

**Phonetics and Phonology of Ikalanga: a diachronic and
synchronic study**

by

Joyce Thambole Mogatse Mathangwane

B.A. (University of Botswana) 1985

M.A. (Leeds University, England) 1988

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Committee in charge:

Professor Larry M. Hyman, co-Chair

Professor John J. Ohala, co-Chair

Professor Sharon Inkelas

Professor Alan Timberlake

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The dissertation of Joyce Thambole Mogatse Mathangwane is approved:

<u>Larry M. Hyman</u>	<u>May 13, 1996</u>
co-Chair	Date
<u>John J. O'Neil</u>	<u>May 14, 1996</u>
co-Chair	Date
<u>Sharon Diehl</u>	<u>May 15, 1996</u>
	Date
<u>Alvin G. ...</u>	<u>15 May 1996</u>
	Date

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Joyce Thambole Mogatse Mathangwane

To the memory of my mother,

Baluki Mathangwane

May your soul rest in peace.

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List of Abbreviations

C	Consonant
V	Vowel
NÇ	Nasal + voiceless stop sequence
POS	Part of speech
Pfx	Prefix
Cl.	Class
exx.	example
n	noun
v	verb
adv.	adverb
adj.	adjective
dem.	demonstrative
aux. v	auxiliary verb
pron.	pronoun
conj.	conjunctive
det.	determiner
prep.	preposition
ideo.	ideophone
interj.	interjective

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Chapter One

Introduction

This study is concerned with the phonetics and phonology of Ikalanga, a Bantu language of the Shona group used in the northern part of Botswana. Although the present study is based on this language as spoken in Botswana, an equally large group of Ikalanga speaking people is found on the southern and southwestern part of Zimbabwe in the region around Hwange and Plumtree. In Botswana, Ikalanga speakers occupy a large part of northern Botswana beginning around Francistown, in the north, and stretching further north to the border with Zimbabwe in what is called the Northeast District, as well as in the villages to the northwest of Francistown in the Central District up to the border with Zimbabwe. Actual statistical figures on the number of Ikalanga speakers in Botswana are not available because population census in Botswana is not carried out by ethnic group. Thus, any figures given are normally based on estimations based on other forms of investigation. Andersson & Janson (forthcoming) estimate that Ikalanga speakers in Botswana must be about 150,000. Their estimation is based on the percentage of Ikalanga-speaking children from surveys of primary education carried out by the Ministry of Education in 1976 and 1982 which are 12% and 11% respectively. But given the method used to derive the above percentages and

the dates when these surveys were carried out, in my opinion¹, the number of the Ikalanga speakers must be well over 150,000.

Speakers of this language refer to themselves in the plural as the BaKalanga and, in the singular, as Nkalanga. They refer to their language as Ikalanga [ikáláŋgá], the term used throughout the present study. The i- in Ikalanga is a noun class 7 prefix, which is often dropped in citing names of Bantu languages by Bantuists. According to Chebanne, Rodewald & Pahlen (1995:17) (henceforth Chebanne et al. (1995)), Ikalanga spoken in Botswana differs slightly from that spoken in Zimbabwe in the areas of pronunciation, vocabulary and grammar. Different researchers have given different subgroupings of the dialects of Ikalanga, as shown below.

Table 1. Different dialect subgroupings of Ikalanga

Doke (1931)	Wentzel (1983)	Chebanne et al. (1995)
Nyayi Nambya Rozwi Kalanga Talaunda Lilima (Humbe) Peri	Nyayi (Rozwi) Nambya Kalanga Talaunda Lilima (Humbe) Peri Twamamba Lemba Lembethu Pfumbi Jawunda Romwe	Nyayi Lilima Talaunda Nambya

¹ De facto census figures of August 1991 indicate that there were approximately 208,647 Bakalanga in Botswana, which is about 16% of the total population which was 1,326,796 in that year. The above figure is based on statistical figures from three districts which are dominantly Ikalanga speaking.

As seen in the above table, Doke (1931) lists seven main dialects of Ikalanga. But, as noted in Wentzel (1983), Nyayi and Rozwi turned out to be two names of the same dialect, which means that Doke distinguished only six dialects. Wentzel (1983) documents twelve dialects, but points out that the Twamamba and Lemba dialects are ascribed to Fortune (1959). According to Wentzel, some of these dialects have fallen into a state of disuse. In a more recent study, Chebanne et al. (1995) give only four main dialects of Ikalanga, seen in the above table. We observe from Doke's and Wentzel's classifications that one of the dialects in the language goes by the same name as the language, that is, Kalanga, a situation which other scholars have commented upon as likely to cause some misunderstanding to researchers. (Also worth pointing out is that Ikalanga should not be confused with Karanga, another of the Shona dialects.) The number of dialects in Ikalanga is beyond the scope of the present study, in which I will assume just the four main dialects given by Chebanne et al. (1995).

Ikalanga, also referred to as Kalanga or Western Shona in some studies (see Doke (1931) and Wentzel (1983)), is one of the six dialects in the Shona cluster. Guthrie (1967-71 Vol.4:62) classifies Ikalanga as S.16, putting it in Area S with other southern Bantu languages such as Tswana, Sotho, Zulu, Xhosa, Venda and Tsonga. The first classification of the dialects of Shona was first undertaken by Doke (1931:8) which study remains the authority in this area. I give the six dialects of Shona below:

Dialects of Shona

Karanga
Zezuru
Korekore
Manyika
Ndau
Ikalanga

Even that early in the century, Doke realized that Ikalanga was far removed from the other dialects in all respects, that is, in the areas of phonetics, grammar, vocabulary and other linguistic areas. The most obvious of these differences include the use of the lateral /l/ where other dialects of Shona have a trill /r/; the lack of implosives in Ikalanga, which are also found in Shona; and, its use of a syllabic nasal N- as a noun class prefix for classes 1 and 3 instead of mu- found in Shona (see §2.3.1 below for the discussion of these noun class prefixes in Ikalanga). Differences like these led to Ikalanga being left out when a unification of the other five Shona dialects was formed for purposes of an orthography. Today, Ikalanga is the least studied of the Shona dialects.

The Ikalanga data used throughout this study are based on my speech. As a result, I am the sole speaker for the phonetic measurements made in the analyses of selected sounds in this language. I have also relied on my knowledge of Tswana when giving some examples from this language.

The remainder of this chapter is organized as follows: §1.1 considers some areas where Tswana, the majority language of Botswana, has had some influence on Ikalanga. §1.2 gives the goals and organization of the dissertation, and, §1.3 gives the theoretical assumptions which inform the

analyses presented in this study. Finally, §1.4 considers the notations used throughout this dissertation.

1.1 Influence of Tswana

Ikalanga has been isolated from the other Shona dialects for at least a few centuries. It is this isolation that has contributed to the slight difference between it and the Zimbabwean version mentioned above, not to mention that between it and the other dialects in the Shona group. During its long period of isolation, it has been in very close contact with the Tswana language, classified by Guthrie (1967-71 Vol 4:62) as S.31a, one of the languages in the Sotho group. Doke noticed in 1931 numerous signs of influence by the Sotho-Tswana group on the dialects of Ikalanga. While there may be more areas in which the influence of Tswana on Ikalanga is found, I limit my discussion below to lexical borrowing, morpheme borrowing and a shared diachronic development. I begin with vocabulary borrowing.

1.1.1 Vocabulary Borrowing

Evidence of the influence of the Tswana language is most obvious in the area of vocabulary borrowing into Ikalanga. A possible explanation for this heavy borrowing must be the superior status given to Tswana which, as the national language, is taught in schools, together with English, while Ikalanga is not. The declaration of Tswana as a national language was made at independence in 1966. As a result, the teaching of Ikalanga in the district

where it had been taught was discontinued. Some Tswana borrowings have introduced novel sounds not found in earlier inventories or writings of Ikalanga (Doke 1931; Masole Kumile in Wentzel 1983, Vol.1). The most obvious of these borrowed sounds are ejectives and velar fricatives. I begin by looking at these borrowings which brought new segments into the language.

1.1.1.1 Lexical borrowings with ejectives

No language other than Ikalanga in the Shona cluster has been shown to have ejective consonants. On the other hand, a number of studies note the presence of ejectives in the consonant inventory of Tswana (Doke (1954); Cole (1955); Janson (1991/92)). The source of most ejectives in Ikalanga is borrowing from Tswana. The two relevant ejectives are the voiceless alveolar stop /t/ and the voiceless palato-alveolar affricate /tʃ/. (1) below gives some examples of words borrowed into Ikalanga with the above ejectives respectively. Tswana cognates are also given for illustration.

(1) Borrowings from Tswana with ejectives sounds /t, tʃ/

	<u>Ikalanga</u>	<u>Tswana</u>	<u>Gloss</u>
a.	li-vaʔí	li-baʔí	'door'
	tʃi-vaʔa	sɪ-baʔa	'patch (n)'
	ma-kat'é	ma-k'at'áne	'wild melons' ²
	kaʔa	k'at'a	'be tamed or trained'
	t'alá	t'alá	'blue or green'

² The Tswana form appears to be a diminutive form with a variant of the diminutive suffix -ane which has now been lexicalized.

b.	ma-t̥ʰíla	mats'íla	'clothes'
	t̥ʰáli	t̥ʰáli	'shawl'
	vu-t̥ʰarara	bot̥ʰarara	'sour; acidic'
	lu-t̥ʰat̥ʰa		'side or flank'

Only one example in (1b) does not seem to have originated from Tswana, in which the word for 'side or flank' is /lot̥ʰákóri/.

1.1.1.2 Borrowing with velar fricatives

Another set of segments which come into Ikalanga through vocabulary borrowing from Tswana are the voiceless velar fricative /x/ and the labialized voiceless velar fricative /xʷ/. (2) below gives some examples to illustrate.

(2) Borrowings with the velar fricatives

<u>Ikalanga</u>	<u>Tswana</u>	<u>Gloss</u>
d̥ʒaxa	d̥ʒaxa	'hasten'
xáxámála	xáxámála	'be tightly drawn'
raxa	raxa	'kick'
ríéxa	díéxa	'delay'
xakala	xak'ala	'be angry'
b.		
i-xʷabá	sixʷapá	'biltong; dried meat'
i-xʷeto		'loop'

1.1.1.3 Borrowings from other cultures

Vocabulary borrowing from Tswana includes words borrowed by Tswana from other cultures. (3) gives some examples and their languages of origin where relevant.

(3) Borrowed specialized words

<u>Ikalanga</u>	<u>Tswana</u>	<u>Language of Origin</u>	
tírína	t'írína	Afrikaans	'trein' (train)
kírísímosi	k'írísímosi	English	'Christmas'
palaménté	palamént'é	English	'parliament'
fániŋjara	fániŋjara	English	'furniture'
mótokára	motorokara	English	'motor car'

However, borrowing from Tswana was not just restricted to lexical items. Ikalanga seem to have borrowed the diminutive morpheme as well. I turn to this in the following subsection.

1.1.2 Borrowing of the diminutive morpheme

Diminutivization is one of the areas in which Ikalanga behaves differently from other Shona dialects. As will be shown in Chapter Four below, unlike Shona which uses classes 12 ka- and 13 tu- noun class prefixes in the formation of diminutives (Doke 1954), Ikalanga primarily uses the diminutive suffix -ana in the formation of its diminutives (see §4.1.1). (4) and (5) give examples of Shona and Ikalanga diminutives respectively.

(4) Shona diminutives

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
ifé	ka- <u>fé</u>	'small chief'
ḡadzá	ka- <u>padza</u>	'small hoe'
ru-rímí	ka- <u>rímí</u>	'small tongue'
va-ndang ^w e	tu- <u>dang^we</u>	'small first-born children'
mbúdzí	tu- <u>mbúdzí</u>	'small goats'
hanz ^w adzi	tu- <u>hanz^wadzi</u>	'small brothers'

(5) Ikalanga diminutives

mbeva	mbeu-aná	'small mouse'
ḍziwa	ḍziw-aná	'small pool (of water)'
ḍiṭima	ḍiṭim-aná	'small pumpkin'
vísi	vís-áná	'small water melon'
n-si	n-s-aná	'small pestle'

As Doke further observes, the use of this suffix is quite widespread in the other southern Bantu languages such as Tswana, Sotho, Zulu, Xhosa and Venda. I am therefore assuming that Ikalanga must have borrowed the use of this diminutive morpheme from the Tswana language. (6) gives examples of Tswana diminutive forms for comparison. Note that the palatalization shown in these Tswana forms when diminutivized is not relevant to this discussion (see Chapter Four for the discussion of palatalization in Ikalanga diminutives); the reader is advised to disregard it when looking at these examples.

(6) Tswana diminutives with suffix -ana

p ^h até	p ^h at̪ ^ʔ -ána	'small skin mat'
l ₁ -rol ₁	l ₁ -rod̪ ₃ -ana	'small dust'
l ₁ -fifi	l ₁ -fit̪ ^{hw} -ana	'small darkness'
mo-xobí	mo-xod̪ ₃ ^w -ána	'small pond'
s ₁ -t ^h ari	s ₁ -t ^h ats ^h -ana	'small tree'

The fact that most of the Shona dialects use the class 12 ka- and 13 tu- noun prefixes and not the diminutive suffix -ana leads me to conclude that the use of this suffix by Ikalanga must be a recent development in this language.

1.1.3 Use of the lateral /l/ from PB *d

The use of the lateral from Proto-Bantu *d is another area where Ikalanga behaves differently from other dialects in the Shona group. In most of its occurrences in Proto-Bantu reconstructions, PB *d corresponds to an alveolar lateral /l/ in Ikalanga. This reflex is different from what we find in Shona where this PB stop changed to an alveolar trill /r/. The development of a lateral from PB *d is an innovation which Ikalanga shares with Tswana, as illustrated below.

(7) Reflexes of PB *d

<u>Ikalanga</u>	<u>Tswana</u>	<u>Shona</u>	<u>Gloss</u>		<u>PB Forms</u>
kófóla	xótt ^h óla	kósóra	'cough'	<	*-kocod-a
kúlá	xóla	kúrá	'grow'	<	*-kúd-a
z ^w ála	tsála	z ^w ára	'give birth'	<	*-biad-a
lima	lma	rma	'cultivate'	<	*-dim-a
lu-límí	lo-límu	ru-rímí	'tongue'	<	*-dími

It has been observed in Doke (1931) that not all dialects of Ikalanga show this development, some using an alveolar trill as in the rest of Shona. However, the use of the lateral reflex appears to be common to those dialects used in northern Botswana, which makes me conclude that it might be from the influence of Tswana.

1.2 Goals and organization of the dissertation

In this dissertation I present an analysis of sound change based on the phonetics and phonology of Ikalanga. As the first work of its kind in this language, it provides insights into how cases of pronunciation variation, both

diachronic and synchronic, occurred in Ikalanga. The questions that I specifically address are: (a) what sound changes were involved in the development of some Ikalanga sounds; (b) what underlying phonetic principles could have led to the development of these sounds; and, (c) is a particular sound change common to other languages of the world, more especially languages within the Bantu family. This study is intended to be a contribution to our knowledge of Bantu phonetics and phonology. My intention is to lay a foundation which will put Ikalanga in the field of linguistic research enjoyed by the other Bantu languages.

It goes without saying that as the first work of its kind in this language, it is bound to leave many questions unanswered. In this dissertation, I address only those aspects of the language which have to do with Ikalanga sounds, their distribution, and sound changes which led to their development, and the tonal system. As a result, I have left untouched many interesting aspects of this language.

In this chapter, I have given background information on the Ikalanga language, and considered the theoretical assumptions that inform the analyses in this dissertation. In Chapter Two, I look at the Ikalanga consonant inventory and its distribution in the phonology. This chapter also gives an overview of the morphs that are used throughout the dissertation in the illustration of different morphophonemic alternations. Chapter Three considers the diachronic and synchronic processes of (af)frication (referred to as High Vowel Frication) in Ikalanga effected by the Proto-Bantu (PB) close

vowels *ĩ and *ũ. Chapter Four looks at the process of palatalization, which is shown to be both diachronic and synchronic. In Chapter Five, I look at the development of velarization in Ikalanga. Just as in the preceding two chapters, I show that this process is both a diachronic sound change and a synchronic morphophonemic alternation. Chapter Six looks at the development of aspiration from PB nasal+voiceless stop clusters and the effects of these aspirated consonants on the following tones. Chapter Seven deals with depressor consonants and the tone system of Ikalanga, and Chapter Eight gives the conclusion.

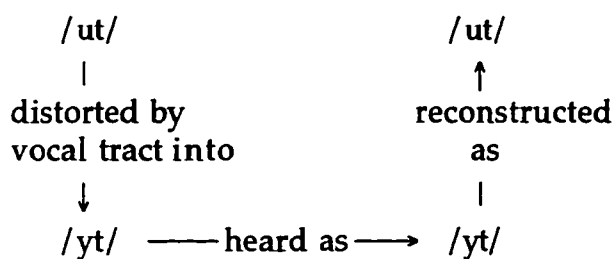
1.3 Theoretical assumptions

This study consist of two parts. The first deals with sound change and the second with the tonal system of Ikalanga. Two different sets of theoretical assumptions, mentioned where relevant, inform the analyses in these subparts. I present these theoretical assumptions here as background information to assist the reader with the basis for the analyses given in this dissertation.

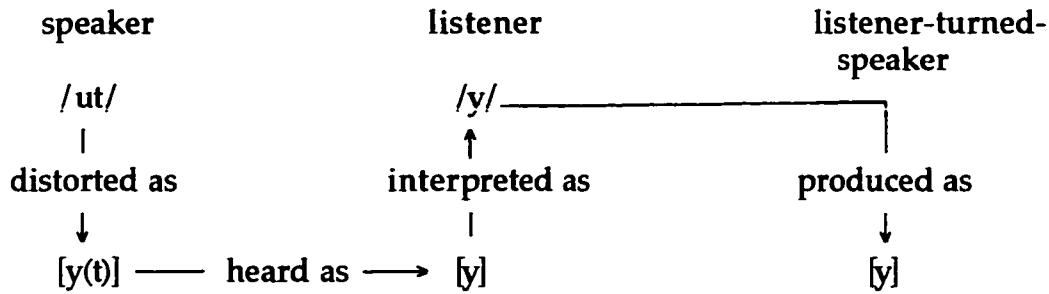
My analysis of sound change is based on Ohala's theory of sound change (1981b, 1992). In this theory, the listener is shown to play an important role in sound change. According to Ohala, a speech signal is subject to a lot of distortions when uttered by the speaker. These distortions may be from vocal tract constraints or other types of noise that speech is subject to. Normally, the listener has the ability to factor out these distortions

and reconstruct the intended speech signal by the speaker. In order for the listener to effectively factor out these distortions, he/she must have detected the environment that causes the distortion. Failure to detect this environment and to be aware of the mechanical causal link between the environment and the distorted segment may lead to the listener not being able to reconstruct the intended speech signal. When the listener turns to speak, he/she may produce a speech signal different from what was intended. As a result, a “mini-sound change” will have taken place. In other cases, the listener may over-apply his/her knowledge of contextual coloring of sounds, in which case, he/she makes a “correction” where it was not required. Here, the listener perceives the intended signal correctly, only he/she assumes it has some distortions because of its environment, which he/she erroneously corrects. Ohala (1981a, 1992) refers to these types of sound changes as “hypo-correction” and “hyper-correction” respectively. (8a-c) below gives these scenarios respectively from Ohala (1981a) for illustration.

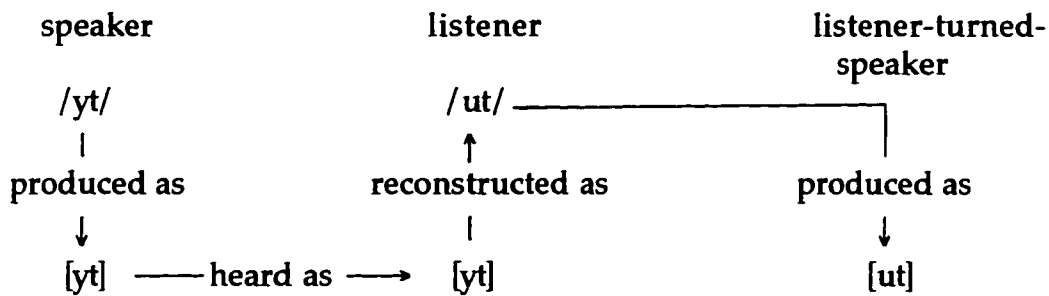
(8)a. No change; successful correction



b. Scenario for hypo-correction



c. Scenario for hyper-correction



Following Ohala (1978), both the inductive and deductive approaches are adopted in my analysis. Under the inductive approach, having observed a particular pattern of sound change in a language under study, typological evidence from other languages of the world is given showing that such a change is also attested in other languages. And under the deductive approach, on the other hand, a phonetic description of the underlying principles which may have led to the development of that pattern are also given. Used together, these two approaches supplement each other leading to our understanding of how certain sound changes are much more common in the languages of the world than others.

The second part of the dissertation gives an analysis of the tone system of Ikalanga. My analysis of the tone system of Ikalanga is based on the

framework of Lexical Phonology (Kiparsky 1982, 1985; Mohanan 1986 etc.) for the different levels at which a given rule in a language apply, that is, whether a rule applies at the lexical or postlexical levels. Furthermore, I am assuming the prosodic domain theory (Nespor & Vogel 1986, Selkirk 1986 etc.) for the way in which phonological domains within which rules apply are formed. According to prosodic domain theory, the interaction between phonology and syntax is mediated in the prosodic structure organized into a phonological hierarchy which includes a phonological word, a clitic group, a phonological phrase, an intonational phrase and an utterance. These levels are strictly layered such that all elements at a lower level are dominated or contained in the domain of the higher level. These two frameworks put together form the basis of the analysis of the tone spreading rules in Ikalanga.

1.4 Notations

Throughout the dissertation, any form preceded by an asterisk (for example, *-bèbà 'rat') is a Proto-Bantu reconstruction from either Guthrie (1967-71) or from Meeussen (1969/80). No distinction has been made between these reconstructions. Where relevant to the discussion, a hyphen is used between morphemes, for example, fúp-áná 'small bone'. As is common in Bantu, most verbs end the Final Vowel (FV) -a, also marked where relevant by a preceding hyphen, as in bik-a 'cook'. An equals sign (=) is following a proclitic (e.g. né= 'with, and').

As is standard, slashes indicate phonemic representations while square brackets indicate phonetic realization. High tones are transcribed throughout the study with an acute accent (´) while Low tones are not transcribed. In a few examples in Chapter Seven though, some Low tones are also transcribed for illustration using a grave accent (`). These two tones are in most cases abbreviated as H (High) and L (Low). In the few cases where LH rising tones are found, they are transcribed with a rising accent (ˇ). The following notations are used in the derivations, which are standard in phonological theory.

- (9)a. C consonant
 V vowel
- b. | 'is linked to'
 / 'is spread to'
 ≠ 'delink'
 ∅ 'deletes'

All Ikalanga examples in this dissertation are given in the International Phonetic Alphabet (IPA); where possible, the transcriptions of examples from other languages are also modified to IPA unless it is not clear to the writer what the phonetic value of a segment is. The one exception are the prenasalized stops and affricate where the nasal part is not superscripted as is normally done in IPA. Throughout this study these segments are simply transcribed as /mb, nd, ŋg/ and /nd̪ʒ/ respectively (but considered singletons and never clusters). A dental diacritic [̪] beneath a sound indicates that the sound has a dental place of articulation, as is customary in IPA. Also worth

mentioning is the transcription of the breathy voice consonants (see Chapter Six below on the phonetic origin of these consonants). Consonants in this class are transcribed with a superscripted hooked -h- [h̥] (e.g. /p^{h̥}, t^{h̥}, w^{h̥}/) or just a hooked /h/ for the glottal fricative making them distinct from the regular non-breathy voice consonants in the language with which they share a place of articulation. (10) gives both the regular consonants and the breathy voice consonants for comparison.

(10)a. <u>Regular consonants</u>	b. <u>Breathy consonants</u>
/p ^{h̥} /	/p ^{h̥} /
/t ^{h̥} /	/t ^{h̥} /
/k ^{h̥w} /	/k ^{w^{h̥}} /
/s ^{h̥} /	/s ^{h̥} /
/ʃ ^{h̥} /	/ʃ ^{h̥} /
/w/	/w ^{h̥} /
	/h̥/

Note that the glottal fricative in Ikalanga is always breathy voiced; as a result, it does not have a regular counterpart.

The Ikalanga portion of the Ikalanga-English lexicon in Appendix C is given in the conventional orthography. As a result, there is need to give the orthographic symbols and their IPA equivalents as a guide to the reader who is interested in both presentations of the language. Starting with the vowels, no difference is made between the conventional orthography and IPA transcription; that is, in both cases the Roman alphabet is used (e.g. /i, e, a, o, u/). A different situation emerges, though, in the case of consonants. As will be shown in §2.1.2 below, Ikalanga has a large consonant inventory and with

work on the orthography still continuing, there are bound to be some changes in this area in future. I have adopted the orthography proposed by Chebanne et al. (1995) with a few differences. In cases where I use a different symbol from theirs, their symbol is also given alongside within parentheses. Because of the larger number of consonants than that proposed by Chebanne et al (1995), some of which are from loanwords, I have made a distinction between the lower case and the upper case in the presentation of some consonants. This is the case with apicals (e.g. Th is the voiceless dental aspirate /t̥^h/ vs th which is the voiceless alveolar aspirate /t̥^h/) and in the class of breathy consonants given in (11k) below. (11) below illustrates.

(11) Consonants³

<u>IPA symbols</u>	<u>Orthography</u>
a. <u>Plosives</u>	
/p/	p
/p ^h /	ph
/b/	bh
/t̥/	t
/t̥ ^h /	t ^h
/d̥/	d
/d̥ ^h /	dh
/k/	k
/k ^h /	kh
/g/	g

³ A classification of Ikalanga consonants is given in §2.1.2 in Chapter Two.

b. Affricates

/ps/	ps
/bz/	bz
/ts/	ts
/tʃ/	tsh
/dz/	dz
/tʃ/	ch (tj)
/tʃ/	ty
/dʒ/	j

c. Fricatives

/f/	f
/v/	v
/s/	s
/z/	z
/ʃ/	sh
/ʒ/	zh
/x/	x

d. Sonorant consonants

/m/	m
/n/	n
/ɲ/	ny
/ŋ/	ng'
/l/	l
/r/	r
/v/	b
/j/	y
/w/	w

e. Doubly articulated stops

/pkʰ/	pkh (pkhw)
/bg/	bg (bgw)

f. Prenasalized consonants

/mb/	mb
/nd/	nd
/ŋg/	ng
/nd͡ʒ/	nj

g. Labialized stops

/tʷ/	tw
/tʰʷ/	thw
/dʷ/	dw
/kʷ/	kw
/kʰʷ/	khw
/gʷ/	gw

h. Labialized affricates

/t͡sʷ/	tsw
/t͡sʰʷ/	tshw
/d͡zʷ/	dzw

i. Labialized fricatives

/sʷ/	sw
/zʷ/	zw
/ʃʷ/	shw
/xʷ/	xw

j. Labialized nasal

/ŋʷ/	ngʷ
------	-----

k. Breathy voice consonants

/pʰ/	pH
/tʰ/	tH
/kʰʷ/	kHw
/t͡sʰ/	tsH
/t͡ʃʰ/	chH
/wʰ/	hw ⁴
/ɦ/	h

⁴ Chebanne et al (1995) use this symbol /hw/ to denote the labialized glottal fricative.

Chapter Two

Segment Inventory, Phonotactics and Selected Aspects of Morphology

This chapter looks at the segment inventory of Ikalanga and its distribution in the phonology. The last section gives an overview of the morphology of the morphs in the examples used throughout this study so as to familiarize the reader to them. In §2.1 I begin by looking at the Ikalanga segment inventory proposed by Chebanne et al. (1995). Because of some problems with their inventory, I propose an amended segment inventory with an increased number of consonants. Palatograms and the acoustic analyses of selected segments provide evidence for the reclassification of some of these segments. Next, §2.2 gives the distributional analysis of both vowels and consonants. Finally, §2.3 gives the morphology of the morphs in the examples used throughout the dissertation.

2.1 Ikalanga Segment Inventory

Very little work has been done over the years on Ikalanga. It wasn't until 1989 that work on the orthography started. As a result, not much work has been done on the segment inventory to date. However, this does not mean to overlook earlier works in this language, for example, Doke (1931) and Wentzel (1961) had both developed segment inventories for Ikalanga,

which, as noted by Chebanne, Rodewald & Pahlen (1995:21) were never adopted. The latest work on the Ikalanga inventory is that by Chebanne et al. (1995). However, as will be shown in §2.1.2, there are some problems with the consonants they propose. I begin by looking at the Ikalanga vowels in the following section.

2.1.1 Ikalanga Vowels

Like many Bantu languages, Ikalanga has a five vowel system:

(1) Ikalanga Vowels

	Front	Back
High	i	u
Mid	e	o
Low	a	

As shown in (1), this vowel system is made up of two front vowels /i, e/, the two back vowels /u, o/, and the low central (unrounded) vowel /a/. In order to properly characterize the qualities of these five vowels, I measured their first three formants instrumentally. To carry out this study, bisyllabic stems were recorded using a high quality analog tape recorder and then digitized at 10,000 Hertz using the Kay Computerized Speech Lab (CSL) Model 4300. As no examples could be found in the language in which all the five vowels occurred in the same environment on the same tone, vowels in different words were used and the formants averaged to get the first three formants of each vowel, measured at mid point. Altogether twenty-five single tokens of twenty-five words were recorded providing seven environments at different

tones.⁵ Frequency measurements, based on single tokens, were made at mid point on the vowels. (2) gives the wordlist.

(2) Wordlist recorded for formant measurements

vila	'boil'
vala	'read; count'
vola	'rot'
vula	'intestine'
vidza	'make boil'
védzá	'irritate'
vodza	'make rot'
vúdzá	'tell'
pélá	'get finished'
pala	'scratch'
pólá	'be cured'
púlá	'thresh'
písa	'burn'
pesa	'jest'
pasa	'pass'
posa	'throw'
ṭálá	'draw (line)'
ṭóla	'take'
ṭúla	'put down load'
ḍila	'pour'
ḍelá	'lazy baby'
ḍála	'elevated platform to put harvest'
siká	'small scar of a burn on back of hand'
seka	'laugh'
suka	'wash'

In Table 1 below I give the formants of each one of the five Ikalanga vowels. For each vowel, I give the first, second and third formants (F1, F2, and F3) and the rightmost column gives the average formants of these vowels.

⁵ I am aware of the possible difference in formant value due to the difference in tone. However, as no examples could be found with low tones only, I have had to use both low tone and high tone vowels. A close look at the formants in Table 1 below reveals that the formants of a high tone vowel are not always higher than the same word on a low tone.

Table 1. Formants of Ikalanga vowels

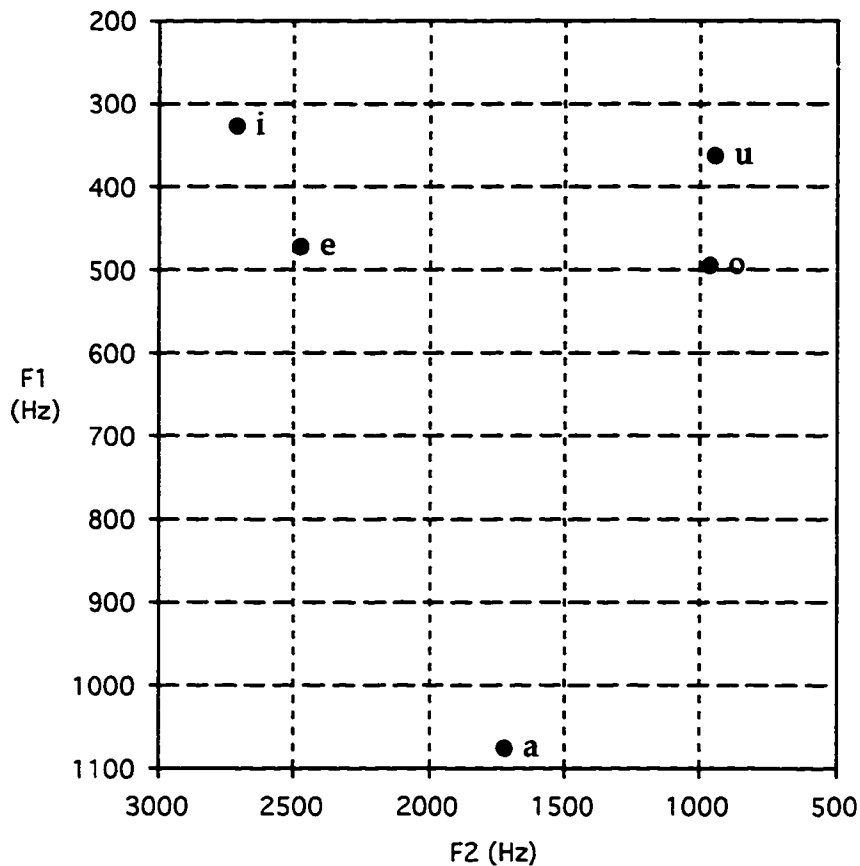
Vowels	Environments							Average
	v_la	v_dza	p_la	p_sa	t_la	d_la	s_ka	
/i/: F1	345	311		328		326	328	328
F2	2765	2540		2713		2817	2679	2703
F3	3508	3318		3353		3353	3336	3374
/e/: F1		518	553	414		414	466	473
F2		2437	2489	2419		2575	2437	2471
F3		3284	3370	3111		3042	3024	3166
/a/: F1	1054		967	985	1037	1348		1078
F2	1693		1676	1745	1763	1711		1718
F3	2903		2869	2696	2955	2696		2824
/o/: F1	466	432	553	466	570			497
F2	881	864	1054	881	1123			961
F3	3163	2990	3215	2990	3076			3087
/u/: F1	414	345	311		328		432	366
F2	674	864	864		985		1313	940
F3	2973	3232	3111		3076		3094	3097

The following observations can be made from these average formants figures: The first formant is closely related to vowel height, a correlation well known in the literature (see Ladefoged (1982); Clark and Yallop (1991), among others). In other words, the frequency of F1 in Ikalanga vowels increases as one moves from the high front vowel /i/ to the low central vowel /a/, after which it starts falling as one moves to the high back vowel /u/. The second observation from this Table, also well known in the literature, is the correlation between the second formant frequency and the degree of backness

of a vowel. The frequency of F2 in Ikalanga vowels decreases as a speaker moves from the high front vowel /i/ to the high back vowel /u/. A similar correlation was found to exist in the Karanga vowels of Shona by Pongweni (1983:130-132). On the contrary, Ladefoged (1982:178) found this correlation not as reliable as that of F1 frequency and vowel height when looking at American vowels.

Figure 1 gives a conventional graphical display of the average frequencies of F1 versus F2 of the vowels, where F1 increases from top to bottom on the Y-axis and F2 increases from right to left on the X-axis.

Figure 2.1. Formant Chart of Ikalanga Vowels



We observe in this Figure that the high front vowel /i/ is more front than /e/ as is often the case when languages' vowels are plotted in this way. Also evident from the Vowel Chart is the extreme low position of the low vowel /a/ in relation to the mid vowels /e, o/ suggesting that that /a/ is a more open central vowel. The mid vowels /e, o/ have been phonetically transcribed as [ɛ] and [ɔ] respectively (see Chebanne et al. (1995)). Throughout this study, these mid vowels are simply transcribed as /e/ and /o/ as indicated in Figure 1 above.

2.1.2 Ikalanga Consonant Inventory

Unlike with the simple five vowel system presented above, Ikalanga has a large and complex consonant inventory. Table 2 gives the consonant inventory proposed by Chebanne et al. (1995:19). In their consonant chart, they give thirty-seven (37) consonants unique to Ikalanga as used in Botswana.⁶ I have modified their transcription to IPA.

Table 2. Ikalanga Consonant Inventory (by Chebanne et al. (1995:19))

	Labials		Dentals		Palatals			Velars		
	bilab	lab-dent	alveo	retro-flex	palat alveo	dorso palat	pal	vel.	uvul	glot.
Plosives								\overline{pk}		
- asp.	p		t d	ṭ ḍ	$\overline{dʒ}$	tʃ	tʃ̥	k g		ʔ
+ asp.	p ^h b ^h		t ^h	ṭ ^h						
	\overline{ps} \overline{bz}									
Affricate										
- asp			\overline{ts}							
+ asp			\overline{ts}^h							
Fricative										
- asp	β	f v	s z		ʃ ʒ					
+ asp										h ^w
Nasals	m		n				ɲ	ŋ		
Lateral			l							
Vibrant			r							
Glides	w						j	w		

Below I look at their classification in series by manner of articulation.

⁶ I have omitted from their chart those sounds which they say are found in the Zimbabwean Ikalanga only because the present study is based on Ikalanga as used in Botswana.

2.1.2.1 Plosives

First, we observe that this series is a mixture of stops and affricates. It is not clear why some affricates are given under plosives when others are given separately below. It would be less confusing to the reader if these affricates /dʒ, tʃ, tʃ, ps, bʒ/ are given with other affricates separate from the plosives. I defer discussion of these affricates until §2.1.2.2. I begin by considering the labials.

(a) Labials /p, p^h, b^h/

No plain voiced counterpart of the voiceless bilabial stop /p/ is given, instead we find the voiceless and voiced aspirated stops /p^h, b^h/. (3) gives words with these labial stops to illustrate.

(3)	pala	'scratch'
	p ^h átúla	'crack'
	b ^h ika	'cook'

However, the average VOT duration (Voice Onset Time), that is, a period of voicelessness after the stop articulation and before the start of the voicing for the vowel (Ladefoged 1982), of the voiced bilabial stop [b^h] in Ikalanga was found to be -143 milliseconds indicating that voicing started at the beginning of the closure for the stop. This figure is based on ten tokens each of the words b^háni 'forest', one of the examples given with an initial voiced aspirated bilabial stop by Chebanne et al (1995). I, therefore, conclude that the voiced bilabial stop /b/ in Ikalanga is not aspirated (see Fig.2.8 in §2.1.2.5 for a spectrogram with a voiced bilabial stop).

(b) “Dentals” /t, d, tʰ/ and ɽ, ɽ, ɽʰ/

As seen in the heading, Chebanne et al. divide these “dentals” into two sets, namely: the alveolar stops and the retroflex stops respectively. (4) gives some examples with these sounds to illustrate.

(4)a. Alveolar stops

túmá	‘send’
tʰámá	‘make’
dá	‘like’

b. Retroflex stops

ɽúmá	‘sew’
ɽopí	‘melon porridge’

However, no examples with the voiceless (unaspirated) retroflex stop /ɽ / are given in the manual even though this consonant is given in the chart. The voiced retroflex stop /ɽ / is said to be an allophone of the “normal d” which occurs when preceded by a nasal (1995:30). I assume by “normal d” is meant the voiced alveolar stop /d/. Likewise, no examples are given to illustrate this sound.

The question is: are Ikalanga apicals produced at the alveolar and retroflex points? I claim that these apicals are produced at the dental and the alveolar places of articulation. In other words, Ikalanga does not have retroflex consonants in its inventory. What Chebanne et al. (1995) identify as retroflex stops are in actual fact alveolar stops and their examples of alveolar stops have a dental place of articulation. Evidence in support of this claim is derived from palatograms of the writer’s speech. I discuss this in §2.1.2.1.1 below.

(c) Velar stops / \widehat{pk} , \widehat{bg} , k, g/

Chebanne et al. (1995) classify the doubly articulated stops / \widehat{pk} / and / \widehat{bg} / under velars with the velar stops /k/ and /g/ in their chart. While it does not make that much difference whether these doubly articulated stops are classified as velars or labials as none of the two portions seem secondary to the other, in Table 3, I chose to enter these doubly articulated stops under labials because the first closure in their production is at the labial place of articulation. The voiceless doubly articulated stop is aspirated, thus, it is realized as / \widehat{pk}^h / (see §5.5 for evidence that these doubly articulated stops are single segments). The voiceless aspirated velar stop / k^h / is not given in Table 2 above even though an example with this sound is later given in the manual. (5) gives examples with these velars to illustrate.

(5)a. Words with doubly articulated stops / \widehat{pk}^h , \widehat{bg} /

\widehat{pk}^h á	'dry up'
\widehat{pk}^h izi	'sheep'
\widehat{bg} ilíla	'return'
m- \widehat{bg} á	'dog'

b. Words with velar stops /k, k^h , g/

kámá	'milk (v)'
kakále	'again'
k^h úṭa	'miss'
k^h ólá	'be excited'
gama	'catch'
gúṭa	'be full'

(d) The Glottal stop /ʔ/

It is not clear if the glottal stop /ʔ/ is considered a phoneme or just a dialectal variant from Chebanne et al. even though it is included in the consonant chart. It seems though that a glottal stop is audible before function words beginning with a vowel including those realized by a vowel alone, for example, the 2nd person pronoun singular u and the 3rd person singular pronoun ú, and some adverbs beginning with vowels. (6) illustrates.

(6)a. Function words and utterances

íní	'what'	→	[ʔíní]
ání	'who'	→	[ʔání]
ípí	'which one'	→	[ʔípí]
ú ngájí?	'where is he/she?'	→	[ʔú ngájí]
u ngájí?	'where are you?'	→	[ʔu ngájí]

b. Adverbs

ee	'yes'	→	[ʔee]
áá	'no'	→	[ʔáá]

The presence of this glottal stop seems to be a case of style which may vary from one speaker to the other. I therefore do not consider it to be phonemic in this language; as a result, it should not be included in the inventory.

2.1.2.1.1 What place of articulation are Ikalanga apicals?

As seen in Table 2, Chebanne et al. (1995) claim that Ikalanga has the alveolars /t, t^h, d/ and the retroflexes /ɬ, ɬ^h, d/ in its inventory. However, only a few examples are given with aspirated apicals to illustrate this difference. I restate these examples in (7).

(7) Words exemplifying apicals (as cited by Chebanne et al. (1995:23)

Alveolars

t^hámá 'do'
t^héúla 'separate'

Retroflex

t^húamá 'sew'
t^hopí 'melon porridge'
t^hangá 'garden'

As mentioned above, no examples are given to illustrate the difference between the voiceless alveolar and retroflex apicals or the retroflex voiced apical /d/.

Even though I agree with them that there are two places of articulation involved in the production of Ikalanga apicals, I argue (as shown in my proposed inventory in Table 5) that these apicals are produced at the dental and alveolar places of articulation respectively. In other words, there seems to be no retroflexion involved in the production of Ikalanga apicals nor in the Ikalanga inventory as a whole. Evidence in support of this claim is derived from palatograms of the writer's speech. (8) gives the five words produced by the writer in this study.

(8) Words used in the palatograms

a. Dentals

t^hámá 'do; make' /t^h/
d^huma 'roar' /d^h/
t^hamá 'we stopped' /t^h/

b. Alveolars

t^húamá 'sew' /t^h/
duma 'agree' /d/

The procedure in making the palatograms is as follows: First, the hard palate and teeth are coated with a charcoal-chocolate drink mix combination using an atomizer. A target word is then produced three times. A photo is then taken using a Polaroid dental photography kit. After each picture is

taken, the mouth is cleaned and the same procedure is repeated for each of the five words.

Palatograms of the above words are given as Figures 2.2-2.6 below. In Figure 2.2, the palatogram of the word t^hámá 'do; make', we observe that the charcoal-chocolate mixture is wiped off from the upper incisors indicating contact at the back of the upper incisors. This confirms a dental place of articulation for this apical. In Figure 2.3, on the other hand, the charcoal-chocolate mixture is not wiped off the upper incisors; instead we observe a place of articulation slightly back at the alveolar ridge for the word t^húmá 'sew'. Likewise, Figure 2.4 shows a wipe off at the back of the upper incisors for the voiced dental stop /ḍ/ in ḍuma 'roar' while Figure 2.5 shows a wipe off at the alveolar ridge for voiced alveolar stop /d/ in the word duma 'agree'. And finally, Figure 2.6 confirms a dental place of articulation for the voiceless apical /t̪/. In this Figure, the charcoal-chocolate mixture is also wiped off the upper incisors, as is the case with the other dental stops. Essential to note is that none of these palatograms shows any evidence of true retroflexion, especially in the production of the alveolar aspirated apical, which, in Chebanne et al., is considered a retroflex apical.

