

REVITALIZATION OF AFRICAN LANGUAGES



**A Festschrift in Honour of
OZO MEKURI NDIMELE**

Oye Taiwo, Funmi Ogunkeye and Harrison Adeniyi

A Preliminary Study of Leggbó Phonetics and Phonology

Imelda Udoh

Abstract

The Leggbó language has a very interesting prosodic phenomenon which we refer to as *fortition*. It contrasts with *lenition* to provide both lexical and grammatical functions in the language. This paper presents a preliminary instrumental study of some aspects of Leggbó phonetics and phonology, particularly with regard to the effect of these prosodies on vowel length and space as well as some evidence to support the geminate status of the fortis consonant in the language using intra-oral air pressure measurements. The results reveal that the prosodies have effect on the vowels in terms of length and position in the vowel space, with further evidence drawn from the Voice Onset Time (VOT) averages across vowel contexts. Whereas the fortis consonants are longer and have double peaks, the lenis consonants are shorter and have single peaks. On the other hand, the fortis vowels are shorter, while their lenis counterparts are longer.

Keywords: Leggbo language, fortition, lenition, Voice Onset Time (VOT)

Introduction

The Leggbó language, an Upper Cross language of the Benue-Congo family is spoken by the Aggbó people of the Cross River State. They number about 60,000 people living in the south-eastern axis of Nigeria. The language is made up of six varieties: Letatama, spoken in Adadama; Lebamma, spoken in Itigidi; Lekuleku, spoken in Ekureku; Lemmabana, spoken in Immabana; Leyigha, spoken in Assigha; and Lenyima, spoken in Inyima. The Letatama variety, spoken in Adadama is the most described, and it is the variety described here.

Very little work has been done on the language. Apart from classifications such as Faraclas (1989), Crozier/Blench (1992) and Grimes (2000), there are just a few other works on the language. Spreda/Spreda (1966) is a phonological sketch of the language. Bendor-Samuel/Spreda (1969) treats the fortis and lenis prosody of the present continuous verb in the language. The first report of the fortis/lenis contrast in Leggbó is a credit to Bendor-Samuel/Spreda (1969). Dimmendaal (1978), is a reconstruction of Leggbó consonants, with a view to the classification of the Upper Cross languages as a whole. However, more descriptive works have in recent times been added to the literature on Leggbó phonology like Udoh (2003), Hyman/Paster/Narrog/Udoh (2002), Hyman/Udoh 2003, Udoh (2004a, 2004b), Udoh/Larson 2005, etc.

Details of the phonology have been explored in some of these recent works. This paper builds on what has been done already, with particular regard to the sound system of Leggbó. Since the sound system has been fairly established, this paper addresses only some aspects of the phonology for which it provides some instrumental support, specifically regarding fortition and lenition prosodies.

Vowels⁸⁷

There are seven vowels phonemes in Leggbó, presented in (1) below:

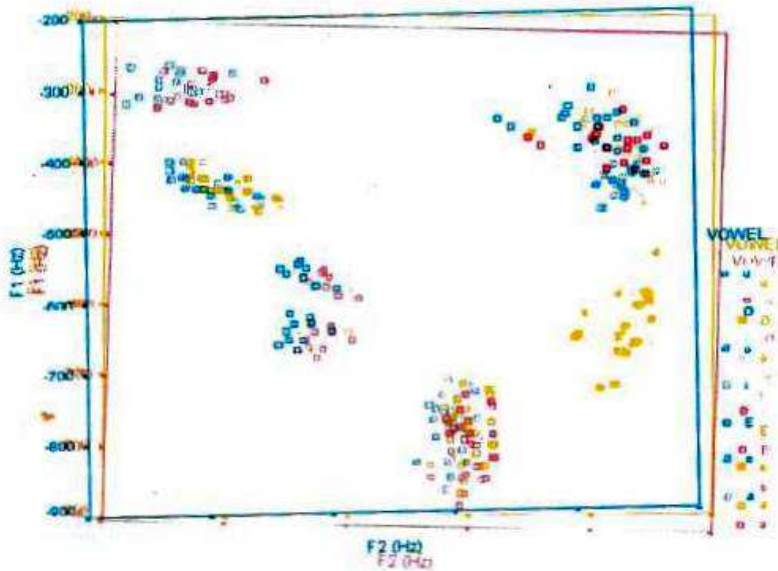
(1) Leggbó vowel phonemes

	front	central	back
high	i		u
Mid	e		o
low	ɛ	a	ɔ

⁸⁷ See Udoh 2014 for more information on the phonemic analysis of Leggbó sounds.

