LANTAN Scope: Journal of Language Studies
A Publication of the Language Teachers Association of Nigeria

ISSN (P): 3092-9296 ISSN (E): 3156-691X
[Vol-1, Issue-1, October 2026]
Website: www.lantanscope-journal.com.ng

Surface Tone Contrast in Ogbia

Merosobo Lawson-Ikuru [1*]

[1] *Department of Linguistics, Federal University Otuoke, Nigeria*

Copyright @ 2026 LANTAN Scope: Journal of Language Studies
This is an Open-Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (https://creativecommons.org/licenses/by-nc/4.0) which permits unrestricted Non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited

ABSTRACT

This study examines tonal representation at the surface level in the Ogbia language, by observing possible tonal patterns and how they contrast and interact with segments in isolation. This involves the grouping of selected Ogbia words into three word classes. They are the noun, verb and adjective. The data used for this study were elicited from three adult speakers from three dialects of Ogbia, using a wordlist of basic lexical items. Two methods of data analysis are employed in the paper. They are the observational method, were possible tonal combinations were presented beginning with words that are monosyllabic, and the instrumentation done by using a speech software to determine tonal heights in the language. Findings from the analysis show that there are three level tones that contrast at the surface level in Ogbia. They are the high (H) mid (M) and low (L) tones. The high and low tones contrast at word initial, medial and final position, while the mid tone does not contrast at word initial position. The data also show a couple of entries of the falling contour (HL) tone which occurs only in word final position in some verbs. It is more prominent in verb infinitives and some adjectives. The instrumentation process involves getting the averages of the tones in selected words with different tonal combinations to ascertain the heights of contrastive tones in the language. Acoustic results show that the heights of tones can be affected by the position of the tone in a word and as such can aid further analysis of tonal behaviour.

Key words: *Phonology, Surface tone contrast, Ogbia*

1.1 INTRODUCTION

Tone is a linguistic term that is mostly categorized as a phonological property that has the ability to differentiate utterances. Tone can mostly be perceived and the perception is often reliant on pitch and then on fundamental frequency (Yip 2002, Maddieson 2013, Clement and Ford 1979). This means that the proper examination of tone in any language would involve

*Corresponding author email: lawson-ikurumm@fuotuoke.edu.ng

both perception and acoustic analysis. It can either be register or contour, based on the shape of their pitch phonemes, and different groups of tone languages use different notations to represent different tone levels, which are basically high tone, mid tone and low tone. The representations of contour tones are usually the rising and falling notations (Pike 1948, Yip 2002, Hyman 2009). In African languages, tones are marked using diacritics (Hyman 2009) or a set of accent marks. The level tones are represented as; (˝) for high tone, (-̄) for mid tone and (ˋ) for low tone, while the contour tones are represented as (ˆ ˆ) for falling and (˘˘)for rising. Tone in Asian languages like Chinese, are represented numerically, beginning with 1 as the lowest tone and 5 as the highest. The Americas also represent tone numerically but in a reverse order which makes it different from Chinese.

In the literature, most tonal descriptions are done using data from African languages. This is in agreement with Yip's (2002) claim that, theoretical phonologists have devoted more attention to African tone languages than to East Asia languages. A possible reason according to her could be that phonologists thrive on alternations which is abundant in African languages, but the morphological characteristic of East Asian languages make alternation relatively rare. As true as this observation is, it is also true that there are African languages that have a rich tonal system and are yet to be described. This is the situation with the Ogbia language whose rich tone system is not fully described. The scarce linguistic literature on Ogbia shows that, there is no comprehensive analysis of tone alongside other linguistic description. However, Isukul (2009) mentions that Agholo (a variety of Ogbia) has three level tones, a contour and a downstep, but her information on tone was rather limited to Agholo. She made the observation in her work on the grammar of Agholo. The focus of the present study is to establish what the phonetic tonal representation is in Ogbia. It seeks to describe tone contrasts on the surface when they occur in words in isolation as this is observed in the data collected. It extends to examining the positions of tone occurrence in order to identify restricted environments as well as determining tonal heights of level tone using acoustic methods.

2. A BRIEF DESCRIPTION OF THE OGBIA LANGUAGE AND ITS SPEAKERS

The Ogbia language is a southern Nigeria language spoken among the Ogbia people in the Ogbia Local Government Area and some boundary communities in Nembe Local Government Area. In these boundary communities, residents switch between Ogbia and Nembe effortlessly and both languages exist fully making speakers natural bilinguals. The National Bureau of Statistics records that the population of the Ogbia people is about 350,000 based on the 2006 National Census result. The assumption would have been that everyone speaks the language but Lawson-Ikuru and Icheku (2021) observe that transmission to the younger generation is abysmal and there is minimal linguistic information on the language, placing it as endangered. From a linguistic point of view, the Ogbia is closely classified under a small group of languages known as the Central Delta languages, a decent of the Delta Cross languages. The Ogbia language has dialects which are mutually intelligible to some degree. Lawson-Ikuru, (2014) identifies six varieties of the language. They are Agholo, Amorokeni, Anyama, Otakeme, Otuelei and Otuokpoti.