In view of the above results, the following observations are made about these apicals. The voiceless unaspirated dental apical /t̪/ does not have an alveolar counterpart. (9) gives some examples to illustrate.



Figure 2.2. Palatogram of the word /tʰámá/ 'make' showing a dental point of articulation for the apical.



Figure 2.3. Palatogram of the word /tʰúmá/ 'sew' showing a point of articulation at the alveolar ridge.

33a



Figure 2.4. Palatogram of the word /duma/ 'roar' showing a dental point of articulation for the apical.



Figure 2.5. Palatogram of the word /duma/ 'agree' with a point of articulation at the alveolar ridge.

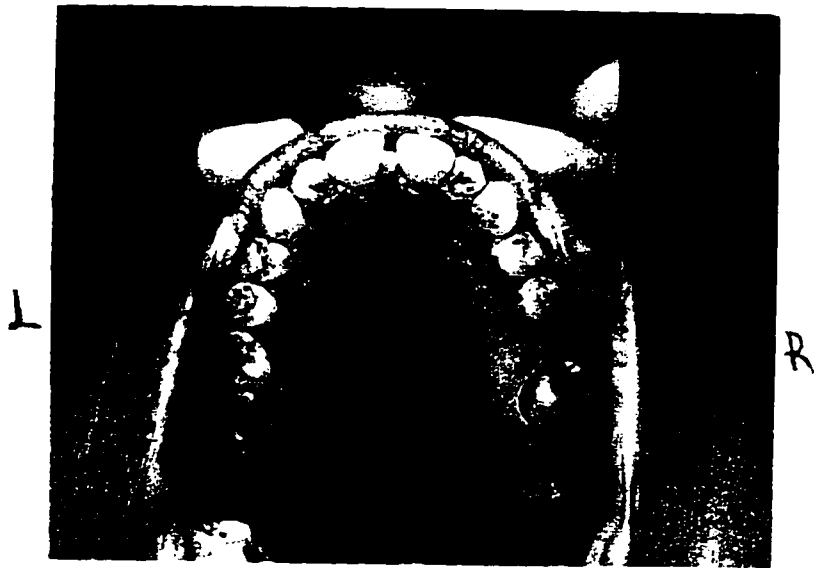


Figure 2.6. Palatogram of the utterance /ʔamá/ 'we stopped' showing a dental point of articulation for the apical.

(9) Words with the voiceless unaspirated apical /t̪/

t̪átá	'chase'
t̪íʒa	'run'
t̪émá	'cut; chop'
t̪óla	'take'
t̪úmá	'send'

The voiced dental stop /d̪/ and the voiced alveolar stop /d/, on the other hand, are phonemically distinct as illustrated by the minimal pair in (10a). However, the voiced dental stop /d̪/ is more widespread than the voiced alveolar stop /d/ which is found in a few words and only before the high back vowel /u/. Note that the dental apical /d̪/ is also found before this back vowel as seen in (10a-b) suggesting that, even though the alveolar stop has a restricted environment, the two apicals are lexically specified.

(10)a. d̪uma 'roar' vs duma 'agree'

b. Words with the dental apical /d̪/

d̪ila	'pour'
d̪elele	'okra'
d̪ámá	'word; cheek'
d̪ope	'mud'
d̪uní	'mortar'

c. Words with the alveolar apical /d/

dukuḍza	'shake, to remove dust'
dubula	'take out of liquid'
n-dumbí	'drizzle (n.)'
duvika	'immerse'
li-vadu	'rib'
ḷi-ledu	'chin'

The voiceless aspirated dental /t̪ʰ/ and the voiceless aspirated alveolar /tʰ/ are also lexically specified as their occurrence is not conditioned by any specific

environment in the words in which they are found. As a result, they are also phonemically distinct. (11) gives words with these apicals to illustrate.

(11)a. Words with the aspirated dental stop /tʰ/

tʰámá	'make'
tʰíkílí	'thatch (n)'
tʰóná	'cuddle'
tʰówá	'whey'
tʰaví	'new hut with thatch and without a wall'

b. Words with the aspirated alveolar stop /tʰ/

tʰúvúla	'break, as a rope'
tʰígáma	'kneel'
tʰúmá	'sew'
tʰúka	'jump over kraal'
uu-tʰáká	'of same age'

I therefore, conclude that Ikalanga apicals have two places of articulation, and they are, the dental and alveolar. The distribution of apicals is discussed in §2.2.3.3 below.

2.1.2.2 Affricates

Altogether seven affricates are given, that is, /ps̄, bz̄, ts̄, ts̄ʰ, dʒ̄, tʃ̄, tʃ̄ʰ/.

Missing from the chart by Chebanne et al. is the voiced dental affricate /dʒ̄/ even though examples with this sound are later given in their manual. Below I look at these affricates by place of articulation.

(a) Bilabial affricates/ps̄, bz̄/

These affricates are marginal phonemes in Ikalanga whose distribution is restricted to very few words. Only six roots were found in the database (Appendix C) with /ps̄/ and four with its voiced counterpart, as shown in (12).

(12)a. Words with /ps̄/

ps̄á	'new'
ps̄á	'burn'
ps̄ájíla	'sweep'
m-ps̄arara	'fowl excreta'
ma-ps̄íg ^w a	'burnt food'
li-ps̄á-vadzímú	'small burn, believed to be by spirits'

b. Words with /bz̄/

bza	'belch'
bzála	'plant (v)'
t̄j̄i-bza	'thigh'
t̄j̄i-bzálo	'plant (n)'

In all the words in which they are found, they are in free variation with the labialized affricates /ts̄^{hw}/ and /dz̄^w/ respectively. This may be an indication that these sounds are dying out of the language. (13) illustrates this alternation.

(13)	ps̄á	~	ts̄ ^{hw} á	'new'
	ps̄á	~	ts̄ ^{hw} á	'burn'
	ps̄ájíla	~	ts̄ ^{hw} ájíla	'sweep'
	bza	~	dz̄ ^w a	'belch'
	bzála	~	dz̄ ^w ála	'plant'
	t̄j̄i-bza	~	t̄j̄i-dz̄ ^w a	'thigh'

I assume that these affricates are single segments and not bi-segmental. As seen in (12) they are only found root initially. Ikalanga does not allow

consonant clusters in its phonology, and to consider them consonants clusters would make them the only clusters in this language (see also §5.5 on arguments against consonant clusters in Ikalanga).

(b) Dental affricates / \widehat{ts} , \widehat{ts}^h , \widehat{dz} /

These affricates have a dental place of articulation. (14) gives some examples with these affricates.

(14)	$\widehat{ts}\acute{a}t\acute{u}la$	'crush'
	$\widehat{ts}ika$	'wink'
	$\widehat{ts}^h\acute{a}$	'dig'
	\widehat{ts}^hamba	'step on'
	$\widehat{dz}il\acute{a}$	'smear mud on floor'
	$\widehat{dz}amula$	'snatch'

(c) Palato-alveolar affricates / $\widehat{tʃ}$, $\widehat{dʒ}$ /

In Chebanne et al these affricates have different places of articulation, namely; / $\widehat{tʃ}$ / is given as a palatal affricate while / $\widehat{dʒ}$ / is palato-alveolar affricate. It is not clear why this is the case as these sounds have a similar place of articulation in this language, that is, as palato-alveolar affricates. (15) illustrates.

(15)	$\widehat{tʃ}\acute{a}$	'fear'
	$\widehat{tʃ}il\acute{a}$	'live'
	$\widehat{dʒ}\acute{a}$	'eat'
	$\widehat{dʒ}il\acute{a}$	'cloth'

(d) Affricate / \widehat{t}^j /

Chebanne et al. identify this affricate as a dorso-palatal affricate. However, this sound seems to be an ejective palato-alveolar affricate / $\widehat{tʃ}^e$ /,

possibly borrowed from Tswana where this sound occurs (see 1.1 above on the influence of Tswana on Ikalanga). In Ikalanga, its occurrence is very restricted, as it is found in four roots only, as seen in (16). Tswana cognates are also given except for the last example which does not seem to be a borrowing. I, therefore, consider this sound a marginal phoneme in Ikalanga, that is, a phoneme with a very restricted distribution.

(16)	<u>Words</u>	<u>Gloss</u>	<u>Tswana</u>
	tʃʰáli	'rug'	tʃʰáli
	vuʃʰarara	'sour; acidic'	boʃʰarara
	ma-tʃʰíla	'clothes'	maʃʰíla
	lu-tʃʰaʃʰa	'side or flank'	

2.1.2.3 Fricatives

Altogether eight fricatives /β, f, v, s, z, ʃ, ʒ, h^w/ are given in Table 2. I assume that the sound Chebanne et al. classify as a voiced bilabial fricative /β/ is in actual fact a bilabial approximant /v/. Unlike the bilabial fricative, the stricture in the production of this approximant is wide enough to allow air to pass without causing any friction. The glottal fricative, on the other hand, always occurs with breathy voicing. As a result, I transcribe it with a hooked [ɦ] (see §2.1.2.7). (17) illustrates.

(17) Words with fricatives

fula	'graze'
vúlá	'water'
seka	'laugh'
zíva	'know'
ʃímá	'dislike'
ʒúvá	'sun'
fiálí	'pot'

2.1.2.4 **Sonorants**

These include the nasals /m, n, ɲ, ŋ/, the lateral /l/, the trill /r/, and approximants /j, w/. (18) gives some examples to illustrate.

(18) Words with sonorants

m éjá	'peel (v)'
n óŋgó	'groundnut'
ɲepa	'lie (v)'
ŋína	'earring'
lévá	'tell'
k ^{hw} iriridza	'snore'
jemula	'desire'
wáníka	'hang out to dry'

Below I consider those series which are not included in the Chebanne et al. inventory.

2.1.2.5 **Prenasalized consonants**

It is not clear whether Chebanne et al. consider prenasalized consonants as consonant clusters, as nowhere in their work do they mention this series. However, Ikalanga has a set of voiced prenasalized consonants in its inventory. These include the voiced prenasalized stops /mb, nd, ŋg/ and

the voiced prenasalized palato-alveolar affricate /nd͡ʒ/. (19) gives examples with prenasalized consonants to illustrate.

(19) Words with prenasalized consonants

a.	lamba	'refuse'
	ṭéndéka	'point'
	landula	'deny'
	ngína	'enter'
	seŋga	'carry'
b.	lu-nd͡ʒí	'needle'
	vu-nd͡ʒí	'many'
	n-ʃand͡ʒe	'green grass or lawn'
	n-sund͡ʒe	'black ant'

The question is whether these prenasalized consonants in Ikalanga are single segments or bi-segmental. To address this question, it is necessary to compare acoustic durations of these prenasalized stops to those of voiced stops and nasals. Note that a number of studies on the timing and duration of prenasalized stops already exist in the literature, the results of which have generally shown the duration of prenasalized stops to be comparable to that of single segments (see Sagey (1986); Browman & Goldstein (1986); Herbert (1986); Maddieson (1989) among others). Below I show that the durations of prenasalized stops in Ikalanga are close to those of single segments suggesting that these prenasalized consonants are single segments.

To carry out this study, the average durations of intervocalic prenasalized stops are compared to those of intervocalic nasals and voiced stops in the language. These average durations are based on ten tokens each from nine (9) target words (see §2.1.1 above for the recording procedure). The

target words were recorded embedded in carrier phrases ku __ kakále 'to/at __ again' to avoid the application of the phonological rule of Penultimate Length which lengthens the penultimate vowel in Ikalanga words when they occur in isolation or at the end of a intonational phrase.⁷ It was thus possible to get characteristic measurements of the duration of the preceding vowels, too. Only the low vowel /a/ was used in the wordlist to eliminate any duration variations that may be due to different vowel qualities. For accuracy, duration measurements were made from both waveforms and broadband spectrograms. (20) below gives the wordlist used in this study.

(20) Wordlist

gabá	'bucket'
gama	'catch'
gámhá	'clot'
ḁaḁa	'jest'
ḁána	'be in-love'
ḁándá	'log'
mága	'mug' ⁸
maḁa	'cracks on heel of foot'
ḁangá	'kraal'

Measurements of the voiced stops were made from the beginning of the oral closure to the release burst. For nasals, measurements were made from the onset of the oral closure for the nasal after the cessation of the preceding vowel to the onset of the following vowel. In the case of prenasalized stops, measurements were made from the onset of the oral closure for the nasal to

⁷ See Chapter Seven for a discussion of the Penultimate Lengthening rule.

⁸ Even though the word *mága* 'mug' is a borrowing from English, it has been fully nativized. As a result its borrowed status does not have any adverse effects on the point being made.

the release burst of the stop, too. Table 4 below gives the average durations and standard deviations.

Table 3. Average durations and Standard Deviation of voiced stops, nasals and prenasalized stops based on 10 tokens each

Segments	Ave. Duration (msec.)	Standard Deviation
Labials:		
b	92	5
m	94	6
mb	100	6
Alveolars:		
d	84	12
n	69	5
nd	73	3
Velars:		
g	89	4
ŋ	117	8
ŋg	107	10

I performed the ANOVA (analysis of variance) which showed that there is a statistically significant difference for type, that is, between a prenasalized stop, a plain voiced stop and a nasal at $F=5.46$ ($F_{2,60}=3.15$, $\alpha=.05$). However, in Table 3 we observe slightly higher durations in the case of the prenasalized bilabial stop compared to its voiced stop and nasal counterparts. The labial prenasalized stop /mb/ has a duration of 100 milliseconds, 8 milliseconds higher than the bilabial voiced stop and 6 milliseconds higher than the bilabial nasal consonant. The velars show the nasal with the longest duration of 117 milliseconds, 10 msec. higher than the prenasalized velar stop /ŋg/. While the velar stop is the shorter than the others. The alveolars, on the

other hand, it is the voiced stop which has longer duration than the others. The fact that these prenasalized stops are not consistently longer in duration on all the three types, that is, in velars the nasal is longest while in alveolars the stop is the longest, suggests that they are considered singletons in this language. The sample waveform and spectrograms of the labials / mb, b, m, / are given below as Figures 2.7, 2.8 and 2.9 respectively to illustrate. (As it happens these figures show vowel durations from the extreme end of the distribution.)

In addition, it has been observed across languages that vowels are shortened before clusters and lengthened before voiced single segments (Maddieson (1985); Maddieson & Ladefoged (1993). As Maddieson & Ladefoged (1993:272) note, these effects are usually attributed to the longer duration of clusters resulting in shortened vowels while the shorter durations of voiced consonants lead to lengthened vowel durations. However, as shown in Table 4 below, the average durations of vowels before the Ikalanga prenasalized stops were found to be very comparable to those of vowels preceding their singleton voiced stop and nasal counterparts.

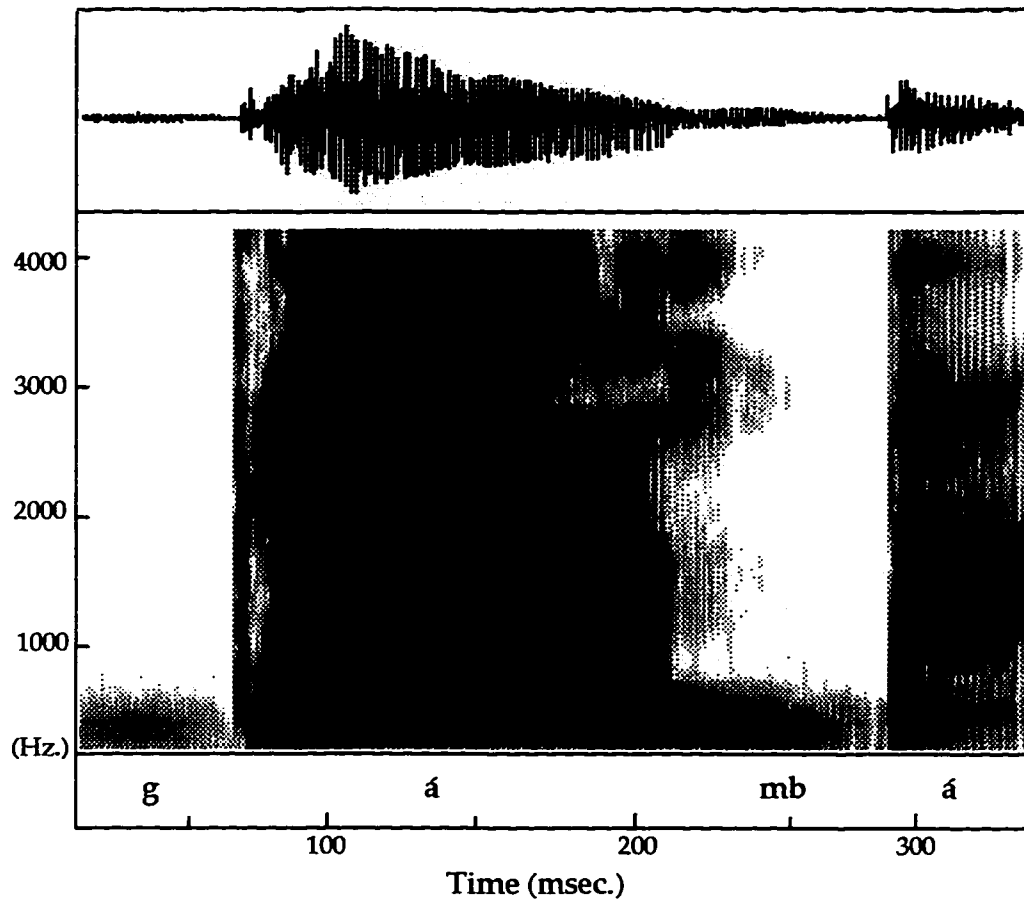


Figure 2.7. Waveform and spectrogram of /gámbá/ 'clot' illustrating the prenasalized bilabial stop /mb/.

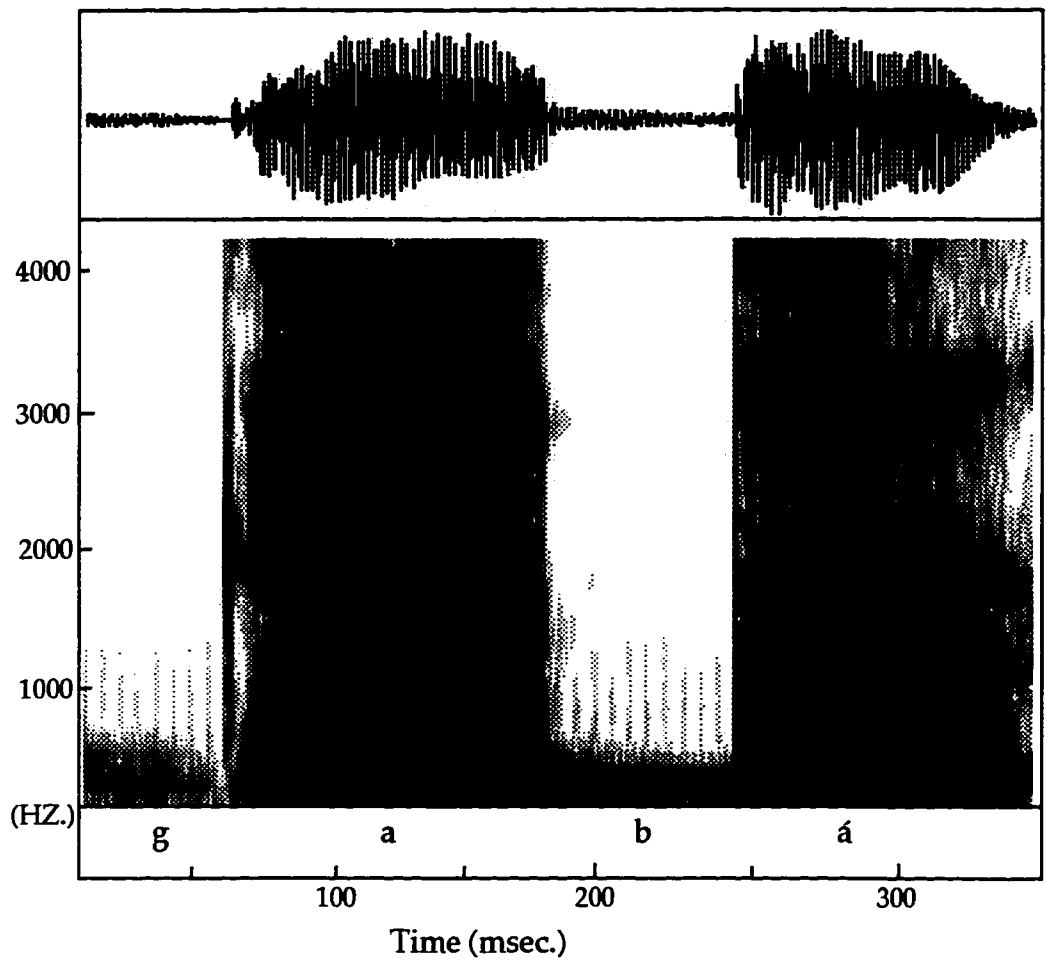


Figure 2.8. Waveform and spectrogram of /gabá/ 'bucket' illustrating the voiced bilabial stop /b/.

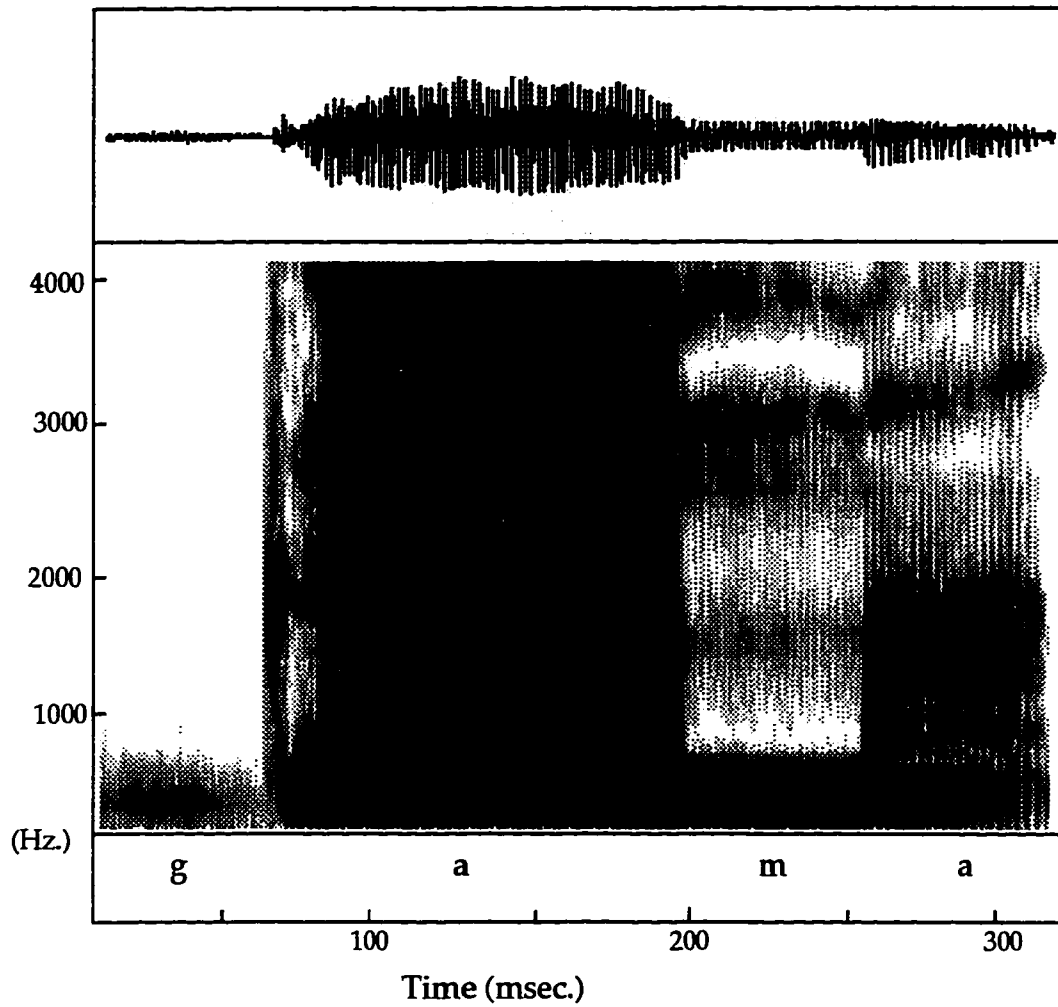


Figure 2.9. Waveform and spectrogram of /gama/ 'catch' illustrating the bilabial nasal /m/.

Table 4. Average duration of vowels before voiced stops, nasals and prenasalized stops based on 10 tokens each

Vowels before	Mean Duration (msec.)	Standard Deviation
Labials:		
- b	114	5
- m	102	6
- mb	110	5
Alveolars:		
- d	116	6
- n	119	10
- nd	123	10
Velars:		
- g	129	10
- ŋ	128	14
- ŋg	129	10

We observe longer vowel durations before the velars followed by those before the alveolars and the shortest vowel durations are before the bilabial consonants. However, these data do not show any difference between prenasalized stops versus the unquestionable singletons suggesting that these prenasalized consonants in Ikalanga are not considered different from these singletons in terms of vowel duration.

In view of the above statistical figures, it may be the case that the above duration measurements be used with caution as evidence for the singleton status of these prenasalized stops because studies conducted across languages have shown there being no difference in phonetic timing between prenasalized stops and nasal+stop clusters (see Ladefoged & Maddieson (1986); Browman & Goldstein (1986)). It may well be the case that the decision

whether a nasal+stop element is a prenasalized stop is not a phonetic matter, but a phonological one as has been suggested by Ladefoged & Maddieson (1986) (see also Maddieson (1989)).

2.1.2.6 Labialized consonants

In addition, Ikalanga has a set of labialized consonants in its inventory. Even though Chebanne et al. do not include these in their chart, they later mention that /t^w, d^w/ are also phonemes. (21) gives examples to illustrate.

(21) Words with labialized consonants

a. Stops

d ^w a	'come from'
k ^w ála	'write'
g ^w ála	'be ill'
t ^{hw} á	'spit; vomit'
k ^{hw} á	'pound (v)'

b. Affricates

t ^{hw} aja	'brand or mark'
dz ^w ála	'plant (v)'

c. Velar Nasal and prenasalized stop

ŋ ^w iná	'hole'
ŋg ^w ing ^w i	'gums'

d. Fricatives

s ^w ika	'arrive'
z ^w ála	'bear child'
ʃ ^w aja	'poke'

/t^{hw}/ is also a marginal phonemes found in only one example in the database (Appendix C). Note that the labialized fricatives /s^w, z^w/ in the Shona group

have often been referred to as “whistling” fricatives (Doke 1931). Below I give an acoustic analysis of these fricatives in Ikalanga to find out if there is a significant amount of whistling involved in their production.

2.1.2.6.1 Labialized alveolar fricatives /s^w, z^w/

The labialized alveolar fricatives /s^w, z^w/ in Ikalanga are in contrast with the plain alveolar fricatives /s, z/ as illustrated in (22).

(22) Plain alveolar fricatives contrast labialized alveolar fricatives

sika	‘create fire’	vs	s ^w ika	‘arrive’
zíg ^w a	‘be known’	vs	z ^w íg ^w a	‘fruit of vangueria infauta tree’

An acoustic analysis of these fricatives /s^w, z^w/ is intended to find out if there is any significant whistling involved in their production to justify labelling them “whistling” fricatives or whether the slight whistle perceived is the effect of secondary labialization in these sounds. Previous work on the acoustic properties of the “whistling” fricatives is by Bladon, Clark and Mickey (1987) on the Zezuru dialect of Shona. In this study, they compare the spectral characteristics of “whistling” fricatives /s^w, z^w/ to dental fricatives /s, z/ and palato-alveolar fricatives /ʃ, ʒ/. Their results show that the “whistling” fricatives have a sharper peak in their noise spectra than the other fricatives.

To carry out this study, two words with these labialized fricatives were recorded using a high quality analog tape recorder for analysis. These words are given in (23) below.

(23) Words with labialized alveolar fricatives

tás ^w á	'mount'
náz ^w á	'lick'

These words were then digitized at 16kHz using the Computerised Speech Lab (CSL) and the broadband spectrograms of these words were generated. In addition, the power spectra of a sample length of 60 milliseconds for each fricative was generated. The 60 milliseconds portion of the fricative was selected at the center of the sound to eliminate transitional effects at the boundaries of the sound.

Contrary to expectations, the spectral characteristics of both fricatives showed no presence of a significant amount of whistling in their production. The presence of whistling would be indicated by an extremely narrow peak in the spectra. In other words, no peak frequency locations were found in the spectra to indicate there being a significant whistle in their production (hence the spectra of both fricatives are not included here). My own native intuition is that this whistle is enhanced when the high front vowel /i/ follows these fricatives, while before a low vowel, it is very slight to the point of zero. But, as can be seen in the spectrograms in Figures 2.10 and 2.11 respectively, in the second half of both labialized fricatives there is a downward trend of intense noise from about 4.5kHz to as low as 3.2kHz obviously effected by the labialization in these fricatives. This extreme effect of labialization in these fricatives suggest that the slight whistle often perceived in their production, especially in the environment of the high front vowel, must be caused by the lip rounding plus fronting involved in their production. In any case, the lip

rounding in these labialized fricatives is very obvious when one articulates them compared to plain alveolar fricatives /s, z/.

In summary, I conclude that the slight whistle perceived in the production of these fricatives is from the effect of secondary labialization and not significant enough to label them “whistling” fricatives. Thus, throughout this study, I refer to these fricatives as labialized alveolar fricatives and transcribed as /s^w/ and /z^w/ respectively.

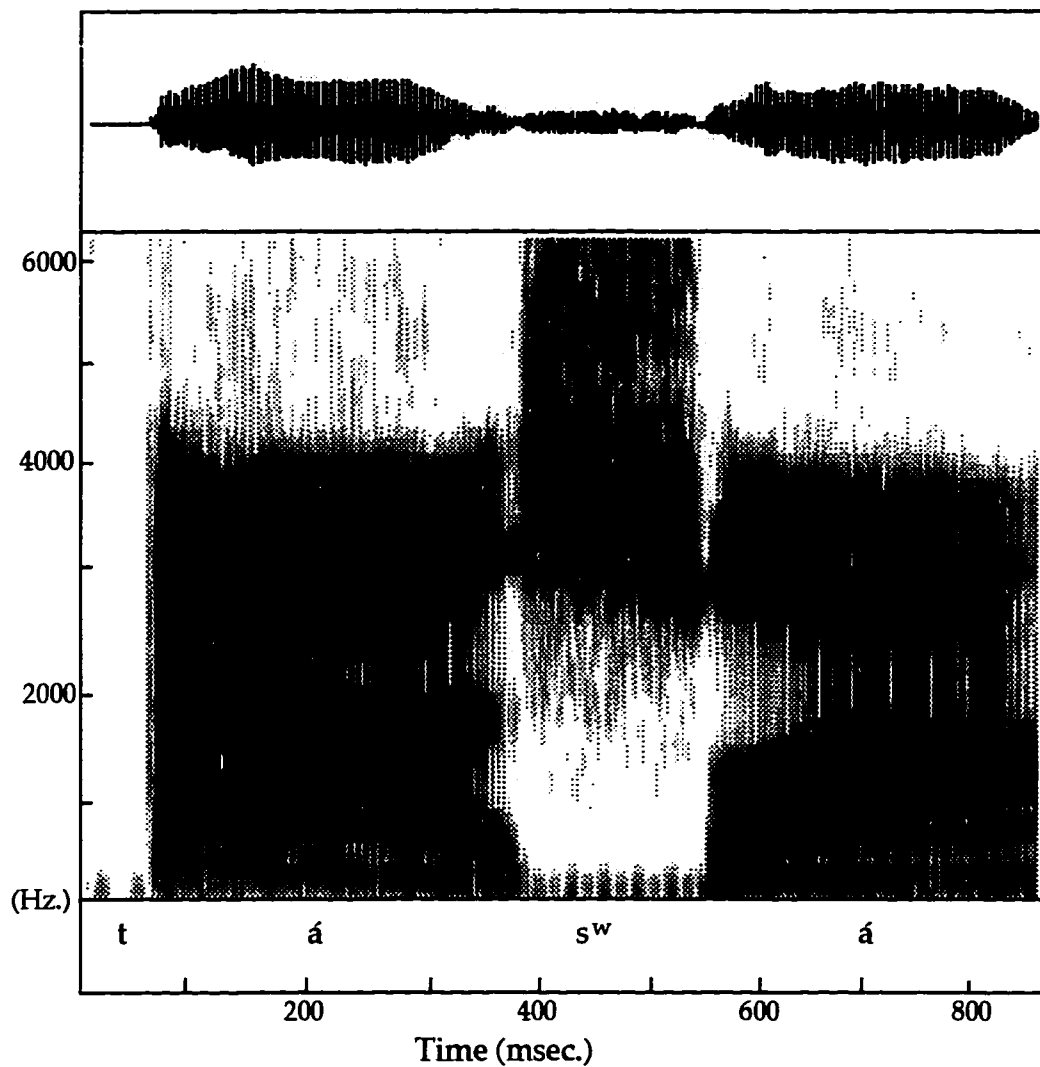


Figure 2.10. Waveform and spectrogram of /tás^wá/ 'mount' illustrating the voiceless labialized alveolar fricative /s^w/.

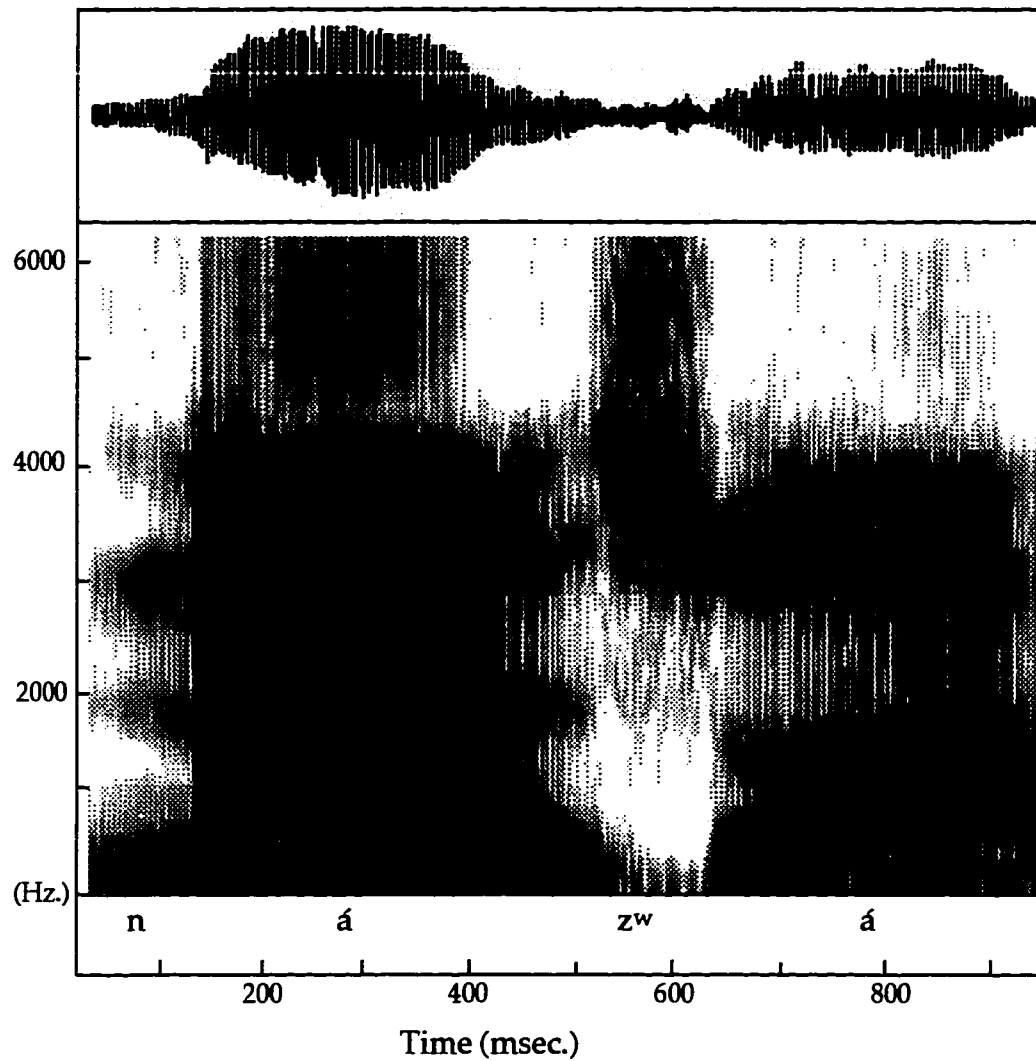


Figure 2.11. Waveform and spectrogram of /názwá/ 'lick' illustrating the voiced labialized alveolar fricative /z^w/.

2.1.2.7 Breathy voice consonants

The final set of sounds also found in Ikalanga are the breathy voice consonants /p^h, t^h, f^h, t̪^h, ts^h, k^w, w^h/. Of these seven breathy voice consonants, only the glottal fricative /f^h/ is given in Chebanne et al. (1995) who transcribe it as /h^w/. These consonants share a similar derivational history from Proto-Bantu *NC sequences and are distinguished from the regular consonants with a similar place of articulation in this language by their behavior in relation to tones. I defer discussion of these breathy consonants until Chapter Six. Below, I give words with these consonants to illustrate.

(24) Words with breathy consonants

p ^h andé	'applause; clap of hands'
t ^h úla	'fruit of sclerocarya caffra tree'
f ^h álí	'pot'
t̪ ^h é̃t̪é̃	'skunk'
ts ^h íngá	'veins'
k ^w íza	'giraffe'
w ^h alí	'partridge'

In view of the above conclusions, I propose a revised consonant inventory for Ikalanga, as shown in Table 5.

Table 5. Proposed Ikalanga Consonant Inventory

	Labial	Labio-dent.	Dent.	Alveo.	Palato-alveo.	Pal.	Labio-velar	Velar	Glott.
Stops:									
<i>plain</i>	p b		t d	d				k g	
<i>aspirated</i>	p ^h <p ^h >		t ^h	t ^h <t ^h >				k ^h	
Velarized stops	p ^h b ^g								
Fricatives:									
<i>plain</i>		f v		s z	ʃ ʒ				<fi>
Affricates:									
<i>plain</i>	(ps) (bz)		(ts) (dz)		(tʃ) (dʒ) <tʃ ^h >				
<i>aspirated</i>			t ^h <t ^h >						
<i>glottal</i>					(tʃ ^g)				
Nasals:	m			n		ɲ		ŋ	
Prenasals:									
<i>stops</i>	mb			nd				ŋg	
<i>affricate</i>					ndʒ				
Labialized:									
<i>stops</i>				d ^w				k ^w g ^w	
<i>lab. asp.</i>				(t ^{hw})				k ^{hw} <k ^{wfi} >	
<i>affricates</i>			t ^{hw} (dz ^w)						
<i>nasal</i>								ŋ ^w	
<i>prenasal</i>								ŋg ^w	
<i>fricative</i>				s ^w z ^w	ʃ ^w				
Trill:				r					
Lateral:				l					
Approx.	v					j	w <w ^{fi} >		

We observe in Table 5 that Ikalanga has a large consonant inventory of altogether fifty-nine (59) consonants.⁹ Of the fifty-nine consonants given, the four marginal consonants are given in parenthesis and the breathy voiced consonants are given in triangular brackets < >. In order to illustrate that Ikalanga consonants in Table 5 are phonemically distinctive, in (25) I give some minimal pairs (ignoring tone which is not relevant).

(25) Ikalanga Minimal Pairs

pika	'carry piggyback'	/p/	bika	'cook'	/b/
pap ^h a	'increase'	/p/	p ^h áp ^h á	'chop'	/p ^h /
túla	'put down'	/t/	t ^h úlá	'kick'	/t ^h /
ḍuma	'roar'	/ḍ/	duma	'agree'	/d/
kuṭa	'be sulky'	/k/	k ^h uṭa	'miss'	/k ^h /
kula	'clear grass'	/k/	gula	'field in fallow'	/g/
fúlá	'blow air'	/f/	vúlá	'water'	/v/
bambá	'famine'	/b/	vambá	'bitch'	/v/
vala	'read'	/v/	vala	'dress-up'	/v/
sévá	'backbite'	/s/	lévá	'tell'	/l/
ŋ ^w ezí	'guest'	/z/	ŋ ^w ení	'owner'	/n/
ʒala	'hunger'	/ʒ/	ʒala	'choose'	/ʒ/
fiálí	'pot'	/fi/	w ^f alí	'partridge'	/w ^f /
psá	'burn'	/ps/	pá	'give'	/p/
b̄za	'belch'	/b̄z/	g ^w a	'fight'	/g ^w /
kátsi	'cat'	/ts/	kápi	'baby's bonnet'	/p/
t̄ ^h amba	'step on'	/t̄ ^h /	lamba	'refuse'	/l/
kud̄zá	'until'	/ḍz/	kud̄zá	'to eat'	/ḍz/
t̄jílá	'live'	/t̄j/	d̄zílá	'cloth'	/ḍz/
mat̄jílá	'materials'	/t̄j/	mat̄jíla	'you lived'	/t̄j/

⁹ Note that four borrowed segments from Tswana /t̄, t̄^w, x, x^w/ are not included in the above chart. Below I give some borrowed words in which these sounds occur.

li-uat'í	'door'
t ^w áéla	'be used to'
xáxámála	'be tight'
i-x ^w abá	'biltong (beef jerky)'

mú má	'shut one's mouth'	/m/	lú má	'bite'	/l/
lapa	'cure'	/n/	lamba	'refuse'	/mb/
ṅó tá	'thirst'	/ɲ/	pó tá	'be cold'	/p/
ṅombe	'cattle'	/ŋ/	lombe	'singer'	/l/
ṗ ^h á	'dry up'	/ṗ ^h /	t ^{hw} á	'spit'	/t ^{hw} /
ḅgilíla	'go back'	/ḅg/	w ^h ilíla	'listen'	/w ^h /
p ^h ázá	'forehead'	/p ^h /	pázá	'have diarrhoea'	/p/
ndá	'lice'	/nd/	ḍá	'love'	/ḍ/
ṅgano	'folktales'	/ŋg/	mbano	'firstborn child'	/mb/
lu-ndḗzǐ	'needle'	/ndḗzǐ/	lu-ḍzǐ	'right hand''	/ḍzǐ/
d ^w a	'come from'	/d ^w /	g ^w a	'fight'	/g ^w /
k ^w ííla	'mate'	/k ^w /	s ^w ííla	'intercourse'	/s ^w /
ŋ ^w anga	'scratch'	/ŋ ^w /	ŋanga	'doctor'	/ŋ/
s ^w ina	'squeeze'	/s ^w /	z ^w ina	'close (container)'	/z ^w /
ʃ ^w aja	'poke'	/ʃ ^w /	ʃaja	'be without'	/ʃ/
ṡ ^{hw} aja	'brand mark'	/ṡ ^{hw} /	k ^{hw} aja	'pound softly'	/k ^{hw} /
ṅg ^w e	'tiger'	/ŋg ^w /	be	'honeycomb'	/b/
mejá	'spirit'	/j/	mela	'sprout'	/l/
rǐjá	'delay'	/r/	pǐjá	'trip s.o.'	/p/

From the above, I conclude that the above Ikalanga consonants are phonemically distinctive.

2.2 Distributional analysis of Ikalanga inventory

This section looks at the phonology of Ikalanga segments and the phonotactics found in their distribution within roots. As would be expected in a language with a large inventory, some restrictions are found as to what segment can occur with another segment within a word. However, many consonants show a wide distribution throughout the language with few or no restrictions at all. I begin by looking at the vowels.

2.2.1 Vowels

As was shown in §2.1.1, Ikalanga has a simple five vowel system consisting of the vowels /i, e, a, o, u/. Although there are cases (shown below) where some of these vowels occur alone in a V syllable (i.e. without an onset), generally all vowels occur in CV syllables. Below, I look at the phonology of these five vowels.