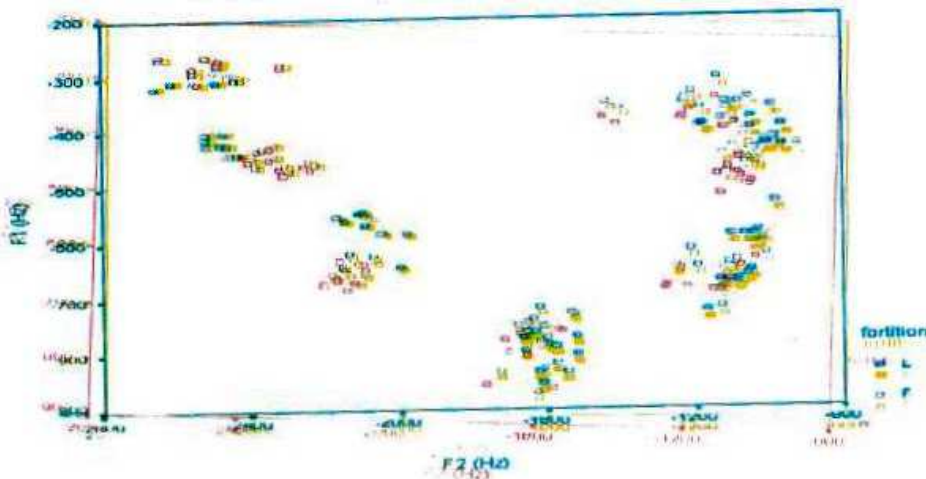
The positions of these vowels are captured in the plots of the vowel space by single vowel and by fortition are presented in (2) and (3).⁸⁸

(2) Legghó vowels



The vowel plot in (2) above confirms the positions of the vowels /i e ε/ in front high and mid positions, and /u o ɔ/ in the back high and mid positions. It also confirms the centrality of the only low vowel /a/.

(3) Legghó vowels by fortition and lenition



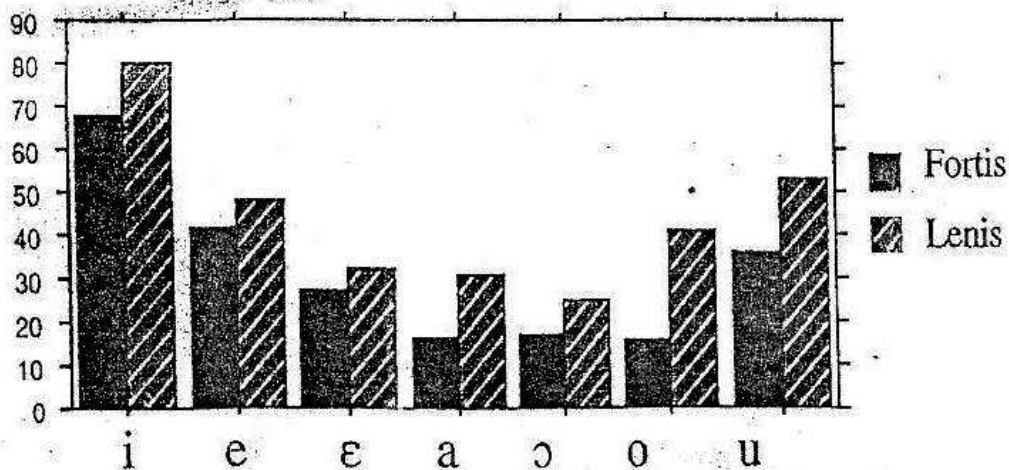
The vowel plot in (3) shows the positions and spacing of both the fortis and lenis vowels. Although the vowels have not shifted from their positions, they do not occur exactly on the same spot in all cases. In other words, the vowels are affected by the prosodies of fortition and lenition. The words used for the vowel plots are presented in (4).