3. METHOD OF STUDY

This study adopts both descriptive and experimental methods of analysis as the data collected are examined through observation and instrumentation. The data collected are words in isolation which were elicited from a wordlist of basic lexical items. The wordlist was given to 3 educated adult speakers of Ogbia who pronounced the words in isolation and these words were recorded by the researcher. The recording was done using a Sony ICD SX712 recorder. The speakers were two male (62 and 26 years old) and one female (57 years old). The woman and the older man have secondary education while the younger male has a university degree. These participants were carefully chosen from three dialects of Ogbia. The Otuelei, Agholo and Anyama dialects.The descriptive analysis of the data is done by using the observatory method for basic linguistic description while the acoustic experimental analysis for determining tone height was carried out with the use of the speech software PRAAT.

This study is basically hinged on the Autosegmental Theory. As a phonological theory originally formulated to handle the phenomenon of tone, its approach contrasts with segmental theories of phonology. It sees phonology as comprising tiers that are related to each other by an association line which shows how they are co-articulated. The theory places tone as an autonomous segment and not part of a segment. Autosegmental has become a classic theory mostly employed in the analysis of tone in most languages. A major proponent of this theory is Goldsmith (1976) who refers to autosegmental theory as a theory that examines the geometry of phonetic representation, thereby suggesting that phonetic representation is composed of a set of several simultaneous sequences of segments with certain elementary constraints on how various levels of sequences can be interrelated or associated. The employment of this framework is considered plausible as it can account for basis tone analysis which must address the autonomy of the prosodic feature begin before making further establishments. Every analysis in this study takes into cognizance the autonomy of tone and its meaning status in the language under investigation.

5. LITERATURE REVIEW

The concept of surface tone is not as rich as other tonal analysis in the tone literature yet it is necessary that surface tones are observed in a tone language as a means to analysing underlying forms. When level or contour tones are established in a tone language, it is important to observe how they contrast in the surface, by this it simply means that we are looking at the possible occurrence of these tones in different positions of an expression without necessarily explaining why they occur. Pike (1948) in his classic text *Tone Languages*, sees every contrast in tone to be observed at the surface level, therefore it is pertinent that tone is examined at the surface level as a first step to analysing the tonal system of a tone language.

Two tonologists that have examined the concept of surface tones are Hyman (2014) and Snider (2014). Hyman (2014) claims that there are three basic stages that one must take up in studying a tone language from the scratch. And that each stage feeds into the other. These

stages according to him are: determining surface contrasts, discovering alternations and interpreting the results from the first two stages. Snider on the other hand states that determining surface tonal contrasts will involve comparing words in isolation. He also makes a comparison of tonal contrast to that of segmental contrast as being the same because they follow similar principles and that in realizing surface contrasts, all factors considered must be the same. Generally, these factors are mainly divided into phonological and grammatical elements.

In agreement with Hyman, this paper observes the surface tonal contrasts of words in isolation as a first task to studying the tonal system of Ogbia. This is done by observing the occurrence of tone on nouns, verbs and adjectives in isolation and how the tones interact with segments as well as following Sniders view of considering both phonological and grammatical factors.

6. THE TONE- BEARING UNIT (TBU)

The tone bearing unit is usually the segment that carries the tone. Sometimes the tone bearing unit is either a vowel, syllabic nasal or a syllabic consonant. One of the fundamental problems in understanding tone according to Odden (1995), is determining what the tone bearing unit (TBU) is. Scholars like Clement and Ford (1979) as well as Yip (2002) have given different views on what the TBU should be. According to Clements and Ford (1979:181), 'there has been some ambiguity in previous uses of the term tone-bearing unit. It is maintained here that tones are not directly associated with vowels or other segments, but rather with higher level units (tone-bearing units) such as the syllable or syllable-final rhyme in which vowels typically function as peaks of prominence'. There is also the argument of the syllable or the mora being the TBU. Most of the differences given by authors are not clear cut and Yip (2002) emphatically states that only two prosodic units can serve as tone-bearing unit in a tone language. These are the mora or syllable.

Akinlabi (2012) refers to two criteria given by Yip (2002) to determine the TBU of a tone language.

a. The mora is the TBU in a language if:

   1. The language has syllabic nasals which bear tone, and onset nasals which do not, OR

   2. The language has both mono-moraic and heavy bi-moraic syllables, and if these differ in the number of tones they can bear, so that mono-moraic syllables can have only one tone and bimoraic syllables can have two.

b. The syllable is the TBU of a tone language if:

   1. The language has a syllabic nasal which bears tone and an onset which does not OR

2. The language has both light monomoraic and heavy bimoraic syllables, and if the two different syllables can bear the same number of tones.

Ogbia does not have syllabic nasals, hence nasal segments do not bear tone. There are heavy and light syllables in Ogbia but there are no distinctions as to the number of tones the different syllables bear. The structure in Ogbia tends to favour the second criteria more, therefore we take the syllable to be the tone bearing unit in Ogbia and this is always on the vowel segment. This also supports Hyman's (1985) claim that if a segment is projected as the TBU then it should be the syllable. For example;

1.



a. t ɔ́ 'measure' ɛ̀ s ɔ́ 'road' ə̀ l í k è 'leg'



b. ɔ̀ ɗ ɔ́ m 'paddle' (n) s ù á 'hate' (imp.)