2.2.1.1 Vowel /i/

The high front vowel /i/ is in contrast with the other four vowels in this language as seen in (26) below.

(26)	sika	'create fire'
	seka	'laugh'
	vila	'boil'
	vala	'count'
	uiga	'put'
	uoga	'alone (pl.)'
	vila	'boil'
	vula	'intestine'

/i/ occurs after most consonants in C1 position except the voiceless aspirated dental stop /tʰ/, the voiced alveolar stop /d/, (which occurs only before the back round vowel /u/), and the breathy voiced glottal fricative /ɦ/, (which is found only in C1 position or after the labialized palato-alveolar fricative /ʃʷ/). In addition, /i/ is not found after velars /k, g/ in this position, possibly because of velar softening discussed in §3.4 in Chapter Three. Furthermore,

this vowel does not occur after the labialized affricates /tʰw, dʒw/, which sounds only occur before the low vowel /a/. /i/ occurs in all positions in Ikalanga verb and noun roots, that is, in V1, V2 and V3 positions. (27) below gives examples of nouns and verbs with this vowel in different syllable positions.

(27)a. Nouns

símbá	'wild cat'
ŋ-kádzi	'woman'
sávási	'red clay'

b. Verbs

lima	'cultivate'
lavila	'taste'
ŋaŋajidza	'deny'

/i/ is very rare after a velar nasal /ŋ/ in both C1 and C2 positions in both nouns and verbs. Of the thirty-one (31) words with the velar nasal, only one word ŋína 'earring' was found where /i/ follows a velar nasal.

2.2.1.2 Vowel /e/

As was shown in §2.1.1, /e/ is a mid front vowel. It is also in contrast with the other four vowels, as shown in (26) above and (28) below.

(28)	téngá	'buy'
	táŋgá	'be first'
	léuá	'tell'
	lóuá	'beat'
	seka	'laugh'
	suka	'wash'

/e/ is found after most consonants in the inventory except the voiced alveolar stop /d/, the breathy glottal fricative /ɦ/ and the velar nasal /ŋ/ (see §2.2.1.1). In addition, this vowel does not occur after the marginal phonemes, namely; the complex affricates /ps̄, b̄z/, the apical /t^{hw}/ and the glottalized palato-alveolar affricate /tʃ̣/. /e/ also occurs in V1, V2 and V3 positions in both verb and noun roots, as illustrated in (29) below.

(29)a. Nouns

mbézo	'adze'
golé	'year; cloud'
fúlélé	'mist'

b. Verbs

peṭa	'fold'
emula	'envy'
ṭovela	'follow'
pótéléka	'surround'

/e/ is rarely found in root final position (in noun roots) preceded by an alveolar nasal /n/. Only one example is found in the database with this sequence, namely; p^hené 'deer'.

2.2.1.3 Vowel /a/

/a/ is a low central vowel (see §2.1.1), in opposition with the other four Ikalanga vowels. (30) illustrates this contrast (see §2.2.1.1 and §2.2.1.2 above for other examples).

(30)	vala	'read'
	vola	'rot'
	ḍála	'receptive for corn'
	ḍúla	'granary'

/a/ is found after most of the Ikalanga consonants except the prenasalized palato-alveolar affricate /nd͡ʒ/. It is found in all positions within noun and verb roots. (31) gives some examples from both nouns and verbs to illustrate.

(31)a. Nouns

ʃángo	'country'
bakasa	'wooden fence'
símbá	'wild cat'

b. Verbs

kámá	'milk'
nángájíla	'walk'
ambula	'undress'
gáḍzikana	'be calm'

2.2.1.4 Vowel /o/

The mid back vowel /o/ is a round vowel, also in contrast with the other four vowels in this language, as shown in (32) below (see above for other examples).

(32)	gombo	'threshing stick'
	gumbo	'leg'

Unlike the front vowels /i, e/ and the low vowel /a/, back vowels have more restrictions in their distribution. The vowel /o/ never occurs after any labialized consonant including the doubly articulated velarized stops /p^h, b^g/

in this language.¹⁰ In addition to these, this vowel is also not found after the dental affricate /tʃ/. In all the thirteen (13) roots in the database with this dental affricate, it only occurs before non-back vowels /i, e, a/. Only one example could be found in which /o/ is preceded by the prenasalized affricate /ndʒ/, namely; ŋi-vandʒoro ‘African violin’. (33) gives examples of verb and noun roots and we observe this vowel in V1, V2 and V3 positions.

(33)a. Nouns

ŋombe	‘cattle’
baŋgo	‘log’
ndóvólo	‘marriage’

b. Verbs

vóná	‘see’
ʃokola	‘harvest’
soḏzólóka	‘slip, as on slippery surface’

2.2.1.5 Vowel /u/

The high back vowel /u/ is also a round vowel. As shown above, it is also in contrast with the other vowels in this language. Like the mid back vowel /o/, /u/ does not occur after labialized consonants, the doubly articulated velarized stops /p^h, b^g/, the prenasalized affricate /ndʒ/ and the dental affricate /tʃ/. In addition to these, no examples were found in which this vowel is preceded by the voiceless aspirated dental stop /t^h/. It is also

¹⁰ See Chapter Five below on Velarization for the historical explanation why back round vowels are not found after labialized consonants and the doubly articulated velarized stops in Ikalanga.

found in V1, V2 and V3 positions in both noun and verb roots, as seen in (34).

(34)a. Nouns

fúpá	'bone'
góvu	'greedy person or thing'
ʔi-vúlúlu	'brown lizard'

b. Verbs

tʰúmá	'sew'
pálúla	'tear; rip apart'
naluluka	'rest'

Tables 6-9 summarize the distribution of Ikalanga vowels after different consonants in C1 position. Note that the breathy consonants have the same distribution as their regular counterparts, as such, they are not considered separately in these Tables. I have also left out the marginal phonemes because the few words in which these phonemes are found are already given in §2.1.2 showing the vowel types with which they occur.

Table 6. Vowel distribution after stops

	p	b	t	d	d	k	g	p ^h	t ^h	t ^h	k ^h
i	+	+	+	+	-	-	-	+	-	+	+
e	+	+	+	+	-	+	+	+	+	+	+
a	+	+	+	+	-	+	+	+	+	+	+
o	+	+	+	+	-	+	+	+	+	+	+
u	+	+	+	+	+	+	+	+	-	+	+

Table 7. Vowel distribution after fricatives and affricates

	f	v	s	z	ʃ	ʒ	fi	ts	dz	ts ^h	tʃ	dʒ
i	+	+	+	+	+	+	-	+	+	+	+	+
e	+	+	+	+	+	+	-	+	+	+	+	+
a	+	+	+	+	+	+	+	+	+	+	+	+
o	+	+	+	+	+	+	+	-	+	+	+	+
u	+	+	+	+	+	+	+	-	+	+	+	+

Table 8. Vowel distribution after nasals, prenasalized segments, trill, lateral and approximants

	m	n	ɲ	ŋ	mb	nd	ŋg	ndʒ	r	l	ʋ	j	w
i	+	+	+	-	+	+	+	+	+	+	+	-	+
e	+	+	+	-	+	+	+	+	+	+	+	+	+
a	+	+	+	+	+	+	+	+	+	+	+	+	+
o	+	+	+	+	+	+	+	+	+	+	+	+	+
u	+	+	+	+	+	+	+	-	+	+	+	-	+

Table 9. Vowel distribution after labialized and doubly articulated segments

	d ^w	k ^w	g ^w	k ^{kw}	ts ^{hw}	dz ^w	s ^w	z ^w	ʃ ^w	ŋ ^w	ŋg ^w	pk ^h	bg
i	+	+	+	+	-	-	+	+	-	+	+	+	+
e	+	+	+	+	-	-	+	+	+	+	+	+	+
a	+	+	+	+	+	+	+	+	+	+	+	+	+
o	-	-	-	-	-	-	-	-	-	-	-	-	-
u	-	-	-	-	-	-	-	-	-	-	-	-	-

2.2.2 Cooccurrence patterns of vowels in stems

I begin by looking at the cooccurrence patterns of Ikalanga vowels in bisyllabic noun stems. We observe in Table 10 below that all the possible twenty-five (25) vowel patterns are found in Ikalanga. Even though other patterns have a larger distribution than others, it is obvious from the Table that disyllabic noun roots in Ikalanga allow all the possible vowel patterns.

Note that C in both Tables 10 and 11 stands for any consonant.

Table 10. Distribution of vowels in disyllabic noun roots

Vowel Patterns	No. of noun roots	Examples
CiCi	47	síndí 'squirrel' g ^w ilí 'potato'
CiCe	6	ŋ ^w isé 'tail' sije 'eyebrow'
CiCa	47	ḍij ^w á 'grass' ḍʒilá 'cloth'
CiCo	42	vu-ŋíló 'life' s ^w ímbó 'club'
CiCu	3	vu-síku 'night' ma-sítú 'soot'
CeCi	27	i-kéji 'yoke-pin' ŋí-léji 'sledge'
CeCe	47	bepe 'calabash' zevé 'ear'
CeCa	24	ŋemba 'beans' ŋedzá 'light'
CeCo	31	mbezo 'adze' li-peṭo 'hem'
CeCu	13	ndedu 'beard' vu-lélú 'lightweight'
CaCi	58	ḍáuí 'branch' g ^w aṭí 'tree bark'
CaCe	20	m-pale 'dried melon' p ^f andé 'clap of hands'

Vowel Patterns	No. of noun roots	Examples
CaCa	136	vanga 'scar' badzá 'hoe'
CaCo	45	ŋi-báko 'snuffbox' jambo 'wild dog'
CaCu	20	li-vadu 'rib' bapú 'lung'
CoCi	25	n-ŋódzi 'tear' li-voni 'lamp'
CoCe	23	ḍope 'mud' golé 'year'
CoCa	28	góla 'vulture' londa 'sore'
CoCo	54	ḍongo 'ruin' nóngó 'groundnut'
CoCu	8	ʒou 'elephant' p ^h óu 'ostrich'
CuCi	34	mbúdzí 'goat' ḍuní 'mortar'
CuCe	12	vuwe 'gad fly' vu-kúse 'fur'
CuCa	44	vula 'intestine' gunda 'owl'
CuCo	27	buzo 'question' vúndó 'pleat'
CuCu	42	ḍútu 'strong wind' ḍzúngu 'dizziness'

From the Table we observe that CiCu roots are very few with only three examples found in the database. From the above figures, /a/ is the most common vowel in this language, in both the V1 and V2 positions. However, a different behavior is observed in the case of trisyllabic verb roots, where, as in bisyllabic noun roots, only two vowels participate in the vowel patterns, that is, the first two vowels in the root. As mentioned above, all Ikalanga

verbs, except those in the subjunctive forms in which the final vowel is -e, end in the final vowel -a. As a separate morpheme, this final vowel does not participate in the vowel patterns found in these verb roots. As a result, it is simply left out in the trisyllabic verbs considered below. Table 11 below shows the cooccurrence distribution of vowels in trisyllabic verb roots and we observe some restrictions between the corner vowels /i, u, a/ and the mid vowels /e, o/.

Table 11. Distribution of vowels in trisyllabic verb roots

Vowel Patterns	No. of verb roots	Examples
CiCiC	39	mílíka 'stand-up' ḍzimúla 'get lost'
CiCeC	0	
CiCaC	9	tʰígáma 'kneel' vígápa 'bury'
CiCoC	0	
CiCuC	6	piṭula 'turn over' símúla 'up-root'
CeCiC	0	
CeCeC	34	pépéta 'winnow' lévésa 'be truthful'
CeCaC	9	lé mála 'be disabled' ʃ ^w eʃ ^w ana 'be creased'
CeCoC	0	
CeCuC	20	ḥévuúka 'look back' ḍeluka 'descend'
CaCiC	40	ḍavúla 'answer' pśájíla 'sweep'
CaCeC	5	p ^h arela 'plaster' náméla 'disappear'
CaCaC	29	kánḡán ^w a 'forget' lavana 'alternate'

Vowel Patterns	No. of verb roots	Examples
CaCoC	0	
CaCuC	36	pálúla 'tear' ʃakula 'weed'
CoCiC	0	
CoCeC	16	ʃowela 'tuck in' voneka 'light'
CoCaC	1	koʃama 'bend over'
CoCoC	39	kólóʃa 'owe' koʃoka 'arrive'
CoCuC	0	
CuCiC	26	sumbika 'conceal' fúmíka 'cover'
CuCeC	0	
CuCaC	7	kúvála 'be injured' wuvama 'lean forward'
CuCoC	0	
CuCuC	44	ʃúlúka 'jump' bukuʃa 'swim'

As the zeros indicate, not all the vowel patterns are found in the verbal database. The unattested patterns violate the harmony patterns permitted by this language. Ikalanga, like many Bantu languages, has vowel harmony in its verb roots whereby the corner vowels do not cooccur with the mid vowels (see also Mtenje (1985) on Chichewa). (35) gives the eight (8) vowel patterns not permissible in Ikalanga verb roots.

(35) Impermissible vowel patterns in trisyllabic verb roots

- a. *CiCoC
- b. *CeCoC
- c. *CoCiC
- d. *CoCuC
- e. *CuCoC
- f. *CaCoC
- g. *CiCeC
- h. *CeCiC
- i. *CuCeC

Just as in other Bantu languages, we observe the asymmetric nature of vowel harmony in Ikalanga. As a result, Ikalanga forbids patterns such as *CeCoC in (35b) which is not in violation of the harmony patterns, while allowing patterns such as CoCaC and CeCuC, which violate the harmony patterns expected. Only one exceptional case is found which violates of the expected harmony, as shown in (36) below¹¹.

(36) CaCeC (5 examples)

Similar vowel harmony patterns are found in trisyllabic nouns where the first two vowels agree in harmonic height, as seen in (37).

(37) Vowel harmony in trisyllabic noun roots

<u>Noun</u>	<u>Gloss</u>	<u>Vowel Patterns</u>
bapiro	'bird wing'	CaCiCo
ɲéɲédzɪ	'star'	CeCeCi
vu-tʃéndzédú	'wisdom'	CeCeCu
i-kókólá	'elbow'	CoCoCa
lu-volelá	'bee sting'	CoCeCa
i-tʰítʰínó	'heel'	CiCiCo

With the exception of (36) above, I therefore conclude that vowel harmony exists in Ikalanga verb roots and trisyllabic noun roots. However, vowel

¹¹ It is not clear if the roots with this pattern are borrowings from other languages or not.

harmony in Ikalanga is not just confined to roots, it also occurs in verb stems, that is, a verb root + extensions, excluding the final vowel which, as mentioned above, is irrelevant to harmony. I turn to these verbal extensions in the following section.

2.2.2.1 Vowel Harmony in Verb Stems

Vowel harmony is an interesting process which has generated a lot of interest in phonological theory in the past two decades. It is a process common to a number of the world's languages both within and outside the Bantu family. A lot of studies have been carried out on vowel harmony cross linguistically from different theoretical viewpoints. The object of this section though, is not to go into the merits and demerits of the different frameworks under which this process has been analyzed in the literature. Nor does the case of vowel harmony in Ikalanga present any novel challenges to the literature. Rather, the present discussion is intended as a documentation of another example of vowel harmony in Bantu.

Bantu vowel harmony can be traced back to Proto-Bantu. As observed in Greenberg (1951), roots with mixed vowels from different levels were almost non-existent in Proto-Bantu. A vowel of a higher level got lowered if the preceding vowel were of a lower level and vice-versa. As Greenberg further notes, vowel harmony in Bantu is not just restricted to verbal suffixes, Proto-Bantu noun roots also did not have mixed vowels. Likewise,

as shown in the preceding section, vowel harmony in Ikalanga is found in both verb and noun roots.

As seen in the preceding section, Ikalanga vowels divide into two sets for purposes of harmony, that is, the corner vowels /i, u, a/ tend to occur together in verb roots and the mid vowels /e, o/ group together, too. Thus, with the exception of those verb roots with the patterns given in (36) above, most verb roots in Ikalanga do not allow mixed vowels from these two harmonic sets. (38) and (39) illustrate the two different vowel harmony patterns found in Ikalanga polysyllabic verb roots.

(38) Corner vowels in polysyllabic verb roots

- | | | |
|----|-------------------------|-----------------|
| a. | fúlúk-a | 'migrate; move' |
| | mílík-a | 'stand up' |
| | ʃaŋgan-a | 'meet' |
| | kúmbíl-a | 'request' |
| | vambul-a | 'crucify' |
| b. | vákílíl-a | 'fence in' |
| | fúmbáʃíl-a | 'close fist' |
| | ʃaluluk-a | 'rest' |
| | ʃút ^h umál-a | 'be elevated' |

(39) Mid vowels in polysyllabic verb roots

- | | | |
|----|-------------|----------------------|
| a. | ɲólódz̄-a | 'moisten' |
| | ʃéndék-a | 'point' |
| | ʃovel-a | 'follow' |
| | sendedz̄-a | 'kindle fire' |
| b. | póʃélék-a | 'circle' |
| | wómélél-a | 'become dry; harden' |
| | lembelek-a | 'dangle; hang' |
| | sodz̄olok-a | 'glide' |

However, vowel harmony also occurs in verbal suffixes. In addition to occurring with the subject agreement marker and a tense marker, both of which do not participate in vowel harmony, an Ikalanga verb, as in most Bantu languages, can also occur with a number of extensions or suffixes. It has been observed that only the underlying high and low vowels appear in these suffixes (Goldsmith 1985). However, the vowel of the verbal suffix always harmonizes with that of the verb root in the surface forms. The verbal suffixes commonly considered in the literature are the applicative suffix -il- ‘for/to/at’, the causative suffix -is-, the reciprocal suffix -an-, the passive -w-/-iw- and the intensive suffix -IS- which has the same phonological shape as the causative suffix (hence given here in the upper case). (40) gives some examples of verbs with the applicative and causative suffixes respectively to illustrate.¹²

(40) Vowel harmony in verb stems

a. <u>Verb root</u>	<u>+ Applicative</u>	
lil-a	lil-il-a	‘cry for/at’
kúmbúl-a	kúmbúl-íl-a	‘think for/at’
ʃaŋgan-a	ʃaŋgan-il-a	‘meet for/at’
<u>tól</u> -a	<u>tól-él</u> -a	‘take for’
pépét-a	pépét-él-a	‘winnow for’
kókódz-a	kókódz-él-a	‘knock for’

¹²Note that these suffixes are underlyingly toneless, thus the High tone on these suffixes when they are attached to H tone verb roots is a result of high tone spreading rules discussed in Chapter 7.

b.	<u>Verb root</u>	<u>+ Causative</u>	
	lim-a	lim-is-a	'cause to cultivate'
	ʃúlúk-a	ʃúlúk-ís-a	'cause to jump'
	ʃangʒa-a	ʃangʒa-is-a	'cause to mix'
	pos-a	pos-es-a	'cause to throw'
	kóʃól-a	kóʃól-és-a	'cause to cough'
	sendedz-a	sendedz-es-a	'cause to kindle fire'

But in cases where the verb roots have mixed vowels, it is the last vowel in the root which determines the harmony, as shown in (41) below.

(41) Harmony conditioned by the root final vowel

a.	<u>Verb root</u>	<u>+ Applicative</u>	
	koʒam-a	koʒam-il-a	'bend for/ onto'
	p ^h arel-a	p ^h arel-el-a	'plaster for'
	ɖeluk-a	ɖeluk-il-a	'descend by/ onto'
	lémál-a	lémál-íl-a	'be injured at'
b.	<u>Verb root</u>	<u>+ Causative</u>	
	koʒam-a	koʒam-is-a	'cause to bend over'
	p ^h arel-a	p ^h arel-es-a	'cause to plaster'
	ɖeluk-a	ɖeluk-is-a	'cause to descend'
	lémál-a	lémál-ís-a	'cause to be injured'

More than one verbal suffix can occur within a stem at the same time subject to some morphotactic constraints on the ordering which are not the concern of this study. When a verb stem has more than one suffix, we observe that the vowel harmony spreads throughout all the suffixes, as shown in (42) below.

(42)	<u>Verb root</u>	<u>+ Caus. + Appl.</u>	<u>Gloss</u>
a.	súŋg-á	súŋg-ís-íl-a	'cause to tie at'
	ʃuʃum-a	ʃuʃum-is-il-a	'cause to boil onto/ for'
	ɖavíl-a	ɖavíl-ís-íl-a	'cause to answer for/ at'

b.	ṭjék-á	ṭjék-és-él-a	'cause to cut at/for'
	bóm-á	bom-és-él-a	'cause to smear at'
	pépét-a	pépét-és-él-a	'cause to winnow at/for'

The following conclusions can be made from the above examples in (38) - (42): vowel harmony in Ikalanga verb stems is root controlled in that the harmonic value of the suffixes is determined by that of the root. As a result, the harmonic feature spreads from left to right. In addition, evidence from those examples where vowels from the two harmonic groups cooccur in a single root show that it is the root-final vowel that conditions the harmonic value of the suffixes.

A different situation emerges, though, when the reciprocal suffix -an- is attached to these verb roots. In this case we observe the failure of the corner vowel /a/ to harmonize with the vowel of the verb root. This shows that the vowel /a/ is opaque in that it fails to undergo harmony when the vowel in the root is a mid vowel. (43) and (44) illustrate this point.

(43) Reciprocal suffix -an-

<u>Verb root</u>	<u>+ Reciprocal</u>	<u>Gloss</u>
ambul-a	ambul-an-a	'undress each other'
sumbik-a	sumbik-an-a	'conceal each other'
ṭjúlúk-a	ṭjúlúk-án-a	'jump (over) each other'
mílídž-a	mílídž-án-a	'lift each other'

(44)	pótélék-a	pótélék-án-a	'circle each other'
	pélék-a	pélék-án-a	'accompany each other'
	ṭjéngél-a	ṭjéngél-án-a	'cheat each other'
	wólót-a	wólót-án-a	'dream each other'

When the reciprocal suffix is preceded by a mid vowel in the root and followed by another suffix, we observe that not only does its vowel fail to

harmonize with the preceding vowel of the root, but it also act as an initiator of a new vowel harmony pattern, as seen in (45).

(45) /a/ initiates a new harmony pattern

<u>Root</u>	<u>+ Rec. + Appl.</u>	<u>Gloss</u>
tém-á	tém-án-íl-a	'chop each other for/at'
bóm-á	bom-án-íl-a	'smear each other for/at'
t̥jéŋgél-a	t̥jéŋgél-án-íl-a	'cheat each other for/at'
t̥ovel-a	t̥ovel-an-il-a	'follow each other for/at'

The corner vowel /a/ initiates a new harmony pattern in the sense that only another corner vowel, in this case /i/ can occur in the suffix following the reciprocal.

2.2.3 Distribution of Ikalanga Consonants

In this section I look at the distribution of the main consonantal phonemes of Ikalanga, given in Table 5 above.

2.2.3.1 Position in a syllable

As in most Bantu languages, Ikalanga has a (C)V syllable structure. A syllable may also be made up of a syllabic nasal, which is tone bearing. This is the case in nouns of the classes 1 and 3 prefixes and the third person pronoun. Besides these syllabic nasals, all the consonants in this language can occur as onsets to syllables subject to the restrictions on vowels shown in Tables 6-9

above. Since Ikalanga does not have any closed syllables, no consonants can occur word- or syllable final.¹³

2.2.3.2 The Aspirates

As shown in §2.1.2, Ikalanga has aspirated stops /p^h, t^h, k^h/ in its consonant inventory. Like the rest of the consonants, they can occur as onsets to syllables word initially and medially subject to restrictions with vowels

¹³ A few words exist though which have a nasal which, at first glance, appears to either form the coda of the preceding syllable or form a cluster with the following consonant. I give the seven (7) words with this structure below and their noun classes which may be the explanation to their syllable structure and morphology (see §2.3.1 on Ikalanga noun class system).

mánlémbe	'bat (bird)	class 7/2a
mánk ^{hw} ana-fiá lí	'praying mantis'	Cl. 7/2a
mánk ^{hw} ak ^w arara	'cricket'	Cl. 7/2a
mánngóví	'snail'	Cl. 7/2a
mánsundze	'black ant'	Cl. 7/2a
mántok ^w é	'honey by black bees'	Cl. 7/2a
mánt ^h úmbe	'type of insect'	Cl. 7/2a

We observe that in the singular, these nouns belong in class 7 associated with names of things, while in the plural they belong in class 2a associated with kinship terms and personal names. Closer examination, however, reveals that these words have double prefixes má- 'mother of' normally prefixed before the name of child and used to call its mother to show respect, and the class 1 prefix n-, which is a syllabic nasal and in this case used in the formation of nouns of class 1 from verbs. As a result this nasal does not form a coda of the preceding syllable nor does it form a cluster with the following consonant. The prefix má- is also used in the language to mean 'one who has or one who does something'. It seems that this is the meaning adopted in these nouns. Thus, the formation of these nouns with prefixes normally used on human beings only explains why they take the class 2a prefix in the plural, while in the singular they belong in class 7 because they refer to non-human things. The following illustrate the morphology of some of these nouns with the literary meaning given.

- a. má- n- lémbe (lémbe < lembeleka 'hanging down') 'one who is a dangler' (referring to the posture of a bat when it is resting, ie. hanging upside down.
- b. má- n- k^{hw}ana- fiá lí 'one who is a breaker of pots'
- c. má- n- k^{hw}ak^warara 'one who makes the crickets noise'
- d. má- n- t^húmbe (t^húmbe < t^humba 'a dwelling') 'one who is carrying its dwelling' This type of insect always moves around carrying its cocoon.

Thus, to explain the syllable structure of these nouns we have to be familiar with the morphology and as well as the semantics of noun class prefixes.

discussed in §2.2.1. In addition they can occur with most of the consonants within a word. Exceptions are those consonants that have a restricted distribution themselves such as the voiced alveolar stop /d/ and the doubly articulated velarized stops /p̄k̄^h, b̄ḡ/. However, it appears to be a general rule in Ikalanga that aspirates do not cooccur within a word, a pattern resembling Grassman's Law as it applies to Proto-Indo-European developments in Sanskrit and Greek. The few examples in which more than one aspirate occur in a word are mainly borrowings from neighbouring languages or from English. (46) gives these examples; where a word is a borrowing, the language of origin is also given. The number of examples found is also given alongside which shows how rare such combinations are in Ikalanga.

(46)a. Words with double apical aspirates /t̄^h, t̄^h/ (2)

<u>Word</u>	<u>Gloss</u>	<u>Language of origin</u>
t̄ ^h á ^h úuo	'examination'	Tswana
ma-t̄ ^h á ^h á	'problems'	Tswana

b. Words with double labial aspirate /p̄^h/ (3)

p̄ ^h ájip̄ ^h i	'pipe'	English
p̄ ^h up̄ ^h uma	'bubble over; froth'	Zulu
p̄ ^h áp̄ ^h á	'chop'	

c. Words with double velar aspirates /k̄^h/ (1)

ma-k̄ ^h ék̄ ^h é	'dornuts'	
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Note that the word p̄^háp̄^há 'chop' in (b) seems to be onomatopoeic, an imitation of the sound made by an axe when someone chops wood.

2.2.3.3 The Apicals

As shown in the consonant inventory (see §2.1.1), Ikalanga has both the dental and the alveolar apicals. While most of these apicals do not have any restrictions in their distribution, the voiced alveolar stop /d/ has a restricted distribution. In the first place, this apical is found in a few words in the database (see Appendix C), and only before a back round vowel /u/. Altogether sixteen (16) words were found in the database with this consonant in C1, C2 and C3 positions. I give these words in (47) below. Note that in (47a) where this consonant occurs in C1 position that four of the examples are actually derived from one root.

(47)a. /d/ in C1 position

duma	'agree'
dumila	'believe, as in God'
dumilila	'permit; allow'
dumano	'agreement'
dumilano	'mutual agreement'
duvika	'immerse; dip'
duvula	'take out of some liquid'
dukud̄za	'shake off, as dust'
n-dumbí	'a drizzle; continuous rain'
n-dumíla	'type of tree'

b. /d/ in C2 position

mbadu	'ribs'
ṽi-ledu	'chin'
ndedu	'beard'
sudu	'maize cob'
kodú	'thick; fat'

c. /d/ in C3 position

vu-ṽend̄zédú	'wisdom'
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No examples could be found before the other four vowels in this language (see Table 6 in §2.2.1 above for the distribution of vowels after stop consonants).

2.2.3.4 The Bilabial Approximant /v/

The bilabial approximant /v/ is a very common consonant in Ikalanga. Historically, this bilabial approximant is derived from Proto-Bantu *b. This explains why the voiced bilabial stop /b/ is not common in Ikalanga compared to /v/. In addition to occurring with all the five vowels in the language, /v/ also cooccurs with the other consonants within words in all syllable positions in words. However, it is very rare to find words in which it cooccurs with the voiced bilabial stop /b/ possibly because of its historical origin mentioned above. Only one compound word was found in the database in which both sounds cooccur and that is, buú-zebé 'deaf person'. Also, the bilabial approximant alternates with the voiced bilabial stop /b/ when preceded by a nasal.

In addition, this approximant is rarely found in the same word with the voiced labio-dental fricative /v/. Only three examples in which these two consonants cooccur could be found in the database. (48) below gives these three words to illustrate.

(48) Stems in which /v/ and /v/ cooccur

vu-vavá	'theft'
v uvéla	'ferment'
v uvú	'hippopotamus'

2.2.3.5 Doubly articulated velarized stops / \widehat{pk}^h , \widehat{bg} /

The doubly articulated stops / \widehat{pk}^h , \widehat{bg} / can occur with the three non-back vowels /i, e, a/, a characteristic they share with the labialized consonants in this language. These two velarized consonants are restricted in their distribution in that they occur in a few words in both C1 and C2 positions. Only eight (8) words in the database have the voiceless velarized stop / \widehat{pk}^h / and / \widehat{bg} / is found in fifteen (15) words only. As a result, they cooccur with few other segments. For example, / \widehat{pk}^h / was found to cooccur with five other consonants and these are /t, fi, s, n, l/ while its voiced counterpart cooccurs with five consonants too, that is, /t, d, s, n, l/. (49) and (50) give some examples in which these velarized consonants cooccur with the above consonants.

(49) Words with / \widehat{pk}^h / in C1 and C2 positions

a.	\widehat{pk}^h á	'dry up'
	\widehat{pk}^h ana	'break'
	\widehat{pk}^h izi	'sheep'
	\widehat{pk}^h iṭa	'snatch'

- b. $\widehat{fiap}k^h\acute{a}$ 'armpit'
 $\widehat{lap}k^h\acute{a}$ 'be healed'
 $ma\text{-}\widehat{fap}k^h\acute{a}$ 'tasteless food'

(50) Words with / \widehat{bq} / in C1 and C2 positions

- a. $\widehat{bgil}i\acute{la}$ 'return'
 $m\text{-}\widehat{bgán}áná$ 'puppy'
 $m\text{-}\widehat{bget}i$ 'type of tree'
- b. $\widehat{dab}gá$ 'type of bird'
 $\widehat{deb}ge$ 'leather blanket'

The question of whether these doubly articulated velarized consonants are bisegmental or not is dealt with in §5.5 in Chapter Five.

2.2.3.6 Prenasalized Consonants

As shown in §2.1.1 above, Ikalanga has prenasalized stops /mb, nd, ŋg/ and a prenasalized affricate / \widehat{ndz} / in its consonant inventory. The prenasalized stops can occur in syllables in any position in a word, that is, in C1, C2 and C3 positions. These consonants can cooccur with other consonants within a word subject to some exceptions discussed below.

(a) Prenasalized bilabial stop /mb/:

As shown in §2.2.1, the prenasalized bilabial stop /mb/ can occur with any of the five Ikalanga vowels. This prenasalized stop does not cooccur with any other prenasalized stop within a word. The only exception to this rule are a few compound words given in (51) below.

(51) Cooccurrence of /mb/ in compound words

ambaamba	'grope'
ma-lembélembe	'hangings'
ma-mburumburu	'crumbs'
mundambeli	'totem name for men' (from <u>muenda-mbelí</u> - 'one who goes forward')

In addition, this prenasalized stop does not cooccur with most labialized consonants except the labialized fricatives /s^w, z^w/. However, only ten (10) words were found with this combination and in all these words the labialized fricatives are in C1 position with the bilabial prenasalized stop in C2 position.

(52) illustrates.

(52) z ^w imbíla	'constipate'
z ^w imbá	'swell'
s ^w imbó	'club'
z ^w imba	'hide (n)'
z ^w imbunula	'uncover'

The non cooccurrence of this prenasalized stop (and the other prenasalized stops considered below) within words suggests the application of Meinhof's Rule found in many eastern Bantu languages (Meeussen (1962)). According to this rule, a nasal+stop compound is simplified to a nasal segment when another nasal+stop compound occurs in C2 position. In any case, traces of this rule in Ikalanga can be seen in words where Proto-Bantu had had two nasal+stop clusters. As seen in (53), the first of these clusters changed to a velar nasal.

(53) ŋombe	'cattle'	<	*N-gombe
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(b) Prenasalized alveolar stop /nd/:

This prenasalized stop can also occur with any vowel (see §2.2.1), and no examples could be found where it cooccurs with another prenasalized stop within a word except in very few compounds as shown in (54) below.

(54) Cooccurrence of /nd/ in compounds

ndélúndelu	'very light (in weight)'
maendambelí	'first fruit or harvest'
dinding ^w e	'leopard'

Except for the last example above, no other examples could be found in the database where it cooccurs with labialized consonants in non-derived environments.

(c) Prenasalized velar stop /ŋg/:

Like the other prenasalized stops, /ŋg/ occur with all Ikalanga vowels (§2.2.1).

Likewise, it does not cooccur with any other prenasalized consonant within a word except in a few compound words, as shown in (55) below.

(55) /ŋg/ in compound words

ŋi-ŋgóríngóri	'small caps on ankle'
ŋi-ŋgúŋgu	'gizzard'
ŋaŋgaŋgaŋa	'mix-up'

Only two examples could be found where the prenasalized velar stop cooccurs with a labialized consonant in a non-derived environment, as shown in (56).

(56) káŋgáŋ ^w a	'forget'
fiáŋgáŋ ^w á	'forgetfulness'

Note that the labialized velar nasal is found only in thirty-eight (38) words in the database.

(d) Prenasalized palato-alveolar affricate /nd͡ʒ/:

Unlike the other prenasalized consonants, the prenasalized palato-alveolar affricate can only occur preceding the four vowels /i, e, a, o/ but not the high back vowel /u/. Only one compound word could be found in which this consonant occurs twice in a word, as shown in (57) below.

(57) /nd͡ʒ/ in a compound word

nd͡ʒínd͡ʒí 'many; a lot'

No examples could be found where this prenasalized affricate cooccurs with other prenasalized consonants or with labialized consonants. Moreover, unlike the prenasalized stops above, this prenasalized affricate does not have a widespread distribution throughout the language. Only twenty-five (25) words were found in the database with this consonant. In twenty-two (22) of these, it occurs in C2 position preceded by other consonants in C1 position, namely; /p^h, ɖ, s, ʃ, mb, ɲ, t͡ʃ, d͡ʒ, l, r, v/. In the remaining three words it occurs as C1. (58) and (59) illustrate.

(58) /nd͡ʒ/ in C1 position

lu-nd͡ʒí 'needle'
vu-nd͡ʒí 'most'
nd͡ʒínd͡ʒí 'a lot; many'

(59) /nd͡ʒ/ in C2 position

mbond͡ʒe 'injuries'
ɖend͡ʒe 'bush'
n-t͡ʃend͡ʒe 'white ant'
ɲond͡ʒe 'gum from tree'

2.2.3.7 Labialized Consonants

As shown in §2.1.1, Ikalanga has a large inventory of labialized consonants. These consonants do not seem to have any restrictions in their cooccurrence patterns with the other consonants, except that they never occur preceding the back round vowels /o, u/ (see Table 7 in §2.2.1). Unlike the aspirates and the prenasalized stops (§2.2.3.2 and §2.2.3.6 respectively) in this language, labialized consonants cooccur within the same word, as illustrated by (60).

(60) Labialized consonants cooccur

s ^w es ^w á	‘black ant’
ŋg ^w iŋg ^w i	‘gums’
g ^w ák ^w a	‘dry veld’
g ^w ak ^w a	‘spineless monkey orange’
n-s ^w iŋ ^w á	‘type of tree’
n-z ^w íg ^w a	‘vangueria infauta tree’
ʃ ^w eʃ ^w ana	‘crease’

2.3 Overview of the Morphology

Throughout this study, a number of morphs are given in the examples used indicating various morphophonemic alternations found in this language. The purpose of this section, therefore, is to familiarize the reader with these morphs and the morphological processes in which they occur.

As in other Bantu languages, the structure of the Ikalanga word consist of prefixes, root and some suffixes:

(61) Word structure in Ikalanga: [prefixes [root -suffixes-FV]_{stem}]_{word}

a. word = (prefixes) + stem

b. stem = root + (suffixes) and the Final Vowel (FV) on verbs

From the above, noun and verb stems in Ikalanga can have the following structures, as shown in (62) and (63) respectively.

(62) Morphological structure of a noun

a.	root	=	fúpa	'bone'
b.	root + suffix	=	fúp-áná	'small bone'
c.	prefix + root	=	ma-fúpá	'bones'
d.	prefix + root + suffix	=	ma-fúp-áná	'small bones'

(63) Morphological structure of the verb

[vǎ-nó-[súŋg-íl-an-a]] 'they tie for each other'

they-present tense-root-applicative-reciprocal-FV

However, details on the cooccurrence patterns of these suffixes are beyond the scope of the present study.

Below I discuss the Ikalanga noun class system.

2.3.1 Ikalanga Noun Class System

I begin by giving the twenty (20) noun classes of Ikalanga in Table 12 following Wentzel (1983). Note that classes 12 ka- and 13 tu- have since been lost in Ikalanga, as a result, have been omitted from the Table.

Table 12. Ikalanga Noun Class System

Class	Noun Prefix	Examples
1	N-	n-lúmé - 'man'
1a	∅	kukú - 'grandmother'
2	va-	va-lúmé - 'men'
2a	vó-	vó-kúkú - 'grandmothers'
3	N-	n-tí - 'tree'
4	mi-	mi-tí - 'trees'
5	(a) [+voice] (b) ∅	golé - 'year' fúpá - 'bone'
6	ma-	ma-kolé - 'years' ma-fúpá - 'bones'
7	(a) t̃i- (b) i- (c) ∅	t̃i-pó - 'gift' i-kúní - 'stick' mánlémbe - 'bat'
8	z ^w i-	z ^w i-pó - 'gifts' z ^w i-kúní - 'sticks'
9	(a) N- (b) ∅	m-búdzí - 'goat' p ^h ené - 'deer'
10	(a) N- (b) dz̃i- (c) ∅	m-búdzí - 'goats' dz̃i-kópi - 'cups' p ^h ené - 'deer (pl.)'
11	(a) lu- (b) li-	lu-vókó - 'arm; hand' li-vaʼí - 'door'
14	vu-	vu-kúse - 'fur'
15	ku-	ku-dz̃á - 'to eat'
16	pa-	pa-zé - 'outside'
17	ku-	ku-b̃ge - 'at stone'
18	mu-	mu-kaʼí - 'inside'
20	ku-	ku-vúdzaná - 'small goat'
21	zi-	zi-t ^h u - 'huge thing'

We observe that some of these classes have different prefix variants. Furthermore, not all noun classes have a prefix; for example, class 1a nouns are without a prefix. In addition, some classes with a class prefix also have

some nouns which take a zero prefix, as in classes 5, 7, 9 and 10. In all these cases, just as in other Bantu languages, the identifying feature as to which class a noun belongs is the concord. However, the situation with class 5 is more complex and requires more elaboration, as discussed in the following subsection.

2.3.1.1 Class 5 nouns

Nouns of class 5 are of two types. The first type have as their prefix a [+voice] feature which surfaces in the initial segment, which feature is not there when these nouns occur in the plural form preceded by the class 6 prefix ma-. The second set is that which does not show this voicing alternation, hence a zero-prefix. (64) illustrates.

(64)a. Class 5 nouns with [+voice] prefix

<u>Class 5</u>		<u>Class 6</u>	
budzi	'melon'	ma-pudzi	'melons'
dula	'granary'	ma-tula	'granaries'
golé	'year'	ma-kolé	'years'
dze ^h ndzedu	'wise person'	ma-t ^h é ^h ndzedu	'wise people'

b. Class 5 nouns with a zero prefix

fupa	'bone'	ma-fupa	'bones'
vudzi	'strand of hair'	ma-vudzi	'hair'
vuli	'hole'	ma-vuli	'holes'
sudu	'maize cob'	ma-sudu	'maize cobs'
zeu	'molar tooth'	ma-zeu	'molar teeth'
zamu	'breast'	ma-zamu	'breasts'
dzu ^h dzu	'cheater'	ma-dzu ^h dzu	'cheaters'
pek ^h á	'lie'	ma-pek ^h á	'lies'
londa	'sore'	ma-londa	'sores'

The voicing alternation, however, is only limited to nouns beginning with stops /b, d, g/ and a few examples beginning with the palato-aveolar affricate /d͡ʒ/. As seen in (64b), nouns of class 5 beginning with other consonants in this language do not show this alternation in voicing. However, as shown in Table 13 below, not all nouns of class 5 which have /b, d, g, d͡ʒ/ initially allows this voicing alternation in the plural.

Table 13. Class 5 nouns with voicing alternation root initially in the plural versus those without

Initial consonant	With voicing alternation	No voicing alternation
/b/	30	8
/d/	35	5
/g/	54	11
/d͡ʒ/	3	10

Note that most of the words with initial stops which do not allow this voicing alternation are either compound words or borrowings from other languages. As mentioned above, nouns in Ikalanga can also take a suffix, as shown in (62b) above. In the following section I look at how nouns diminutivize with the suffix -ana.

2.3.2 Diminutive Suffix

Ikalanga, like most southern Bantu languages such as Tswana, Sotho, Zulu and Xhosa (Doke 1954), uses the suffix -ana in the formation of its diminutives. This is unlike the rest of the Shona group which uses the noun

class prefixes 12 ka- and 13 tu- in the formation of its diminutives (Doke 1954). In Ikalanga, these two noun class prefixes have been lost. Doke (1954:54) best illustrates the use of this prefix in southern Bantu by giving the diminutive form of the word for 'goat' in some of these languages, as illustrated in (65) below. The gloss for the nouns is 'goat' and for the diminutive form its 'little goat'.

(65)	<u>Language</u>	<u>Noun</u>	<u>Diminutive</u>
	Zulu	imbuzi	imbuz-ana
	Tsonga	mbuti	mbut-ana
	N. Sotho	púdi	puṯ-ana
	Venda	mbúḏzi	mbúḏz-ana
	Ikalanga	mbúḏzi	mbúḏz-aná

but,

Shona	mbúḏzi	kambúḏzi
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(66) gives examples of Ikalanga diminutives to illustrate.

(66)	<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
	mbúḏzi	mbúḏz-aná	'little goat'
	núnda	núnd-áná	'small hump'
	zulá	zul-áná	'small frog'
	mbavá	mbav-áná	'small thief'
	ṅama	ṅam-aná	'small meat'

It is important to note that even though Ikalanga mainly uses the diminutive suffix -ana in the formation of its diminutives, it can also use class prefixes for diminutive function. In Ikalanga, the noun classes 7 ṽi- and 8 z^wi- prefixes can be used together with the -ana suffix to add the meaning of 'very small or little' to a noun (see also Louw (1975/76) on Tsonga). In addition to these two class prefixes, a few words are found which allow the use of the

class 20 ku- prefix in the formation of diminutives. Like the other class prefixes mentioned above, this prefix is also used with the suffix -ana to derive the diminutive meaning (see Wentzel 1983:82). (67) gives the different ways of forming diminutives in Ikalanga with examples.

