmu S.2011. The CVX theory of syllable structure. In Cairns E. and Rairmy E. (ed) *Handbook of the Syllable*. Boston: Brill's Handbook in Linguistics Vol 1
viii. Eme, C.A.2008. *Parameters of intersegmental co-ordination in speech. Insight from Igbo*.Awka: Amaka Dreams Ltd.
ix. Fudge, E.1987.Branching Structure within the syllable. *Journal of Linguistics* 23:359-377.
x. Hyman, L.M and D.J. Magaji. 1970.Essentials of Gwari grammar. Ibadan: Institute of African Studies.
xi. Hyman, L.M.1972.Nasals and nasalization in Kwa. *Studies in African Linguistics*, Volume3, No. 2, August 1972
xii. Ikhinwe, G.A.2015. Phonology of Usen. Unpublished Ph.D. work, University of Port Harcourt, Rivers State.
xiii. Imam, R.A.2011.Aspects of Gbagyi Phonology: Nkwa Dialect: An Unpublished B.A. Project. Nasarawa State University Keffi
xiv. Je'adayibe, G.D.2003.The intellectual dimension of Gbagyi struggle. *Gbagyi Journal* Vol.1 No 3, pp 1-4
xv. Je'adayibe, G.D.2005.Gbagyi identity crisis. *Gbagyi Journal* Vol.2. No 2 pp 1-27
xvi. Kahn, D.1976.Syllable-based generalisations in English Phonology. PhD Dissertation, MIT
xvii. Katamba, F. 1989. *An Introduction to Phonology*. Essex, England: London Press.
xviii. Lewis, M.P., Garry, F.S., Charlse, D.F. (eds.).2015. Ethnologue: Languages of the world. Eighteenth edition, Dallas, Texas: SIL International. Online: http://www.ethnologue.
xix. Oyebade, F. O. 1998. *A Course in Phonology.* Jebu Ode: Shebiotimo Publications.
xx. …….. 2006.*A Course in Phonology.* (4thed) Ijebu Ode: Shebiotimo.
xxi. Roca, I. and Johnson, W. 1999.*A Course in Phonology*. Malden, M. A: Blackwell.
xxii. Rosendall, Heidi J. 1992. A Phonological Study of Gwarilects. Language data Africa Row.
xxiii. Ugorji, C.U.C.2000.Revising the Igbo syllable structure. Research in African Languages and Linguistics 6(1).61-75
xxiv. Wiliamson, K.1984. Practical orthography in Nigeria.Ibadan: Heinemann Educational Books Plc
xxv. ……..1989.Niger-Congo overview. In John Bendor-Samuel(ed.), the Niger-Congo languages,3-45. Lanham, Maryland: University Press of America.
xxvi. Yul-Ifode, S.2007.A *course in phonology*. Port Harcourt: University of Port Harcourt Press.
xxvii. ……..2008. *Basic phonetics*. Port Harcourt: Uni