7. SURFACE TONE PATTERNS

Determining surface tone contrasts in a tone language, makes it easier to establishing underlying forms. At the most basic phonetic level, Ogbia exhibits four surface tones. They are the low, mid and high tones as level tones and the falling tone as a contour tone. The rising contour tone does not occur in the lexical representation of tones in Ogbia. It is more of a grammatical tone and rarely occurs. The occurrence of the surface tones in this study is observed and discussed as they are presented as lexical items in isolation. This is because surface tone patterns are easily observed when words are grouped and controlled and are presented in isolation and later shown in other environments. At the surface lexical representation, different possible tone contrasts are evident in Ogbia, taking into consideration the number and type of syllables of stems. The essence of observing surface tonal patterns is to know all possible combinations of tones in the language and also to make generalisations concerning their surface contrast.

7.1 Nouns

The nouns presented here are elicited following an alphabetical ordering of the words in isolation with their plural forms. The plural forms of the nouns are considered in the elicitation as a means to enable us have a clear observation of tone patterns and to be able to carry out a structured analysis. Nouns in most languages are usually easy to elicit in isolation, hence the reason for beginning with them. Nouns in Ogbia begin with a vowel prefix which may alternate to form their plural. There are no monosyllabic nouns in Ogbia, thus a basic syllable pattern of a noun in Ogbia would be a V-CV syllable type. Below is a presentation of Ogbia nouns in isolation showing the different surface tones and how they contrast.

2. L L

i.	èwɛ̀l	'bears'	àkpà	'bag'
ii	ɔβà	'arm'	èkà	'horn'
iii	èɣò	'pond'	ìrè	'tobacco'

3. L H

i	ɔ̀gbɔ́	'net'	èwá	'alligator'
ii	òwór	'tsetse fly'	èmú	'head'
iii	ògíβ	'nerve'	èkpá	'mortar'

4. H L

i.	ɔ́bà	'story'	édù	'thigh'
ii.	ɔ́fɪ̀lɔ́	'soup'	ɛ́gà	'bride price'
iii.	íbə̀	'ladder'	énə̀	'fish'

5. H M

i.	ɔ́ga	'cane'	ípo	'mask'
ii.	ɛ́gɪ	'journey'	óβə	'breath'

6. L M

i.	ɔ̀gɔm	'bunch'	ɔ̀ɗɔm	'paddle'
ii.	ɔ̀ɣɔl	'palm wine tree'	èdʊm	'pestle'

7. L HL

i.	ìsîm	'semen'

8. L HL H

i. əɣôbə́ 'co-wife'

9. L L L

i. àɓàɓà 'calabash' ògìdì 'matchete'

ii. ɛ̀gàrà 'pepper' ìgbògì 'money'

iii. ìgbògì 'money' àbàdì 'sea'

10. L H H

i. ətúrú 'nail' òpóló 'hole'

ii. ɛ̀gbásí 'rib' àtʊ́kpáβ 'hook'

iii. əkígbó 'bonga fish' àmámám 'breast'

11. L H L

i. èkúnè 'mat' àwɔ́gɔ̀ in law

ii. ɛ̀zɛ́rɛ̀m 'foot' ɛ̀tátàl 'bin'

iii. ɔ̀βíβì 'broom' èɗűrùm 'knee'

12. H H H

i. íkpútú ‘stone’ ékírí ‘leprosy’

ii. ólógó 'law' íkpókí 'buttocks'

13. H L H

i. óləní 'vomit' ɔ́fìlɔ́ 'soup'

ii. íɓəkú 'box' əjìbó 'praying mantis'

iii. égùgúm ' mountain' ógògó 'sun'

14. H H M

i. əwúɗum 'life'

15. L H M

i. àɣínɪ 'vision'

16. L M M

i. èɡbasa 'rib'

The nouns in the data above are a proof of surface tone contrast in Ogbia as they occur in different word positions. These nouns are bisyllabic and trisyllabic but that is not to say that there are no larger tonal combinations in the data but for the purpose of this work, we consider them sufficient for observing surface contrast. From the data, we observe that the H and L tone contrast at all word positions. They are seen to be the most active surface tones in the data as they occur on the noun prefix as well as the stem whereas the M tone shows contrast at the medial and final positions. The M tone is restricted in its occurrence in that it is not found at initial positions, even though the occurrence of the M tone is limited in the data. The falling contour tone is seen to occur twice in the data and this is seen in the word medial position. The falling tone in nouns are not seen in word final position. Hence the M tone and the HL tones are constrained in their occurrence in nouns. The data also show that the L M pattern occurs on only closed syllables with the voiced bilabial nasal and the lateral approximant being the last segments after a back vowel in the coda. The bilabial nasal is seen to also occupy the final position in the H H M pattern which has just one entry.

Some phonological observations in the noun data are concerned with the occurrence of tone and permissible segments. The L and H tone are said to be the active tones in the language (Lawson-Ikuru 2021) however there are restrictions of tonal occurrence on some segments at the surface level. For example, the L tone can occur with almost all the vowels in the language with exception of the back rounded vowel /ʊ/ at word final position. Although the back rounded vowels /u/ and /ʊ/ do not occur at initial positions in Ogbia. At word initial position of nouns, the high front vowel /ɪ/ does not receive the L tone. The H tone on the other hand is restricted from occurring with the vowels /ʊ, e, ɛ/ at final positions and at initial positions it does not occur on / ɪ, a, u, ʊ/ vowels. This observation goes to show that there are segmental influences in the occurrence of tones in tone languages. However, we shall see the data for verbs for more observations. It is important to state that there about 15 possible tonal combinations for nouns at the surface level with three dominant syllable types which are V-CV, V-CVC and V-CVCV. There are no bisyllabic nouns in Ogbia.