(67) Forms of diminutives in Ikalanga

a. Nouns [- diminutive prefix, - diminutive suffix]

mbúdzí	'goat'
fúpá	'bone'
ɲóká	'snake'
ɲama	'meat'
ɲumbá	'hut or house'

b. [- diminutive prefix, + diminutive suffix]

mbúdz-ána	'small kid goat'
fúp-ána	'small bone'
ɲók-ána	'small snake(s)'
ɲam-ána	'small meat'
ɲumb-ána	'small hut or house'

c. [+ diminutive prefix, + diminutive suffix]

ʃi-vúdz-ána	z ^w i-vúdz-ána	'very small kid goat(s)'
ʃi-fúp-ána	z ^w i-fúp-ána	'very small bone(s)'
ʃi-ɲók-ána	z ^w i-ɲók-ána	'very small snake(s)'
ʃi-ɲam-ána	z ^w i-ɲam-ána	'very small(pieces of) meat'
ʃi-ɲumb-ána	z ^w i-ɲumb-ána	'very small house(s)'
ku-vúdz-ána		'very small goat'
ku-ʃaŋg ^w -ána		'very small shoe'

However, when these class prefixes are used before these nouns without the suffix -ana, the meaning conveyed is derogative and not the diminutive one.

As result, we observe the omission of the [+diminutive prefix, -diminutive suffix] pattern in (67).

In the next sections I discuss the morphs which occur in the causativization and passivization of verbs.

2.3.3 Causative Suffix

Ikalanga, as with most Bantu languages, forms its verb causatives by affixing the suffix -is- onto the preceding verb root. (68) below gives some examples to illustrate.

(68) Verb Causatives

<u>Verb</u>	<u>Causative</u>	<u>Gloss</u>
vúmb-á	vúmb-ís-a	'cause to build'
ḍzím-á	ḍzim-ís-a	'cause to extinguish'
biɜ-a	biɜ-is-a	'cause to leak'
posa	pos-es-a	'cause to throw'
sek-a	sek-es-a	'cause to laugh'

The change in vowel quality of this causative suffix in the last two examples is due to vowel harmony (see §2.2.6). However, a study of causativization in Ikalanga shows that this suffix does not occur with all the verb roots. Most verb roots with a lateral consonant as the root final consonant have a different form of the causative. In these verb roots, the root final surface lateral alternates with the palato-alveolar affricate /ḍz/ when these verbs causativize. (69) below gives some examples to illustrate.

(69) Causatives of verb roots with final lateral

<u>Verb</u>	<u>Causative</u>	<u>Gloss</u>
fula	fud̥za	'cause to graze'
vila	vid̥za	'cause to boil'
pólá	pód̥zá	'cause to heal'
kófóla	kófód̥za	'cause to cough'

I defer discussion of this alternation until Chapter Three.

2.3.4 Passive Suffix

Ikalanga, as is common in many Bantu languages, has two forms of the passive suffix, traditionally referred to as the short form -w- and the long form -iw-.¹⁴ It has been observed in many Bantu languages that monosyllabic stems almost always occur with the longer form -iw-. As Schadeberg (not dated) notes, no language has been found that uses the shorter form -w- after roots of the shape -CV. (70) below gives examples of monosyllabic stems and their passive forms.

(70) Passive forms of monosyllabic verbs¹⁵

<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
ts ^h -á	ts ^h -íw-a	'be dug'
w-á	w-íw-a	'be heard'
tj-á	tj-íw-a	'be afraid'
g ^w -a	g ^w -iw-a	'be fought'
mb-á	mb-íw-a	'be sung'

A different picture emerges though when disyllabic and polysyllabic verb stems are passivized. We observe two groups, namely: one which allows both the short and long forms and another which only takes the long form of the passive suffix. The former are illustrated in (71).

¹⁴ Schadeberg (n.d.) gives the most common shapes in which the passive suffix is realized in Bantu languages as -w-, -iw-, -ibw-, ilw-, and -igw-.

¹⁵ Note that not all the examples given in (70) are historically monosyllabic, for example, -mbá 'sing' < *-yímb-a; and, -wá 'hear' < *-yígú-a.

(71)	<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
	peṭ-a	peṭ ^w -a/ peṭ- <i>iw</i> -a	'be folded'
	sund-a	sund ^w -a/ sund- <i>iw</i> -a	'be pushed'
	goṭṭ-a	goṭṭ ^w -a/ goṭṭ- <i>iw</i> -a	'be baked on hot coals'
	seṅg-a	seṅg ^w -a/ seṅg- <i>iw</i> -a	'be carried'
	ḍus-a	ḍus ^w -a/ ḍus- <i>iw</i> -a	'be removed'
	ṭṭúlúk-a	ṭṭúlúk ^w -a/ ṭṭúlúk- <i>iw</i> -a	'be jumped (over)'
	sendedz-a	sendedz ^w -a/ sendedz- <i>iw</i> -a	'be kindled'

When the short passive form *-w-* occurs adjacent to another consonant, it is realized as secondary articulation to the preceding consonant, while the glide in the long form retains its primary place of articulation.

The second group of verbs, which only take the longer form *-iw-* is exemplified in (72) below.

(72)a.	<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
	lap-a	lap- <i>iw</i> -a	'be cured'
	lip-a	lip- <i>iw</i> -a	'be paid'
	p ^h áp ^h -á	p ^h áp ^h - <i>iw</i> -a	'be chopped'
	bab-a	bab- <i>iw</i> -a	'be carried on back'
	uúmb-a	uúmb- <i>iw</i> -a	'be built'
	k ^w íu-á	k ^w íu- <i>iw</i> -a	'be stolen'
	kou-a	kou- <i>iw</i> -a	'be given away'
b.	kús ^w -á	kús ^w - <i>iw</i> -a	'be sharpened'
	buz ^w -a	buz ^w - <i>iw</i> -a	'be asked'
	náz ^w -á	náz ^w - <i>iw</i> -a	'be licked'

Of interest is the fact that these verb stems all end in a labial or labialized consonant. A plausible explanation for this type of development is that Ikalanga appears prohibit the labialization of labials. This prohibition is also common to a number of other Southern Bantu languages, which, like Ikalanga, have been found not to allow sequences of a labial followed by a

labio-velar glide /w/ (see Ohala and Kawasaki-Fukumori (forthcoming) who cite a number of other languages in which labialized labials are also disfavored). I formalize the requisite constraint in Ikalanga in (73) below.

(73) Constraint against labialized labials

[+rd]
|
*C
|
[lab]

This constraint also applies to words ending with labialized consonants. For a detailed discussion of the passive suffix and the restrictions in its occurrence, the reader is referred to §5.9.1 in Chapter Five.

2.3.5 Summary

In this chapter I have considered the segment inventory of Ikalanga and its distribution in the phonology. It has been shown that Ikalanga has a very large consonant inventory of fifty-nine consonants, some of which have a restricted distribution. This chapter also gives an overview of selected morphs used throughout the dissertation to illustrate the different sound changes and morphophonemic alternations found in this language.

CHAPTER THREE

EFFECTS OF THE CLOSE VOWELS

In this chapter, I look at the effects of Proto-Bantu (PB) close vowels on Ikalanga reflexes. In the majority of Bantu languages in which high vowels of degree 1 and 2 have merged, it has been found that before PB close vowels *i and *u PB stops underwent a process of spirantization (see Hinnebusch, Nurse and Mould (1981) on Eastern Bantu; Hinnebusch and Nurse (1981) on Chaga; Nurse (1987); and Janson (1991/92) on Southern Bantu). By spirantization is meant a process whereby PB close vowels *i, *u effected changes in PB stops turning them into fricatives and affricates. This process occurred in those Bantu languages which underwent vowel reduction from seven vowel systems to five vowel systems. The purpose of this chapter is to show that Ikalanga underwent spirantization. In addition, it is shown that (af)frication from PB close vowels still occurs synchronically in morphophonemic alternations. In this study, I refer to this process as High Vowel Frication (HVF) standing for frication arising from the high vowels. In §3.1 I begin by giving the reconstructed segment inventory of Proto-Bantu. Next, §3.2 looks at the process of High Vowel Frication in Ikalanga. §3.3 gives phonetic explanations for how high vowels caused the development of frication on the preceding stops. §3.4 looks at frication in morphophonemic alternations in the formation of some verb causatives. §3.5 gives typological

evidence from other languages, more especially, Bantu languages. And finally, in §3.6 I give a summary to the chapter.

3.1 Proto-Bantu inventory

I begin by giving the seven vowels of Proto-Bantu in (1) below. Of relevance to this discussion are the two most high vowels, often referred to as “super close vowels” in the literature. In the present study, however, these two vowels are simply referred to as close vowels. These close vowels are usually differentiated in transcription from the high vowels by a small diacritic mark underneath as seen in (1).

(1) Proto-Bantu Vowel System (Meeussen 1969/80)

*i̥	*u̥
*i	*u
*e	*o
*a	

In most Bantu languages, these close vowels have merged with the high vowels *i, *u reducing the vowel systems of these languages from seven to five vowel systems. As Schadeberg (1994) notes, the five vowel system is the most commonly reported one in Bantu.

In addition to the seven vowel system given in (1) above, PB had a consonant inventory given in (2).

(2) Proto-Bantu Consonant Inventory (Meeussen (1969/80)¹⁶)

*p	*t	*c	*k
*b	*d	*j	*g
*m	*n	*ɲ	

We observe in (2) that PB did not have fricative consonants. But on studying the PB reconstructions in both Meeussen (1969/80) and Guthrie (1967-71) and cognates from different Bantu languages, it has been found that PB stops changed to fricatives and affricates in the environment of the close vowels. It is therefore logical to assume, as in previous studies, that the close vowels *i, *u first caused the frication of these Proto-Bantu stops, after which the close vowels merged with the high vowels, reducing the vowel systems of the respective languages to five.

In the next section I look at the different environments in which High Vowel Frication took place in Ikalanga. As will be shown below, this process did not take place with all the PB stops; evidence shows that the (af)frication was not complete in the case of apicals.

¹⁶Note that some skepticism has often been expressed on the phonetic value of some of the PB voiced stops as to whether they were stops or fricatives, fricatives vs affricates and so on (Nurse 1987). However, that will not be my concern in this study. I am assuming that these consonants are voiced stops as given in other sources in the literature.

3.2 High Vowel Friction in Ikalanga

Ikalanga, as in most Bantu languages, underwent the process of High Vowel Friction where PB stops occurred preceding the close vowels *i, *u. Below I give all the environments where HVF occurred in Ikalanga with examples to illustrate. PB reconstructed forms are also given for illustration and where these forms have a different reconstructed gloss from that of Ikalanga, the gloss of the proto form is also given in parenthesis.

(3) HVF of the labial stops before *i

a. *p changed to a labialized fricative /s^w/

<u>Word</u>	<u>Gloss</u>		<u>PB</u>
s ^w ika	'arrive'	<	*-p _ɪ k-a
s ^w imbó	'club'	<	*-p _ɪ mbo ('stick')
s ^w ina	'squeeze'	<	*-p _ɪ n-a
s ^w ípá	'suck'	<	*-p _ɪ p-a

b. *b changed to a voiced labialized fricative /z^w/

z ^w ála	'bear child'	<	*-b _ɪ ád-a
z ^w imba	'conceal'	<	*-b _ɪ mb-a
z ^w imbá	'swell'	<	*-b _ɪ mb-a
z ^w itá	'enemies'	<	*-b _ɪ ta ('war')

Of particular interest about these changes is that even with the occurrence of the (af)frication, the labialization from the stops was retained as secondary articulation. However, a different situation occurred where the same labials were followed by the back close vowel *u. In this case, we derived labio-dental fricatives with the labiality as primary articulation. (4) gives some examples to illustrate.

(4) HVF of the labials before the close vowel *u

a. *p changed to a labio-dental fricative /f/

fána	'resemble'	<	*-púán-a
fúlá	'blow (by mouth)	<	*-púd-a
fúló	'foam'	<	*-púdo
fúpa	'jealousy'	<	*-pupa

b. *b changed to a voiced labio-dental fricative /v/

vú	'soil'	<	*-bú
ví	'white hair'	<	*-búi
vángá	'mix'	<	*-búáng-a
vúlá	'water'	<	*-búda
vudzi	'strand of hair'	<	*-búdi
vúná	'break'	<	*-bún-a
vuníka	'be broken'	<	*-búnik-a

We observe that even in those examples where PB had two vowels creating an environment for a glide formation, this glide does not occur. I assume that with the frication of these stops to labio-dental fricatives, the labio-velar glide from the back vowel was lost as a result of the constraint against labialized labials discussed in §2.3.4 (see also §5.7.1). (5) gives the historical derivations of fána 'resemble' and ví 'grey hair' to illustrate.

(5)	<u>PB</u>	<u>HVF</u>	<u>Labialization</u>	<u>Absorption of labialization</u>
a.	*púan-a	> fuan-a	> fwan-a	> fan-a
b.	*búi	> vui	> vwi	> ví

Note that Ikalanga does not have distinctive vowel length, so that as a result, where PB had two vowels within a syllable, one of the vowels has been lost. In cases where V1 was one of the close vowels, after (af)frication occurred,

they underwent other changes resulting in their loss as in (5). However, in cases where the close vowel was the only vowel within a syllable, after effecting the (af)frication on the preceding stop it simply changed to a high vowel, as will be seen in the examples below. In (6) are given examples where we observe the affrication of the apicals *t, *d before the close vowel *i. In this environment, these apicals changed to affricates /tʰ/ and /dʒ/ respectively.

(6) HVF in the apicals before the vowel *i

a. Voiceless apical *t changed to an affricate /tʰ/

tʰúlá	‘wipe’	<	*-tʰud-a
tʰíndíka	‘push’	<	*-tʰíndik-a
tʰímá	‘well’	<	*-tʰíma
tʰínde	‘stub of grass’	<	*-tʰíndé
tʰíngá	‘veins (cl.10)’	<	*-tʰínga

b. Voiced apical *d changed to an affricate /dʒ/

n-dʒi	‘root’	<	*-dʒi
dʒúngu	‘dizziness’	<	*-dʒúngu (‘giddiness’)
dʒiva	‘deep water’	<	*-dʒiba
dʒímá	‘extinguish’	<	*-dʒím-a
dʒimíla	‘get lost’	<	*-dʒimíla

Note that before the close vowel *u the voiced apical did not undergo HVF as would be expected. The voiceless apical, on the other hand, developed aspiration while retaining its primary place of articulation. Where *u was in the V1 position followed by another vowel within the same syllable, Ikalanga

reflexes of PB apicals *t and *d also have secondary labialization. (7) and (8) illustrate.

(7) Failure of HVF in *t before the close vowel *ɯ

a. *t changes to an aspirated apical /tʰ/

tʰúlá	'forge; kick'	<	*-tɯd-a
tʰúdzí	'shoulder'	<	*-tɯɯdi
tʰúmó	'bullet'	<	*-tɯmo ('spear')
tʰúmá	'sew'	<	*-tɯm-a
tʰúmúla	'take firewood from fire'	<	*-tɯmud-a

b. Labialization of *t where V1= *ɯ

tʰwá	'spit; vomit'	<	*-tɯ-a
tʰwíla	'vomit into'	<	*-tɯíd-a ('spit')

(8) Failure of HVF in *d before the close vowel *ɯ

a. *d retains its PB form

duma	'agree'	<	*-dɯm-a
ɖuma	'roar'	<	*-dɯm-a
n-dumbí	'continuous rain'	<	*-dɯmbi

b. Labialization of *d when V1= *ɯ

dʷa	'come from'	<	*-dɯ-a
ɽi-dʷí	'knee'	<	*-dɯi

It is obvious from these examples that the apicals did not undergo frication when followed by these close vowels in PB. It is not clear why the process of HVF was incomplete in these apicals. I can only assume that this has to do with Ikalanga losing contact with the other Shona dialects where this process of frication was complete (see (19) below). This means that Ikalanga must

have moved out of the HVF zone before these changes hit the apicals before the back close vowel *ɯ. This suggests that HVF must have started on the labials, palatal and velars, and that the apicals were the last to undergo the process. As a result, where PB had these apicals preceding the vowel *ɯ, Ikalanga reflexes show other changes.¹⁷ However, the process of HVF was complete in the other PB stops, as seen in (9) - (12) below.

(9) HVF of the palatal stops *c and *j before *i

a. *c changed to an alveolar fricative /s/

sála	'remain'	<	*-cɨád-a
uu-só	'face'	<	*-cɨó
uu-síku	'night'	<	*-cɨku
símbá	'wild-cat'	<	*-cɨmba

b. *j changed to a palato-alveolar fricative /ʒ/

ʒa	'come'	<	*-jɨ-a
ʒula	'open'	<	*-jɨgud-a

10. HVF of the palatal stops before *ɯ

a. *c changed to an alveolar fricative /s/

suka	'wash'	<	*-cɯk-a
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b. *j changed to a palato-alveolar fricative /ʒ/

ʒungá	'sift'	<	*-jɯng-a
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¹⁷ See also Chapters Five and Six below for more discussion of these diachronic changes to apicals.

It is worth noting however, that unlike other PB stops, these palatal stops underwent frication before all the seven PB vowels. See Appendix A for all Ikalanga reflexes before PB vowels for illustration.

11. HVF of the velar stops *k, *g before *i

a. *k changed to an alveolar fricative /s/

uu-sílú	'stubbornness'	<	*-kídu
n-síndó	'footfall; echo'	<	*-kíndo
sije	'eyebrow'	<	*-kígé

b. *g changed to an alveolar fricative /z/

n-zi	'village; home'	<	*-gí
t ^h úzi	'fly'	<	*-gí
zíná	'name'	<	*-gína

12. HVF of the velar stops before *u

a. *k changed to a labio-dental fricative /f/

fá	'die'	<	*-kú-a
fúmá	'be rich'	<	*-kúm-a
táfúna	'chew'	<	*-takun-a
uu-fá	'inheritance'	<	*-kúá
i-fúvá	'chest'	<	*-kúba
fúpá	'bone'	<	*-kúpa
ma-fúťá	'oil'	<	*-kúta

b. *g changed to a labio-dental fricative /v/

víma	'hunt'	<	*-gúím-a
v uvú	'hippopotamus'	<	*-gubú

However, no changes involving HVF took place where these close vowels occurred preceded by the PB nasals. (13) below illustrates.

(13) No HVF where close vowels followed nasals:

mila	'mucus'	<	*-m̩da	
mímhá	'pregnancy'	<	*-m̩mba	('foetus')
m-mid̩zo	'throat'	<	*-m̩do	
na	'defecate'	<	*-n̩-a	
nala	'tire (v)'	<	*-n̩ad-a	('wither')
nuw ^f a	'smell (n)'	<	*-n̩uk-a	

Instead, we observe palatalization of the alveolar nasal, which changes to a palatal nasal /ɲ/ before the close front vowel *i. From the above examples, that is, excluding the nasals and the apicals before *u, it is obvious that HVF took place in Ikalanga, changing PB stops to fricatives and affricates. Table 1 summarizes changes involving HVF in Ikalanga (see also Appendix A).

Table 1. Summary of HVF changes in Ikalanga

	*p	*b	*t	*d	*c	*j	*k	*g
*i	s ^w	z ^w	ts ^h	d̩z	s	ʒ	s	z
*u	f	v	t ^h	d	s	ʒ	f	v

The question is: how did these vowels cause frication in the preceding PB stops? I address this question in the following section.

3.3 How did the close vowels cause frication of PB stops?

To understand how the PB close vowels caused HVF on the preceding stops, it is worthwhile considering aerodynamic principles involved in the production of both stop consonants and high vowels. As Ohala (forthcoming) points out, it is the initial portion of a high vowel (or glide)

which gets fricated after the stop release. But if listeners parsed this frication with the preceding stops, it is stops that become (af)fricated, as has been the case with PB stops. According to Ohala (p.6), the speed of airflow through a constriction is one of the primary determinants of frication intensity, which, in turn, depends on the volume of air flowing through the constriction. Ohala indicates that there are two situations which lead to an increase in the speed of airflow. First, if these high vowels are produced with the vocal cords in a voiceless configuration, there will be little resistance to the airflow at the glottis and this can result in a very high P_{oral} (oral pressure). Note that a high P_{oral} makes the ΔP_{oral} ($= P_{oral} - P_{atmospheric}$) high and it is the ΔP_{oral} which partly determines the speed of airflow. This high speed airflow would result in a fricative sound. Second, as Ohala further points out, stop sounds generate a high upstream pressure. As a result,

“... when a stop is released before a high close vowel or glide, some of the air must escape through the narrow channel present. It can take a few tens of milliseconds for the P_{oral} to reach P_{atmos} (atmospheric pressure) and during this time the air will be forced through the constriction at a higher rate. Hence the initial portions of the vowel or glide can be fricated ...” (Ohala (forthcoming:6)).

As a result of these facts, PB stops became (af)fricated before the close vowels in Ikalanga, as is the case in most Bantu languages. This frication, however, did not occur where these vowels were preceded by nasals because, as Ohala further explains, the open velopharyngeal valve bleeds any pressure build up in the cavity behind the oral constriction. As a result, these nasals retained

their PB forms in Ikalanga or underwent different changes as shown in (13) above.

As pointed out earlier in the chapter, sound changes involving (af)frication from PB close vowels are still found in the present state of the language in the formation of causatives of some verb stems. I discuss these changes in the following section.

3.4 Affrication in causative verbs

Ikalanga, as with most Bantu languages, forms its verb causatives by affixing the suffix *-is-* onto the preceding verb root (see §2.3.3). However, it is clear from the reconstructions of Proto-Bantu that there is a shorter form of the causative suffix which in a number of studies is identified as *-i-* (see Guthrie 1967-71 Vol.4:219; Meeussen 1967:92; and Schadeberg n.d.:22). This causative suffix has disappeared in Ikalanga. However, its effect is still present in morphophonemic alternations in the formation of the causative forms of some verb stems. The effect of this causative suffix is most common in those verb roots in which the root final consonant is a lateral consonant /l/ (< PB *d). When verb roots ending in a lateral consonant are causativized in Ikalanga, the lateral alternates with an alveolar affricate / \widehat{dz} /. (14) gives examples of verb causatives to illustrate.

(14) /l/ alternates with /d̪z/ in verb causatives

<u>Verb</u>	<u>Causative</u>	<u>Gloss</u>
vila	vid̪za	'cause to boil'
vola	vod̪za	'cause to rot'
fula	fud̪za	'cause to graze'
lila	lid̪za	'cause to cry'
gala	gad̪za	'cause to sit'
kúlá	kúd̪zá	'cause to grow'
pólá	pód̪zá	'cause to heal'
ɲala	ɲad̪za	'cause to be tired'
ezela	ezed̪za	'cause to sleep'
ambala	ambad̪za	'cause to dress'
aŋgula	aŋguđ̪za	'cause to bathe'
ḍzimíla	ḍzimíd̪za	'cause to get lost'
lémála	lémád̪za	'cause to be crippled'
ṭovela	ṭoved̪za	'cause to follow'
lavila	lavid̪za	'cause to taste'
kófóla	kófód̪za	'cause to cough'
wóméléla	wóméléd̪za	'cause to dry-up'
nángájíla	nángájíd̪za	'cause to walk'
túŋgámíla	túŋgámíd̪za	'cause to lead'
amuṭṣíla	amuṭṣíd̪za	'cause to receive'

As was shown in Table 1 above, in the environment of PB close vowel *i̯, in this case the shorter causative suffix *-i̯-, *d affricated changing to /d̪z/, while in the other environments it changed to a lateral /l/. A rule accounting for these developments can be formulated as follows.

(15) Affrication Rule of *d:

$$*d > /d̪z/ / __ *i̯$$

With the development of the dental affricate, the close vowel was then lost before the Final Vowel -a of the verb stem.

The affrication of PB *d before the close vowel *i̥ is also found in other environments where its proto form was retained as in cases where it occurred preceded by a nasal consonant, and is realized as a prenasalized stop /nd/. Of the thirteen (13) verb stems with this prenasalized stop in root final position, only four (4) verbs causativize by alternating the prenasalized stop /nd/ with a breathy voiced dental affricate /ts̃^{n̄}/ while the other nine (9) causativize with the long causative form -is- with no affrication. (16) gives a list of both types of verb stems and their causatives. Where available, the PB forms of these verbs are also given.

(16) Verb stems with /nd/ root final

a. Verbs which affricate /nd/ > /ts̃^{n̄}/ in causatives

<u>Verb</u>	<u>Causative</u>	<u>Gloss</u>		<u>PB</u>
panda	pats̃ ^{n̄} a	'cause to ache'		
wóndá	wóts̃ ^{n̄} á	'cause to be thin'	<	*-jond-a
ṭunda	ṭúts̃ ^{n̄} a	'cause to urinate'	<	*-tund-a
wanda	wats̃ ^{n̄} a	'cause to be plentiful'		

b. Verbs which do not affricate /nd/ in causatives

enda	end-is-a	'cause to go'	<	*gend-a
fúndá	fúnd-ís-a	'cause to mouth something'		
kúndá	kúnd-ís-a	'cause to defeat'		
linda	lind-is-a	'cause to wait'	<	*-dind-a
londa	lond-es-a	'cause to follow'	<	*-dond-a
sunda	sund-is-a	'cause to push'		
ṭanda	ṭand-is-a	'cause to sew poorly'		
ṭenda	ṭend-es-a	'cause to praise'		
ṭs̃ ^{n̄} índá	ṭs̃ ^{n̄} índ-ís-a	'cause to groan'		

I assume that the four verbs in (16a) must be lexically specified to causativize with the short suffix -i̥- as other verb stems with a similar environment do

not take this suffix. Also worth noting about the causatives in (16a) is that a number of sound changes must have occurred to derive the breathy voiced dental affricate /tʰs̃/. First, we observe that, unlike with PB *d which affricated to a voiced affricate /dʒ/, /nd/ changed to a voiceless affricate. To account for this change I assume that PB apical *d first underwent an intermediate stage whereby it devoiced becoming a voiceless stop /t/, after which PB close vowel *i of the short causative suffix effected affrication and aspiration changing it to /tʰs̃/, a sound change shown in Table 1 above (see also §6.4.1.1). The nasal segment then caused the breathy effect we find in this affricate after which it was lost (see §6.5.2). (17) gives some derivations wótshá ‘cause to be thin’ and tutsha ‘cause to urinate’ to account for the different stages in the development of the affricate /tʰs̃/ from the prenasalized stop /nd/.

(17) Derivation of /tʰs̃/ from /nd/

a. *-jond-a	b. *-tund-a	1. Proto-Bantu
*-jont-a	*-tunt-a	2. Devoicing
*-jont-ĩ-a	*-tunt-ĩ-a	3. Causative suffix
-jontʰa	-tuntʰa	4. Affrication and Aspiration
-jontʰ̃a	-tuntʰ̃a	5. Breathly effect from nasal
jótʰ̃á	tútʰ̃a	6. Loss of the nasal
wótʰ̃á	---	7. Other Rules

Note that other rules refers to a rule which led to the development of the labio-velar glide where PB had a palatal glide. A detailed discussion of how nasals caused the development of breathy effect in the following steps is given in §6.5.2 in Chapter Six.

Furthermore, the short causative suffix caused velar softening in a few roots ending in a voiceless velar stop /k/. In these verbs, this velar stop changes to a voiceless alveolar fricative /s/ in the causative forms. (18) gives some examples to illustrate.

(18) Velar stop /k/ changes to a fricative /s/

muka	musa	'cause to wake-up'
ʃanduka	ʃandusa	'cause to go back'
ɖeluka	ɖelusa	'cause to descend'
fúlúka	fúlúsa	'cause to move'
koṭoka	koṭosa	'cause to arrive'
ɲawuka	ɲawusa	'cause to melt'
léwúka	léwúsa	'cause to sprain'

Note that other velar final verb stems causativize with the long causative suffix *-is-* with no velar softening. Since this causative suffix is no longer found in Ikalanga I regard all the above causative forms as “frozen forms”. However, it is essential to point out that the changes we see in these verb causatives are typical of the diachronic changes that took place changing the Proto-Bantu apicals *t, *d and the velar stop *k to affricates and a fricative respectively in the environment of a following PB close vowel *i (see Table 1 above and also Appendix A). Thus, if we adopt the PB reconstruction form of the short causative suffix as PB **-i-* given in Guthrie (1967-71 Vol.4:219) and Meeussen (1967:92), it makes sense to conclude that the changes we find in these frozen causatives are in actual fact the result of diachronic sound changes which have persisted into the present state of the language even after the close vowels merged with the high vowels in Ikalanga.

As noted above, HVF occurred in most Bantu languages where the vowel systems were reduced from seven to five vowel systems. In the following section I give a survey of the Bantu languages where this process also took place. A few examples are also given from outside the Bantu family.

3.5 Typological evidence from other Bantu languages

Examples from other Bantu languages show us that the fricatives and affricates we find in these languages developed from PB close vowels *i, *u following PB stops. I begin by giving examples of the Shona language where we observe that this process of frication is fully developed.

(19) HVF in the Shona language

<u>PB Stops</u>		<u>Shona</u>	<u>Examples</u>	<u>Gloss</u>		<u>PB forms</u>
*p/_i	>	s ^w	s ^w imbo	'stick'	<	*-pimbo
*p/_u	>	f	fana	'resemble'	<	*-pɨan-a
*b/_i	>	z ^w	z ^w ara	'give birth'	<	*-bɨad-a
*b/_u	>	v	m-vura	'water'	<	*-bɨda
*t/_i	>	s	sinde	'grass'	<	*-tɨnde
*t/_u	>	pf	pfura	'forge'	<	*-tɨd-a
*d/_i	>	dz	dziva	'pond'	<	*-dɨba
*d/_u	>	bv	bvi	'knee'	<	*-dɨi
*c/_i	>	s	simba	'genet'	<	*-cɨmba
*c/_u	>	s	suka	'wash'	<	*-cɨk-a
*j/_i	>	z ^w	iz ^w i	'voice'	<	*-jɨu
*j/_u	>	z	nzungu	'groundnut'	<	*-njɨ
*k/_i	>	s	sije	'eyebrow'	<	*-kɨge
*k/_u	>	pf	tapfuna	'chew'	<	*-tɨkɨn-a
*g/_u	>	v	vima	'hunt'	<	*-gɨim-a

(20) HVF in Swahili (from Hinnebusch & Nurse (1981))

<u>PB</u>		<u>Swahili</u>	<u>Examples</u>	<u>Gloss</u>		<u>PB forms</u>
*p/_i	>	f	fipa	'pinch'	<	*-pĩnĩ
*p/_u	>	f	fuko	'mole'	<	*-pũko
*b/_i	>	v	ma-vi	'excrement'	<	*-bĩ
*b/_u	>	v	vuna	'harvest'	<	*-bũn-a
*t/_i	>	s	m-situ	'forest'	<	*-tĩtu
*t/_u	>	f	fua	'forge'	<	*-tũd-a
*d/_i	>	z	ma-ziwa	'milk'	<	*-dĩba
*d/_u	>	v	vuta	'pull'	<	*-dũt-a
*k/_i	>	ʃ	ʃina	'tree base'	<	*-kĩna
*k/_u	>	f	fupi	'short'	<	*-kũpĩ
*g/_i	>	z	n-zige	'locust'	<	*-gĩge
*g/_u	>	v	vumbi	'dust'	<	*-gũmbĩ

According to Hinnebusch and Nurse (1981), the frication changes we see in Swahili above are a representation of the changes that occurred in the Bantu languages of the Northeast Coast Group (NEC). In addition to Shona and the languages of the NEC, HVF also took place in some Southern Bantu languages (see Janson 1991/92). In (21) below, reflexes of the Nguni group are given from Janson (1991/92:80-81) showing frication. To these, I have added Zulu cognates to illustrate.

(21) HVF in Zulu

<u>PB</u>		<u>Nguni</u>	<u>Zulu</u>	<u>Gloss</u>		<u>PB</u>
*p/_i	>	f	fika	'arrive'	<	*-p̥ik-a
*p/_u	>	f	futha	'blow'	<	*-p̥ud-a
*b/_i	>	v	vimba	'swell'	<	*-b̥imb-a
*b/_u	>	v	vuna	'harvest'	<	*-b̥un-a
*t/_i	>	s	-sinde	'clod of grass'	<	*-t̥indé
*t/_u	>	f	funga	'bind'	<	*-t̥ung-a
*d/_i	>	z	zifa	'deep pool'	<	*-d̥iba
*d/_u	>	v	vuma	'assent'	<	*-d̥um-a
*k/_i	>	s	silá	'grind'	<	*-k̥id-a
*k/_u	>	f	-fuba	'chest'	<	*-k̥uba
*g/_i	>	z	-zi	'village'	<	*-g̥i
*g/_u	>	v	-vu	'sheep'	<	*-g̥ú

It is obvious from the above examples from Shona, Swahili and Zulu that Proto-Bantu close vowels caused the frication of the preceding stops throughout most of the Bantu field. It is worth pointing out though that some variations exist in the type of fricative derived from one language to the other.

However, the process of (af)frication of stops before high vowels is not just restricted to Bantu languages. Ohala (forthcoming:4) gives some synchronic changes and diachronic sound changes showing (af)frication in other languages outside the Bantu family. I give these examples in (22) below to illustrate.

- (22)a. English actual ['æktʃuəl] < ækt + juəl
 bestial ['bistʃəl] < bist + jəl
- b. Latin fortia > *fortsja > Fr. force

3.6 Summary

In the above sections, it has been shown that the PB close vowels *i, *u are responsible for the process of High Vowel Frication which changed PB stops into fricatives and affricates in most Bantu languages. This process was shown to have persisted into the present state of this language in the formation of some causatives. Phonetically, it is the frication of the initial portion of the high vowels due to a combination of different elements involved in the production of both stops and the high vowels which led to the frication of these stops. As a result, most Bantu languages today have fricatives and affricates where PB stops had preceded the close vowels.

CHAPTER FOUR

PALATALIZATION

This chapter looks at the process of palatalization in Ikalanga. As will be shown below, the word palatalization here is used to mean those changes caused by a palatal element, which could be either the front vowels /i, e/ or a palatal glide /j/. As a result, some of the segments derived by this process are palato-alveolar affricates (e.g. /tʃ, dʒ/) and the palatal nasal /ɲ/ while others have an alveolar place of articulation (e.g. /tʰ, ndz/). In this chapter, I look at palatalization both as a diachronic and a synchronic process. Ikalanga, like many Bantu languages, attests to diachronic palatalization of the velar stop PB *k, which changed to a palato-alveolar affricate /tʃ/ before Proto-Bantu front vowels *i, *e. Synchronically, like in most of the southern Bantu languages, Ikalanga palatalization is found in the formation of noun and adjective diminutives. According to Doke (1954:39), who provides a comprehensive survey of palatalization in southern Bantu, palatalization is “... a phonological process, occurring among Southern Bantu languages in Nguni and Sotho, by which a palatal (or prepalatal) consonant is substituted for one of another organic position.” I am assuming that by using the word “prepalatal” above, Doke meant that the consonants derived by this process have a fronted place of articulation on the palatal, that is, a palato-aveolar place of articulation. However, nowhere in the literature has this process been shown to exist in Ikalanga. For example, Wentzel (1983:65) gives some

examples of Ikalanga diminutives showing palatalization, yet he fails to include this process among the morphological features of this language considered in his work. This chapter is intended to show that the process of palatalization exists in Ikalanga. §4.1 looks at the diachronic process of velar palatalization in Ikalanga. §4.2 deals with palatalization in morphophonemic alternations in the formation of Ikalanga noun and adjective diminutives. Next, in §4.3 typological evidence for the occurrence of palatalization from other Southern Bantu languages is given. §4.3 gives the summary.

4.1 Velar palatalization

As in many Bantu languages, Ikalanga attests to velar palatalization. Where PB voiceless velar stop *k occurred before the front vowels *i, *e, it palatalized to a palato-alveolar affricate /tʃ/ in Ikalanga. An example common in these Bantu languages is the class 7 noun class prefix $\widehat{tʃi}$ - (ci-) derived from PB * \widehat{ki} -. Hyman and Moxley (1994) cite (ci-)Bemba, (ci-)Tonga, (ci-)Shona and (ci-)Cewa as some of the languages which occur with this prefix given in parenthesis. In Ikalanga, the velar in this class prefix also underwent palatalization and it is now realized with an initial palato-alveolar affricate $\widehat{tʃi}$ - as shown in (1) below. PB reconstructed forms are also given for illustration.

(1) Velar palatalization of the class 7 noun prefix

<u>Cl.7 noun</u>	<u>Gloss</u>	<u>PB forms</u>
ṽi-t ^h u	'thing'	*ki-ntu
ṽi-nálá	'finger'	*ki-jádá
ṽi-ledu	'chin'	*ki-dédụ
ṽi-lémá	'cripple'	*ki-démá

Velar palatalization in Ikalanga is also found root initially in verbs, as shown in (2) below.

(2) Velar palatalization root initially in verbs

<u>Verbs</u>	<u>Gloss</u>		<u>PB forms</u>
ṽílá	'be alive'	<	*-kíd-a ('get well')
ṽíngáma	'lie across'	<	*-kíngam-a
ṽéla	'draw (water)'	<	*-kéd-a ('strain')
ṽéká	'cut'	<	*-kék-a
ṽémá	'cry out'	<	*-kém-a
ṽévúka	'look around'	<	*-kébuk-a
ṽénáma	'be amazed'	<	*-kénam-a

However, only two examples were found in which velar palatalization occurred root initially in nouns, as shown in (3) below.

(3) Velar palatalization root initially in nouns

ma-ṽende	'testicles'	<	*-kende	(class 6)
vu-ṽí	'honey'	<	*-júkí	(class 14)

But in cases where this PB velar was followed by the back vowel /u, o/ and the low vowel /a/, no palatalization occurred. (4) below gives some examples to illustrate this point.

(4) No velar palatalization before non-front vowels

a.	koṭama	'be bent'	<	*-kotam-a
	koṭoka	'arrive home'	<	*-kotuk-a
	kúlá	'grow up'	<	*-kúd-a
	kuma	'touch'	<	*-kúm-a
	kúmbíla	'ask for'	<	*-kúmbid-a
b.	káŋgá	'fry'	<	*-káŋg-a
	kámá	'milk'	<	*-kám-a
	ŋ-kádzí	'woman'	<	*-kad̥z̥i
	mu-kaṭí	'inside'	<	*mu-katí

From the above, we conclude that velar palatalization only occurred where PB *k was followed by the front vowels *i, *e. A rule that accounts for these changes can be formulated as in (5) below.

(5) Velar Palatalization Rule:

$$*k > /t͡ʃ/ / _ \text{*i, *e}$$

Note that unlike the voiceless velar stop, in most of its occurrences in this environment, PB voiced velar stop *g was lost; hence very few examples with this consonant underwent velar palatalization (see Appendix A).

In the above examples, I have shown velar palatalization occurring morpheme initially. However, Ikalanga seem to be one of those Bantu languages in which velar palatalization also occurred morpheme internally, contrary to claims made that velar palatalization does not occur in non-initial syllables within a morpheme (Hyman and Moxley (1994)). As shown in (6) below, a few words are found in this language where velar palatalization took place within morphemes.

(6) Velar palatalization morpheme internally

ḽéndzéla	'be wise'	<	*-kénɡid-a
n-séḽe	'sand'	<	*-céké
núḽi	'bee'	<	*-júki

The first example in (6) presents an interesting case because it shows that velar palatalization also occurred in the case of the voiced velar stop *g in this environment as well. The fact that Ikalanga has velar palatalization both morpheme initially and internally only puts it in what Hyman and Moxley have referred to as the Type B category with Cifundi and Jomvu, a few other Bantu languages in which palatalization occurs anywhere within morphemes but not across morphemes.

However, as mentioned above, palatalization in Ikalanga is not just a diachronic process; it is also found in morphophonemic alternations in the diminutivization of nouns and adjectives. I turn to these in the following section.

4.2 Palatalization in diminutives

As mentioned in §2.3.2, Ikalanga, like most southern Bantu languages such as Tswana, Sotho, Zulu and Xhosa (Doke 1954), primarily uses the suffix -ana in the formation of its diminutives. Of particular interest to this discussion, however, are those cases in Ikalanga which, with the affixation of the diminutive suffix -ana, the primary place of articulation of the root final consonant in the noun or adjective changes to become palatal or prepalatal. This type of alternation occurs in those stems in which the root final

consonant is either a lateral, a nasal or a labial. In other words, these changes are only found with alveolars and labials in Ikalanga. This is unlike the other southern Bantu languages (except Shona) where this process of palatalization is much more widespread. For example, in the Tswana language alone, Cole (1955:43) gives six instances where this process occurs, such as, in verb passives, nominal and adjectival diminutives, in nouns with class 3 prefix *le*, verb causatives and via other sound changes. As will be shown below, even in those environments where this process is well developed in Ikalanga, such as in nouns ending with a lateral, there are some exceptional cases where the process fails to occur for a large number of words. I assume, as mentioned in §1.1 in Chapter One, that the process of palatalization in this language is a recent development, hence its inconsistency in the environments where it is expected.

In the following subsections, I consider the different environments in which palatalization occurs in diminutives. I begin with the lateral in Ikalanga.

4.2.1 Palatalization of the lateral

The lateral consonant /l/ changes to a palato-alveolar affricate /d͡ʒ/ before the diminutive suffix *-ana*. (7) below gives some examples; we observe palatalization when the final vowel in the noun is a front vowel /i, e/.

(7) Palatalization of lateral before front vowels

a.	vúlí	vúḍ̃-aná	'small hole'
	fiálí	fiáḍ̃-aná	'small pot'
	m-bili	m-biḍ̃-aná	'small body'
	w ^h alí	w ^h aḍ̃-áná	'small partridge'
	vúṭíli	vúṭiḍ̃-aná	'small bottle'
b.	golé	god̃-aná	'small cloud'
	p ^h ele	p ^h ed̃-aná	'small hyena'
	vu-g ^w éle	vu-g ^w éd̃-aná	'small illness'
	i-ṭole	i-ṭod̃-aná	'small kid'
	vílévíle	vílévíḍ̃-aná	'small hot peppers'
	delele	deled̃-aná	'small (amount of) okra'

In (8) below, observe the non-occurrence of palatalization when the stem final lateral consonant is followed by the back vowels /o, u/.

(8) No palatalization of lateral before back vowels

ʃulo	ʃug ^w -aná	'small rabbit'
n-ʃóló	n-ʃóg ^w -aná	'small head'
ndílo	ndíg ^w -aná	'small plate'
n-ṭólo	n-ṭóg ^w -aná	'small load'
ṭi-milo	ṭi-mig ^w -aná	'small nose'
i-kulú	i-kug ^w -áná	'small ringworm'
p ^h ulú	p ^h ug ^w -áná	'small calf'

Note that when the lateral is followed by the back vowels, we derive velarization and not palatalization as seen in (7) above. In this case the lateral sound changes to a velar consonant effected by a labio-velar glide from the back vowels in the environment of a following low vowel. For a detailed discussion of the process of velarization, the reader is referred to Chapter Five. For our purpose, what is significant is that palatalization of this lateral consonant occurs in the environment of the front vowels /i, e/ and not back

vowels. I am assuming that these vowels first undergo a glide formation rule in the environment of a following low vowel /a/. The palatal glide then effects affrication of the preceding consonant changing it to a palato-alveolar affricate /d͡ʒ/. It is worth pointing out that the lateral /l/ in Ikalanga is a reflex of PB *d, the reflex of which alternates with the lateral in the surface forms. It is, therefore, this proto *d which underwent an affrication rule in the environment of a following palatal glide. (9) and (10) below give the Glide Formation Rule and the Affrication Rule respectively.

(9) Palatal Glide Formation Rule

$$i, e \rightarrow /j/ \text{ / } _ /a/$$

(10) Affrication Rule

$$*d > /d͡ʒ/ \text{ / } _ /j/$$

These rules apply in the order given to derive the surface forms seen in (7) above. (11) gives a derivation to illustrate.

(11)	*-godé	*-godé	1. Underlying form
		godé-aná	2. Diminutive suffix
	golé	---	3. *d > l
		godj-áná	4. Glide Formation Rule
		god͡ʒ-áná	5. Affrication Rule
	golé	~ god͡ʒ-áná	'small cloud'

In this derivation, we observe that with the affixation of the diminutive suffix, the Glide Formation Rule applies changing the front vowel to a palatal glide. It is this palatal glide which causes the affrication of the underlying

variant of the surface lateral changing it to a palato-alveolar affricate / $\overline{d}z$ /.