(4)	u	dum	'bite'
	o	kol	'to be red'
	ɔ	ppo	'hatch'
	i	siŋ	'fight'
	ε	sεŋ	'go'
	e	bbe	'slice'
	a	nna	'shine'

⁸⁸ These measurements were done by Julie Larson at the University of California at Berkeley. These are initial plots. Further investigations on the vowel inventory are still going on and more details will be presented at a later date.

In (5), we present VOT averages across vowel contexts.

(5) VOT averages across vowel contexts



Consonants

Leggbo has two sets of consonants – fortis and lenis consonants. In (6), the fortis consonants are represented as double, and the lenis ones as single.

(6) Leggbo Consonants

	Stops		Nasals	Fricatives	Affricates	Approximants	Laterals
Bilabial	p pp	b bb	m mm				
Palatalized Bilabial	bja bbj	pj ppj	mj mmj				
Dental				f ff	v vv		
Palatalized Dental					vj		
Alveolar	t tt	d dd	n nn	s ss	z zz	dz ddz	l ll
Post Alveolar					tʃ ttʃ	dʒ ddʒ	
Palatal			ɲ			j jj	
Velar	k kk	g gg	ŋ ŋŋ	[ɣ]			
Labialized Velar	kw kkw	gw ggw	ŋw ŋŋw			w ww	

The consonant chart given in (6) consist of phonemes except the voiced velar fricative [ɣ], which is an allophone of /g/. It occurs in initial and medial positions and it is reduced to a fricative as the examples in (7) and (8) show.

- (7) gitt ù ~ yíttù ~ ítù 'life'
 gèdi ~ yèdí ~ èdí 'speech, trouble'
 gètòò ~ yètòò ~ ètòò 'work'

In medial position, it alternates with [h], with a further option of a complete drop as shown in (8).

- (8) dzáyáá ~ dzáhá ~ dzá.á 'suck'
 bbáyá ~ bbáhá ~ bbá.á 'slap, tie wrapper, hide'
 bàya ~ bàha ~ bà.a 'boil something on the fire'

In initial position as a prefix and in medial position, the voiced velar stop is therefore highly unstable. Its alternation between a Stop, a Fricative and a complete drop makes it very unstable. The synchronic relevance of this instability of the sound caused by such alternations in both initial and medial positions are indications of its movement on a Strength Hierarchy involving spirantization. It is an important allophone because it is synchronically a kind of 'place holder' for lost stop consonants which resurface in strong environments like fortis articulation.⁸⁹

The coda consonant is restricted to laterals and nasals /l m n ŋ/. All consonants can occur in initial positions. In (9), we provide some examples of the consonants showing contrasts between the lenis and fortis forms.