7.2. Verbs

The only group of words with a CV pattern in Ogbia are the verbs and these monosyllabic verbs are some of the imperative verbs. Below is the data for verbs showing their surface tonal contrast as they occur in different word positions.

17. H

i. tɔ́ 'measure' wə́ ‘call’ ‘invite’

ii. ɣá ‘yawn’ ŋɛ́ ‘give’

iii.	gbá	‘tell’ ‘invite’	wé	‘fight’
iv.	sá	‘carry’ ‘lift’	βó	‘look’
v.	ɲá	‘pull’	rɔ́	‘stay’

18. H L

i.	ínè	‘to bear'	élɔ̀	‘to smile’
ii.	ólò	‘to cry’	ɔ́ɣɔ̀n	‘to snore’
iii.	ɔ́ɣɔ̀n	‘to snore’	eli	'to fall'
iv.	óβɔ̀	‘to breathe’	ɔ́ɣɔ̀n	‘to snore’
v.	élè	'to lay(eggs)'	ɔ́ɓò	‘to skin (v)’

19. L H

i.	wòlé	'sell'	ɣòné	'hear'
ii.	gɔ̀lɛ́	'curse'	sòré	'descend'
iii.	ɓòβé	'bite'	ɣɛ̀nɛ́	'crack'
iv.	làlɛ́	'crow'	gbàlɛ́	'feed'
v.	gìé	'dig'	gìɛ́	'go'

20. L L H

i.	sàràgɛ́	'spread'	wàlàmá	'think'
ii.	kòkòɗɛ̌	'assemble'	jɔ̀mànɛ́	'burn'
iii.	βòròwé	'chase'	ɗùmòmé	'believe'
iv.	ɗîkɔ̀nɛ́	'reoncile'	zùwɔ̀nɛ́	'visit'
v.	kpògòmé	'repair'	sèrèjé	'drop'

21. L HL

i.	àkâ	'to carve'	àβâ	'to paddle'
ii.	àɗâ	'to dance'	ɔ̀lô	'to build'
iii.	ɔ̀sî	'to say'	ɔ̀βô	'to look'
iv.	ɔ̀βô	'to look'	ɔ̀ɗɛ̂	'to eat

22. L H L

i.	àgɔ́là	'to forbid'	àgbínì	'to send'
ii.	àkʊ́nɔ̀	'to be sad'	àkásì	'to cook'
iii.	ədʊ̋mè	'to allow'	əwémə̀	'to wink'
iv.	əβúlə̀n	'to quarrel'	əwúrà	'to bathe'

23. H L L

i.	ɔ́ɓɔ̀kɔ̀	'to deceive'	ɔ́βɔ̀lì	'to pierce'
ii.	ɔ́kɔ̀zɔ̀n	'to slaughter'	íkùlə̀	'to knock down'
iii.	ítèkə̀n	'to divorce'	ɔ́ɓìlɔ̀	'to paint'
iv.	ɛ́sìrì	'to spit'	ɛ́fɛ̀gì	'to wave'
v.	ékpèrè	'to be startled'	ékèkə̀	'to stutter'

Verbs in Ogbia exhibit 7 possible tonal combinations. These are a combination of H, L and HL tones, without the M tone which is not seen in the data for verbs in isolation. There are some differences in the behaviour of tones in the verbs from what we observed in the nouns presented above. Firstly, we have monosyllabic verbs and they are the imperative verbs with all of them receiving the H tone. There are other imperatives that are bisyllabic and trisyllabic in Ogbia. The verbs basically receive the L H and L L H tonal combinations and it is interesting to note that all imperative verbs no matter the syllable type end with a H tone. The seven tonal patterns for verbs are H, H L, L H, L L H, L HL, L H L and H L L. The H tone of the monosyllabic imperative verb does not occur on the high vowels / i, ɪ, u ʊ/ and this also occurs with the bisyllabic and trisyllabic at word final position. In fact, the bisyllabic and trisyllabic H tone in final position occurs only on the unrounded vowel /e/ and its counterpart /ɛ/. There is a high level of restriction of co- occurrence here. What is however not clear is why are the [+ high] vowels restricted from occurring with an H tone. This could have a clearer explanation if the data is used for an underlying analysis.

The segments in the infinitive verbs are more accommodating because both H and L seem to have a flexible attitude in the data. For example, the H in the H L pattern occurs on most of the verbs including the high vowel /i/ but then this is just one entry for the H L and two entries for the H L L tonal pattern, while the other high vowels are not occurring. The initial L tone occurs on all vowels with exception of /u/ and /ʊ/ and this also applies to the final tone. The falling contour tone has more entries in the verb data and it occurs consistently on the final segment in the infinitives. These contour tones have the capability of moving to final positions when they occur in larger constructions in underlying representations but our focus

here is on the surface representation hence the data are analysed based on the surface occurrence of tone on words in isolation.

7.3. Adjectives

Available data show that there are not many adjectives in Ogbia hence the listing of a single entry of adjectives in the data below. The examples given below are both real adjectives and verbal adjectives. The verbal adjectives are those with the infinitive prefix and they can function as adjectives in expressions in the language. The attested patterns for these adjectives are L L, H L, L HL, L H L and L H L. The contour tone in the data for adjectives only occur in closed syllables with exception of ə̀zû ' to be hot'. The data for adjectives is small when compared to that of nouns and verbs in this work but 9 out of the 10 phonemic vowels in Ogbia receive a L, H or HL tone as is seen the data below. The data also show that adjectives in Ogbia have more of closed syllables than open syllables and no M tone is found in the surface tonal representation of adjectives. This sort of differentiates the adjectives from the nouns and verbs in the discussion of surface tonal contrast.