Note that the diminutive suffix in Ikalanga has a High tone on the final vowel. (A discussion of the tone system of Ikalanga is given in §7.2 below.)

Diachronic evidence for the above sound changes where *d changed to a palato-alveolar affricate / $\overline{d}z$ / before a palatal glide can be seen in the development of the word for 'eat' in this language. (12) illustrates.

(12) $\overline{d}z$ -á 'eat' < *dj-a < *-dí-a

More evidence of affrication of l (~ *d) before high vowels was also seen in §3.4 in frozen causatives where the surface /l/ alternates with an affricate / $\overline{d}z$ / in the causative forms of some verbs, obviously from the influence of the short causative suffix which is PB close vowel *i.

However, a different situation is observed in those nouns in which the final lateral consonant is followed by a low vowel /a/. In this case, two groups of nouns emerge: those in which the palatalization of the lateral consonant is optional, and, those in which the lateral consonant never palatalizes at all. (13) and (14) give examples to illustrate respectively.

(13) Optional palatalization of /l/ before /a/

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
zila	zil-áná ~ zid \overline{z} -áná	'small path'
vúlá	vul-áná ~ vúd \overline{z} -áná	'small (quantity of) water'
ṭṭi-nálá	ṭṭi-nál-áná ~ ṭṭi-nád \overline{z} -áná	'small finger'
ŋ-k ^w alá	ŋ-k ^w al-áná ~ ŋ-k ^w ad \overline{z} -áná	'small footprints'
ma-mila	ma-mil-áná ~ ma-mid \overline{z} -áná	'small mucus'

(14) No palatalization before the vowel /a/

zulá	zul-áná	'small frog'
zala	zal-aná	'small hunger'
góla	gol-áná	'small vulture'
d̄zilá	d̄zil-áná	'small (piece of) cloth'
gula	gul-aná	'small grassland'
vula	vul-aná	'small intestine'
m-bálá	m-bál-áná	'small color'

Note that the majority of nouns ending in a low vowel which do not allow palatalization is much larger than that which allows an alternation illustrated in (13) above. Altogether sixty-seven (67) nouns were found in the database ending in a lateral followed by a low vowel. In forty-eight (48) of these, the lateral fails to undergo palatalization and only nineteen (19) allow optional palatalization, making the former class the most productive of the two. The question is: why is palatalization also found in the environment of a low vowel /a/? Obviously, there is no glide formation in this environment, as seen in (14) where palatalization fails to occur. I assume that the occurrence of optional palatalization in (13) is a case of analogy. In this case, speakers of Ikalanga have tended to palatalize the lateral consonant in this environment simply because they do the same in the other environments, that is, before the front vowels.

As I will show below, the occurrence of palatalization in Ikalanga diminutives also occurs when nouns ending in nasals are diminutivized. I turn to these in the following subsection.

4.2.2 Palatalization of the nasals

Palatalization in Ikalanga diminutives is also common in nouns ending with the nasals /m, n/ followed by the front vowels /i, e/. When the diminutive suffix -ana is affixed to these nouns, the root final nasals change to a palatal nasal /ɲ/. In this case, as with the lateral consonant above, I am assuming the application of the Glide Formation Rule given in (9) above; the glide then changes the preceding nasal to a palatal nasal. The following examples in (15) illustrate this point.

(15)a. /n/ > /ɲ/ before the front vowels /i, e/

ɖuní	ɖuɲ-áná	'small mortar'
báni	baɲ-áná	'small bush'
fiúní	fiuɲ-áná	'small firewood'
m-píní	m-piɲ-áná	'small axe-handle'
i-kúní	i-kuɲ-áná	'small stick'
p ^h ani	p ^h aɲ-áná	'small scorpion'
zání	zaɲ-áná	'small leaf'
p ^h ené	p ^h eɲ-áná	'small steenbuck'

b. /m/ > /ɲ/ before the front vowels /i, e/

lu-límí	lu-liɲáná	'small tongue (uvula)'
semé	seɲáná	'small basket'
i-temé	i-teɲáná	'small gourd'
ts ^h íme	ts ^h iɲáná	'small well'
n-lúmé	n-luɲáná	'small husband i.e. younger brother to one's husband'

However, when these nasals are followed by the low vowel /a/, palatalization does not occur. Instead, the diminutive suffix is simply attached. I assume the final vowel of the noun simply drops before an identical low vowel in the

suffix. (16) gives some examples where we observe the failure of palatalization to occur when these nasals are followed by a final low vowel.

(16) No palatalization in nouns with a final low vowel

ts ^h íma	ts ^h ím-áná	'small well'
ɲama	ɲam-áná	'small meat'
ŋg ^w ena	ŋg ^w en-áná	'small crocodile'
ŋ ^w iná	ŋ ^w in-áná	'small hole'
ɖitima	ɖitim-áná	'small pumpkin'
ndalamá	ndalam-áná	'small bead'

The fact that palatalization of nasals is restricted to the environment of the front vowels /i, e/ clearly lends support to my argument above that, it is the palatal glide from the root final front vowels which triggers palatalization of the lateral consonant and the nasals. Thus, in cases where there is no glide formation, as in (14) and (16) above, palatalization fails to occur.

In the following section I turn to palatalization of the labials, a topic that has generated a lot of interest in the literature.

4.2.3 Palatalization of the labials

Even more interesting about this process in Ikalanga diminutives, as in most Southern Bantu languages where it is attested, is the palatalization of labials. While in the Sotho and Nguni group of languages this process is found in most labials, in Ikalanga only three labials undergo palatalization: the voiceless bilabial stop /p/, the prenasalized bilabial stop /mb/, and the bilabial approximant /v/ (< PB *b). The other two labials, that is, /p^h/ and /b/, fail to undergo palatalization in similar environments. It is worth

mentioning that the changes to these labials are covered under palatalization because of the conditioning environment, which is also palatal, as pointed out at the beginning of this chapter (see also Cole (1955) on Tswana; Stahlke (1976); Herbert (1977); and Ohala (1978)). However, as will be seen in the examples below, the derived consonants in this case have an alveolar place of articulation. This explains why in other studies (for example, Doke (1954); Swanepoel et al. (1980) on Southern Sotho) these changes are treated under the process of alveolarization, whereby a consonant changes to an alveolar fricative or affricate. In (17) below are given the diminutive forms of nouns and adjectives ending with the voiceless bilabial stop /p/ where we observe the occurrence of palatalization.

(17) /p/ changes to an aspirated labialized affricate /tʰw/¹⁸

t ^h opí	t ^h o ^h tʰw-áná	'small melon porridge'
kópi	kó ^h tʰw-áná	'small cup'
fúpi	fú ^h tʰw-áná	'shorter'
bepe	be ^h tʰw-áná	'small calabash'
hópé	hó ^h tʰw-áná	'little sleep'
ḍope	ḍo ^h tʰw-áná	'small mud'

I am assuming that, just as with the lateral /l/ (~ *d) and the nasals /m, n/ (see §4.2.1 and §4.2.2 respectively), the affrication of these labials is triggered by a palatal glide after the application of the Glide Formation Rule given in (9) above. After which the Affrication Rule in (10) above applies. The question of whether a palatal glide can effect the type of changes we see in these labials

¹⁸ Only one example was found where palatalization occurs before a back vowel, and this is:

p ^h épó	p ^h é ^h tʰw-áná	'small wind'
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Again I assume analogy.

has been addressed in Ohala (1978:373). As Ohala notes, it is phonetically natural for labial sounds to shift to dentals in the environment of a following palatal glide. According to Ohala (1978) (and the references therein), the acoustic similarities between palatalized labials and dentals are likely to make the listeners confuse these sounds (e.g. /pʲ, pʲ/ > /t, t̪, t̪ʲ/). In addition to the acoustic evidence provided in this study, Ohala further gives a survey of the world's languages both within and outside the Bantu family, where changes similar to those found in Ikalanga labials above are also found. As will also be shown in the processes of velarization and aspiration below (see Chapters Five and Six respectively), some morphophonemic alternations in Ikalanga today reflect some of the regular sound changes which occurred in this language diachronically. (18) below gives Ikalanga examples where we observe these apicals derived from palatalized labials in Proto-Bantu.¹⁹

(20)	<u>Ikalanga</u>	<u>Gloss</u>		<u>PB forms</u>
	t̪ ^{hw} á	'new'	<	*-pía
	t̪ ^{hw} -á	'burn'	<	*-pí-a
	t̪ ^{hw} ájíl-a	'sweep'	<	*-píágid-a
	dz ^w ál-a	'plant'	<	*-biad-a

¹⁹ These labials present an interesting case in that, unlike in (20) where they changed to apicals before PB high vowel *i, before PB close vowel *ɨ they changed to labialized fricatives, as seen below.

s ^w ík-a	'arrive'	<	*-pɨk-a
s ^w ímbo	'club'	<	*-pɨmbo
z ^w ímbo-á	'swell'	<	*-bɨmb-a
z ^w ál-a	'bear child'	<	*-bɨád-a

And in both cases, the labialization is retained as secondary labialization.

Note that /t̥^{hw}/ and /d̥z^w/ in Ikalanga alternate with the complex sounds /ps/ and /bz/ respectively, which are still found in a few words in one of its dialects (see §2.1.2 for the consonant chart). I can only speculate that the complex sounds /ps/ and /bz/ may be an intermediate stage in the development of the labialized apicals. Furthermore, I assume that the aspiration in the voiceless apical was caused by the glide (see §6.4.2 on how glides might cause the development of aspiration on the preceding sounds). An explanation on the retention of the labialization as secondary articulation in these sounds is given below.

But first, I look at other labials in which this change occurs. In (19) we observe the prenasalized bilabial stop /mb/ alternating with a prenasalized labialized affricate /nd̥z^w/.

(19) /mb/ alternates with a prenasalized labialized affricate /nd̥z^w/

ŋ-kómbe	ŋ-kónd̥z ^w -áná	'small water vessel'
ŋombe	ŋond̥z ^w -aná	'small ox or cow'
simbe	sind̥z ^w -aná	'small coal'
vu-simbe	vu-sind̥z ^w -aná	'small laziness'

(20) gives examples where the labial approximant also alternates with the labialized dental affricate /d̥z^w/.

(20) Approximant /v/ alternates with a labialized affricate /d̥z^w/

dáví	d̥ad̥z ^w -áná	'small branch (of tree)'
zevé	zed̥z ^w -áná	'small ear'
ndove	ndod̥z ^w -aná	'small dung'
ŋguluve	ŋgulud̥z ^w -aná	'small pig'

However, in the environment where a palatal glide is not formed, no palatalization occurs. For instance, no changes occur when the diminutive suffix is attached to nouns where these root final labials are followed by the low vowel /a/²⁰, as shown in (21).

(21) Failure of palatalization of labials with a final low vowel /a/

fúpá	fúp-áná	'small bone'
i-ťápá	i-ťáp-áná	'small ceremony'
ʃúmba	ʃúmb-áná	'small lion'
dziua	dziu-aná	'small pool'
lu-koua	lu-kou-aná	'small stream'
mbeva	mbeu-aná	'small mouse'

On the other hand, before the back vowels /u, o/ these labials undergo velarization whereby their primary place of articulation change to that of a velar consonant (see also §5.8.2 in Chapter Five). (22) gives some examples to illustrate.

(22) Velarization of the labials before back vowels /u, o/

lu-zívó	lu-zíg ^w -aná	'small knowledge'
n-lívó	n-líg ^w -aná	'small (amount of) greens'
gumbo	gumbǧ-aná	'small foot'
lu-tombó	lu-tombǧ-áná	'small flat rock'
n-tumbu	n-tumbǧ-aná	'small stomach'

²⁰ There are only two examples where these labials underwent optional palatalization where they had been followed by the low vowel /a/. These are,

ŋ-koua	ŋ-kouaná ~ ŋ-kodz ^w -aná	'small opening'
ŋumbá	ŋumbaná ~ ŋundz ^w -áná	'small house (room)'

Once again I assume analogy in this case.

I am now in a position to address an observation made earlier on the retention of the labialization with the palatalization of these labials. This is a development found in most of the Southern Bantu languages in which palatalization of labials occurs (see Doke (1954); Cole (1955); Stahlke (1976); Herbert (1977); Ohala (1978); Louw (1975/76) on Tsonga and Xhosa). In these studies, it has been found that the labialization is always retained as secondary articulation when these labials are palatalized. Following earlier suggestions on the origin of the labialization, I am also assuming that the secondary labialization must have come from the original labial consonant in the noun (see Stahlke (1976) and Ohala (1978)).

From all the above, I conclude that palatalization in the formation of Ikalanga diminutives occurs in the environment where the root final vowel had been a front vowel /i, e/. These front vowels are then subjected to a palatal glide formation rule in the environment of a low vowel /a/ of the diminutive suffix. It is this palatal glide which then causes the palatalization of the preceding consonants. Altogether six (6) consonants in Ikalanga undergo this process before a palatal glide and these are /l, m, n, p, mb, v/. Note that only one example was found where an apical /t/ palatalizes before a front vowel (i.e., g^watí ~ g^watíáná 'small piece of tree bark'); hence it is not included in the discussion above.

4.3 Typological evidence of palatalization

As already mentioned above, the process of palatalization is common to a number of the Southern Bantu languages. According to Doke (1954), this process is much more widespread in the Nguni and Sotho group of languages, where, unlike in Ikalanga, palatalization occurs in a number of morphological processes including passives, causatives, diminutives and some noun formations (e.g. class 3 le- in Tswana). In (23) and (24) below are illustrations of Tswana and Zulu diminutives (Doke (1926, 1954); Doke and Vilakazi (1958); and Cole (1955)).

(23) Tswana diminutives

moráfi	moráts ^{hw} ana	'small nation'
lík ^h úbu	lík ^h údz ^w ana	'small ridge'
molapo	moláts ^w ana	'small stream'
líroli	lírodz ^w ana	'small dust'
logoŋ	logojána	'small (piece of) wood'

(24) Zulu diminutives

u:p ^h á:p ^h e	u:p ^h a:fána	'small feather'
isigú:bu	isigudzána	'small calabash'
ink?ómo	isik?onána	'small beast'
inkabi	inkatjána	'small ox'

These examples are evidence that the occurrence of palatalization in Ikalanga diminutives is a process also found in other Southern Bantu languages. The only difference which needs to be mentioned here is that, in the Sotho and Nguni languages, this process seem to be morphologized; as a result it occurs even when the final vowel is back and round, while in Ikalanga, it is still largely phonologically conditioned. In the environment where the final

vowel is back and round, Ikalanga has velarization. And where the final vowel is low, no palatalization occurs, with only a few exceptions.

4.4 Summary

In this chapter I have shown that the process of palatalization occurs in Ikalanga. It was shown that, diachronically, Ikalanga is one of those languages where PB velar stop *k palatalized in the environment of front vowels *i, *e. This process occurs both morpheme initially and internally. In addition, it has also been shown that Ikalanga has palatalization in the formation of diminutives. Even though I assume that this process might be a recent development in Ikalanga, it is interesting to note that, unlike in the other Southern Bantu languages where this process seem to have morphologized, in this language it is phonologically conditioned in that its occurrence is triggered by the palatal glide from the front vowels. Thus, in cases where the final vowel in a noun is back and round, Ikalanga has velarization instead of palatalization.

CHAPTER FIVE

VELARIZATION

This chapter looks at the velarization of consonants, a process which is widespread in the Shona group (Doke 1931). Within the Bantu field, velarization is also attested in a number of other languages such as Venda, Rwanda, Rundi, Nyiha, Tumbuka and Mang'anja (Ponelis 1974), but it appears to be most dominant in the Shona group, especially in the Zezuru dialect of Central Shona. In other languages, such as Venda where it occurs inconsistently, it is assumed to be from the influence of Shona, which has had a lot of contact with Venda in the past (Doke 1954). In this chapter, I will show that the process of velarization in Ikalanga is both a diachronic and synchronic process. §5.1 gives the definition of velarization and the different types of this process in Ikalanga. Next, §5.2 considers velarization in Ikalanga, and in §5.3 I look at velarization in other Bantu languages. §5.4 gives an acoustic analysis of the doubly articulated velarized stops derived by this process in Ikalanga, that is, /p̠k̠h/ and /b̠g̠/. In §5.5 phonological evidence is given that these Ikalanga complex segments are single segments. Next, §5.6 gives a diachronic analysis of velarization in Ikalanga. §5.7 gives a phonetic explanation for why the labio-velar glide /w/ causes velarization of the preceding sounds. §5.8 gives typological evidence from other languages, and, §5.9 looks at synchronic velarization in morphophonemic alternations in

passives, the formation of diminutives, and agreement markers in the environment of a following past tense marker -a-. Finally, in §5.10 I give a summary of the chapter.

5.1 What is velarization?

Velarization is a phonetic process whereby there is a raising of the back of the tongue towards the velum in the articulation of a sound. In a number of studies, this process is considered as secondary articulation (Ladefoged (1982); Crystal (1991)). But, as I will show below, the term velarization has also been used to refer to a diachronic process whereby the primary place of articulation of a sound changed to that of a velar. As mentioned above, this process is attested in a number of Bantu languages. (1) below illustrates some examples from two of the languages in which this process occurred.

(1)a. Shona (Doke 1931)

ḡká	'dry up'
ḡxáɲa	'break'
íbɛ	'stone'
ḡgaírá	'wink'

b. Kinyarwanda (Jouannet 1983)

ìgìḡkàrà	'soulier usé'
ùrùḡgà	'médísance'
ḡk ^w àrà	'porte'
íḡg ^w í	'voix'

The most extensive study done on velarization is by Doke (1931) on the Shona language who defines this process as follows,

“Velarization is brought about by an abnormal raising of the back of the tongue towards the soft palate (velum), instead of the usual slight raising effected in pronouncing the velar semi-vowel”. (1931:109)

According to Doke, different states of raising of the back of the tongue result in different types of velarized sounds. For example, when the back of the tongue is raised to “... effect contact with the velum...”, we derive doubly articulated stops whereby the second segment is realized as a velar consonant as in /p̄k/ or /b̄g/. The choice of the velar segment is dependent on whether the sound that is being velarized is voiceless or voiced. In cases where raising corresponds to that of a fricative sound, the velar component would be either one of the velar fricatives /x, ɣ/, as in /p̄x/ and /b̄ɣ/. Doke refers to these two realizations of this process as “plain velarization”. But in cases where a further retraction of the back of the tongue from the soft palate occurs eliminating the friction, there is velarization by the semi-vowel /w/. The following representations from Doke give a summary of the types of velarization.²¹

(1) Representations of Shona Velarization

Explosive velarization:	pka, bga, mɲa
Fricative velarization:	pxa, bya, mɲa
Resonated velarization:	p̄wa, b̄wa, m̄wa
Non-velarization:	pwa, bwa, mwa

On the basis of these representations Doke (1931) gives three types of velarization common to this group:

²¹ Doke is not clear on how Resonated velarization differs from velarization with a semi-vowel.

- (a) plain velarization, whereby a velar consonant occurs immediately following another consonant, e.g. /pk, px/;
- (b) velarization with a semi-vowel /w/ whereby the glide occurs following an already velarized consonant, e.g. /pkw/; or
- (c) plain semi-vowel /w/ following another consonant.

These different types of velarization can best be demonstrated by the word for 'dog' in some of the Shona dialects including Ikalanga, as shown in (2).

(2) Velarization in the word for 'dog' in Shona dialects

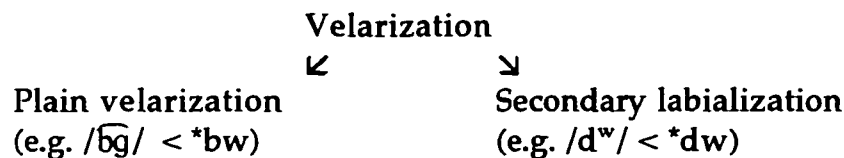
Zezuru	:	i m̄bgá
Korekore	:	iŋg ^w á
Karanga	:	m̄b̄yá
Ikalanga	:	m̄bgá

Doke did not make a distinction between the two processes of velarization and secondary labialization. His use of the term velarization for both processes stems from his definition of velarization, given above, in which the labio-velar glide /w/ is simply referred to as a velar semi-vowel instead of a labio-velar glide. His failure to make a distinction between the two processes is further evident in his later work on the Southern Bantu languages where he gives the consonant inventory of two Shona dialects, Karanga and Zezuru. Doke presents these consonants in two charts, one of plain consonants and the other of velarized consonants. In the chart of velarized consonants, however, we find that both the labialized and velarized consonants are grouped together.

Doke's classification which considers both plain velarization and secondary labialization under the same umbrella of velarization can be

confusing to the reader. Even though both are derived by the same process of velarization, in the development of the plain velarization, the labiality in the labio-velar glide is lost changing the primary place of articulation of the sound into a velar. In other words, the secondary articulation is “hardened”, developing into a closure. In secondary labialization, on the other hand, the glide is simply realized as secondary articulation without effecting a change in place of articulation on the primary articulation. These two developments of velarization can be illustrated by (3).

(3) Developments of velarization



In my analysis, I show that even though both plain velarization and secondary labialization are derived by the same process, phonetically, they are realized differently. In addition, it will be shown that apicals underwent another form of velarization whereby the primary place of articulation of the apical changed to that of a velar and the secondary labialization was also retained, for example, /ḡw/ < PB *dw. I refer to this third type as complete velarization. Throughout the chapter though, I use the term ‘velarized consonants’ to refer to the segments derived under both plain and complete velarization, while the term ‘labialized consonants’ refers to segments with secondary labialization.

5.2 Velarization in Ikalanga

Ikalanga, as is the case in the rest of the Shona group, attests to a number of velarized and labialized consonants. As I will show below, the presence of these consonants in Ikalanga is a result of both the diachronic sound changes as well as the morphophonemic alternations that take place in certain morphological processes in the language, such as diminutive formation and verb passive formation. Although Wentzel (1983) points out that the process of velarization is not a typical characteristic of Ikalanga (referred to as Kalanga or Western Shona in his work), Ikalanga has two doubly articulated velarized stops in its consonant inventory. In addition to these two doubly articulated velarized stops, eight labialized consonants are also found. In (4a) and (4b) below I give the Ikalanga inventory of velarized and labialized sounds respectively.

(4)a. Velarized sounds

\widehat{pk}^h \widehat{bg}

b. Labialized sounds

	d^w	k^w	g^w
t^{hw}		k^{hw}	
			ηg^w
			η^w
	\int^w		

It is worth noting that in a number of words in Ikalanga, the sound $/k^{hw}/$ occurs in free variation with the aspirated doubly-articulated velarized stop $/\widehat{pk}^h/$. This alternation may be a result of the influence of dialects on each another, resulting in speakers' tendency to use the two sounds in free variation in their pronunciation. This is especially the case in the speech of

the younger people. In (5) are given examples of words where speakers tend to alternate between the two sounds.

(5) /k^{hw}/ as a variant of /p^h/

p ^h á	~	k ^{hw} á	'dry up'
p ^h iṭa	~	k ^{hw} iṭa	'snatch'
p ^h izi	~	k ^{hw} izi	'sheep'
p ^h ana	~	k ^{hw} ana	'break'

As seen in (4a) above, doubly articulated velarized consonants in Ikalanga are only derived from bilabial sounds. This is consistent with the observation made by Ponelis (1974) that velarization originates with labials. Another observation already noted in the literature is that possible complex segments are those which combine two or more of the constituents: labial, coronal and dorsal (Sagey 1986). Thus, the Ikalanga complex segments are a combination of the labial plus dorsal constituents. On the other hand, as seen in (4b), secondary labialization is unrestricted in that it is found on the alveolars, palato-alveolars, and velars in this language. The one exception to secondary labialization are the bilabials, which point is discussed in §5.6.1 below. In (6) to (15) I give examples of words in Ikalanga which have velarized and labialized consonants. The number of words in which each consonant occurs is given from a database of 3,000 lexical entries of Ikalanga (see Appendix C). These numbers are intended to show the restricted distribution of these sounds, more especially, that of the doubly articulated velarized consonants. In cases where a consonant has a large distribution

(that is, if found in many words), only a few examples are given for illustration.

(6) /p^h/ 8 examples

p ^h á	'dry up'
p ^h ana	'break'
p ^h izi	'sheep'
hap ^h á	'armpit'

(7) /b^g/ 15 examples

b ^g ilíla	'return or go back'
b ^g e	'stone'
deb ^g e	'leather blanket'
m ^g á	'dog'
ʃamb ^g á	'dirt'
p ^h e mb ^g e	'duiker'

(8) /d^w/ 6 examples

uu-d ^w ilo	'beginning (n)'
d ^w ilidzila	'catch water seeping through in a well'
d ^w ilila	'advance; progress'
tʃi-d ^w i	'knee'
d ^w a	'say; come from'
uíd ^w á	'get cooked; ripen'

(9) /t^{hw}/ only 1 example

t ^{hw} á	'spit; vomit'
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(10) /k^w/ 41 examples

k ^w ija	'grind'
k ^w eua	'pull'
k ^w íuá	'steal'
g ^w ák ^w a	'dry veld'
k ^w égúla	'grow old'

(11) /k^{hw}/ 40 examples

k ^{hw} iriri	'snore (n)'
ŋ-k ^{hw} e	'crack (n)'
ŋek ^{hw} á	'lie (n)'
k ^{hw} íta	'snatch'

(12) /g^w/ 80 examples

g ^w ilik ^w iŋi	'measles'
vu-g ^w éle	'illness'
g ^w isá	'flour'
ndug ^w i	'bile'
g ^w a	'fight'
vu-g ^w á	'pus'
g ^w adá	'lump of dry soil'

(13) /ŋg^w/ 27 examples

ŋg ^w enú	'now'
ŋg ^w iŋg ^w i	'gums'
ŋg ^w e	'tiger'
m aŋg ^w ána	'tomorrow'
ŋg ^w ena	'crocodile'

(14) /ŋ^w/ 17 examples

ŋ ^w edzi	'moon'
ŋ ^w aná	'child'
ŋ ^w ezi	'guest; visitor'
ŋ ^w á	'drink'

(15) /ʃ^w/ 7 examples found.

ʃi-ʃ ^w á	'bundle of thatching grass'
ʃ ^w aja	'poke'
ʃ ^w eʃ ^w ana	'creased or crumpled'
diʃ ^w á	'grass'
lu-meʃ ^w é	'left hand'

It is evident from the examples in (6) and (7) that the two doubly-articulated velarized sounds are restricted in their occurrence, which may be an indication of their dying out in the language. This development is supported by the fact that some speakers they now alternate with /k^{hw}/ and /g^w/ in some words, as was shown in (5) above. The sounds /k^{hw}/ and /g^w/, on the other hand, are more widespread in their distribution than these doubly-articulated stops. /d^w/ and /j^w/ are also found in a few words, and the exceptional case is /t^{hw}/, which is found in only one word in the database.

It is worth noting that all these velarized and labialized consonants are only found in the environment of a following non-back vowel, which can be any one of the vowels /i, e, a/, and none occurs preceding the back round vowels /u, o/. As I will show in §5.6 below, the absence of the back round vowels following these consonants can be explained by looking at their derivational history. That is, historically, the velarization and labialization we find in these sounds is derived from Proto-Bantu back round vowels in the environment of another vowel within a syllable. In other words, this velarization and the secondary labialization was effected by a labio-velar glide /w/ derived from Proto-Bantu back vowels in the environment of a following non-back vowel. A similar development is also discussed in §5.8.2 on velarization in Ikalanga diminutives. The question of how this labio-velar glide /w/ effect velarization in these stops is discussed in §5.7 below. In

the following section, I consider other languages in which velarization is attested.

5.3 Velarization in other Bantu languages

I begin by giving a survey of velarization in the Shona dialects. According to Doke (1931), this process is widespread in Shona but the extent of its occurrence differs with each dialect concerned. While in some dialects, such as Zezuru in Central Shona, it is much more widespread, in others, such as Ndau in Eastern Shona, it is kept to a minimum. (16) gives examples from three Shona dialects of Zezuru, Karanga and Manyika with both velarized and labialized stops (Doke 1931), to illustrate.

(16) Velarization of the labial stops in Shona dialects

<u>Zezuru</u>	<u>Karanga</u>	<u>Manyika</u>	<u>Gloss</u>
ku- $\widehat{p}k\acute{a}$	ku- $\widehat{p}x\acute{a}$	ku- $\widehat{p}x\acute{a}$	'to dry up'
$\widehat{p}k\acute{a}n\acute{a}$	$\widehat{p}x\acute{a}n\acute{a}$	$\widehat{p}x\acute{a}n\acute{a}$	'break'
$\widehat{i}p\acute{k}\acute{a}$	$\widehat{i}p\acute{x}\acute{a}$	$\widehat{i}p\acute{x}\acute{a}$	'sweet reed'
$\widehat{h}ap\acute{k}\acute{a}$	$\widehat{h}ap\acute{x}\acute{a}$	$\widehat{h}ap\acute{x}\acute{a}$	'armpit'
$\widehat{t}j\acute{i}-bwe$	$\widehat{b}y\acute{e}$	$\widehat{u}y\acute{e}$	'stone'
$\widehat{i}mbg\acute{a}$	$\widehat{m}by\acute{a}$	$\widehat{i}mbw\acute{a}$	'dog'

We observe that the Shona language has both the doubly articulated velarized consonants and labialized stops as was shown to be the case in Ikalanga. An exception is the presence in the Zezuru and Manyika dialects of labialized labials²², which are not found in Ikalanga. In addition to labials, the Zezuru dialect also attests to velarization of nasals, as shown in (17).

²² It is not clear from Doke (1931) whether these labialized labials are given in their orthographic form or in their phonetic realizations.

(17) Velarization of nasals in Zezuru (Doke 1931)

<u>Zezuru</u>	<u>Gloss</u>
m̄ɲené	'owner'
m̄ɲaná	'child'
m̄ɲed̄z̄í	'moon'
m̄ɲená	'rat-hole'
ku-ɲɲ ^w á	'to drink'

The examples given in (16) are consistent with Doke's observation that velarization in the Shona group differs from one dialect to the other. While some dialects have the plosive velarization as in Zezuru, others such as Karanga and Manyika attest to fricative velarization. Labialization, on the other hand, is common to all of the Shona group.

In addition to the above examples of labials and nasals, Doke also cites velarization in other types of consonants in the Shona dialects and these are velarized prepalatals, dentals and alveolars. In these consonants, this process is found in morphophonemic alternations as will be shown below in the case of Ikalanga (see §5.8). Velarization of prepalatals, on the other hand, is found in the Zezuru dialect only (Doke (1931)). (18) gives some examples to illustrate. It is not clear from the source if these segments are considered clusters or not.

(18) Zezuru velarized prepalatals

ku-tʃká	'to fear'
ɖatʃka	'frog'
ku-dʒga	'to eat'
dʒgárá	'sow'
ru-dʒgi	'right side'

No examples could be found in Ikalanga with velarized prepalatals. I am assuming that either velarization of prepalatals did not occur in Ikalanga at all or that the velar segment was simply dropped at some stage in the past. The examples in (16), (17) and (18) above show velarization to be more common in the Shona language than appears to be the case in Ikalanga where few sounds appear to be derived by this process. A possible explanation for this imbalance in the occurrence of these sounds in the two languages may be a result of Ikalanga having been isolated from the main Shona group over a long period of time. Thus, changes which took place in Shona may never have reached Ikalanga or vice versa.

Another Bantu language which attest to the process of velarization in Bantu is Kinyarwanda, an eastern Bantu language spoken in Rwanda. Jouannet (1983) cites the following words from Kinyarwanda which show velarization similar to that in both Ikalanga and Shona.

(19) Kinyarwanda (Jouannet 1983)

a. Velarized consonants

ím̄bgá	'chien'
ìgìpkàrà	'soulier usé'

b. Labialized velarized consonants

ík ^w àrà	'porte'
ùbùj ^w ì	'sommet'
bíráè ík ^w àrà	'c'est connu'
g ^w à ùbùj ^w ì	'tombe'
bíráàz ^w ì	
g ^w à	

5.4 Acoustic analysis of the doubly-articulated stops

In this section I look at the acoustic and aerodynamic nature of the doubly-articulated consonants / \widehat{pk}^h / and / \widehat{bg} /. Aerodynamic samples will show if there is a negative phase in the air pressure in the production of these sounds. Such a condition would be an indication that the ingressive velaric airstream is used in the release of the first portion of these sounds (Ladefoged 1964; Demolin 1991-92). In addition, this analysis will also provide evidence of articulatory overlap in the production of these sounds.

Phonetically, when these labio-velar sounds are produced, two closures are made in the oral cavity: one at the labial place of articulation and another at the velar place of articulation. This means that there is an overlap in the two closures. Because of the abovementioned overlap, a body of air becomes trapped between the two points in the oral tract. When the first closure is released, that is, the labial closure, the velar closure will still be in place. As a result, a temporary rarefaction of pressure is created which leads to the first release resembling that of a click (Ohala 1995). In other words, the fact that the first release burst occurs while the velar closure was still in place, means that the air stream utilized in the first release is the velaric airstream which was trapped in the mouth. The use of the velaric airstream in these sounds compares to the labial-velars / \widehat{kp} / and / \widehat{qb} / found in some West and Central African languages. A number of studies on these labial-velars show the presence of velaric suction in their production (see Connell (1994) and the references therein).

A previous analysis on articulatory overlap is offered by Silverman and Jun (1994), who looked at a Korean medial cluster as in [ipku]. Using aerodynamic evidence, they showed a brief rarefaction in oral pressure during the consonantal sequence while the pharyngeal pressure was still positive. Ohala (1995) suggests that some emergent stops in European languages may derive from epiphenomenal clicks. Using both acoustic and aerodynamic data of the word damnation, Ohala shows the presence of a negative pressure in the consonant cluster mn. He notes that in the production of these clusters, a temporal overlap of the two closures takes place. As the first closure is released, a negative pressure in the pocket of air is created resulting in a click-like burst. This click-like burst could be reinterpreted as a pulmonic [p] by the listeners. Ohala (1995:9) refers to this negative pressure as epiphenomenal clicks, "...born out of the fortuitous temporal overlap of consonantal constrictions in a cluster." Maddieson (1990), on the other hand, analysed some velarized consonants in the Zezuru dialect of Shona. Using both acoustic and aerodynamic data as well, he shows the absence of an articulatory overlap in the production of the consonants /tkw/ and /tʃk/. Even though Maddieson's study shows these velarized segments in Zezuru as sequential articulations, whereby the velar closure is only formed after the release of the first segment, acoustic and aerodynamic evidence in Ikalanga shows that velarized consonants /p̄k̄/ and /b̄ḡ/ in Ikalanga are not sequential articulations.

Below I present acoustic and aerodynamic data of the two Ikalanga words /p̄k^há/ 'dry up' and /b̄ge/ 'stone'. The words were embedded in a frame ku ___ pakatí 'to/at ___ in the middle'. These utterances, given in (20), were recorded into the Kay Computerised Speech Lab (CSL). The oral pressure was also recorded using a pressure transducer connected to the CSL.

- (20) a. ku-p̄k^há pakatí 'to dry up in the middle'
 b. ku-b̄ge pakatí 'at the stone in the middle'

The waveforms, the air pressure data and broad band spectrograms of both utterances are given below as Figure 5.1 and Figure 5.3 respectively. The following observations are made from these data:

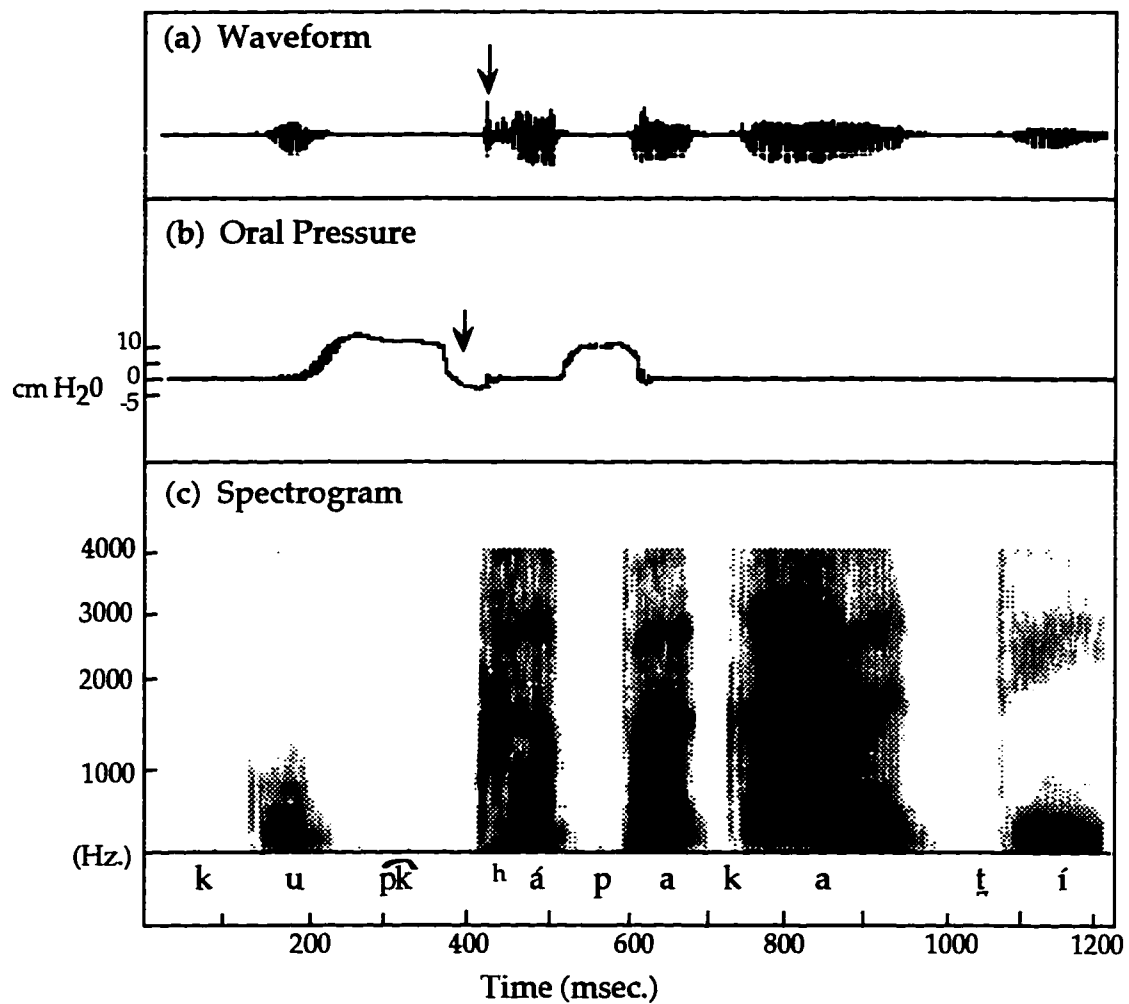


Figure 5.1. Waveform, oral pressure, and spectrogram of the utterance /ku- $\widehat{p}k^h$ á pakatí/ showing a negative pressure in the production of the velarized stop / $\widehat{p}k^h$ /.

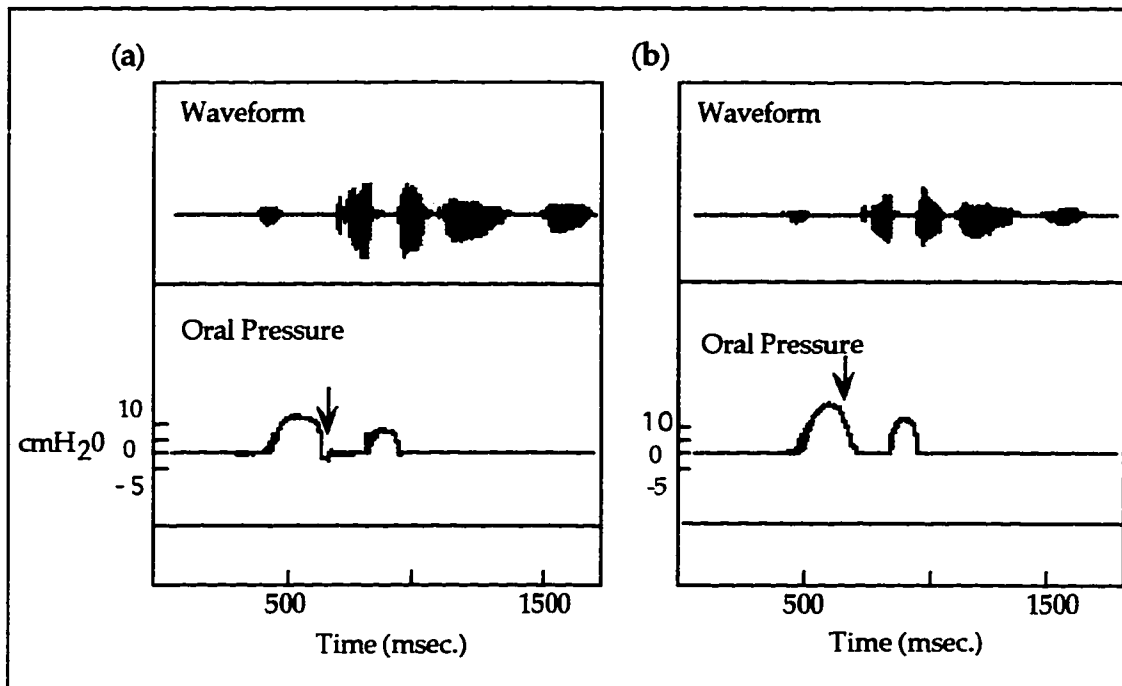


Figure 5.2. Waveforms and oral pressure data of two samples of the same utterance /ku-p̄a pakat̄i/ where we observe a minimal recording of negative pressure in (a), while (b) shows no negative pressure.

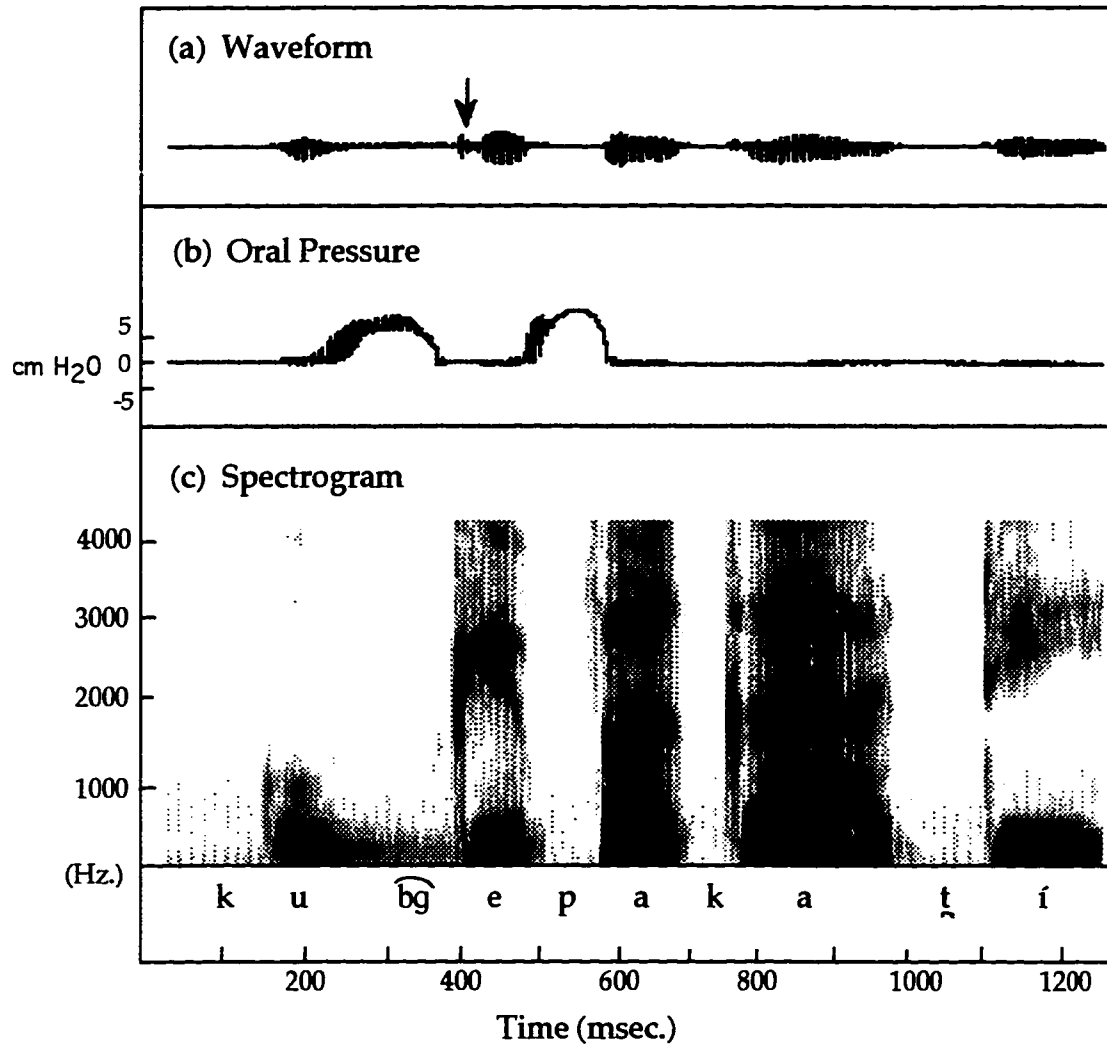


Figure 5.3. Waveform, oral pressure, and spectrogram of the utterance /ku- $\widehat{b}ge$ pakaṭi/. No negative pressure is recorded in the production of the voiced velarized stop / $\widehat{b}g$ /.