(9) Leggbó Consonants

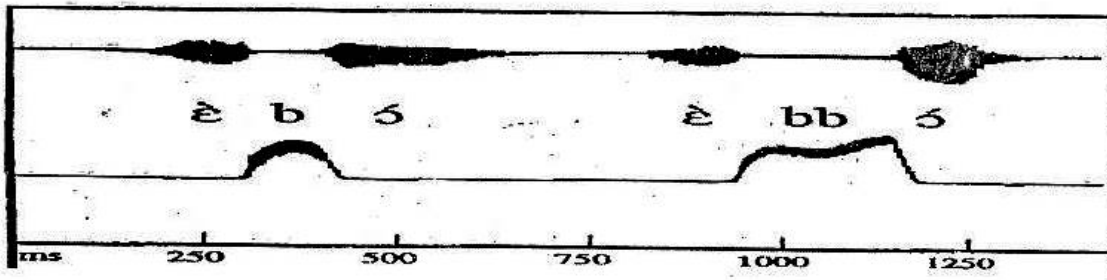
Lenis			Fortis		
Consonant	Leggbo	Gloss	Consonant	Leggbó	Gloss
p	ppom	'be early'	pp	ppa	'pluck'
b	baa	'marry'	bb	bba	'block'
t	tu	'dance'	tt	ttu	'stampede'
d	du	'beat'	dd	ddu	'whisper'
k	koo	'smoothen'	kk	kkoo	'hate'
g	egide	'beans'	gg	ggama	'perch'
m	mina	'lye'	mm	mmina	'squeeze'
n	num	'take'	nn	nnui	'push'
ŋ	ŋoo	'look'	ŋŋ	ŋŋana	'scatter'
ŋ	seŋ	'go'	ŋŋ	wŋŋoo	'fly'
v	vooŋ	'want'	vv	vvua	'heap'
-	-	-	ff	ffa	'rub'
z	zo	'baby sit'	zz	zzo	'forget'
s	so	'your'	ss	ssoo	'menstruate'
-	-	-	ddz	ddzooŋŋi	'keeping'
tʃ	tʃee	'divide'	ttʃ	ttʃe	'expect'
-	-	-	ddʒ	ddʒa	'instigate'
w	woli	'take off'	ww	wwei	'swimming'
j	ji.a	'pile up'	jj	jjalli	'paddling'
l	laa	'tangle'	ll	lli	'bury'
kp	kpa	'be strict'	kkp	kkpa	'pay'
gb	gba	'block'	ggb	ggba	'sacrifice'
-	-	-	ppj	ppja.a	'arrest'
bj	gebja	'badness'	bbj	bbja.a	'press down'
vj	vja.i	'squeeze leaves'	-	-	-
mj	mjelezi	'slippery'	-	-	-
ŋw	ŋwa	'wear, reach'	ŋŋw	ŋŋwai	'wearing'
kw	kwool	'groan'	kkw	kkwob	'preach'
gw	-	-	ggw	ggwob	'stay at home'

As can be seen in the data in (9), the fortis and lenis prosodies have both lexical and grammatical functions. Articulatorily, lenition involves an opening in the stricture of the consonantal articulation which leads to a reduction of the consonants and some compensatory lengthening of the following vowel which also has a kind of breathy quality. Fortition on the other hand involves strong, tense movements associated with the articulation of consonants. It involves extra compression of the articulators in the consonants characterised by obvious consonantal lengthening followed by a shortened vowel. In addition to these features, perceptually, there is also an unusual outburst for obstruent sounds.

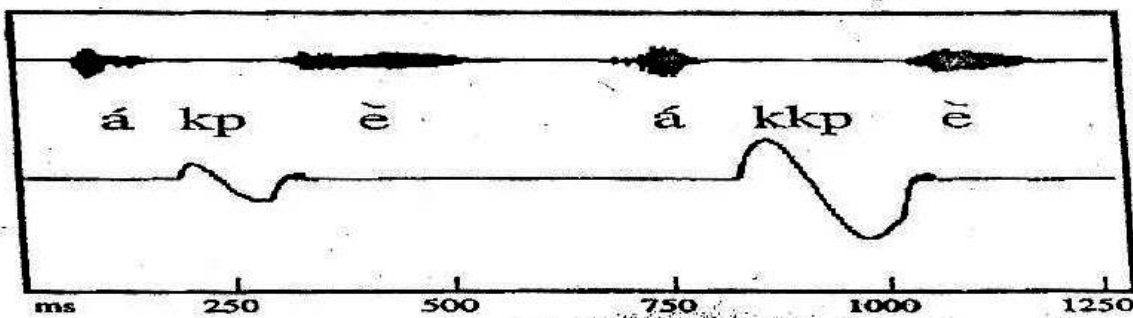
⁸⁹ For more details on this allophone as a 'ghost consonant', see Udoh (2003, 2014).