24. L L

i. òmòm 'new' ègbèj 'far'

ii. əbò 'to be big'

25. H L

i. ímòr ‘be hot (pepper)’ ɔ́mɔ̀r ‘be heavy’

ii. ízò ‘to be full’ éɓò ‘to be cold’

26. L HL

i. òɓêβ 'good' òkûβ 'young'

ii. əkpə̂n 'thick' ə̀zû ‘be hot’

iii. àkpâr ‘be strong’ ə̀rôβ ‘be sweet’

iv. ə̀rôβ ‘be sweet’

27. L L H

i. òzùzú 'hot' ɔ̀zòzó 'black'

ii. àɓɔ́rɔ̀m 'to be wet' ɔ̀ɓàɓál 'white'

iii. ɔ̀ɓàɓám 'red' òwèwéj 'tall/long'

28. L H L

i. əwúrù 'to dry up' əsélə 'to be straight'

8. ACOUSTIC REPRESENTATION OF TONAL HEIGHTS

At the acoustic level, we begin by determining what pitch level passes for the level tones. The level tones in this study have been established to be H, M and L with H and L being the dominant surface tones. But that is not to say all Hs or Ls have exactly the same pitch level when they occur in isolation. In order to have an idea of what range of pitch level constitutes a H or L, we took a few examples of nouns and verbs in isolation and calculated their average.

8.1. Tonal Height for Nouns

The tonal patterns identified below for nouns are described acoustically showing the heights of the tones as well as calculating the averages of what a basic tone level would be in different word positions. We take (5) examples from each of the syllable types and the word that has the average or close to average of the selected words is used for the illustration with its pitch track.

Table 1: **L-L tonal patterns of nouns**

Word	L-1	L-2	
ɔ̀nɔ̀	153.1Hz	140.3 Hz	'mouth'
ɛ̀gbà	179.6 Hz	168.1 Hz	'dance'(n)
ɔ̀gɔ̀m	158.9 Hz	139.5 Hz	'toad'
àtì	158.3 Hz	149.6 Hz	'faeces'
èzò	175.5 Hz	149.7 Hz	'antelope'
Average	165.8 Hz	149.4 Hz	

The noun with the closest height range to the average here is ɔ̀gʊm whose tonal heights are 158.9 Hz and 139.5 Hz respectively. and below is a pitch track. All nouns that are close to the average in the different bisyllabic tone patterns are presented in the form of pitch tracks to show what the average height of a level tone will be in such combinations.

Figure 1 : **Pitch track for ɔ̀gɔ̀m 'toad'**

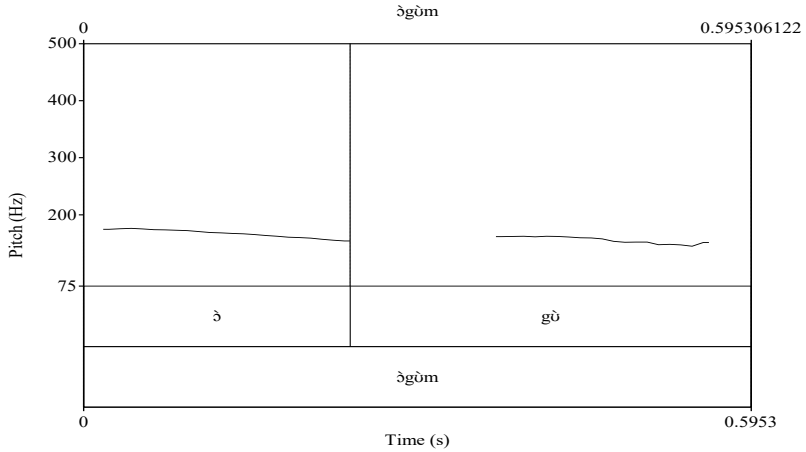


Table 2: **L-H tonal pattern of nouns**

Word	L	H	
ɛ̀wá	158.7 Hz	197.8 Hz	'iguana'
ɔ̀ɓú	169.9 Hz	223.1 Hz	'body'
ɛ̀gú	171.0 Hz	192.8 Hz	'door'
ɛ̀mú	168.7 Hz	202.7 Hz	'head'
ɔ̀ɣól	151 Hz	191 Hz	alcoholic plant
Average	163.9 Hz	201.5 Hz	

The L-H tonal combination of nouns in table 2 reveals that the noun ɛ̀mú 'head' has the closest F0 to the average.