(a) Release bursts:

Figure 5.3 shows the presence of two bursts, the second one released immediately after the first one (indicated by an arrow on the waveform). In general, the duration between the two bursts was found to be less than 10 milliseconds.

(b) Aerodynamic data:

An important point to note is that, in the case of /p̄k̄h/, when the labial closure was released, the velar closure was still in place. As a result, a negative pressure develops, as indicated by an arrow on the oral pressure data. We observe that there is a lag between the fall in oral pressure and burst which is not the case in the second peak, which shows oral pressure in the production of /p/ in pakatí. This lag provides evidence of an overlap in the two closures. However, this negative phase was not found in the production of its voiced counterpart /b̄g/, as seen in Figure 5.3 above. Returning to Figure 5.2, it was found that some samples with the voiceless velarized stop /p̄k̄h/ showed minimal pressure rarefaction of about -2.5 cm H₂O (see Fig.5.2 (a)), while others showed no negative pressure just like in the voiced velarized stop (see Fig.5.2 (b)).

A conclusion to be drawn from this study is that Ikalanga velarized stops are not sequential articulations. Both the acoustic and aerodynamic data given above suggest a temporal overlap in the production of the two portions. As a result, the velar release occurs immediately after the labial release.

5.5 Velarized consonants as single segments

Before launching into the details of how these velarized and labialized segments developed diachronically, this section provides evidence that these doubly articulated velarized consonants / \widehat{pk}^h / and / \widehat{bg} / are single segments and not consonant clusters in Ikalanga. It is obvious that Doke (1954:206) also considered these doubly articulated consonants in the Shona group as single segments. In his charts of the Zezuru and Karanga velarized consonants, he entered these consonants each in its own slot which shows that he was aware that they are not consonant clusters.

Phonological evidence that these velarized consonants are single segments is derived from the syllable structure of Ikalanga. Like most Bantu languages, Ikalanga has a (C)V syllable structure. The only exception involves syllabic nasals which can stand on their own as syllables. Thus, Ikalanga disallows onset clusters as well as coda consonants. Besides, if these doubly articulated velarized consonants were considered bi-segmental, Ikalanga would have a strange coda condition whereby only the two labial plosives /p, b/ can be codas, and only if they are followed by the velar consonants / k^h, g /.

Evidence that Ikalanga does not allow onset clusters and coda consonants is derived from loanwords. All loanwords into Ikalanga which have consonant clusters in their originating languages are simplified by either omitting one of the consonants or a vowel is inserted to break the cluster. In those words which had coda consonants in their originating

languages, a vowel is epenthesized to form a nucleus of a syllable or the coda consonant is simply omitted. (21) and (22) gives examples of loanwords from both English and Afrikaans to illustrate. Clusters which have been simplified in Ikalanga are underlined in the original words.

(21) Simplification of onset clusters in loan words

<u>Loan word</u>	<u>Original word</u>	<u>Language from</u>
porakaṭisa	<u>p</u> ractise	English
biriki	' <u>b</u> rake'	English
poraimari	' <u>p</u> rimary'	English
ṭirina	' <u>t</u> rein'	Afrikaans ('train')
uu-rúk ^w i	' <u>b</u> roek'	Afrikaans ('trousers')
kúnúpo	' <u>k</u> noop'	Afrikaans ('button')

(22) Simplification of coda consonants

porakaṭisa	' <u>p</u> ractise'	English
uúṭli	' <u>b</u> ottle'	English
ḍolí	' <u>d</u> oll'	English
síkisi	' <u>s</u> ix' /siks/	English
i-kéro	' <u>s</u> ker'	Afrikaans ('scissors')

Additional evidence that the doubly articulated velarized consonants are single segments can also be derived from the duration measurements of these consonants. Ikalanga words with these doubly articulated stops and some with plain stops were recorded and analysed for duration (see Chapter Two on recording procedure). The duration measurements of these sounds were found not to be markedly different from those of the plain stops as shown in Table 1.²³ These measurements are based on single tokens.

²³ Note that no figures are given for the voiced stops in the chart without the VOT because voicing starts at the beginning of the closure for these stops.

Table 1. Duration Measurements (in msec.) of Ikalanga stops

	/p̤ ^h /	/p/	/k/	/k ^w /	/b̤g/	/b/	/g/	/g ^w /
Plus VOT	119	132	94	93	142	143	141	81
Less VOT	63	125	75	80				

Even though the duration of the doubly articulated velarized stop /p̤^h/ plus VOT is higher than that of the velar stop /k/, we observe that it is lower than that of the labial stop /p/. On the other hand, without the VOT, this velarized stop has a duration much lower than that of the other three voiceless stops. The voiced doubly articulated velarized stop /b̤g/ has a duration which is close to that of /b/ and /g/. The labialized voiced velar stop has the lowest duration of these four sounds. The above duration measurements show that these velarized consonants are single segments just like the other stops in this language. I, therefore conclude, based on the Ikalanga syllable structure, the syllabification of loanwords, and the duration measurements that the doubly-articulated velarized consonants in Ikalanga are single segments and not clusters.

5.6 Diachronic velarization

As already pointed out in §5.2 above, Ikalanga has diachronic velarization. On studying Ikalanga cognates with these velarized and labialized consonants and their Proto-Bantu reconstructions from both Guthrie (1967-71) and Meeussen (1969/80), it becomes evident that the

velarization and labialization we find in these correspondences is derived from Proto-Bantu back round vowels *ɔ̄ and *u in the environment of the following non-back vowels /i, e, a/. Note that the back close vowel *ɔ̄ is only relevant when it occurred after the apicals *t, *d where it became secondary labialization. In the environment of other stops, this vowel caused frication in the Ikalanga stops (i.e. High Vowel Frication (HVF) discussed in §3.2), as is the case in most Bantu languages. Thus, before the above PB back and round vowels, Ikalanga reflexes are either velarized, labialized, or labialized velarized consonants depending on the Proto-Bantu consonant which preceded these vowels.

In order to properly demonstrate, step by step, the different stages that took place in the diachronic development of these velarized and labialized consonants in Ikalanga, below I consider these consonants in sets according to their place of articulation beginning with the labial stops, the apicals and then the nasals. The palato-alveolar fricative, the voiceless velar stop and the prenasalized velar stop are considered together in §5.6.4 as they do not present any new changes except to provide more cases of the changes already seen in the apicals.

5.6.1 Velarization of bilabials

To begin with, I consider the development of doubly articulated velarized bilabial stops in Ikalanga. Where Proto-Bantu bilabial stops *p, *b

occurred preceding the back round vowel *u in V1 position, followed by one of the non-back vowels *e, *a in V2 position, Ikalanga reflexes are the doubly articulated velarized bilabial stops /p̠h/ and /b̠g/ respectively. In (23) and (24) I give examples of Ikalanga words with these velarized consonants and their PB reconstructions for illustration. As mentioned earlier, where the gloss of the reconstruction differs from that of the cognate in Ikalanga, its meaning is also given within parenthesis to the right.

(23)	<u>Words</u>	<u>Gloss</u>		<u>PB</u>
	p̠há	'dry up'	<	*-pu-a
	p̠hána	'break'	<	*-puan-a ('pound')
	p̠haja	'pound softly'	<	*-puag-a
	fiap̠há	'armpit'	<	*-kápu-a
(24)	m̠gá	'dog'	<	*-bua
	b̠gilíla	'return; go back'	<	*-bued-a
	b̠ge	'stone'	<	*-bue
	m̠-b̠geti	'type of tree'		

Nowhere in PB reconstructions do we find a sequence of the two back round vowels *u, *o occurring together. As Greenberg (1951) notes, combinations of these vowels are almost non-existent in Proto-Bantu because of vowel harmony. The absence in Ikalanga of velarized consonants preceding back round vowels follows from the ban on *Cuo and *Cou sequences in Proto-Bantu. In addition, velarization failed to occur on those labials when V1 was a close vowel *u, in which case, Ikalanga shows evidence of High Vowel Friction taking place (see §3.2). A few examples are given in (25) to show the

development of the frication from these PB bilabial stops in cases where V1 was a close vowel *u.

(25) High Vowel Frication of the bilabial stops

fánána	'resemble each other'	<	*-púanan-a
fáníla	'become fitting'	<	*-púan-a
vángá	'mix'	<	*-búáng-a
ví	'grey hair'	<	*-búi

This suggests that High Vowel Frication must have occurred earlier and it is by far more widespread in Bantu than velarization. Thus, in the case of Ikalanga apicals where HVF failed to occur, we find labialization (§5.6.2).

The question that we need to address at this point is: how did velarization develop in these bilabial stops in Ikalanga? As already alluded to above, velarization of these stops developed from the PB back vowel *u immediately followed by another non-back vowel. Such a diachronic development can best be explained if we assume an intermediate stage whereby the Proto-Bantu back vowel *u first changed into a labio-velar glide /w/ in the environment of another following vowel. A glide formation rule that accounts for this diachronic development can be formulated, as shown in (26) below.

(26) Glide Formation Rule:

$$\begin{array}{c} V \\ [+bk] \end{array} > /w/ / \begin{array}{c} _ \\ [-bk] \end{array} V$$

According to this rule PB back vowels changed to a labio-velar glide /w/ in the environment of a following non-back vowel. After the application of this

rule, the glide then lost its labiality and became a high back consonant, in this case, a velar stop. As a result, Ikalanga has these doubly articulated velarized stops / \widehat{pk}^h / and / \widehat{bg} /. In (27) I give a schema outlining the different stages in the development of these velarized consonants.

(27) Stages in the diachronic development of velarized stops

a.	*-kápuá	b.	*-bue	1. Proto-Bantu
	*-kápwá		*-bwe	2. Glide Formation
	*-ká \widehat{pk}^h á		*- \widehat{bge}	3. Aspiration & loss of labiality
	\widehat{fiapk}^h á		—	4. Others
a.	\widehat{fiapk}^h á - 'armpit'	b.	\widehat{bge} - 'stone'	

I am assuming that the aspiration realized in the voiceless doubly articulated velarized stop / \widehat{pk}^h / developed simultaneously with the loss of labiality. It was this glide which caused the development of aspiration in this velarized stop (see §6.4.2 for a discussion of how the labio-velar glide effected aspiration on these consonants). Stage four in the schema simply refers to other diachronic developments in Ikalanga which changed the voiceless velar stop */k/ in classes 9 and 10 nouns to a breathy glottal fricative / \widehat{h} / (see §6.4.3).

The changes we see in these bilabial stops are not just restricted to Ikalanga; other dialects of Shona show this type of change. In (28) I give cognates from the Zezuru and Manyika dialects of Shona (Doke 1931) of some of the examples given for Ikalanga above.

(28) Velarization in the Shona Dialects

	<u>Dialects</u>	<u>Word</u>	<u>Gloss</u>	<u>PB</u>
a.	ZeZuru Manyika	$\widehat{p}k\acute{a}$ $\widehat{p}x\acute{a}$	'dry up' 'dry up'	*-pu-a
b.	ZeZuru Manyika	$hap\widehat{k}\acute{a}$ $hap\widehat{x}\acute{a}$	'armpit' 'armpit'	*-kápua
c.	ZeZuru Manyika	$im\widehat{b}g\acute{a}$ $im\widehat{b}y\acute{a}$	'dog' 'dog'	*-bua
d.	ZeZuru Manyika	$ib\widehat{g}e$ $ib\widehat{y}e$	'stone' 'stone'	*-bue

These examples provide more instances where the labiality of the labio-velar glide was lost, leading to the development of velarization in these dialects.

It is worth noting that the doubly articulated velarized stops in Ikalanga occurred only with the bilabial stops /p, b/, while reflexes of other consonants in a similar environment underwent different changes. A plausible explanation for this type of development is the application of constraint against labializing labials given in §2.3.4 in Chapter Two. This constraint prohibits the labialization of these labial stops in Ikalanga, as a result, in this environment, labials underwent different changes as noted above. (29) restates this constraint from §2.3.4.

(29) Constraint against labialized labials

[+rd]
|
*C
|
[lab]

Ohala (1981b) has referred to these changes in the Shona language as a case of “contact dissimilation” whereby the listeners factor out the labiality of the labio-velar glide /w/ assuming it was a distortion from the preceding labial consonant.

5.6.2 Velarization of the apicals

Apicals show very interesting diachronic changes compared to others, in that, two different changes occurred on PB apicals *t, *d in the environment of the two back vowels *ɯ, *u followed by a non-back vowel. In cases where the first vowel (i.e. V1) following an apical were the close vowel *ɯ and V2 was any of the three non-back vowels *i, *e, *a, Ikalanga reflexes are labialized apicals /t^{hw}/ and /d^w/ depending on whether the apical was voiced or voiceless. But where these apicals were followed by the high back vowel *u in V1 position, Ikalanga reflexes are labialized velar stops /k^{hw}/ and /g^w/. A summary of these changes is given in (30)a and b respectively.

(30) Diachronic changes on apicals

- a. $t_{\text{ɥ}}V2$ $>$ $/thwV/$
 $d_{\text{ɥ}}V2$ $>$ $/dwV/$
- b. $tuV2$ $>$ $/khwV/$
 $duV2$ $>$ $/gwV/$

Where these apicals were followed by the close vowel *ɥ, their primary place of articulation remains unchanged. Instead, they are now realized with labialization as secondary articulation. However, when they were followed by the back vowel *u, they not only became labialized, but their primary place of articulation also changed to velar. This change of apicals to velars in Ikalanga was also noted by Guthrie (1967-71, Vol. 2:62) who included the change *du(a) > gw in Ikalanga reflexes. However, data given below show that this type of velarization also occurred with the voiceless apical *t in a similar environment. The quality of the V2 vowel may or may not change as will be seen in some of the examples. (31) gives some examples of Ikalanga cognates with labialized alveolar stops where Proto-Bantu apicals were followed by the close vowel *ɥ and another vowel in the V2 position.

(31)a. * $t_{\text{ɥ}}V$ > $/thwV/$

- | | | | |
|--------------------|---------------|---|---------------------------------|
| $t^{\text{hw}}á$ | ‘spit; vomit’ | < | *- $t_{\text{ɥ}}$ -a |
| $t^{\text{hw}}íla$ | ‘vomit into’ | < | *- $t_{\text{ɥ}}í$ d-a (‘spit’) |

b. *duV > /dwV/

ṭṣi-d ^w í	'knee'	<	*-dúí
d ^w a	'say; come from'	<	*-dú-a
uíd ^w á	'ripen; get cooked'	<	*-bídu-a

In the environment where V1 was the high back vowel *u, Ikalanga reflexes show not just secondary labialization, these apicals also changed their primary place of articulation to become labialized velar stops /k^{hw}/ and /g^w/ respectively. (32) gives some examples and their PB reconstructions for illustration.

(32)a. *tuV > /khwV/

k ^{hw} iʒa	'giraffe'	<	*-tuiga
k ^{hw} á	'pound (v)'	<	*-tu-a
ŋ-k ^{hw} á	'Bushman'	<	*-túá ('bush dweller')

b. *duV > /gwV/

g ^w ála	'be ill'	<	*-dúád-a
vu-g ^w éle	'illness'	<	*-dúáidé
ndug ^w i	'gallbladder'	<	*-dúdue
g ^w a	'fight (v)'	<	*-du-a
ŋg ^w a	'fight (n)'	<	*N-du-a

An explanation is necessary as to why PB close vowel caused secondary labialization on the apicals when other Ikalanga stops underwent different changes. In most Bantu languages where PB vowels were reduced from seven to five, evidence shows that Proto-Bantu stops underwent High Vowel frication (spirantization) before the close vowels (§3.2). This frication appear to have taken place with all other stops in Ikalanga except for the apicals. A plausible explanation for this failure by the apicals to undergo frication is a

split that took place between Ikalanga and the rest of the Shona group where HVF occurred in all the stops. In other words, Ikalanga must have moved out of the HVF zone before the changes hit the apicals. With this movement away from this zone into a zone where this process did not occur, that is, in contact with languages to the south, such as Tswana, where HVF did not take place (Janson 1991/92), these apicals were left out of this change for good. As a result, in the environment of a following close vowel *ɥ, followed by any of the three non-back vowels, Ikalanga apicals became labialized, with the labio-velar glide /w/ realized as secondary labialization. Once again, we observe the development of aspiration in the voiceless stop making it a voiceless labialized aspirated alveolar stop /t^{hw}/ (see §6.4.2 in Chapter Six for the development of aspiration from a labio-velar glide).

(33) summarizes the different stages which occurred in the development of velars from PB apicals in the two environments discussed above. I give seriations showing these stages for both voiceless and voiced apicals.

(33)a. V1 = *ɥ

tɥV2	>	twV	>	thwV
dɥV2	>	dwV		

b. V1 = *u

tuV2	>	twV	>	tkwV	>	khwV
duV2	>	dwV	>	dgwV	>	gwV

We observe that the voiceless apical in (33a) underwent more stages of development than the voiced apical because of aspiration (see §6.4.2). In (33b), on the other hand, both the voiceless and voiced apicals undergo the same number of stages. With the application of the Glide Formation Rule (given as (29) above), both apicals undergo a stage of velar development. In the final stage, PB apicals *t and *d are lost and we observe the development of aspiration in the voiceless sound.

Of interest about the changes to these apicals is that: with the development of the labio-velar glide in both cases, in (31) we only derived secondary labialization, while in (32) complete velarization took place whereby the apicals were lost and we derive sounds whose primary place of articulation is velar. I can think of no obvious phonetic explanation why, with the development of the labio-velar glide /w/ in both environments, complete velarization only developed where the glide was derived from PB high vowel *u and not the close vowel *ɯ. I can only speculate that maybe the labio-velar glide from the close vowel (i.e. $w < *ɯ+V$) took place at a different time. As a result, it evaded complete velarization.

The question remains of how velar stops developed where PB had a labio-velar glide /w/ preceded by the apicals *t, *d changing them to /k^{hw}/ and /g^w/ respectively. Phonetically, the two important cues for place of articulation of a stop consonant are the noise burst and the second formant transitions. In the event one of these cues is missing or is not detected for

one reason or the other, the listener may be left guessing on the identity of the speech sound. A plausible explanation, therefore, on how PB apicals changed to labialized velar stops has two parts. First, with the development of a labio-velar glide secondary articulation, the listener is most likely to miss the noise burst cue of the apical since the labial constriction acts as a low-pass filter and effectively attenuates the burst which, as noise, is inherently high frequency.

In addition, apicals generally cause the second formant to rise, while, on the other hand, as Ohala and Lorentz (1977) note, labio-velars such as the glide /w/ push the second formant to an extreme low value. Thus, we expect the labialization of these PB apicals to have a lowering effect on the second formant, a place of articulation cue shared by labials, back velars and labio-velars. Already accustomed with this knowledge that labio-velars distort adjacent sounds, the listener may have got confused and “over-corrected” the speech signal assuming it was distorted. As a result, he/she reconstructed the velar segment when he/she turned speaker. The conditioning environment, that is, the labio-velar glide, is retained after the change takes place. Ohala (1992) refers to this type of sound changes as “listeners’ perceptual hypercorrections”. Thus, Ikalanga reflexes of these apicals became labialized velar stops.

5.6.3 Velarization of the nasals

The nasals also underwent complete velarization in the environment of a labio-velar glide. Both the bilabial *m and alveolar *n nasals changed to a velar nasal /ŋ/ in the environment of a labio-velar glide. As a result, today Ikalanga has a labialized velar nasal /ŋʷ/ in its consonant inventory. In most Ikalanga words where this consonant is found word initially, it is a reflex of PB classes 1 and 3 prefixes *mu- (see §2.3.1 for Ikalanga noun class system). Where these noun class prefixes occurred before a vowel initial noun root, today we find the labialized velar nasal /ŋʷ/. The following examples with their derivational history illustrate.

(34) Stage in the development of a labialized velar nasal /ŋʷ/

a. Nouns

ŋʷaná	<	mwaná	<	*mu-ána	<	*mu-jána
'child' (class 1)						
ŋʷení	<	mwení	<	*mu-éńí	<	*mu-jéńí
'owner' (class 1)						
ŋʷedzǐ	<	mwedzǐ	<	*mu-edǐ	<	*mu-jédǐ
'moon' (class 3)						
ŋʷiná	<	mwiná	<	*mu-iná	<	*mu-jiná
('pit') (class 3)						

b. Verb

ŋʷá	<	nwá	<	*-nu-a
'drink'				

The palatal glide *j has been dropped in Ikalanga nouns where it had occurred initially in PB noun roots. With the loss of the palatal glide, a suitable environment is created for the application of the Glide Formation Rule, changing the back vowel *u to a labio-velar glide /w/. The prefix initial

bilabial nasal *m then assimilates to the velarity of the labio-velar glide changing to a velar nasal /ŋ/ (Ohala & Lorentz 1977). The morpheme initial palatal glide *j did not have any effect on the developments shown in these examples. In (34b) the alveolar nasal *n also assimilates to the velarity of the labio-velar glide after the application of the Glide Formation Rule changing to a velar nasal, as well. As mentioned above, not all consonants changed their primary place of articulation to that of a velar in the environment of a following labio-velar glide. I turn to these consonants in the following section.

5.6.4 Secondary labialization in /kʷ, ŋgʷ, ʃʷ/

This section looks at the diachronic development of the other labialized consonants in Ikalanga not covered in the above sections. I begin by looking at the labialization of the velar stop /k/. As shown by the examples below, the voiceless labialized velar stop /kʷ/ in Ikalanga is derived from Proto-Bantu *k in the environment of two following vowels where V1 can be any one of the back vowels *u and *o and V2 is one of the non-back vowels. In this case, the back vowels simply changed to a labio-velar glide /w/ by the Glide Formation Rule.

(36)	kʷávo	'theirs'	<	*-kuabo (other)
	ŋ-kʷáfa	'son-in-law'	<	*-kóǀ
	ŋ-kʷakʷa	'spineless monkey orange tree'	<	*-kuakua ('kind of tree')
	vu-kʷé	'wedding ceremony'	<	*-kó-a ('give bridewealth')

Turning to the labialized prenasalized voiced velar stop /ŋgʷ/, an explanation is required on the development of prenasalized stops in Ikalanga. A number of voiced prenasalized stops in Ikalanga are derived from the prefixation of the classes 9/10 nasal prefix (*N-) to a Proto-Bantu noun stem which had a voiced stop initially. This nasal prefix has since been lost in most of these nouns in Ikalanga except before voiced stops where, unlike other class prefixes realized as nasals, e.g. classes 1 and 3, this prefix is not syllabic. Where found in the language today, it simply behaves as one segment with the following stop, making it a prenasalized stop. (36) gives a few examples to illustrate.

(36) Prenasalized stops from class 9/10 nasal prefix plus PB voiced stops

mbadu	'ribs'	<	*N-badu
mbúdzí	'goat'	<	*N-búdzí
ndá	'lice'	<	*N-dá
ndedu	'beard'	<	*N-dedu
ŋgano	'folktales'	<	*N-gano
ŋguluve	'pig'	<	*N-gudube

Of relevance to this discussion, however, are those cases where the root initial consonant in PB was the voiced velar stop *g followed by two vowels the first of which was the back round vowel *u. In this case, the Ikalanga reflex is a labialized prenasalized stop /ŋgʷ/. Just as with the other consonants considered above, the back vowel changed into a labio-velar glide in the environment of a following non-back vowel. This glide is then realized as secondary labialization, as exemplified in (37) below.

(37) *N-guV2 > /ngwV/

ng ^w e	'tiger'	<	*N-gue
ng ^w ena	'crocodile'	<	*N-guena

The same pattern of changes is also observed with the labialized palato-alveolar fricative /ɲ^w/. This fricative is a reflex of PB palatal stop *c and where this palatal stop occurred preceding the back vowel *u followed by a non-back vowel, the Ikalanga reflex is /ɲ^w/. (38) illustrates.

(38) *cuV2 > /ɲ^wV/

ɖiɲ ^w á	'grass'	<	*-cúá
ɲi-ɲ ^w á	'bundle of grass'	<	*-cúá

From the above, I conclude that the PB back vowel *u followed by a non-back vowel within the same syllable led to the diachronic development of both velarization and labialization of the above consonants in Ikalanga. The only exceptional case are the apicals, where only labialization is derived from the back close vowel *ɯ and in the environment of the back vowel *u, we derive a change in the primary place of articulation of these apicals into velar stops. As illustrated by the different stages in the development of these processes in the preceding sections, the back vowels first change into a labio-velar glide /w/, after which three things happened: In the case of bilabial stops, the labio-velar glide lost its labiality and became a back velar consonant simultaneously articulated with the labial. In the case of apicals two changes took place depending on the vowel quality of V1. Where these apicals occurred preceding a back close vowel *ɯ, secondary labialization occurred,

and where they preceded PB high back vowel *u, the apicals developed into velars. Nasals also underwent velarization, changing to the labialized velar nasal /ŋʷ/. Finally, we observe secondary labialization of /kʷ, ŋgʷ, ʃʷ/. Table 2 below gives a summary of all the above diachronic changes involving the process of velarization in Ikalanga.

Table 2. Diachronic developments of velarization in Ikalanga

PB	Ikalanga Reflexes	Examples
*pwV	/p̄kʰ/	p̄kʰá < *-pu-a 'dry-up'
*bwV	/b̄g/	b̄ge < *-bue 'stone'
*twV (<*uV)	/tʰʷ/	tʰʷá < *-tũ-a 'spit'
*dwV (<*uV)	/dʷ/	vídʷá < *-bídũ-a 'ripen'
*twV	/kʰʷ/	kʰʷá < *-tu-a 'pound (v)'
*dwV	/gʷ/	gʷála < *-dúád-a 'be ill'
*kwV	/kʷ/	kʷávo < *-kuabo 'theirs' ('other')
*N-gwV	/ŋgʷ/	ŋgʷena < *N-guena 'crocodile'
*cwV	/ʃʷ/	vu-ʃʷá < *-cúá 'grass'
*mwV	/ŋʷ/	ŋʷaná < *mu-(j)ána 'child'
*nwV	/ŋʷ/	ŋʷá < *-nu-a 'drink'

Of interest about all these diachronic changes is the important role played by the labio-velar glide /w/ in effecting these changes. In particular, we observe

how it can lose its labiality and become a velar stop, or lead to the development of a velar stop where PB had apicals, while in other cases it is simply realized as secondary labialization.

5.7 Phonetic evidence why /w/ causes velarization

In §5.2 above, I mentioned that the labio-velar glide /w/ is the initiator of all the changes resulting in both complete velarization and secondary labialization. As shown in §5.6, this glide is derived from the back vowels in the environment of a following non-back vowel (see also §5.9). In this environment, these back vowels are subjected to a Glide Formation Rule, changing them to a labio-velar glide. Depending on the type of consonant preceding the glide, we may simply derive secondary labialization of the respective consonants, whereby the glide adds the lip rounding to the production of the preceding consonant. But in other instances, we derive velarized consonants, whereby the place of articulation of a consonant is changed to that of a velar. In the case of bilabials, we derive doubly articulated velarized stops while with apicals we derive labialized velar stops. The question I consider in this section is: why does the labio-velar glide /w/ influence the development of velarization in these consonants.

I claim that the explanation lies in the unique way in which this sound is made. As mentioned above, two constrictions are made in the production of the labio-velar glide. The two constrictions, in this case, are at the labial and velar places of articulation. Because of there being two constrictions

made in its production, it is possible for it to affect consonants adjacent to it and thus promote sound changes. Listeners, however, drawing from their knowledge that the labio-velar glide distorts other consonants promoting sound change, may erroneously “correct” a speech signal assuming it was distorted. Thus, in the case of the apicals, with the occurrence complete velarization, the conditioning environment is also retained (see §5.6.2). In addition, as Ohala and Lorentz (1977) point out, labio-velars such as /w/, share an important acoustic feature with back velars and labials, and that is, they all have a low second formant. This, therefore, explains why, in plain velarization the glide is seen changing to a velar stop (see §5.6.1). In other words, listeners are likely to confuse the labio-velar glide with a velar stop because of a shared low second formant.

I assume that the synchronic changes discussed in §5.9 below, that is, in verb passives, noun diminutives and agreement markers are a reflection of the diachronic sound changes that took place in this language. Thus, changes effected by the labio-velar glide synchronically, can also be explained in a similar fashion as above.

5.8 Typological Evidence from other languages

It is often very enlightening in this type of sound changes to consider typological evidence from other languages. In this section, therefore, I consider whether the changes involving diachronic velarization described above for Ikalanga are also found in other languages. I focus my attention

more on the bilabials, nasals and the apicals. As I will show below some of these diachronic changes are not unique to Ikalanga or the Shonoid group as such; other Bantu languages attest to similar changes.

Phoneticians have long noted that the labio-velar glide or approximant /w/ has two points of articulation, that is, labial and velar. While in many languages of the world the labio-velar glide commonly changes to its labial place of articulation (Ohala & Lorentz 1977), in a number of Bantu languages, Ikalanga and Shona included, instances where the labio-velar glide changes to its velar place of articulation are found. Evidence from Guthrie (1967-71, Vol.2) shows that Tumbuka (N.20), a Bantu language found in Malawi, Nyanja (N.31c) also used in Malawi and the Ruanda-Rundi group (D.60) attest to changes similar those found in the Shonoid group. In these languages, instances of velarization similar to that found in Ikalanga and the other Shona dialects are also found. Obviously, the velarization in these segments also developed from a labio-velar glide derived from a back vowel *u. In (39) I give reflexes of the Tumbuka, Nyanja and the Rundi languages from Guthrie of PB bilabial stops where we find velarized consonants.

(39)a. Tumbuka reflexes

*p-u(a) > px
 *b-u(a) > bɸ

b. Nyanja reflex

*p-u(a) > px

c. Rwanda-Rundi reflex

*b-u(a) > by

Consider also more examples of Kinyarwanda from Jouannet (1983) who gives examples of velarized stops similar to those we find in Ikalanga. The gloss is given in French as per the source.

(40) Kinyarwanda (Jouannet 1983)

ìgìpkàrà	'soulier usé'
ím̂bgá	'chien'
ùrùbgà	'médísance'

Likewise, changes involving the bilabial nasal *m, that is, where it assimilates to the velarity of a following labio-velar glide, are attested in many languages, both within and outside of the Bantu family (see Ohala and Lorentz (1977) who cite some of these languages). Below I give examples from Tswana diminutives in support of this point. We observe the glide formation from the back round vowels /u, o/ in the environment of a following low vowel of the diminutive suffix in Tswana (see §5.9.2 below on Ikalanga diminutives). This is shown in the intermediate stage in the second column. After the glide formation, the bilabial nasal then assimilates to the velarity of the glide.

(41) Tswana diminutives (m + w > ŋw)

molomo+ana	>	molomwana	>	molon ^w ana	'small mouth'
mosámo+ana	>	mosámwana	>	mosán ^w ána	'small pillow'
molamú+ana	>	molamwána	>	molan ^w ána	'small club'
mosimá+ana	>	mosimwána	>	mosin ^w ána	'small rathole'

Changes to the apicals are also attested in other Bantu languages such as Tumbuka and Rundi. However, from the reflexes of these languages given in Gurthrie (1967-71), with the development of the velar, the apical was retained, as seen in (42).

(42)a. Tumbuka reflex of an apical

*t-u(a) > txw

b. Rundi reflexes

*t-u(a) > txw

*d-u(a) > ryw

In (43) I give some examples from Kinyarwanda which also provide evidence of the retention of the apical with the development of the velar stop. I have also given PB reconstructions of these cognates where available to illustrate.

(43) Kinyarwanda (Jouannet 1983:65)

tk^wàrà 'porte'

màdg^wèdg^wè 'plante sup.'

índg^wârà 'maladie' < *-dúáídé

(cf. Ikalanga vu-g^wéle - 'illness')

Doke (1931) also gives some examples from the Zezuru dialect of Shona where we observe the velarization of these apicals. (44) illustrates.

(44) Zezuru dialect in Shona (Doke 1931)

natx^wa 'affliction

uzútk^we 'species of mushroom'

ku-ry^wára 'to be ill' < *-dúád-a

ku-ry^wa 'to fight' < *-du-a

Note that the Shona reflex of PB *d is a trill /r/. However, the changes we see in all these languages on the labials, nasals and apicals are evidence that the

occurrence of velarization is also found in other Bantu languages. But as will be shown in the following section, velarization in Ikalanga is not just a diachronic process, this process also occurs synchronically in morphophonemic alternations.

5.9 Synchronic Velarization

As mentioned above (§5.1), Ikalanga also has synchronic velarization. By synchronic velarization I refer to cases of morphophonemic alternations in this language where a consonant assimilates to the velarity of a following labio-velar glide. As a result, changing its place of articulation to that of a velar. Synchronic velarization in Ikalanga is found in some morphological processes, namely: the passivization of verbs, the formation of diminutives and, the classes 11 and 14 subject agreement markers when they occur preceding the past tense morpheme *-a-*. I look at each one of these morphological processes in turn.

5.9.1 Velarization in verb passivization

The passive suffix in the Bantu languages is generally a very productive suffix. As is common to many Bantu languages, the passive suffix in Ikalanga has two forms, traditionally referred to as the short form *-w-* and the long form *-iw-* (*-iCu-*) (see also 2.3.4). As mentioned above, Ikalanga, like other Bantu languages, uses both the short form and the long form in the formation of its passives. (45) gives some examples to illustrate.

(45)a. Passives with the suffix -iw-

<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
p ^h áp ^h -á	p ^h áp ^h -íw-a	'be chopped'
bab-a	bab-iw-a	'be carried on back'
uúmb-á	uúmb-íw-a	'be built'
k ^w íuá	k ^w íu-íw-a	'be stolen'
kou-a	kou-iw-a	'be given away'

b. Passives with the suffix -w-

peɬ-a	peɬ ^w -a	'be folded'
sund-a	sund ^w -a	'be pushed'
súŋg-á	súŋg ^w -á	'be tied'
ʃúúúk-a	ʃúúúk ^w -a	'be jumped (over)'
seŋg-a	seŋg ^w -a	'be carried'
ɖus-a	ɖus ^w -a	'be removed'

Note that the /w/ in the long form -iw- in (45a) is a glide while in the short passive form it always gets realized as secondary articulation as seen in (45b). For a detailed discussion on the distribution of these passive suffixes, the reader is referred to §2.3.4 above.

Of relevance to this discussion though, are those cases where in the formation of the passive form using the short form -w-, velarization occurs whereby the root final consonant adjacent this suffix changes its place of articulation to a velar. I begin by giving some verbs in which the root final consonants are the bilabial and alveolar nasals. (46) illustrates.

(46) Velarization of nasals in passives

<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
bóm-á	bóŋ ^w -á	'be smeared'
túm-á	túŋ ^w -á	'be sent'
tém-á	téŋ ^w -á	'be felled'
lim-a	liŋ ^w -a	'be cultivated'
wana	waŋ ^w -a	'be found'
ŋgín-a	ŋgíŋ ^w -a	'be entered'
s ^w in-a	s ^w iŋ ^w -a	'be squeezed'

However, unlike in (45b) above where this suffix is simply realized as secondary articulation, in (46) both nasals assimilate to the velarity of the following labio-velar glide changing to a velar nasal /ŋ/. The glide then gets realized as second articulation. In other words, we derive complete velarization when nasals occur immediately followed by the labio-velar glide of the passive suffix. As mentioned above, this is a sound change attested in a number of the world's languages, both within and outside the Bantu family.

Of particular interest are cases where the same suffix is attached to verb stems which have a lateral /l/ as the root final consonant. Note that verb stems which have a lateral as the root final consonant can only take the short form -w- in the passive form in Ikalanga. Just as in the case of nasals in (46), when this suffix is attached next to this lateral consonant, the lateral undergoes complete velarization. In other words, this lateral alternates with a labialized voiced velar stop /g^w/. Even more interesting about the lateral in Ikalanga is that it is a reflex of PB *d. And in §5.6.2, similar changes were shown to have occurred diachronically changing PB *d to a voiced labialized velar stop /g^w/ in the environment of a following labio-velar glide /w/ (i.e.,

gw < *dgw < *duV). Thus, the alternation between the lateral and the labialized velar stop we find in the passive formation is a reflection of the diachronic sound changes which took place in this language.

Altogether 367 verbs with a lateral /l/ as the root final consonant were found in the database (see Appendix C), and in all these verbs (that is, those which allow passivization) complete velarization occur when they are passivized. (47) gives examples of verbs ending in a lateral consonant and their passive forms. Proto-Bantu reconstructions of these verbs are also given to illustrate.

(47) Velarization of /l/ in passives (PB *d > /l/)

<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>		<u>PB</u>
fúl-á	fúg ^w -á	'be blown'	<	*-púḍ-a
ṣ ^h úl-á	ṣ ^h úg ^w -a	'be wiped'	<	*-tíḍ-a
ṭól-a	ṭóg ^w -a	'be taken'	<	*-tóód-a
uál-a	uag ^w -a	'be read'	<	*-bad-a
ṣal-a	ṣag ^w -a	'be chosen'	<	*-cad-a
púl-á	púg ^w -á	'be threshed'	<	*-púúḍ-a
pulul-a	pulug ^w -a	'be stripped off'	<	*-puḍud-a
piṭul-a	piṭug ^w -a	'be turned'	<	*-pidod-a
ṣakul-a	ṣakug ^w -a	'be cultivated'	<	*-cakod-a
ḍzimíl-a	ḍzimíg ^w -a	'be lost'	<	*-ḍímid-a
ḍzimúl-a	ḍzimúg ^w -a	'be allayed'	<	*-ḍimod-a
landul-a	landug ^w -a	'be denied'	<	*-dandod-a

The fact that this lateral is a reflex of PB *d clearly shows that the changes which take place in Ikalanga passives are underlyingly similar to the diachronic changes discussed above. In this cases, it is the underlying apical *d which alternates with the labialized velar stop in the environment of a labio-velar glide (i.e. *d+wV > dgwV > gwV)

A different behavior is observed though where the apical /d/ retained its proto form in the environment of a preceding nasal. In this case, it became a singleton consonant with the preceding nasal, that is, a prenasalized stop. The following examples illustrate this point.

(48) /d/ following a nasal

pind-a	'pass'	<	*-pind-a
lind-a	'wait'	<	*-dind-a
séndám-a	'lean'	<	*-cendam-a
lond-a	'follow'	<	*-dond-a

However, when verbs ending in the prenasalized apical /nd/ passivize, they do not seem to have any particular preference regarding the two suffixes. Even where they occur with the short suffix, they do not show the alternation shown with the lateral. As seen in (49), the labio-velar glide of the passive suffix is simply realized as secondary articulation.

(49) No velarization in passives with /nd/ root finally

<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
pind-a	pind ^w -a/pind-iw-a	'be passed'
lond-a	lond ^w -a/lond-iw-a	'be followed'
lind-a	lind ^w -a/lind-iw-a	'be waited (for)'

Note that only two verbs were found in the database which end in the voiced apical /ḍ/, namely; dá 'love' and búḍá 'come out'. Of the two only dá passivizes taking the long form -iw- (see §2.3.4 on the passivization of monosyllabic verbs) and the other does not as it is intransitive.

The alternations we observe in (47) above are not just found in Ikalanga, Shona also shows the presence of a velar when verbs ending in a reflex of PB *d are passivized. As mentioned earlier, the reflex of PB *d in

Shona is a trill /r/ and not a lateral, as it is in Ikalanga. When Shona verbs with this reflex root finally passivize, a velar fricative is created before the labio-velar glide. Unlike in Ikalanga though, in Shona both the trill and velar fricative are retained. In the absence of an explanation from Doke (1931) on the phonetic value of the labio-velar glide in Shona, I assume that this glide is realized as secondary articulation. The following examples from Doke are given to illustrate.

(50) Shona verb passives

tór-a	tóry ^w -a	'be taken'	<	*-tóód-a
dímur-a	dímury ^w -a	'be severed'	<	*-dĩmod-
ku-dár-o	kuzary ^w -o	'to be done thus'		

This is unlike in Ikalanga where complete velarization occurred and the apical was lost. In this case Shona retains both the trill and the velar fricative (cf. examples (43) and (44) in Kinyarwanda and Shona respectively in §5.8 above). I, therefore, conclude that the morphophonemic alternations we find in Ikalanga verb passives in stems ending in a lateral sound are indeed a reflection of the diachronic changes that took place in Ikalanga apicals and other languages such as Kinyarwanda and Shona.

A few examples are also found in this language where velarization occurs in some verbs ending in a voiceless bilabial stop /p/, a bilabial approximant /v/, and an alveolar stop /t/. (Note that most verbs ending in these sounds take the long passive suffix, as a result, no changes involving velarization take place when they passivize.) (51) gives these examples.

(51)	<u>Verb</u>	<u>Passive</u>	<u>Gloss</u>
a.	lip-a lap-a	lip ^h -a lap ^h -a	'be paid' 'be cured'
b.	lóv-á lév-á	lóg ^w -á lég ^w -á	'be beaten' 'be talked of'
c.	bát-a tát-á	bák ^{hw} -a ták ^{hw} -á	'be caught' 'be chased'

The changes we see in some of these examples are similar to the diachronic changes discussed in §5.6.1 and §5.6.2. For example, in (51a) we observe plain velarization of the bilabial stop /p/ when these verb stems are passivized, obviously using the short form -w-. Likewise, (51c) is also a reflection of the diachronic changes that took place on apicals when a labio-velar glide occurs next to them. The only change not found diachronically is that involving the bilabial approximant /v/ in (51b), which is a reflex of Proto-Bantu *b. One would have expected a change to a velarized doubly articulated stop /b̥g/, which is not the case. The few instances where this bilabial approximant changes into a velar stop are in verb passives and diminutives, to which I turn to in the following section.

5.9.2 Velarization in diminutives

As mentioned in §2.3.2 and §4.2, like other Bantu languages to the south, Ikalanga uses the suffix -ana in the formation of its diminutives. Of particular interest about this suffix in Ikalanga are the morphophonemic alternations triggered by its suffixation to Ikalanga nouns. When the

diminutive suffix is attached to nouns in which the stem final consonant is a lateral consonant /l/ (< PB *d) followed by any one of the non-back vowels /i, e, a/ in final position, we derive palatalization. In other words, the place of articulation of the lateral consonant changes to that of a palato-alveolar affricate /d͡ʒ/. A detailed discussion of palatalization in Ikalanga diminutives is given in §4.2. (52) gives a few examples to illustrate.