Tentatively, we represent the lenis consonants as a single consonant, while the fortis sounds we have represented as double. The double representation is supported by the double peaks of the fortis sounds as shown in the intra-oral air pressure measurements of the bilabial and labial-velar stop consonants shown in (10) and (11).⁹⁰

(10) Intra-oral air pressure of lenis/fortis bilabial Stops⁹¹



(11) Intra-oral air pressure of lenis/fortis labial-velar Stops⁹²



The lenition and fortition prosodies are features of the whole word in Leggbó. The lenis consonants appear short while the vowels following them are long. On the other hand, the fortis consonants are lengthened and the vowels following them are short. Both processes occur only in initial and coda positions.

So far, however, it has been ascertained that closure durations for the fortis consonants are twice those of their lenis counterparts. For instance, the mean duration values for /p/ and /b/ are 108.8ms and 88.2ms, while the values for the fortis /pp/ and /bb/ are 212.5ms and 203.8ms respectively.⁹³

The fortis consonants are articulated with greater strength than the lenis ones. One can conclude at this point given these reasons that the difference between these classes of consonants is that of germination.

The oral pressure pattern for the fortis consonants have two clear peaks while the lenis consonants have single peaks as shown in (10). The air pressure pattern of the voiced bilabial stop shows a clear distinction of the peak patterns of both classes of bilabial stops. While the lenis /b/ has one peak, the fortis /bb/ has two clear peaks.⁹⁴

The strength of articulation of the fortis stop sound is further confirmed with the air pressure pattern of the voiceless labial velar stop, /kp/ and /kkp/, in which the pressure changes show the movements of the articulators themselves, rather than pulmonic activity as shown in (11).

Tentatively therefore, we can claim that the fortis consonants are clearly allied to germination. However, rather than just treat them as germinates, the use of fortis/lenis labels is more appropriate here for a number of reasons: Firstly, there is widespread occurrence of the contrast in the language. Secondly, the prosody extends beyond the segment, and it is a feature of the syllable, particularly as it affects the vowels following the fortis/lenis consonant. Apart from the difference in the length of the vowels, where the lenis vowels are longer and the fortis ones shorter, they do not occur in the same position. Thirdly, apart from

⁹⁰The intra-oral air pressure measurement was done by Ian Maddieson.

⁹¹ ebɔ́ = hand, ebbɔ́ = branch

⁹² ákpe = you will teach, ákkpe = you will pick things.

⁹³ These figures were provided by Ian Maddieson.

⁹⁴ This distinction was consistent in all the repetitions of the different lenis/fortis pairs that Ian measured of the author's speech.

duration, the strength of articulation differs in both classes of sounds as reflected in the movements of the articulators.⁹⁵

Tones

There is a three-way contrast of level tones – high, mid and low in noun roots, but the prefixes are mid and low tones.

(12)	MH	lɛdzál likól	'sacrifice' 'mat'
	LH	lɛttál ɛdán	'stone' 'yellow powder'
	MM	lɛval akpó	'race' 'jaw'
	LM	lɛttól mbóm	'head' 'cheek'
	ML	lɛggbál ledùl	'time' 'bundle'
	LL	lɛsál lɛkól	'teeth' 'neck'

Tonal minimal pairs like those given in (13) also abound in Leggbó.

(13)	dzo	'ten'
	dzo	'snake'
	dzi	'eat'
	dzi	'twenty'
	dzele	'know'
	dzele	'answer, respond'
	lédùl	'mound, heap'
	lèdul	'charm, deity'

An interesting phenomenon is a two-way contrast in verb roots: M tone verbs and L tone verbs. There are two classes of verbs. The first has a Mid tone, while the second has either a High or Low tone on the root, and its choice is determined by the grammar.

(14)	M	du tɛm mana	'beat' 'send' 'catch'
	L	di nù fina	'say' 'take' 'touch'

The M tone verbs in the verbal paradigm are more stable than the L tone verbs which alternate with H. For instance

(15)	mana	'catch'
	ba mana	'they caught'
	fina	'touch'
	ba fina	'they touched'

⁹⁵ We owe this idea to Ian Maddieson.

The inflections of the verbs have different tone patterns which affect both the prefixes and suffixes depending on which categories are operating. This forms quite a complicated network with overrides where two or more categories compete. For more details on these overrides, see Hyman et al (2002). The acoustic measurements of Leggbó tones are in progress and will be presented soon.