Figure 2: Pitch Track showing ɛ̀mú 'head'

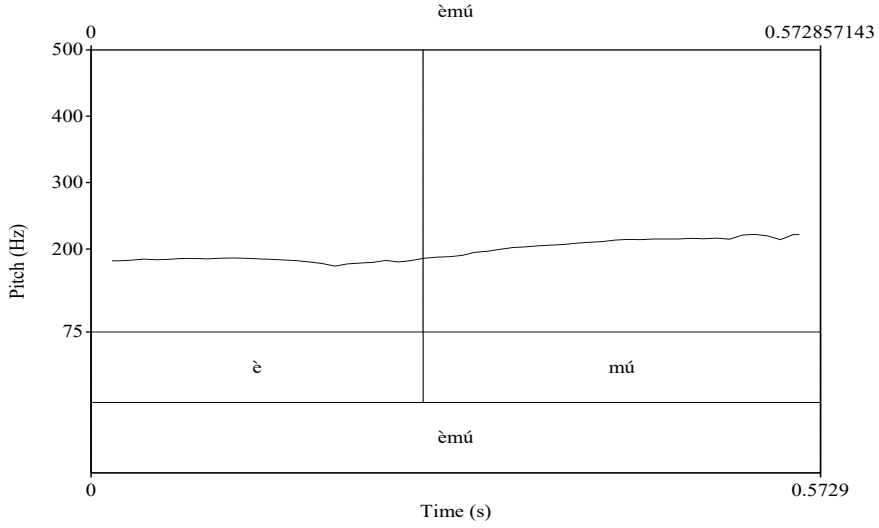


Table 3: **H-M Tonal pattern of nouns**

Word	H	M	
óβə	193Hz	180.3 Hz	'breath'
ɔ́ɓɔ	205Hz	203 Hz	'turtle'
óvi	213.9Hz	206.2 Hz	'cow'
ípo	216.4 Hz	214.2 Hz	'masquerade'
ɛ́gɪ	230.4 Hz	224.1 Hz	'journey'
Average	211.74 Hz	205.56 Hz	

Table 3 has ɔ́ɓɔ 'turtle' as the noun with a tonal combination that approximates to the F0 of the average.

Figure 3: **Pitch track for ɔ́ɓɔ 'turtle'**

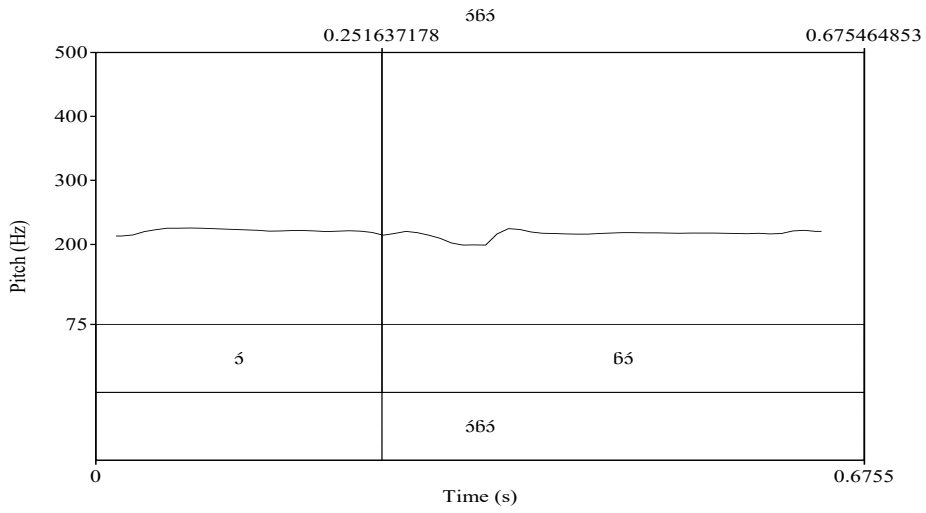


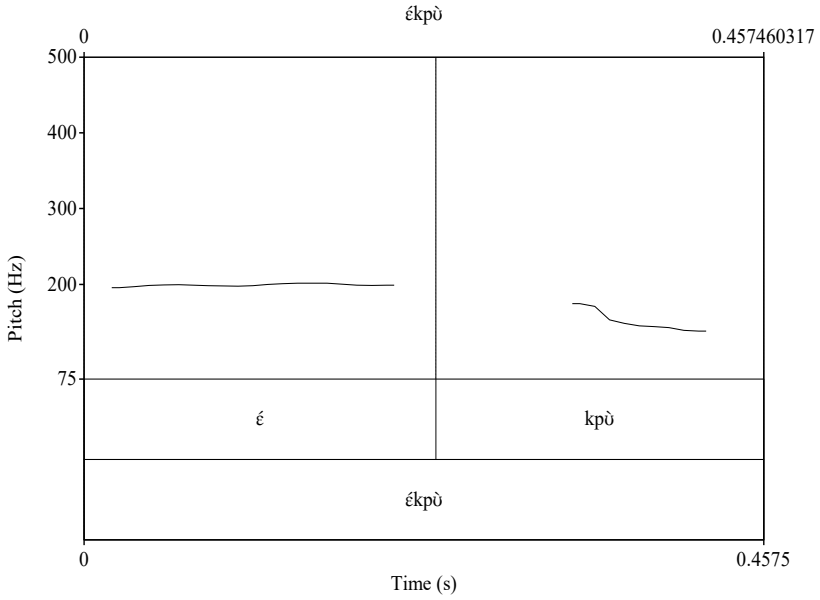
Table 4: **H-L tonal pattern**

Word	H	L	
ófò	248.6 Hz	151.7 Hz	'boa'
ɛ́gà	213.4 Hz	130.8 Hz	'price'
ásò	213.6 Hz	142.8 Hz	'horse'
érì	238.4 Hz	151.6 Hz	'thread'

ékpὸ	215.5 Hz	123.8 Hz	'hump'
Average	225.9 Hz	140.14 Hz	

The noun 'hump' which is the last word on table 4 has the closest F0 to the average and this is shown in the pitch track below

Figure 4: Pitch track showing ékpὸ 'hump'



8.2 Tonal Heights for Verbs

The verbs in Ogbia have monosyllabic verbs with a single tone and two tonal patterns for the bisyllabic words. Below is the measurements for what the average height of an H and L tone in verbs would be in a monosyllabic or bisyllabic tonal combination. The verb with the closest tonal height to the average of the selected verbs is presented in a pitch track.