(52) Palatalization in diminutives

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
vúlí	vúd͡ʒ-aná	'small hole'
m-bili	m-bid͡ʒ-aná	'small body'
golé	god͡ʒ-áná	'small cloud'
vu-g ^w éle	vu-g ^w éd͡ʒ-aná	'small illness'
zila	zid͡ʒ-aná	'small path'
ma-mila	ma-mid͡ʒ-aná	'small mucus'

However, in cases where the nouns end in one of the back vowels /u, o/ preceded by this lateral /l/ (PB *d), we derive velarization instead. This comes as no surprise in the light of the developments shown in the preceding sections where velarization is shown to have occurred when these back vowels occurred preceding a non-back vowel within a syllable causing them to first change into a labio-velar glide /w/, which then effects complete velarization in the preceding consonant, in this case the lateral. The same scenario is observed in the formation of these diminutives. In the environment of the initial low vowel /a/ of the diminutive suffix -ana, these back vowels also change into a labio-velar glide by the Glide Formation Rule,

which glide then effects complete velarization of the root final lateral consonant (PB *d). (53) give some examples to illustrate.

(53) Velarization in diminutives

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
ʃulo	ʃug ^w -aná	'small rabbit'
n-tólo	n-tóg ^w -aná	'small load'
n-ʃóló	n-ʃóg ^w -aná	'small head'
ndílo	ndíg ^w -aná	'small plate'
ʃi-milo	ʃi-mig ^w -aná	'small nose'
lu-selo	lu-seg ^w -aná	'small winnowing basket'
w ^h aʃulo	w ^h aʃug ^w -aná	'small mushrooms'
n-sázámílo	n-sázámíg ^w -aná	'small pillow'
p ^h ulú	p ^h ug ^w -áná	'small calf'
vúmbúlú	vúmbúg ^w -aná	'small egg'
i-kulú	i-kug ^w -áná	'small ringworm'
n-zekúlú	n-zekúg ^w -aná	'small niece or nephew'

(54) below gives examples of velarization of the nasals /m, n/ in the environment of a back vowel. With the glide formation, the nasal then assimilates to the velarity of the following labio-velar glide /w/ and becomes a velar nasal /ŋ/.

(54) Velarization of nasals

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
zámú	zəŋ ^w -áná	'small breast'
ʃamú	ʃəŋ ^w -áná	'small lash'
fiómó	fiəŋ ^w -áná	'small bag'
n-lomo	n-ləŋ ^w -aná	'small mouth'
zínó	ziŋ ^w -áná	'small tooth'
ʃi-z ^w ino	ʃi-z ^w iŋ ^w -aná	'small lid'
i-t ^h its ^h ino	i-t ^h its ^h iŋ ^w -áná	'small heel'

However, this is not the case in (55) when the same nasals are followed by the front vowels /i, e/. In this case, just as in (52) above, we get palatalization (see §4.2 for more examples).

(55) Palatalization of nasals

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
báni	baŋ-ána	'small forest'
ɖuní	ɖuŋ-ána	'small mortar'
m-píní	m-píŋ-ána	'small axe-handle'
semé	seŋ-ána	'small basket'
i-temé	i-teŋ-ána	'small gourd'

In addition to the above environments, velarization in Ikalanga diminutives also occurs in nouns where the root final consonant before the back vowels are the labials /p, v, mb/ and the voiceless apicals /t, tʰ/. In (56) below I give some examples where these consonants alternate with velars in the diminutive forms.

(56)a. Approximant /v/ alternate with /gʷ/

<u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
lu-zívó	lu-zígʷ-ána	'small knowledge'
n-lívó	n-lígʷ-ána	'small (amount of) greens'

b. Prenasalized labial /mb/ alternate with /mb̥g/

n-ɬumbu	n-ɬu mb̥g-ána	'small stomach'
sʷímbó	sʷí mb̥g-ána	'small clubs'
i-kómbó	i-kó mb̥g-ána	'small navel'
lu-ɬombó	lu-ɬo mb̥g-ána	'small flat rock'

c. Apicals /t, t^h/ alternate with /k^{hw}/

bátó	bak ^{hw} áná	'small buttock'
i-pátó	i-pák ^{hw} áná	'small anus'
mo tó	mo k ^{hw} áná	'small fire'
ʃat ^h u	ʃak ^{hw} áná	'small axe'

One thing is obvious in all the examples given in (53), (54) and (56) above, and that is: the development of velarization in these diminutives is partly conditioned by the quality of the final vowel in the nouns. The final vowel in a noun should be one of the back vowels /u, o/. These vowels are then subjected to a glide formation rule in the environment of a following low vowel of the diminutive suffix. Most important though, is that, for velarization to take place, the root final consonant must, in most cases, be a lateral /l/ (< PB *d) or one of the nasals /m, n/. As seen in (57) below, if another consonant other than those specified above, that is, /l, m, n/ and to a lesser extent /v, t, t^h/, occurs preceding these back vowels, velarization fails to take place. In the event of there being other consonants preceding these back vowels, the glide formation rule still applies changing the back vowel into a labio-velar glide but we only derive secondary labialization of the respective consonants.

(57) <u>Noun</u>	<u>Diminutive</u>	<u>Gloss</u>
ʃi-tʰu	ʃi-tʰw-aná	'small thing'
guṭukuṭu	guṭukuṭʰw-aná	'small veranda'
lú-dó	lú-dʰw-ána	'small love'
n-kuku	n-kukʰw-aná	'small stream'
ʃokó	ʃokʰw-ána	'small monkey'
ziʃó	ziʃʰw-ána	'small eye'
m upú	m upʰw-ána	'small salt'
n-súŋgo	n-súŋgʰw-ána	'small rope'
nóŋgó	nóŋgʰw-ána	'small groundnut'
ŋ-góro	ŋ-gorʰw-ána	'small trough'

The question remains: is velarization in the formation of diminutives only found in the Ikalanga language? The answer appears to be a positive one because none of the languages in the region attest to this type of morphophonemic variations in the formation of diminutives. As mentioned in Chapter Four, the Shona language uses the classes prefixes 12 ka- and 13 tu- in the formation of its diminutives. This rules out diminutive formation as a source of velarization in this language. Furthermore, the reflex for PB *d in Shona is a trill /r/, which, even in cases where it occurs followed by the labio-velar glide /w/ (see verb passives above), it does not undergo a change in place of articulation, instead a velar fricative is created between the trill and the labio-velar glide.

Tswana, on the other hand, does not have velarization in diminutive formation. When Tswana nouns ending in a lateral followed by a back round vowel are diminutivized, the lateral sound is simply labialized, and its primary place of articulation remains unchanged. In (58) I give examples of Tswana nouns to illustrate this point. We observe that instead of

velarization of the root final lateral, we derive a labialized lateral /lʷ/ or in other cases, another diminutive suffix -ɲana is used, as in (58b) below.

(58) Tswana diminutives

a. Diminutive suffix -ana

kárólo	kárólʷ-ana	'small section'
pʰílo	pʰílʷ-ana	'small kidney'
seolo	seolʷ-ana	'small antheap'

b. Diminutive suffix -ɲana

mokʷálo	mokʷáló-ɲana	'small writing'
molelo	molelo-ɲana	'small fire'
tʰálélo	tʰáléló-ɲana	'small anxiety'
tʰapelo	tʰapelo-ɲana	'small prayer'
letʰalo	letʰalo-ɲana	'small hide'

This clearly shows that complete velarization in the formation of diminutives is a characteristic peculiar to the Ikalanga language.

The occurrence of both velarization and palatalization in Ikalanga presents a very interesting case in the study of the Southern Bantu languages. According to Doke (1954) these two processes are in complementary distribution in that in languages where one is found, the other one does not occur. This is especially the case in languages such as those of the Sotho group and the Nguni group where palatalization is very common in the formation of diminutives, but not velarization. Likewise, in the Shona language, where velarization is common, palatalization does not occur. In making these conclusions, Doke failed to consider these morphophonemic variations at the level of individual languages within these groups as this would have shown him the diversity that sometimes exist between the

individual languages due to their interactions with languages from other groups. For example, it is obvious that Ikalanga, long split from the rest of the Shona group, shares some sound changes with the Shona group and at the same time, resembles languages to the south in other changes. Ikalanga, therefore, appears to be an exception in having both the velarization and palatalization processes.

5.9.3 Velarization in agreement markers

Another example of complete velarization in Ikalanga is found in the agreement markers of the nouns of classes 11 lu- and 14 vu-. Today, the agreement markers in both classes are realized with an initial velar stop /g/. This is the case in subject agreement markers as well as with the possessive pronouns in these classes. Obviously, the voiced velar stop was derived from the initial consonants /l/ (< PB*d) and /v/ in the environment of a following labio-velar glide. In both cases, the Glide Formation Rule was triggered by the following past tense morpheme -a-. The following examples illustrate this point.

(61) Velarization in agreement markers

a. Class 11 (lu + a > lwa > g^wa)

lu-go g^wá vunika. '(the) ladle broke'
 11-ladle SM+past tns break.

- b. Class 14 (vu + a > vwa > g^wa)
 vu-kúsé g^wá wa. '(the) fur fell'
 14-fur SM+past tns fall
- c. Possessive markers
 lu-go g^wá ngu. 'my ladle'
 11-ladle my
- vu-kúsé g^wá ngu. 'my fur'
 14-fur my

Thus, today, the subject agreement markers and the possessive pronouns of nouns of classes 11 and 14 are phonologically similar in shape. In sentences where the noun is not given, listeners tend to rely on the context in order to understand whether the noun was of class 11 or 14.

5.10 Summary

In this chapter, I have looked at the development of velarization in Ikalanga. I have tried to show that even though both velarization and labialization are developed from a similar process, the two are realized differently phonetically. It has also been shown that Ikalanga has both diachronic and synchronic velarization. Synchronically, changes involving velarization occur in morphophonemic alternations in the formation of verb passives, noun diminutives, and agreement markers. Of particular interest throughout the chapter is the important role played by the labio-velar glide /w/ in all these changes. This clearly shows the unique character of the labio-velar glide in sound change, obviously from the unique way in which it is produced.

Chapter Six

Aspiration and its Effects

In this chapter, I look at the development of aspiration in Ikalanga stop consonants and the different factors which led to its development. Of interest about aspiration in this language is that it is both a diachronic and synchronic process, a characteristic it shares with the other processes discussed in the preceding chapters. First I show that there are two types of aspirates in Ikalanga, one labelled the 'breathy' aspirates, symbolized with a hooked -h- as C_h and the regular voiceless aspirates symbolized as Ch. I will show that, unlike the regular aspirates, these breathy aspirates in Ikalanga are depressor consonants in their interaction with the tone system of this language. Furthermore, a phonetic account is given on how different factors effected aspiration in Ikalanga stop consonants. I begin in §6.1 by giving a general account on aspiration in Ikalanga and the different types of aspirates found in this language. Next, in §6.2 I give an acoustic analysis of the breathy aspirates, focusing on the acoustic cues that differentiate these sounds from the regular aspirates in this language. §6.3 gives phonological evidence that the breathy voiced consonants in Ikalanga are depressor consonants in their interaction with tones. §6.4 gives a diachronic analysis of the development of aspiration, focusing on the three factors that effected aspiration in Ikalanga: (a) the effect of the Proto-Bantu (PB) close vowels *i and *u on the preceding stop; (b) the

effect of the labio-velar glide /w/ (< PB *uV); and, (c) the effect of the classes 9 and 10 nasal prefix. §6.5 covers the previous analyses of the development of aspiration in other Bantu languages as well as my own analysis of how these nasals must have influenced the development of aspiration in PB *NÇ clusters. §6.6 looks at breathy voiced consonants in morphophonemic alternations in nouns of classes 9 and 10. Finally, §6.7 gives a summary.

6.1 Aspiration in Ikalanga

Aspiration is defined as the period of voicelessness following the release of a stop consonant before the onset of the voicing for the vowel (Ladefoged (1982)). As in many languages, both within and outside the Bantu family, Ikalanga exhibits phonemic aspiration in its consonant inventory. The presence of phonemic aspiration in this language allows it to make a three-way contrast between the voiceless non-aspirated stops, voiceless aspirated stops and voiced stops. This three-way contrast include the dental affricates in this language. (1) below gives the stops and affricates showing this contrast in Ikalanga phonemes.

(1)a. <u>Stops:</u>	p	t̚	k	b. <u>Affricates:</u>	t̚s̚
	p ^h	t̚ ^h /t̚ ^h	k ^h		t̚s̚ ^h
	b	d̚/d	g		d̚z̚

In (2) below I give some words to illustrate this three-way contrast.

(2)a. Voiceless <u>Unaspirated</u>	Voiceless <u>Aspirated</u>	Voiced <u>Stops</u>
pikisa 'cause to carry one on shoulders'	p ^h ikisa 'refuse'	bikisa 'cause to cook'
tamá 'we stopped'	t ^h ámá 'do'	dámá 'cheek'
túmá 'send'	t ^h úmá 'sew'	duma 'agree'
túla 'take load off head'	t ^h úlá 'kick'	dúla 'granary'
kámá 'milk'	k ^h ámá 'choke'	gama 'catch'
kola 'get fat'	k ^h ólá 'be happy'	góla 'vulture'
kuta 'be sulky'	k ^h uta 'miss'	gúta 'be full'
b.	t̂ŝíla 'bury'	ḁzílá 'smear mud'

In addition to the regular aspirated stops and affricate given in (1) and (2) above, Ikalanga has another set of aspirated consonants in its consonant inventory. These are the aspirated stops that were historically derived by the process of diachronic velarization discussed in §5.6 in Chapter Five. I refer to these aspirates, given in (3), as the 'labialized aspirates'. I defer discussion of these aspirates until §6.4.2.

(3)a. Voiceless aspirated velarized doubly articulated stop /p̄k^h/

b. Voiceless labialized aspirated velar stop /k^{hw}/

Of particular interest though, is the third set of aspirates found in this language. As will be shown in the sections below, these aspirates are phonetically and acoustically distinct from the other aspirates in this language. For ease of identification, I refer to this third set as the 'breathy aspirates'. (4) below gives the two breathy aspirates.

(4) Breathy aspirates:

/p^h, t^h/

Ikalanga makes a phonetic and acoustic distinction between the regular voiceless aspirated stops and the breathy aspirates, a distinction that has never been made before in the literature. These two sets of aspirates are given in (5) and some near-minimal pairs to illustrate.

(5)a. Regular aspirates:

/p^h/ : p^háp^há 'chop'
 /t^h/ : t^hova 'elope'
 /k^h/ : k^hámá 'strangle'

b. Breathy aspirates:

/p^{fi}/ : p^{fi}ako 'tree-hollow'
 /t^{fi}/ : t^{fi}ombá 'chickenpox'
 /fi/ : fiáli 'pot'

We observe the absence of a breathy velar aspirate /k^{fi}/, instead we have a breathy voice glottal fricative /fi/. Its omission is not accidental in that, in the environment where the two Proto-Bantu voiceless stops *p, *t developed into breathy aspirates diachronically, the voiceless velar stop *k underwent subsequent changes which led to the loss of the occlusion. As a result, the reflex of the velar stop in Ikalanga is a breathy voice glottal fricative /fi/, also transcribed with a hooked fi because of shared phonetic features with the breathy aspirates. Equally interesting about these breathy aspirates and glottal fricative is their behavior in their interaction with the tone system of Ikalanga. When these sounds interact with High tones in Ikalanga, they act as depressor consonants. But, before going into the phonological behavior of these sounds, first I give an acoustic analysis of these breathy aspirates.

6.2 Acoustic analysis of the breathy aspirates

In this section I give acoustic analysis of the breathy aspirates, contrasting them with the regular aspirates, voiceless stops and voiced stops. Note that this data is only meant to demonstrate the phonetic differences between these consonants and not to establish them. To carry out this study, near minimal quadruplets were recorded using a high quality tape recorder and then digitized, and analyzed using the Kay Computerized Speech Lab (CSL). Broadband spectrograms of these words were also generated. The target words were recorded without a frame to avoid the application of tone spreading rules (see §7.3.1 for the tone rules). (6) gives the four words recorded for acoustic analysis and all the contrastive syllables occur word initially.

(6) Near minimal quadruplets

<u>Breathy aspirates</u>	<u>Regular aspirates</u>	<u>Voiced stops</u>	<u>Voiceless stops</u>
a. t ^h ombá	t ^h ova	ɖová	ʈova
'chickenpox'	'elope'	'moisture'	'massage'

These words were then analyzed acoustically for the following characteristics:

(a) Voice Onset Time (VOT), that is, the period of voicelessness between the release of the stop and the onset of the voicing of the vowel; (b) Voice Quality; and, (c) Pitch. I look at each one of these in turn:

(a) Voice Onset Time

The average duration of VOT of the breathy aspirates, regular aspirates, voiced stops and voiceless stops was measured for comparison. These

measurements based on ten tokens of each word and the standard deviations are given in Table 1 below.

Table 1. Average VOT durations and Standard Deviation of breathy and regular aspirates, voiced and voiceless stops in msec.

	/t ^h /	/t ^ʰ /	/d̥/	/t̥/
Ave. VOT	54	66	-110	8
SD	7	7	27	2

We observe that the average duration of the VOT in the regular aspirate is longer than that of a breathy aspirate. The voiced stop, on the other hand, has a negative VOT duration as voicing begins at the closure for the stops. As expected, the voiceless unaspirated stop has a very low VOT of less than ten milliseconds. The difference in VOT between the regular aspirates and the breathy aspirates shows that the VOT duration is one of the phonetic cues which differentiate these two sets of aspirates in Ikalanga.

(b) Voice Quality

Breathy aspirates have a longer duration of noise in the high frequencies than the regular aspirates after the vowel onset indicating a difference in voice quality in the production of these two sets. The average duration of the high frequency noise for the breathy is 42 milliseconds while for the regular aspirates is 10 milliseconds. Also some very preliminary measurements of oral airflow (using the Rothenberg mask from Glottalic Enterprises) suggest greater airflow on the release of the breathy voiceless aspirated stops in comparison to both the regular (plain) voiceless aspirates or

voiceless unaspirated stops. Clearly, though, this requires further more careful study.

(c) Pitch

The average pitch of a vowel following these breathy aspirates was found to be always lower than that of a vowel of the same quality following the regular aspirates. These measurements are also based on ten (10) tokens each measured at the onset of the vowel. Table 2 below gives these average pitch measurements in Hertz (Hz). Pitch measurements after the voiced and voiceless stops are also given for comparison.

Table 2. Average pitch measurements and Standard Deviation of the vowel following regular vs breathy aspirates, voiced and voiceless stops

	/tʰ/	/tʰ/	/d/	/t/
Ave. Pitch	195	248	196	218
SD	6	9	5	11

It is obvious from the above Table that the average pitch of a vowel following a breathy aspirate is lower than that of a vowel of the same quality following a regular aspirate. This provides evidence that the Ikalanga breathy aspirates lower the Fundamental Frequency (F0) of the following vowel. It is this extreme lowering of the F0 which, synchronically, makes them tone depressors, a feature normally associated with voiced obstruents in some Bantu (and non-Bantu) languages. As seen in Table 2, the average pitch of a vowel following both the breathy aspirate and voiced stop are very close. Just like the regular aspirate, the voiceless stop also has a high pitch. In the next

section, I look at the behavior of these breathy aspirates as depressor consonants.

6.3 Breathly aspirates as depressor consonants

As is common in a number of Bantu languages, especially in Southern Bantu, Ikalanga has a set of voiced sounds traditionally referred to as “depressor consonants” (see also Cassimjee & Kisseberth (1992) on Xhosa; Traill, Khumalo & Fridjhon (1987) on Zulu). According to Schachter (1976), depressor consonants are that class of consonants with a special affinity for low tones. In Ikalanga, voiced obstruents are the depressor consonants, and where these sounds occur, they act like they are linked to low tones. As a result, they can block some High tones from spreading. However, just like voiced obstruents in this language, breathy aspirates can also block High tones from spreading. In (7a) I give some examples where we observe a H tone of the verb k^wívá ‘steal’ spreading once onto the vowel of the class 7 prefix ú in the following word (see §7.3 for a discussion of the tone spreading rules in Ikalanga). This H tone, however, is blocked from spreading in (7b) if the following word has an initial depressor consonant (i.e. a voiced obstruent). In this case, the voiced labialized alveolar fricative /z^w/ of the class 8 prefix z^wi- blocks the H tone from spreading across it.

(7)a. A High tone spreads once onto the following vowel

Underlying Forms

ku-k^wi^vá $\bar{\text{t}}\bar{\text{i}}\text{-pó}$

\ / |
H H

Intermediate Forms

ku-k^wi^vá $\bar{\text{t}}\bar{\text{i}}\text{-pó}$

\ / \ / |
H H

ku-k^wi^vá $\bar{\text{t}}\bar{\text{i}}\text{-pó}$ 'to steal a gift' (cf. $\bar{\text{t}}\bar{\text{i}}\text{-pó}$ - 'gift')

b. A H tone is blocked from spreading by the depressor consonant

ku-k^wi^vá z^wi^v-pó

\ / |
H H

ku-k^wi^vá z^wi^v-pó

\ / |
H H

ku-k^wi^vá z^wi^v-pó 'to steal gifts'
(cf. z^wi^v-pó - 'gifts')

A similar case is observed when we look at the interaction between the regular and breathy aspirates and these H tones. In (8a) we observe a H tone of the verb fí^vmá 'hate' spreading across a regular aspirate /p^h/, but in (8b) the same H tone is blocked from spreading when the following noun begins with a breathy aspirate /p^h/.

(8)a. A H tone spreads across a regular aspirate

Underlying Form

ku-fí^vmá p^híle

\ / |
H H

Intermediate Form

ku-fí^vmá p^híle

\ / \ / |
H H

ku-fí^vmá p^híle 'to hate a bad singer'
(cf. p^híle - 'bad singer')

b. A H tone is blocked from spreading by a breathy aspirate

ku-ſĩma p ^h ene	ku-ſĩma p ^h ene
\ /	\ /
H H	H H

ku-ſĩmá p^hené ‘to hate a steenbuck’
 (cf. p^hené - ‘steenbuck’)

From the above, I conclude that breathy aspirates are true depressor consonants as they exhibit a similar behavior to that of the voiced obstruents in their interaction with the High tones in Ikalanga. This means that Ikalanga has two sets of depressor consonants given in (10) below.

(10) Two sets of depressor consonants in Ikalanga:

a. Voiced obstruents:

/b, b̄g, b̄z, d, d̄, d̄z, d̄z̄, g, dz̄^w, g^w, v, z, z^w, z̄/

b. Breathy voiced consonants: (see §6.4.3.1 below)

/p^h, t^h, ŋ/

Note that the consonants in the second set (in 10b) are in contrast with similar sounds in the language that are non-depressors. An exception in this case is the glottal fricative which, in its restricted occurrence, is always produced with a breathy voice (see §7.1.1.2 for a detailed discussion of depressor consonants in Ikalanga).

In the remainder of this chapter, I look at the diachronic developments of breathy consonants in Ikalanga and the morphophonemic alternations in which they occur synchronically in this language.

6.4 Diachronic analysis

I begin by restating the consonant inventory of Proto-Bantu (Meeussen (1969/80)) from §3.1. We observe in (11) that, historically, no aspirated sounds were reconstructed for Proto-Bantu.

(11) Proto-Bantu Consonants (Meeussen (1969/80))

*p	*t	*c	*k
*b	*d	*j	*g
*m	*n	*ɲ	

But, on studying the reconstructions of Proto-Bantu by both Meeussen (1969/80) and Guthrie (1967-71) and the cognates in Ikalanga, it becomes evident that, diachronically, Ikalanga aspirated consonants are derived from several different sources. At least three factors appear to have played an important role in the development of aspiration: (a) the influence of the close vowels *i̥ and *u̥ of Proto-Bantu (Meeussen (1967)) following voiceless stops; (b) the influence of the labio-velar glide /w/ derived from PB *u in the environment of a following non-back vowel within a syllable; and, (c) a nasal plus voiceless stop sequence in Proto-Bantu, most prevalent in nouns of classes 9 and 10. I look at each one of these factors in turn in the following sub-sections.

6.4.1 Influence of the close vowels *i̥ and *u̥

As shown in §3.1. in Chapter Three, seven vowels were reconstructed for Proto-Bantu (Meeussen (1969/80)). Of interest in this vowel system are

the two most high vowels *i̥ and *u̥, referred to throughout the present study as the close vowels. (12) below restates the seven vowel system of Proto-Bantu from Meeussen (1969/80) (see also §3.1).

(12) Proto-Bantu Vowel System

*i̥	*u̥
*i	*u
*e	*o
*a	

These close vowels have merged in most Bantu languages with the high vowels *i and *u, bringing down the number of vowels in these languages to five. But before this merger occurred between the close vowels and the high vowels, these close vowels effected different sound changes on the preceding stops. They caused frication (i.e., affrication, spirantization) of the preceding stops in most Bantu languages which underwent vowel reduction from seven to five vowel systems, including Ikalanga. This process of frication, referred to as High Vowel Frication in this study, is discussed in detail in §3.2 in Chapter Three. Of particular relevance to this discussion however, are the exceptional cases in Ikalanga, which, unlike the other stops in this language, did not undergo frication in the environment of the close vowels. In Ikalanga, evidence shows that the apicals *t and *d in the environment of a following close vowel underwent different changes which did not involve frication. (13) gives PB apicals and their reflexes in Ikalanga.

(13) Changes to apicals before PB close vowels

- | | | | |
|----|----|---|------------------------|
| a. | *t | > | ts ^h / _ *i |
| b. | *t | > | t ^h / _ *u |
| c. | *d | > | dz / _ *i |
| d. | *d | > | d / _ *u |

Our main interest though, is on the changes exemplified by (13a) and (13b) where the occurrence of the close vowels *i and *u following Proto-Bantu *t changed it to an aspirated affricate /ts^h/ and an aspirated stop /t^h/ respectively. These sound changes are found in both nouns and verbs in Ikalanga. I give examples of words with reflexes showing aspiration derived from the influence of these vowels in (14) and (15).

(14)	<u>Nouns</u>	<u>Gloss</u>		<u>PB</u>
a.	ts ^h ima	'well'	<	*-tɪmá
	ts ^h inde	'stub of grass'	<	*-tɪndé
	ts ^h ingá	'veins (cl.10)'	<	*N-tɪŋga
b.	t ^h údzí	'shoulder'	<	*-tɪúɟi
	t ^h úmó	'bullet; spear'	<	*-tɪm o
(15)	<u>Verbs</u>			
a.	ts ^h indíka	'push'	<	*-tɪndik-a
	ts ^h úlá	'wipe'	<	*-tɪúd-a
b.	t ^h úlá	'forge; kick'	<	*-tɪú d-a
	t ^h úmá	'sew'	<	*-tɪm-a
	t ^h úmúla	'take firewood out of fire'	<	*-tɪmud-a
	t ^h úvúla	'break, as a rope'	<	*-tɪb-a
c.	t ^{hw} á	'spit; vomit'	<	*-tɪ-a
	t ^{hw} íla	'vomit into'	<	*-tɪú d-a ('spit')

I am assuming that the secondary labialization in the examples in (15c) developed at a later stage after the close vowel *ɥ had already effected aspiration on PB *t. With the development of aspiration, this close vowel became a high back vowel /u/ creating a suitable environment for the Glide Formation Rule (see §5.6.1 for this rule) to apply changing the back vowel to a labio-velar glide. This glide is then realized as secondary labialization. (16) shows the stages in the development of this labialized aspirated stop.

(16) Stages in the development of labialized aspirated /t^{hw}/

$$*t_{\text{ɥ}}V2 \quad > \quad thV2 \quad > \quad thwV$$

From the examples in (15c) above, the quality of V2 must be that of a non-back vowel. However, the examples in both (14) and (15) clearly show that the aspirated dental affricate /tʰ/ and alveolar stops /t^h, t^{hw}/ in Ikalanga are reflexes of the Proto-Bantu stop *t in the environment of the close vowels *i and *ɥ. A rule that accounts for these diachronic changes can be formulated as follows.

$$(17) \quad *t \quad > \quad [+ \text{spread glottis}] / \text{---} \left\{ \begin{array}{c} *i \\ *ɥ \end{array} \right\}$$

According to this rule a Proto-Bantu voiceless stop *t became aspirated when followed by the close vowels *i and *ɥ (see also Hyman 1972 & 1977 on Bamileke where high vowels are also shown to effect aspiration in the preceding stops). But the question is, how did these close vowels cause

aspiration to develop in this stop sound? I address this question in §6.4.1.1 following.

6.4.1.1 Phonetic evidence on how close vowels effected aspiration on PB *t

I claim that the answer to the question raised above lies in the phonetic properties of these vowels. Close vowels, as the name suggests, had higher or closer constrictions during their articulation relative to the other vowels in Proto-Bantu. It has been observed that high vowels, in general, have certain effects on voiceless stops (see Ohala (1981a)). According to Ohala (1981a:112), (and the references therein), it has been found that the,

“...VOT of voiceless stops in various languages shows systematic variation as a function of vowel quality, i.e., a slightly longer VOT before high, close vowels and lesser VOT before low, open vowels.”

This variation in Voice Onset Time (VOT) has been hypothesized to be due primarily to the fact that high close vowels offer greater resistance to the air escaping from the oral cavity which, in turn delays the achievement of a transglottal pressure suitable for voicing. In another study on vocal cord constraints, Ohala (1983:205) further observes that after the release of a stop, the time required to reduce oral pressure to a given level is greater when a close vowel follows than an open vowel (see also Klatt 1985). Thus, stops preceding close vowels should be more aspirated than those preceding non-close vowels.

From the above facts, I conclude that the following must have happened in the case of those stops followed by the close vowels in Ikalanga. If we assume that these PB close vowels were indeed articulated with the tongue position close to the roof of the mouth, then there must have been greater resistance to the escaping air. Thus, the longer VOT caused these stops to be perceived as categorically aspirated while those which occurred with other vowels were not perceived as such. When later a merger occurred between the Proto-Bantu close vowels and the high vowels, the aspirated stops retained their aspiration contrasting them with the non-aspirated stops in the language.

But, as I will show in the following section, not all the aspirated stops in Ikalanga were derived by this sound change involving high close vowels. A number of words have reflexes with aspiration derived from the influence of the labio-velar glide /w/. I turn to these in the next section.

6.4.2 Aspiration from the labio-velar glide /w/

As shown to in §5.6.1 and §5.6.2 in Chapter Five, the aspiration we find in the doubly articulated velarized stop / \widehat{p}^h / and the labialized aspirated stop / k^{hw} / was caused by a labio-velar glide. It is essential to note that in the diachronic development of these consonants, at one point there was a labio-velar glide /w/ derived from PB back vowel *u (i.e. the more open u). This glide may still be found in some reflexes as secondary articulation, while in others, this glide underwent other changes. For example, with the

development of aspiration in the doubly articulated velarized stop / \widehat{pk}^h / (< *pwV < *puV) below), simultaneous loss of labiality took place (see §5.6.1). But in the case of the labialized aspirated velar stop / k^{hw} / (< *twV < *tuV), this labio-velar glide is still found as secondary labialization (see §5.6.2). I am, therefore, claiming that the aspiration in these consonants was caused by the labio-velar glide /w/ derived from the PB back vowel *u in the environment of a following non-back vowel at some stage in the historical development of these sounds. The question of how a glide could have influenced the development of aspiration is looked at in §6.3.2.1 below.

In §6.4.1 above, I showed that the aspiration in the consonants / t^h , t^{hw} , \widehat{ts}^h / is a result of the sound changes effected by the Proto-Bantu close vowels *i and *y. However, it is also obvious from the data in (19) below that some aspirated stops in this language developed in the environment of a Proto-Bantu high back vowel *u. But unlike the close vowels which effected the development of aspiration even when they were the only vowels following a stop consonant, PB *u only effected aspiration when followed by another vowel within a syllable. In (18a) I give examples showing Ikalanga reflexes with aspiration where Proto-Bantu had a close vowel *y as the only vowel in a syllable, but in (18b) we observe the absence of aspiration in those reflexes where PB had had a back vowel *u following this stop. Note that all the

examples given below are of the apical /t/ because, in the environment of the close vowels, the bilabial and velar stops underwent frication (see §3.2).

(18)a. Aspiration from *CVC sequences where V=*u

t ^h úmo	'bullet'	<	*-túm o
t ^h úlá	'forge; kick'	<	*-túd-a
t ^h úmá	'sew'	<	*-túm-a
t ^h úmúla	'take wood out of fire'	<	*-túmud-a

b. No aspiration from *CVC sequences where V=*u

i-túndú	'basket'	<	*-túndú
n-tumbu	'stomach'	<	*-tumbu
tunda	'urinate'	<	*-tund-a
tukuṭila	'perspire'	<	*-tukut-a
tuṭuma	'boil over'	<	*-tutum-a

On the other hand, aspiration developed in the environment where this back vowel *u was followed by a non-back vowel in V2 position within a syllable as shown in (19).

(19) Aspiration from *CuV2 syllables

a.	p ^h á	'dry-up'	<	*-pu-a
	p ^h aja	'break'	<	*-puaj-a ('pound')
	ḥap ^h á	'armpit'	<	*-kápu-a
b.	ŋ-k ^{hw} á	'Bushman'	<	*-túá ('bush dweller')
	k ^{hw} á	'pound'	<	*-tú-a
	k ^{hw} aja	'pound lightly'	<	*-tuang-a ('reduce to small parts')

I therefore, conclude that the development of aspiration in these stops was effected by the development first of a labio-velar glide /w/ in the intermediate stage. It is this glide which then led to the development of aspiration in these consonants. The fact that aspiration did not develop in

the Ikalanga reflexes of PB *Cu as in (18b) but developed in the reflexes of PB *CuV as illustrated by (19) above clearly supports this conclusion. It is worth noting that the development of aspiration from the labio-velar glide only occurred where PB stops had been *p and *t. However, where PB stop were a velar *k before this labio-velar glide, Ikalanga reflexes are a labialized velar stop /kʷ/, as shown in (20) below (see also §5.6.4).

(20) No aspiration from PB *kw

ŋ-kʷáfa	'son-in-law'	<	*-kói
uu-kʷé	'wedding ceremony'	<	*-kó-a ('give bridewealth')
kʷávo	'theirs'	<	*-kuabo ('other')
ŋ-kʷakʷa	'spineless monkey orange tree'	<	*-kuakua ('type of tree')

In the following section I look at how a labio-velar glide /w/ effected the development of aspiration in PB *p and *t.

6.4.2.1 How the labio-velar glide effected aspiration

In this section, I claim that the answer to the question raised at the end of the preceding section can be derived from the phonetic properties of the glides.

Phonetically, glides (or approximants) are articulated with a constriction greater than that of high vowels, but not to the extent of causing turbulent airflow (in which case the sound derived would be a fricative and not an approximant). Just as was shown to be the case where aspiration developed from the influence of PB close vowels *i and *u (see §6.4.1.1), the narrow constriction of a glide then causes an increase in oral pressure, which

in turn, causes a delay in Voice Onset Time (VOT). This, therefore, explains why PB *u, unlike the close vowel *ɯ, caused the development of aspiration only in those environments where it first changed into a labio-velar glide /w/. In other words, it is this delay in VOT caused by the narrow constriction in the production of the glide which made the listener perceive these velarized and labialized consonants as aspirated. When the listener turns speaker, he/she would then repeat what they thought they heard, and in this case, these sounds were then repeated with aspiration. This resulted in a sound change making these sounds to be realized with aspiration.

Evidence that the labio-velar glide effected aspiration in the development of these stops can be derived from a study by Klatt (1985). In this study on VOT and aspiration in word-initial consonant clusters in English (among other things), Klatt shows that the VOT changes as a function of the place of articulation of a plosive and the identity of the following vowel or sonorant consonant (see also Ohala 1981). The results of this study showed, among other things, that the VOT of a plosive before a high vowel or a sonorant was always longer than before mid- or low vowels. Of particular relevance to this discussion though, is that, the mean VOT of a plosive was found to be longer before sonorant consonants than before vowels.

I, therefore, conclude that the long VOT, caused by the labio-velar glide /w/ following the above PB stops, caused the development of the labialized aspirated stops we find in Ikalanga. In other words, listeners tended to

reinterpret the longer VOT effected by the following glide as aspiration and when they turned to speak, pronounced these stops with aspiration.

As to why the labialization was retained as secondary articulation on the velar stop /k^{hw}/ but not on the doubly articulated stop /p^hk^h/ can best be explained by looking at the derivational history of these consonants. That is, in the case of the doubly articulated velarized stop /p^hk^h/, the labiality was lost with the development of the velarity, which did not happen with the velar stop. I assume both are cases of dissimilation where listeners made erroneous 'corrections' of the signal. In the case of *pw > /p^hk^h/ they factored out the labiality of the labio-velar glide, assuming it was a predictable consequence of the labial. But the velar portion of the labio-velar remained and was re-interpreted as a velar element - a stop co-articulated with the labial. In the case of *tw > /k^{hw}/, listeners erroneously corrected the place cues from the stop burst thinking they had been distorted by the low-pass filtering effects of the /w/: they thus re-interpreted it as a velar but retained the labialization (the presumed cause of the distortion).

6.4.3 Aspiration from a nasal+stop sequence

The development of aspiration in environments where a nasal has been reconstructed in Proto-Bantu is also found in both nouns and verbs in Ikalanga. But it is most common in nouns of the classes 9 and 10. I begin by looking at classes 9 and 10 nouns.

6.4.3.1 Classes 9 and 10 Nouns

In Ikalanga, as in other Bantu languages, nouns are classified into different classes characterised by the noun class prefixes (see §2.3.1 for Ikalanga noun class prefixes). Historically, classes 9 and 10 had a nasal segment (*N-) for a class prefix, but this nasal prefix has since been lost in most of these nouns in Ikalanga. Today the remains of this prefix are found before voiced stops only, where, unlike other class prefixes, it is not syllabic but simply behaves as one segment with the following voiced stop, that is, as part of a prenasalized stop. As a result, it is not tone bearing. (21) - (23) below give nouns of classes 9 and 10 where the nasal prefix occurred before PB voiced stops *b, *d, and *g respectively.

(21) Class 9/10 nasal prefix before PB roots with voiced stops initially

	<u>Nouns</u>	<u>Gloss</u>		<u>PB</u>
	mbezo	'adze'	<	*N-beejo
	mbadu	'ribs'	<	*N-badɔ
	mbeva	'rat(s)'	<	*N-beba
	mbéwú	'seedlings'	<	*N-bégú
	mbílá	'rockrabbit(s)'	<	*N-bída
	mbúdzí	'goat(s)'	<	*N-búdi
(22)	ndá	'lice'	<	*N-dá
	ndedu	'beard'	<	*N-dedɔ
	ndímí	'tongues'	<	*N-dími
	ndipo	'payment(s)'	<	*N-dipo
	ndílo	'plate(s)'	<	*N-dido
(23)	ngano	'folktales'	<	*N-gano
	nguvo	'blanket(s)'	<	*N-gubo ('cloth')
	nguluve	'pig(s)'	<	*N-gudube
	ng ^w ena	'crocodile(s)'	<	*N-guena

However, different changes are observed in nouns of classes 9 and 10 whose roots had initial voiceless stop *p, *t, and *k in Proto-Bantu. In these nouns, the nasal prefix has been lost. Of interest though, is that, where this nasal prefix occurred followed by the voiceless stops *p, *t and *k, these stops are now breathy aspirates /p^h, t^h/ and a breathy glottal fricative /ɦ/ respectively. I begin by giving examples showing changes to the bilabial stop *p and alveolar stop *t respectively.

(24)	<u>Nouns</u>	<u>Gloss</u>		<u>PB</u>
	p ^h ako	'tree-hollow'	<	*N-pako
	p ^h alá	'antelope'	<	*N-pádá
	p ^h ené	'steenbuck'	<	*N-pene ('goat')
	p ^h épó	'wind'	<	*N-pépo
	p ^h óla	'beeswax'	<	*N-púda
	p ^h óu	'ostrich'	<	*N-poi
(25)	t ^h éngó	'purchase price'	<	*N-téngo
	t ^h ávi	'branches'	<	*N-tápi
	t ^h atú	'three (cl.10)'	<	*N-tatú
	t ^h úndu	'load; possessions'	<	*N-tundu

The voiceless velar stop *k, on the other hand, underwent subsequent changes which resulted in it losing the occlusion. As a result, its reflex in Ikalanga is the breathy glottal fricative /ɦ/. (26) below illustrates.

(26)	ɦópé	'eyelash'	<	*N-kópé
	ɦúkú	'fowl'	<	*N-kúku
	ɦúní	'firewood'	<	*N-kúni
	ɦáŋgá	'guinea-fowl'	<	*N-kánga
	ɦálí	'pot'	<	*N-kádi
	ɦámbá	'tortoise'	<	*N-kamba
	ɦap ^h á	'armpit'	<	*N-kápua

(27) gives a summary of the changes effected by the nasal prefix on the voiceless stops in Ikalanga.

- (27) a. *N-p > *N-pfi > pfi
 b. *N-t > *N-tfi > tfi
 c. *N-k > *N-kfi > kfi > fi

However, in cases where proto *k was followed by two vowels as V1 and V2 within a syllable, (that is, V1=*u and V2=*a) the Ikalanga reflex is an breathy aspirated labio-velar glide /w^h/, as shown in (28).²⁴ I assume that the Glide Formation Rule first applied changing V1 into a labio-velar glide /w/ in the environment of the following low vowel *a. With the prefixation of the class 10 nasal prefix, proto *k underwent similar changes to those shown in (27c) above.

- (28) w^hak^wa 'dried fruit of spineless monkey orange tree' < *N-kuakua ('kind of tree')
 w^halí 'partridge' < *N-kuadí
 w^háló 'books' (cf. k^wálá - 'write')

²⁴ One verb root is found in the database (Appendix C) where this breathy aspirated labio-velar glide is derived from a nasal+stop cluster with voiced velar stop in PB as shown below.

w^há 'hear' < *-yíngɔ̣-a

I assume that the initial syllable in the proto form was lost. The voiced velar stop *g must have first devoiced, after which it went through the same stages which other nasal+stop sequences underwent to derive the breathy aspirated labio-velar glide (see example (29)).

This means that the breathy glottal fricative /fi/ and the aspirated labio-velar glide /w^{fi}/ are in complementary distribution.²⁵ Thus (27c) should be modified to include the breathy aspirated labio-velar glide given in parenthesis alongside, as seen in (29).

- (29) *N-k > *N-kfi > kfi > fi/(wfi)
- a. kfi > fi / __ i, e, a
- b. kfi > w^{fi}/ __ u, o

No correspondences could be found of PB velar stop followed by the front vowels *i and *e in these two classes. As was mentioned above, all the reflexes of proto voiceless stops are depressor consonants in their interaction with High tones in Ikalanga. But, as illustrated in (30), the class 9 and 10 nasal prefix also induced similar depressor effects in three more consonants occurring root initially in nouns of classes 9 and 10, namely, /k^{wfi}, ts^{fi}, tʃ^{fi}/.

(30) Other breathy voiced consonants in classes 9 and 10

- | | | | | | | |
|----|---|---|--------------------------|---|----------|---------------------------------------|
| a. | k ^{wfi} iʒa
k ^{wfi} é | < | *N-k ^{hw} iʒa | < | *-tʉiʒa | 'giraffe'
'sweet reeds' |
| b. | ts ^{fi} iŋgá
ts ^{fi} ijilo | < | *N-ts ^{fi} iŋga | < | *-tʉiŋga | 'veins'
'poverty' |
| c. | tʃ ^{fi} éʉé
tʃ ^{fi} éla | | | | | 'skunk'
'space underneath granary' |

²⁵Note that the glottal fricative /fi/ in the environment of the back and round vowels /u, o/ is optionally realized as the breathy aspirated labio-velar glide /w^{fi}/. This variation, though, may be subject to speaker variation (idolectally).

For the intermediate stages in the development of the labialized aspirated velar stop /k^{hw}/ and dental affricate /t̪^h/ from the above proto forms, the reader is referred to §5.6.2 and §6.4.1 respectively. From the above, I conclude that there are altogether seven breathy voiced consonants in Ikalanga derived in the environment of the classes 9 and 10 nasal prefix. Of particular interest is that all these consonants are depressor consonants in their interaction with High tones in this language. I give this class of special depressor consonants in (31).

(31) Special depressor consonants in Ikalanga

[p^h, t^h, ŋ, w^h, k^{wh}, t̪^h, t̪^h]

I defer discussion of depressor consonants until §7.1.1.