Conclusion

This preliminary study on Leggbó phonetics and phonology has addressed some peculiar features of the language with instrumental support for the phonological perceptual claims. A particularly interesting phenomenon addressed is *fortition*, which has both lexical and grammatical functions in the language. As a preliminary work, it has thrown more light on the germinate nature of the Leggbó fortis consonant, but because of the effect of the prosody beyond the segment, it is more appropriate to use the labels 'fortis' and 'lenis' to describe these phenomena. The investigation was done with the intra oral air pressure measurements of simple bilabial and multiple labial-velar consonants. Apart from the double peaks in the fortis consonants, the length in the fortis consonants also support this. Furthermore, VOT averages across vowel contexts show that the vowels that occur with the lenis consonants are longer than those that occur with the fortis consonants. In other words, the fortis consonants are longer, with shorter vowels, while the lenis consonants are shorter, with longer vowels. The vowel space has been defined with plots to show the exact positions of the vowels in the Leggbó space. However, the tonal measurements are yet to be presented. It will be worthwhile to investigate the effect of fortition and lenition on tone.

Acknowledgements

This work started while I was on a sabbatical leave to University of California, Berkeley, with funding from COR Grant/Department Funds for Linguistics 240a, b – Field Methods course on Leggbó Language in the 2001/2002 session. I am grateful to Larry Hyman, Ian Maddieson, Heiko Narrog, Ahmadu Kawa, Jeff Good, Keith Sanders and Mary Paster. I am also grateful to Eno-Abasi Urua and Sophie Saffluer for very useful comments on an earlier version of this paper. Finally, I thank the University of Uyo, for granting me the leave that enabled me to work in Berkeley.

References

- Bendor-Samuel, J. T. & Spreda, K. W. 1969. Fortis articulation: a feature of the present continuous verb in Agbo. *Linguistics*. 52:20-26.
- Crozier, D. H. & Blench, R. M. 1992. *An Index of Nigerian Languages*, Dallas: Summer Institute of Linguistics, Inc.
- Dimmendaal, G. J. 1978. The consonants of Proto-Upper Cross and their implications for the classification of the Upper Cross languages. PhD Thesis, University of Leiden.
- Faraclas, N. 1989. Cross River, *The Niger-Congo Language*. Ed. Bendor-Samuel. Lanham: University Press of America.
- Grimes, B. F. 2000. *Ethnologue*. Volume 1. Dallas: SIL International.
- Hyman, L. Paster, M. Narrog, H. & Udoh, I. 2002. Leggbó verb inflections: A semantic and phonological particle analysis. *Proceedings of the Berkeley Linguistic Society*, University of California, Berkeley.
- Hyman, L. & Udoh, I. 2003. Tone Mapping in Leggbó. *Frankfurter Africanistische 15*, Rose-Juliet Anyanwu, (ed.), Koln: Rudiger Koppe.
- Spreda, K. & Spreda, J. 1966. An Interim Workshop Report on the Phonological data of Agbo. *Tagmemic and Matrix Linguistics Applied to Selected African Languages*. Ed. K. L. Pike. Pp 255-288.
- Udoh, I. I. 2003. Varieties of Leggbó: A Preliminary Report. In *The Linguistic Paradise: A Festschrift for E. N. Emenanjo*, Ozo-Mekuri Ndimele, (ed.), Aba: NINLAN, pp 129-135.
- Udoh, I. I. 2004a. Leggbó Compounds. *Kiabara, Journal of Humanities*. Vol. 10.1.
- Udoh, I. I. 2004b. Ghost Consonants and Lenition in Leggbó. *Journal of West African Languages*. 31.1:47-63.
- Udoh, I. I. L. 2011. *Leggbó Phonology: A Preliminary Description*, Saarbruchen: LAP.
- Udoh, I. 2014. Weak contexts and place-holders in Leggbó. *USEM Journal of Languages, Linguistics and Literature*. Vol. 6:1-13.
- Udoh, I. & Larson, J. 2005. *USEM Journal of Languages, Linguistics and Literature*. Vol 1:1-14.