Table 5. L-H Tonal pattern of verbs

Word	L	H	
wὸlé	89.39Hz	233.4 Hz	'sell'
ɓὸβé	170.5 Hz	212.3 Hz	'bite'
làlɛ́	179.9 Hz	211.3 Hz	'crow'
gbàlɛ́	161.2 Hz	212.3 Hz	'feed'

gìé	194.1	219.3Hz	‘go’
Average	159.0 Hz	217.72 Hz	

Figure 5: **Pitch track for gbàlɛ́ 'feed'**

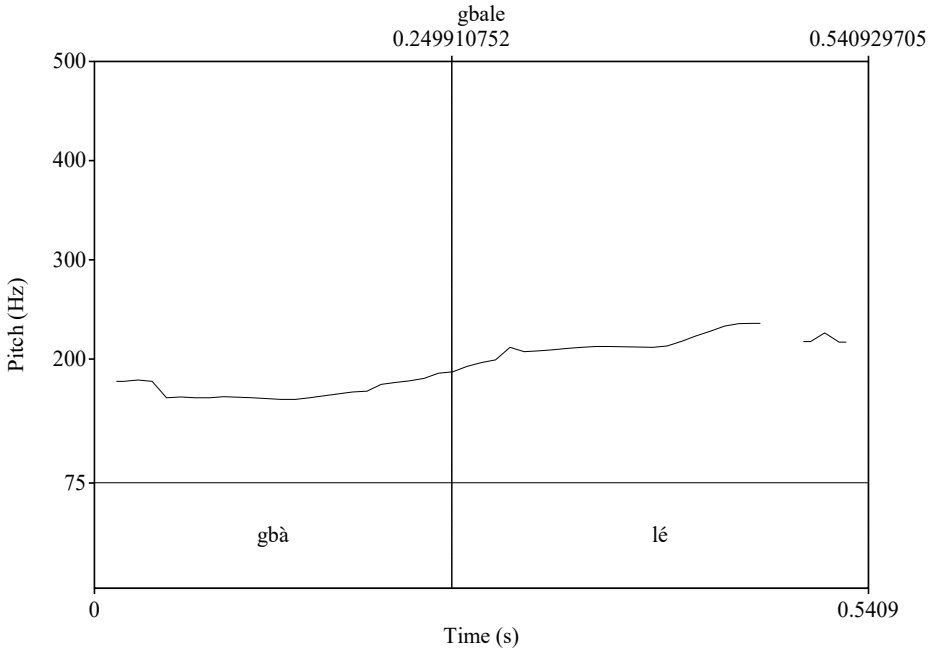


Table 6: **H-L tonal pattern**

Word	H	L	
ínè	253.6 Hz	169.8 Hz	‘to endure’
ɛ́lɔ̀	245.1 Hz	154.0 Hz	‘to laugh’
óβə̀	264.4 Hz	162.0 Hz	‘to breathe’
élì	243.9 Hz	143.7 Hz	‘to fall’
ɔ́nɔ̀n	244.9 Hz	175.9 Hz	‘to cough’
Average	250.38 Hz	161.08 Hz	

Figure 6: **Pitch track for ínè 'to endure'**

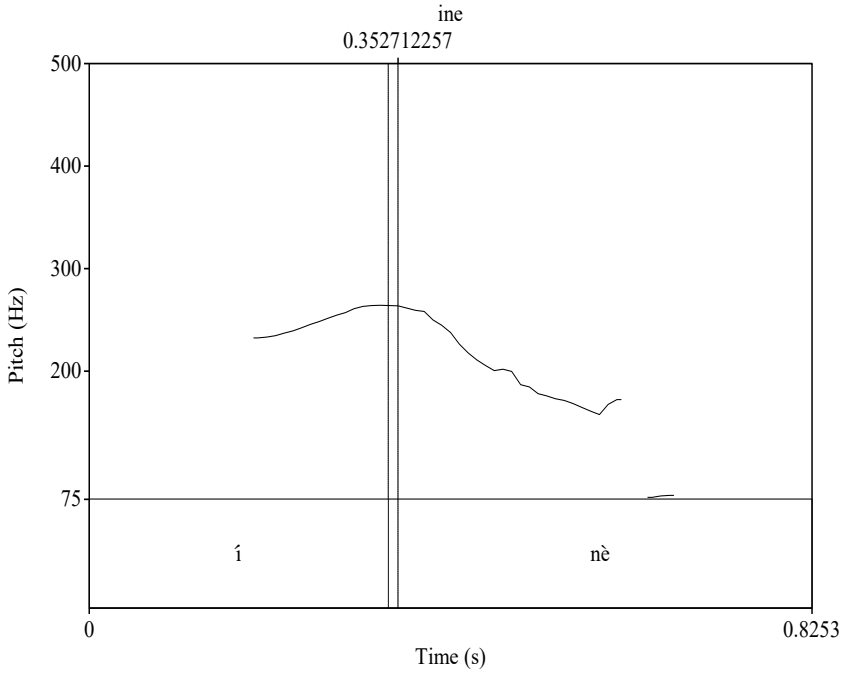
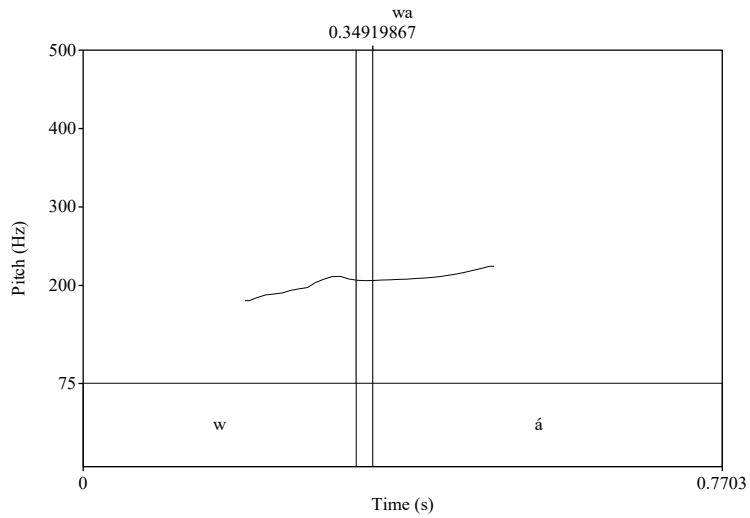


Table 7. H tonal pattern for verbs

Word	H	
wá	209.2 Hz	'call'
ŋɛ́	210.5 Hz	'give'
wé	210.6 Hz	fight'
βó	213.6 Hz	'look'
lo	198.2 Hz	'build'
Average	208.42 Hz	

Figure 7: Pitch track for wá



A significant observation in the tables above is that, H tones and M tones have an almost equal *f0* when they are combined. This could mean that some M tones could be downstepped H tones underlyingly. High tones have also shown to be higher in initial position when they are combined with L tones than when they are at final positions. Low tones in initial positions tend to have a close range of F0 in both nouns and verb but a higher F0 in final position for verbs than for final position in nouns.

9. CONCLUSION

This study has established that tones in Ogbia contrast in their raw form without necessarily showing how they behave in their underlying forms. However, the contrast is examined in words in isolation and it shows that the L and H level tones are the most active as they contrast in different positions, while the M tone is restricted in its position of occurrence. It is not as active as the L and H tones. The study also attempts to determine the height of level tones in the different positions that they occur. The observation is that the highest level of the H tone is around 264Hz and it is usually higher at word initial position. The L tone on the other hand rises to about 178Hz and the M tone gets to about 224Hz. It is important to state that the heights of these tones are also influenced by the features of the segments that bear them. Although this is not explicitly expressed in the discussion of the data, a larger collection of data in the language shows that tones on velar sounds usually have higher F0 than other sounds.

REFERENCES

Akinlabi, A. (2012). *Yoruba: A phonological grammar*. The W. E. B. Du Bois Institute for African Research, Harvard University.

Clements, G. N., & Ford, K. C. (1979). Kikuyu tone shift and its synchronic consequences. *Linguistic Inquiry, 10*, 179–210.

Goldsmith, J. A. (1976). *Autosegmental phonology* [Doctoral dissertation, Massachusetts Institute of Technology].

Hyman, L. M. (1985). Word domains and downstep in Bamileke-Dschang. *Phonology Yearbook, 2*, 85–138.

Hyman, L. M. (2009). The representation of tone. In M. van Oostendorp, C. J. Ewen, E. Hume, & K. Rice (Eds.), *The Blackwell companion to phonology* (pp. 108–132). Wiley-Blackwell.

Hyman, L. M. (2014). Tone: Is it different? In J. A. Goldsmith, J. Riggle, & A. L. C. Yu (Eds.), *The handbook of phonological theory* (2nd ed., pp. 197–239). Wiley-Blackwell.

Isukul, C. (2009). *A grammar of Agholo* [Doctoral dissertation, University of Port Harcourt].

Lawson-Ikuru, M. (2014). *A phonology of Ogbia* [Master's thesis, University of Port Harcourt].

Lawson-Ikuru, M. (2021). *A study of tone in Ogbia* [Doctoral dissertation, University of Uyo].

Lawson-Ikuru, M., & Icheku, C. (2022). The impact of Nigerian Pidgin on indigenous languages: A case of language shift in Ogbia and Isekiri. *Nigerian Languages' Studies, 6*, 78–88.

Maddieson, I. (2013). Tone. In M. S. Dryer & M. Haspelmath (Eds.), *The world atlas of language structures online*. Max Planck Institute for Evolutionary Anthropology.

Odden, D. (1995). Tone: African languages. In J. A. Goldsmith (Ed.), *The handbook of phonological theory* (pp. 198–224). Blackwell.

Pike, K. L. (1948). *Tone languages: A technique for determining the number and type of pitch contrasts in a language, with studies in tonemic substitution and fusion*. University of Michigan Press.

Snider, K. (2014). On establishing tonal contrast. *Language Documentation & Conservation, 8*, 707–737.

Yip, M. (2002). *Tone*. Cambridge University Press.