However, the above changes to PB voiceless stops did not just occur where noun roots of classes 9 and 10 were preceded by this nasal prefix. As I will show in the following section, breathy consonants also developed root medially in verb roots and nouns of other classes which, in Proto-Bantu, had nasal+stop sequences medially. I discuss these in the following section.

6.4.3.2 Breathly voice consonants from *NC sequences root medially

I begin by looking at those verbs which have breathy voice consonants root medially from PB nasal+stop sequences. Out of a total of 1,165 verbs in the database (see Appendix C), only sixteen (16) verbs have breathy voice consonants which appear to have been derived from a nasal+stop sequence. Most of these verbs occur with the breathy alveolar aspirate /t^h/ in the second

syllable. Only two examples with the breathy bilabial aspirate /p^h/ and one with breathy labio-velar glide /w^h/ could be found in the database. In (32) I give a list of the 16 verbs with breathy aspirates.

(32)	<u>Verbs</u>	<u>Gloss</u>		<u>PB</u>
a.	ḍot ^h a	'drip'	<	*-tont-a
	ket ^h a	'pluck off; break-off'	<	*-kant-a
	kut ^h a	'brush on something'	<	*-kunt-a
	mét ^h á	'pluck-off, as feathers'		
	nát ^h á	'separate corn flour from grain'		
	ṭat ^h a	'climb'	<	*-tant-a ('cross')
	ʃát ^h á	'be happy'		
	ḍot ^h ela	'drop onto (of liquid)'	<	*-tont-a
	kút ^h uvúla	'pluck-off leaves from lash'		
	ṭút ^h umála	'be elevated'		
	kót ^h oméla	'nail into'		
	ku ^h iwa	'stumble on; trip on'		
	ṭat ^h ikaja	'pile on top of the other'		
b.	fép ^h a	'blow one's nose'	<	*-pémbo
	pap ^h a	'increase'		
c.	nuw ^h a	'smell (v)'	<	*-nųṅk-a

(33) gives the few nouns found in the database with breathy consonants morpheme internally in C2 positions also from nasal+plus stop clusters.

(33)	<u>Nouns</u>			
	bép ^h ó	'cold or flu'	<	*-pémbo
	mi-w ^h á	'thorn'	<	*-yıṅḡa
	n-nuw ^h o	'smell (n)'	<	*-nųṅko
	gák ^w á	'pool'		
	ʃát ^h ó	'happiness'		

I assume that the voiced stops in the proto forms in the first two examples in (33) first underwent a stage of devoicing (see also footnote 24). After which,

they went through the different stages of development given in (27) and (29) to derive the breathy bilabial aspirate /p^h/ and aspirated labio-velar glide /w^h/ respectively. (34) below gives monosyllabic noun roots with a breathy aspirate /t^h/ derived from a nasal+stop cluster in PB roots. Note that the initial nasal in the word for person is the class 1 nasal prefix (< PB *mu-) which is also syllabic.

(34)	n-t ^h u	'person'	<	*-ntu
	ŋi-t ^h u	'thing'	<	*-ntu

From the above examples in (32) - (34), I conclude that breathy consonants in Ikalanga did not just develop from the influence of the class 9 and 10 nasal prefix, the development of these consonants was also triggered by a nasal that was not a noun class prefix in PB nasal+stop clusters. Just as mentioned above, all these breathy consonants are also depressor consonants.

In the next sections, I address the question of how a nasal segment could have caused the development of aspiration in these voiceless stops. First, I consider the previous analyses on the development of aspiration in a similar environment in some Bantu languages. I also look at the weaknesses of these analyses in the way they account for the development of aspiration in the environment of a nasal segment, and then go on to give my own analysis providing phonetic evidence from the literature on how breathy aspiration could have developed from the influence of a nasal segment.

6.5 Previous analyses on the development of aspiration

I begin by looking at a study by Hinnebusch (1975) on the development of aspiration in root initial stops of Swahili classes 9/10 nouns and other related languages in the region, in the environment of the nasal prefix. Swahili and the other languages considered in this study are also Bantu languages to the north of Ikalanga. Even though in this study Hinnebusch concludes that aspiration in these nouns is due to the influence and loss (in the case of Swahili) of this nasal prefix, it is not clear how this nasal prefix caused aspiration of these stops. In Hinnebusch's analysis, the nasal first assimilates to the voicelessness of the following root initial voiceless stop. After the nasal gets devoiced, two possibilities are said to have occurred (Hinnebusch 1975:38). I number these as (35a) and (b) for ease of reference.

- (35) a. "Perceptually, native speakers have reinterpreted the period of initial noisiness as post-aspiration rather than pre-aspiration,
b. or a change in timing has occurred in that velic closure occurs before the air pressure has been totally expended in the production of the voiceless nasal and carries over in the release of the stop."

Hinnebusch is forced to assume that either one or both of the above possibilities may have taken place because of the data from other Bantu languages close to Swahili such as Pokomo and Pare. In these languages, unlike in Swahili, both the nasal and the aspiration are retained. However, Hinnebusch only gives a schema which accounts for the development of aspiration in Swahili, and not the other languages, seen in (36) below.

(36) Hinnebusch's schema for Swahili (1975:40)

/N-pepo/	/N-ta/	
m-pepo	n-ta	Nasal assimilation
m̩p ^h epo	n̩-t ^h a	Partial Nasal devoicing/ aspiration
m̩p ^h epo	—	Full devoicing
∅∅	∅	Nasal loss
p ^h epo - 'wind'	n ^h a - 'wax'	

Hinnebusch gives two stages of devoicing in order to account for monosyllabic words where with the development of aspiration, a fully voiced nasal is still maintained. However, it is at the stage of partial devoicing that metathesis to post-consonantal position occurs resulting in aspiration. According to Hinnebusch, partial devoicing applies to all class 9/10 nominals while full devoicing only applies in polysyllabic nominals. I assume that Pokomo and Pare failed to undergo the last stage of nasal loss since both are shown to have retained the devoiced nasal. Below I give examples from Pokomo, Pare and Swahili for illustration.

(37) Pokomo (Hinnebusch (1975))

m̩p ^h eφo	'wind'	<	*N-pépo
n̩ ^h ahu	'three'	<	*N-tátu
ŋk ^h uju	'big'	<	*N-kúdu

(38) Pare (Hinnebusch (1975))

m̩p ^h eho	'wind'	<	*N-pépo
n̩ ^h ondo	'star'	<	*N-tóndo
ŋk ^h ombe	'fingernails'	<	*N-kómbe

(39)a. Swahili Hinnebusch (1975)

p^hepo 'wind/cold' < *N-pépo

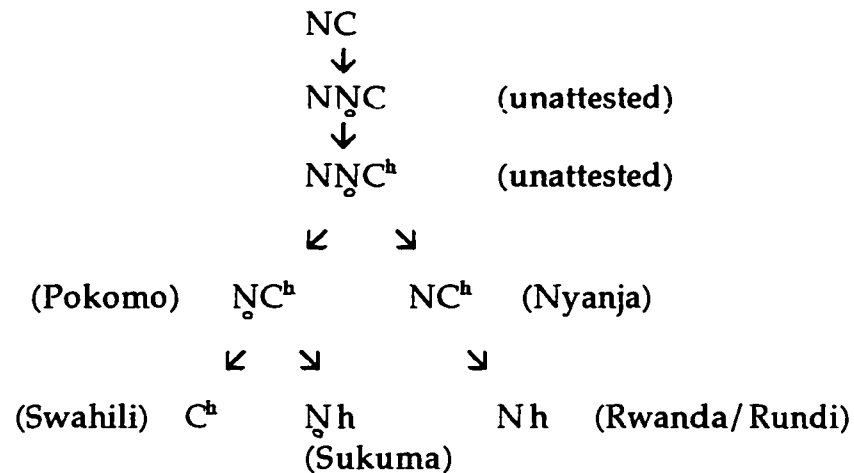
b. Additional Swahili examples (from Givón (1974))

p^haa 'gazelle' < *N-páádá
t^haa 'lamp' < *N-kúkú
k^huku 'chicken' < *N-kúkú

(37) and (38) show both Pokomo and Pare to have retained both the aspiration and the devoiced nasal as indicated by a diacritic mark [◌̥] beneath the nasal prefix, while Swahili has the aspiration only. Thus, by assuming that both processes (given as (35)a and b above) may have taken place, Hinnebusch was able to account for both developments. If we look at Ikalanga cognates in (24), (25) and (26) above, we observe that, like Swahili in (39), with the development of aspiration, the nasal prefix was also lost. So, under Hinnebusch's analysis, a process of metathesis given in (35a) above would be used to account for this development in Ikalanga.

Givón (1974) also gives an analysis on the development of aspiration in these Bantu languages along the same lines as Hinnebusch (1975). According to Givón, the nasal first undergoes natural assimilation of devoicing before a voiceless homorganic stop. This voiceless nasal is then perceived as "a breath". The presence of this "breath" effect before a voiceless consonant creates some perceptual confusion. As a result, a perceptually motivated metathesis occurs, whereby the speaker interprets the voiceless nasal as post-stop aspiration. Givón gives the following stages in the development of aspiration citing languages where different stages are attested.

(40) Stages in the development of aspiration (Givón 1974:110)



Givón posits two unattested stages, the second of which enables him to account for the difference between Pokomo, where the nasal is devoiced, and Nyanja, where the nasal is fully voiced. Unlike Hinnebusch, though, his analysis is based on metathesis alone. However, he fails to account for how languages such as Pokomo and Swahili developed from partial devoicing to full devoicing.

6.5.1 Arguments against the previous analyses

Below, I give arguments against the above analyses by Hinnebusch (1975) and Givón (1974). On the basis of these arguments, I reject these analyses as not being appropriate for Ikalanga.

(a) The nasal prefix did not lose its voicing.

According to Maddieson (1991) phonetic evidence indicates that nasals, in a similar environment, in Sukuma, an Eastern Bantu language, are not voiceless. Maddieson carried out studies on Sukuma “aspirated nasals”,

some of which were of the classes 9/10, in order to find out what kind of sounds they are. In Sukuma nouns of classes 9/10, the root initial voiceless stops have been lost; instead, we find nasals followed by aspiration, hence the label “aspirated nasals”. But the lost voiceless stops determined the place of articulation of these nasals. The results of this study, among other things, showed that the nasal portion of these aspirated nasals is not voiceless. According to Maddieson (1991:152), the phonetic characteristics of these sounds “... also suggest that the diachronic development of aspirated nasals did not involve any stage in which the nasal portion became devoiced, as has sometimes been proposed ...” (cf. Givón (1974) above). For our purposes, it is important to note that the sound changes attested for Sukuma in Maddieson are the exact parallel of what we find in Shona classes 9 and 10 nouns, a sister language to Ikalanga. The following examples from both Sukuma and Shona illustrate this point.

(41) Sukuma (Maddieson (1991))

mhala	‘gazelle’	<	*N-pádá (‘antelope’)
nhaawa	‘spotted hyena’		
ɲhɔɔji	‘detective’		
ɲhɔɔ	‘sheep’	<	*N-kodo

(42) Shona (Hannan (1987))

mhépo	‘wind’	<	*N-pépo
mhené	‘steenbuck’	<	*N-pené (‘goat’)
mhóu	‘ostrich’	<	*N-poɪ
nhéngó	‘price’	<	*N-téngó

As already mentioned in the case of Sukuma, the place of articulation of the nasal is determined by the place of articulation of the now lost voiceless stop.

This is also the case in Shona nouns. I, therefore, conclude that while Shona and Sukuma went ahead and lost the voiceless stops, Ikalanga, instead, retained the aspiration and lost the nasal segment. Thus, on the basis of the findings by Maddieson (1991), it makes sense to conclude that the nasal prefix in Ikalanga and other Bantu languages such as Sukuma and Shona never lost its voicing; instead, the aspiration we find in these stops must be a result of other conditions which led to the sound changes we see in these languages today.

(b) An increase in pressure is not equal to greater VOT

It does not make sense to talk of a change in timing with velic closure occurring before the air pressure is totally expended in the production of the voiceless nasal, and as a result carrying over in the release of the stop (see (36b) above). In any case, an increase in the air pressure does not necessarily result in a greater VOT as suggested by Hinnebusch's analysis. For instance, it has been found that the amount of air pressure used in the production of stops is independent of aspiration (Kim 1965). In other words, more air pressure used in the production of a stop consonant does not necessarily make it have a longer VOT.

(c) Nasal devoicing and metathesis fail to account Ikalanga data

Finally, an analysis such as given by Hinnebusch (1975) or Givón (1974) where these nasals undergo partial and full devoicing and are then subject to metathesis fails to account for the Ikalanga data where the reflexes of PB *NÇ clusters are depressor consonants (see §6.3). Even though it is possible for

languages to develop differently at times, I claim that an analysis such as given below can be extended to the other Bantu languages given above.

Below I give my proposed analysis which accounts for the sound changes we find in Ikalanga reflexes of Proto-Bantu *NÇ clusters.

6.5.2 A proposed analysis on how a nasal influenced aspiration

I propose that these nasals were first perceived by the listener as being breathy voice, that is, as if they were made with a slightly open glottis. This argument is based on a study by Fujimura and Lindqvist (1971) which showed that the acoustic effects of nasalization are very similar to those of a slightly open glottis. Fujimura and Lindqvist (1971) carried out sweep-tone measurements of the vocal tract in order to determine its transfer function. This study was carried out for both a closed and open glottis condition, and on both oral and nasalized vowels. The results of this study, among other things, showed that nasalization has the effect of lowering the amplitude of the first formant of a vowel and increasing its bandwidth. The effects of nasalization on the formants were found to be similar to those of a slightly open glottis when articulating these vowels. I therefore suggest that the fact that nasalization has similar effects acoustically as a slightly open glottis could have led to these Ikalanga nasals to be perceived as breathy voice. In other words, listeners reinterpreted nasalization as breathy voice, a mode of phonation commonly associated with low pitch. Ohala and Ohala (1993) also note that breathy voice vowels are often reinterpreted as nasalized, although

the reverse has not yet been demonstrated. As for what happened after the nasals became breathy voiced, I am assuming that by a process of assimilation, the breathy feature of these nasals then moves onto the release of the adjacent stops where it is realized as aspiration. As a result, stops following these nasals became breathy aspirated. When later the breathy nasals were lost in Ikalanga, these aspirated stops retained this breathy feature.

An analysis such as this one also offers an explanation why these Ikalanga breathy aspirated stops (< PB *NÇ) are phonetically and phonologically distinct from the regular aspirates, in that, synchronically, they are depressor consonants since they lower the F0 of a following vowel.

In (43) below a schema is given which outlines the different stages these sounds evolved to become breathy aspirated.

(43) Stages in the development of aspiration

NC	→	ṆC	Stage 1: Nasal perceived as breathy
ṆC	→	ṆC̥h	Stage 2: Breathly feature moves onto the release of the stop
ṆC̥h	→	C̥h	Stage 3: Loss of the nasal
C̥h	>	h̥	Stage 4: Loss of the occlusion

Note that the fourth stage is only applicable in cases of proto *k which has also been lost. (44) illustrates these stages on two Ikalanga words: /p^{h̥}épó/ - 'wind' and /h̥úní/ - 'firewood'.

(44)	a.	*N-pépo	b.	*N-kúni	Proto-Bantu
		m̥-pépo		ŋ-kúni	Stage 1
		m̥-pfiépo		ŋ-kfiúni	Stage 2
		Ø-pfiépo		Ø-kfiúni	Stage 3
		—		fiúni	Stage 4
		/p ^h épó/ - 'wind'		/fiúni/ - 'firewood'	

Typological evidence that these Ikalanga nasals must have changed to breathy voiced nasals is derived from Pongweni (1990). In his study of Karanga, a dialect of Shona closely related to Ikalanga, he shows Karanga to have two sets of nasals: the plain voiced nasals and the breathy voiced nasals. The following minimal pairs from Pongweni (1990:97-98) illustrate.

(45) Plain vs breathy voiced nasals in Karanga (Shona)

mándá	'animal fat'	m̥ándá	'fork in branch of tree'
nàkà	'be sweet'	ŋàkà	'inheritance'
mèjú	'in your (pl.)'	m̥èjú	'alive (adj. Cl.9/10)'

I have argued above that the development of breathy voice consonants in Ikalanga is from a nasal in PB *NÇ clusters. In addition, an analysis is given on how these nasals could have resulted effected the development of these unique sounds, which, synchronically are depressor consonants. However, as pointed out in the introduction to this chapter, these changes did not just occur diachronically, similar changes occur synchronically in morphophonemic alternations in this language. I turn to these in the following section.

6.6 Morphophonemic variations in nouns of classes 9 and 10

As mentioned above, similar changes to the diachronic sound changes shown in the above sections are also found in morphophonemic alternations in this language. These changes are found in the modification of nouns of classes 9 and 10 by the adjectives which have voiceless stops or affricates root initially.

In Ikalanga, as in most Bantu languages, adjectives do not have inherent noun class membership. Whenever an adjective modifies a noun it always takes a class prefix which agrees with that of the noun it modifies. (46) gives some examples from different classes to illustrate this point.

(46)a. Classes 1 and 2 nouns + adjectives

<u>Underlying forms</u>		<u>Surface forms</u>	<u>Gloss</u>
va-kádzí + ʦaʦú	→	va-kádzí va-ʦaʦú	'three women'
ŋ-kádzí + peɲú	→	ŋ-kádzí m-peɲú	'an alive woman'
va-lúmé + kodú	→	va-lúmé va-kodú	'fat men'

b. Classes 7 and 8 nouns + adjectives

ʦi-tʰu + paví	→	ʦi-tʰu ʦi-paví	'an broad thing'
zʷi-tʰu + ʦena	→	zʷi-tʰu zʷi-ʦena	'white things'
zʷi-pó + ʃávuá	→	zʷi-pó zʷi-ʃávuá	'red gifts'

c. Class 9/10 nouns + adjectives

ɲóká + lefú	→	ɲóká n-défú	'a long snake' ²⁶
ɲombe + bilí	→	ɲombe m-bilí	'two cows'

²⁶ Note the surface alternation between a lateral /l/ and proto *d discussed in Chapter Four.

d. Class 14 nouns + adjectives

uu-kúse + ɬemá	→	uu-kúsé uu-ɬemá	'black fur'
uu-láwo + paví	→	uu-láwó uu-paví	'wide bed'

Of relevance to our discussion are the class 9/10 nouns in (46c) where we observe the adjectives taking a class 9/10 nasal prefix in agreement with the nouns they modify (cf. exx. (21) and (22) in §6.4.3.1 above). Interestingly, when adjectives with voiceless stops /p, t, k/ initially modify nouns of these classes, we observe in the intermediate forms that these stops are realized as breathy consonants /p^h, t^h, k^h/ respectively. In this case the nasal prefix is lost and we derive breathy voice aspirates and glottal fricative (cf. exx. (24-26) above).

(47) Breathy consonants in adjectives modifying classes 9/10 nouns

ɲumbá + paví	→	ɲumbá p ^h aví	'wide room'
ɲombe + pepú		ɲombe p ^h epú	'alive cattle'
ɲóká + ɬaɬú	→	ɲóká t ^h aɬú	'three snakes'
p ^h uká + ɬemá	→	p ^h uká t ^h emá	'black animal(s)'
ʃamú + ɬeɬʃanána	→	ʃamú t ^h eɬʃanána	'thin lash'
fiukú + kodú	→	fiukú fiodú	'fat chicken'
n uŋgú + kúlúkulu	→	n uŋgú fiuluɬulu	'big porcupine'

Essential to note in all the above surface forms too, is the failure of the High tone of the nouns to spread across these breathy consonants onto the first vowel of the adjectives. This shows that, just like those breathy consonants derived by diachronic sound changes, these sounds also have depressor effects. Similar depressor effects are also observed when the modifying adjective begins with a voiceless affricate, as shown in (48) below.

(48) Class 9/10 nouns modified by adjectives with initial affricates

ndílo + t̪ena → ndíló t̪ena 'white plate'
ʃúmba + t̪eʃaná → ʃúmbá t̪eʃaná 'young lion'

6.7 Summary

In this chapter, it has been shown that Ikalanga shows aspiration as both diachronic sound changes and synchronic changes. While these changes are shown to be most prevalent in nouns of classes 9 and 10, which diachronically, had a nasal segment for a class prefix, these changes are also found where PB had *NÇ clusters non-initially in nouns as well as verbs. Of particular interest about these changes is that, the resultant sounds are phonetically distinct from regular consonants with the same place of articulation, in that, they lower the F0 of the following vowel. It is this characteristic which makes them depressor consonants in their interaction with High tones in Ikalanga. Thus, Ikalanga today makes a distinction between the regular voiceless aspirates, the glottal fricative, the labio-velar glide, the labialized aspirated velar stop and the palato-alveolar affricate on the one hand, and their breathy counterparts on the other hand, a distinction never been made before in the literature.

Chapter Seven

Depressor Consonants and Tone

This chapter looks at depressor consonants and the tonal system of Ikalanga. According to Schachter (1976), depressor consonants are that class of consonants with a special affinity for low tones. In this chapter, I first determine which consonants pattern as depressor consonants and which are not depressor consonants. I then go on to discuss in detail the effects of depressor consonants. Furthermore, the chapter considers Ikalanga tonal systems and how depressor consonants interact with the tone spreading rules in this language. The interaction between this class of consonants and tone has been subject to a lot of attention in a number of studies on different Bantu languages (see Beach (1924) and Lanham (1958) on Xhosa; Schachter (1976) on Siswati; Laughren (1984) on Zulu; Cassimjee & Kisseberth (1992) on Mijikenda & Nguni; Trithart (1976) on Chichewa; and Hyman & Mathangwane (to appear) on Ikalanga, among others). §7.1 begins by giving a history of the study of depressor consonants in southern Bantu languages. §7.2 looks at the characteristics of depressor consonants. §7.3 looks at tone and the tone spreading rules in Ikalanga. §7.4 looks at the interaction of the tone spreading rules and depressor consonants in Ikalanga. §7.5 gives the summary.

7.1 Depressor consonants

I begin by giving two nouns the first of which consist of a class 7 prefix $\widehat{tʃi}$ - and the second consist of a class 8 prefix $z^w i$ -, both low tone in (1a). (1b) gives pronominals which show agreement with these nouns respectively.

- (1)a. $\widehat{tʃi}$ -pó 'gift' $z^w i$ -pó 'gifts'
 b. $\widehat{tʃi}$ - $\widehat{tʃó}$ 'your (sg.)' $z^w i$ -zó 'your (pl.)'

- (2)a. $\widehat{tʃi}$ -po $\widehat{tʃi}$ $\widehat{tʃó}$ b. $z^w i$ -po $z^w izó$
 | / | | |
 H H H H

 $\widehat{tʃi}$ -pó $\widehat{tʃi}$ $\widehat{tʃó}$ - 'your gift' $z^w i$ -pó $z^w izó$ - 'your gifts'

(2) gives these words in intonational phrases. We observe in (2a) that the High (H) tone of the noun spreads onto the first vowel of the pronominal, which is not the case in (2b). The only reason why there is tone spreading in (2a) but not in (2b) is because the initial consonant $\widehat{tʃ}$ in the pronominal is not a depressor consonant, while in (2b) the initial $/z^w/$ is a depressor consonant. As a result, this depressor consonant blocks the H tone from spreading across it.

The term 'depressor consonant' was first introduced into the study of Nguni languages by Lanham (1958:66) when he was looking at Xhosa tones. But, as noted by Rycroft (1980:1), the phenomenon of tone depression by some consonants in Nguni was recognized much earlier in the century by Beach (1924) when he stated that "... all consonantal initials of syllables may be

divided into two classes according to their tonetic relationships ... the high class and the low class'. Beach further explains that,

“...The fully voiced initials belong mainly to the low-tone class; ... whereas the high-tone class contains mainly initial consonants which are at least partially unvoiced...(1924:81).

Contrary to earlier studies, such as Beach (1924) and Lanham (1958), in which depressor consonants were associated with consonant voicing, it has now been shown in some Nguni languages that consonantal voicing is not an essential requirement of depression (Rycroft 1980:3). In languages that have depressor consonants, it is not necessarily the case that all voiced consonants are depressors, nor is it necessarily the case that all depressors are voiced. For example, Siswati depressor consonants include voiced consonants as well as voiceless consonants (Schachter (1976:213). Traill, Khumalo & Fridjhon (1987:264) also note that the class of depressor consonants in Zulu is heterogeneous, consisting of voiceless unaspirated stops, voiced stops and some voiced non-obstruents.

7.1.1 Ikalanga depressor consonants

Ikalanga, as is common in a number of Bantu languages, has depressor consonants in its inventory (see §2.1.2 above; Hyman & Mathangwane (to appear)). As in some Nguni languages such as Zulu and Siswati, not all the depressor consonants in this language are voiced consonants. As shown in (3) below, depressor consonants in Ikalanga are comprised of voiced obstruents and breathy voice consonants. The list of breathy voice

consonants includes the voiceless breathy aspirated stops, the voiceless breathy affricates, the breathy glottal fricative, the voiceless breathy labialized aspirated velar stop and the breathy labio-velar approximant.

(3) Ikalanga depressor consonants

a. Plain depressors

voiceless breathy stops:	p ^h		t ^h			
voiced stops:	b	ɗ	d		g	fi
voiced fricatives:	v		z	ʒ		
vls breathy affricates:		ts ^h		tʃ ^h		
voiced affricates:	ɓz	ɗz		dʒ		
voiced velarized stop:	ɓg					

b. Labialized depressors

voiced labialized stops:		d ^w			g ^w
vls breathy asp. stop:				k ^{wfi}	
voiced affricate:		ɗz ^w			
voiced fricatives:		z ^w			
labio-velar approx.:				w ^{fi}	

Ikalanga has altogether twenty-two depressor consonants in its consonant inventory. (4) gives words with depressor consonants in stem-initial position for illustration.

(4) Words with depressor consonants

a. Voiced obstruents

bika	'cook'
ɗána	'call'
duma	'agree'
gala	'sit'
vúná	'break'
zana	'play'
ʒola	'smear'
ɓza	'belch'
ɗamula	'snatch'
dʒá	'eat'

b. Breathly depressors

p ^h andé	'clap of hands'
t ^h ozo	'hoof'
fiúkú	'fowl'
ts ^h íngá	'veins'
tʃ ^h éíʃe	'skunk'
k ^{wfi} iʒa	'giraffe'
w ^{fi} i	'voice'

d ^w ilila	'proceed'
ḍz ^w ála	'plant'
g ^w ála	'be ill'
z ^w ála	'bear child'

However, a large number of consonants in Ikalanga are not depressor consonants. (5) illustrates.

(5) Non-depressors in Ikalanga

a. Voiceless plain consonants

Stops:	p, t, k
Fricatives:	f, s, ʃ
Affricates:	ps̄, ts̄, tʃ̄

b. Voiceless aspirated consonants

Stops:	p ^h , t ^h , k ^h
Affricate:	ts̄ ^h
Velarized stop:	pk̄ ^h

c. Sonorants: m, n, ɲ, ŋ, r, l, u, j, w

d. Prenasalized consonants

Voiced Prenasalized stops:	mb, nd, ŋg
Voiced prenasalized affricate:	ndʒ̄

e. Voiceless labialized consonants

Stops:	k ^w
Aspirated stops:	t ^{hw} , k ^{hw}
Aspirated affricate:	ts̄ ^{hw}
Fricatives:	s ^w , ʃ ^w

(f) Voiced labialized consonants

Nasal:	ŋ ^w
Voiced prenasalized stop:	ŋg ^w

We observe that non-depressors include both voiceless and voiced consonants in Ikalanga. Voiced consonants which are not depressor consonants include sonorant consonants, voiced prenasalized stops and the

prenasalized affricate. This shows that, like in Nguni, voicing is not a determinant of depression in Ikalanga. From the above, I conclude that depressor consonants in Ikalanga fall into three featural classes, namely; [+voice, -continuant], [+voice, +strident], and, [+breathy]. However, these depressor consonants have certain characteristics in common with regard to tone, which I discuss in the following section.

7.2 Characteristics of Depressor Consonants

According to Hyman and Mathangwane (to appear), depressor consonants in Ikalanga are characterized by four effects in their interaction with tones in this language. These effects, listed in (6) have analogues in the other Bantu languages as well (see Cassimjee & Kisseberth (1992)).

(6) Effects of depressor consonants on tones

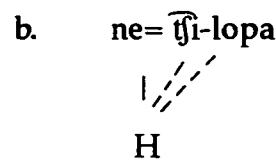
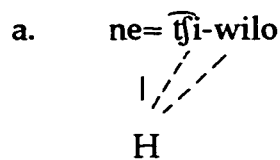
- a. they block some High (H) tones from spreading
- b. they convert H's to LH rising tones
- c. they cause a H tone to delink, and,
- d. they lower the pitch of the following tone.

Note that these effects are interrelated in Ikalanga. For example, in (6b) the conversion of a High tone to LH rising tone can also be explained as a result of pitch lowering effect by a preceding depressor consonant in (6d). I look at each one of these effects below.

A. Depressor consonants block some H tones from spreading

In Ikalanga, a High (H) tone spreads twice postlexically onto the following two vowels if it can (see §7.3.1). (7) gives two Low tone nouns preceded by an associative marker né= 'with, and, by' which has an underlying H tone. The H tone of the associative marker spreads first onto the vowel of the class prefix of the following word and then again onto the first vowel of the noun root.

(7) A H tone spreads twice postlexically



né= $\widehat{\text{tʃi}}$ -wilo - 'by chance'

né= $\widehat{\text{tʃi}}$ -lópa - 'and a liver'

(cf. $\widehat{\text{tʃi}}$ -wilo - 'chance')

(cf. $\widehat{\text{tʃi}}$ -lopa - 'liver')

But in cases where this H tone associative marker né= is followed by a noun with a H tone, Meeussen's Rule in (8) deletes the second H tone in (9). Following Meeussen's Rule, a H tone can only spread once onto the first vowel of a noun.

(8) Meeussen's Rule (MR):

$$H \rightarrow \emptyset / H _$$

(9) A H tone spreads once after the application of MR



né=ndílo - 'and a plate'

né=léle - 'and a ladder'

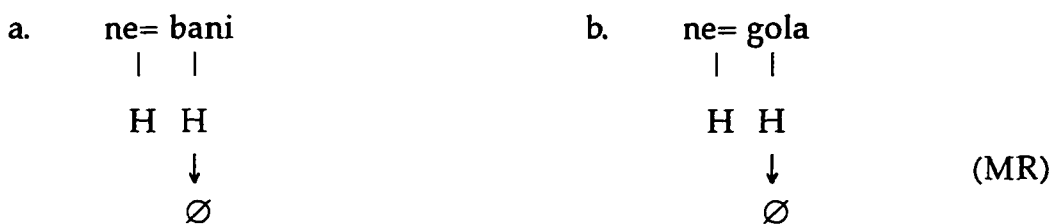
(cf. ndílo - 'plate')

(cf. léle - 'ladder')

As seen in (10) and (11) below, when the noun following the associative marker has an initial depressor consonant, the H tone of the associative marker is blocked from spreading onto the first vowel of the noun.

<u>(10) Underlying forms</u>	<u>Intermediate forms</u>	<u>Gloss</u>
a. né= bání	né= bani	'and a forest'
né= dǎmá	né= dǎma	'and a word'
né= góla	né= gola	'and a vulture'
né= gák ^{wí} a	né= gak ^{wí} a	'and a lake'
né= zání	né= zani	'and a leaf'
né= d̄zilá	né= d̄zila	'and a cloth'
né= p ^h épo	né= p ^h epo	'and wind'
né= t ^h úŋgó	né= t ^h ungo	'and rafters'
né= fiópé	né= fiope	'and eyelashes'
né= t̄j ^h éŋjé	né= t̄j ^h eŋje	'and a skunk'
né= ts ^h íŋgá	né= ts ^h ingá	'and veins'

(11) Depressor consonants block a H tone



né= bani - 'and a forest'

né=gola - 'and a vulture'

(cf. bání - 'forest')

(cf. góla - 'vulture')

c.	$\begin{array}{c} \text{ne= p}^{\text{h}}\text{epo} \\ \quad \backslash / \\ \text{H} \quad \text{H} \\ \downarrow \\ \emptyset \end{array}$	d.	$\begin{array}{c} \text{ne= t}^{\text{h}}\text{ungo} \\ \quad \backslash / \\ \text{H} \quad \text{H} \\ \downarrow \\ \emptyset \end{array}$	(MR)
	<p>né= p^hepo - 'and wind' (cf. p^hépó - 'wind')</p>		<p>né= t^hungo - 'and rafters' (cf. t^húngó - 'rafters')</p>	

B. Depressor consonants convert H's to LH rising tones

As will be shown below, when a H tone occurs between two depressor consonants in the underlying representations (UR), this H tone gets realized as a LH rising tone in the intermediate forms. This is illustrated in (12) by verbs followed by another word, in this case an adverb kakále 'again'. In the intermediate forms, we observe the H between the two depressor consonants converted to a LH rising tone.

(12) Depressor consonants convert H's to LH rising tones:

<u>UR</u>	<u>Intermediate Forms</u>	<u>Gloss</u>
g ^w ádza kakále	g ^w ádza kakále	'(be) painful again'
zádza kakále	zádza kakále	'fill-up again'
zīg ^w a kakále	zīg ^w a kakále	'be known again'
gák ^{wf} a kakále	gák ^{wf} a kakále	'(a) lake again'
t ^h úzi kakále	t ^h úzi kakále	'fly (n) again'

However, this is not the case when a H tone occurs between two non-depressor consonants. As seen in (13) the initial H tone of the verb simply spreads twice in the intermediate forms, first onto the following vowel of the verb and for the second time onto the first vowel in the following adverb.

(13) No LH rising tones with non-depressors

<u>Underlying forms</u>	<u>Intermediate Forms</u>	<u>Gloss</u>
ʔóla kakále	ʔólá kákále	'take again'
písa kakále	písá kákále	'burn again'
ngína kakále	ngíná kákále	'enter again'
lála kakále	lálá kákále	'lie down again'

C. Depressor consonants cause H tones to delink

As shown in (14), when a H-L noun with an initial non-depressor consonant is followed by a possessive pronoun lángu - 'my' also with a H-L tone pattern, the H tone of the noun simply spreads once onto the following vowel in the noun (subject to the tone spreading rules discussed in §7.3) and does not delink from the preceding vowel. In other words, non-depressors do not cause H tones to delink.

(14) Non-depressors do not cause H tones to delink

<u>Underlying forms</u>		<u>Spreading</u>
a. ʃumba jaŋgu	→	ʃumba jaŋgu
		/
H H		H H
ʃúmbá jáŋgu - 'my lion' (cf. ʃúmba - 'lion')		
b. ndilo jaŋgu	→	ndilo jaŋgu
		l'
H H		H H
ndíló jáŋgu - 'my plate' (cf. ndílo - 'plate')		

However, this is not the case if the initial consonant in the noun is a depressor consonant. In this case, after spreading once onto the following

vowel, this H tone then delinks from the preceding syllable with a depressor consonant. (15) and (16) below illustrate.

(15) Depressor consonants cause H's to delink:

<u>UR</u>	<u>Intermediate forms</u>	<u>Gloss</u>
dála lánɡu	dála lánɡu	'my corn stall'
dúla lánɡu	dúla lánɡu	'my granary'
báni lánɡu	báni lánɡu	'my forest'
góla lánɡu	golá lánɡu	'my vulture'
fióve jáŋɡu	fiové jáŋɡu ²⁷	'my fish'
t ^h éko jáŋɡu	t ^h ekó jáŋɡu	'my hiccup'

(16) gives some derivations to illustrate.

(16) Derivations illustrating delinking of H tones by depressors:

a. Underlying forms Spreading Delinking

bani lánɡu	→	bani lánɡu	→	bani lánɡu
		/		‡ /
H H		H H		H H

báni lánɡu - 'my forest' (cf. báni - 'forest')

b. Underlying forms Spreading Delinking

gola lánɡu	→	gola lánɡu	→	gola lánɡu
		/		‡ /
H H		H H		H H

golá lánɡu - 'my vulture' (cf. góla - 'vulture')

c. Underlying forms Spreading Delinking

fióve jáŋɡu	→	fióve jáŋɡu	→	fióve jáŋɡu
		/		‡ /
H H		H H		H H

fiové jáŋɡu - 'my fish' (cf. fióve - 'fish')

²⁷ Note that the different initial consonant of the pronoun in these examples from a lateral to a palatal glide is in agreement with noun classes of these nouns.

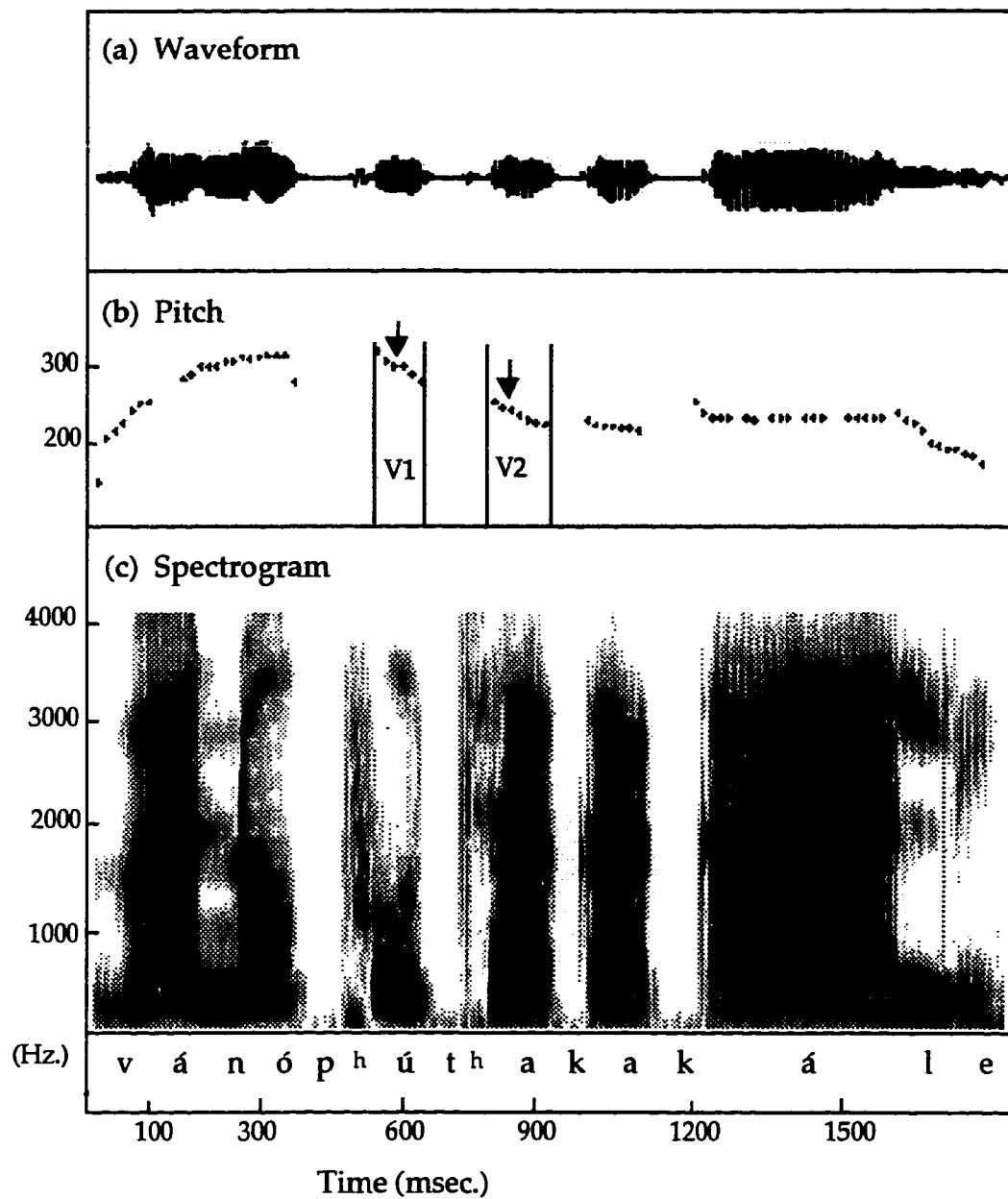


Figure 7.1. An analysis of the phrase *vá-nó-p^hú^th kakále* - 'they are assembling again'. We observe a slight difference in pitch between V1 and V2.

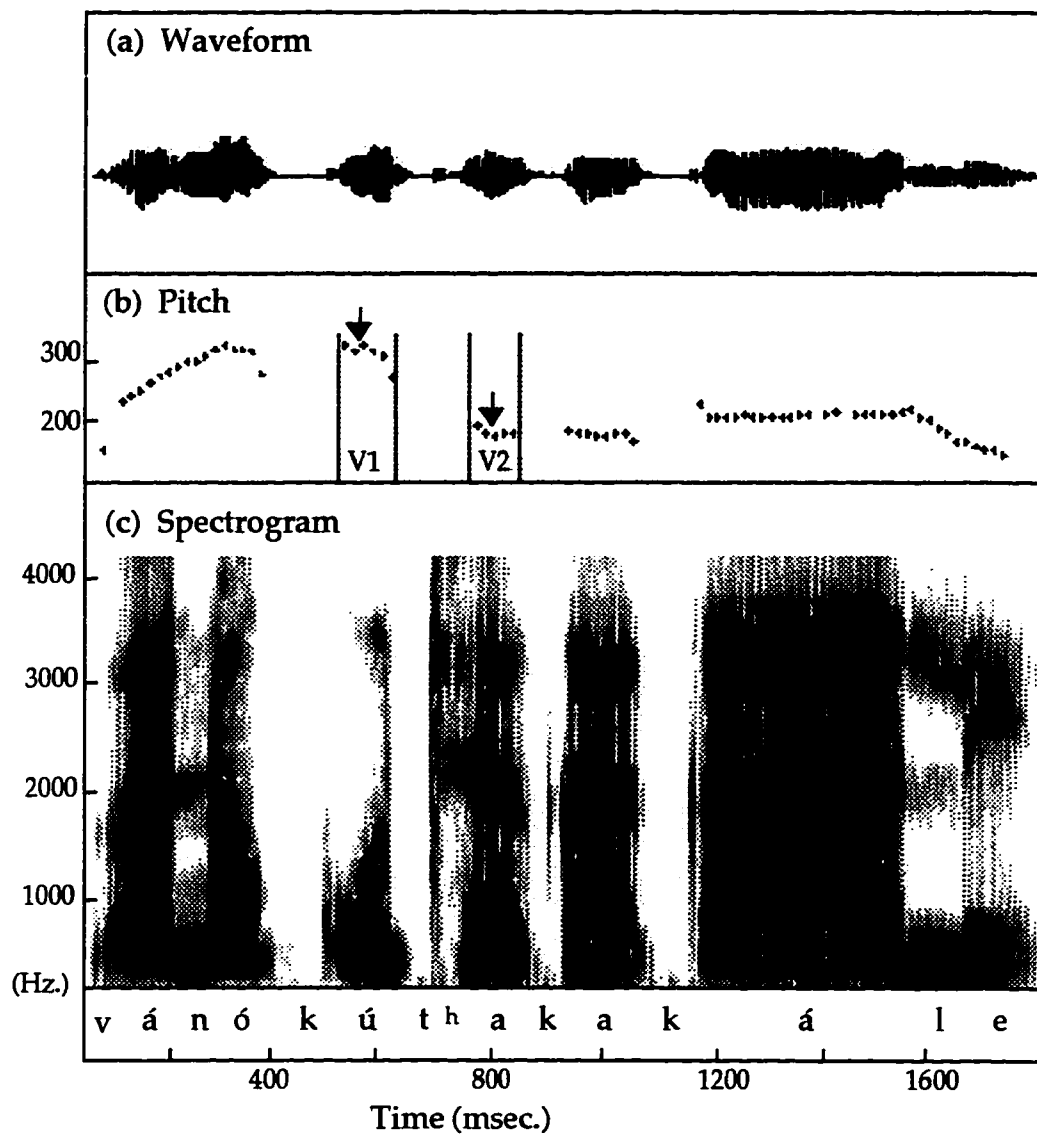


Figure 7.2. An analysis of the phrase *vákútá kákále* - 'they are touching again'. We observe a pronounced difference in the level of pitch between V1 and V2.

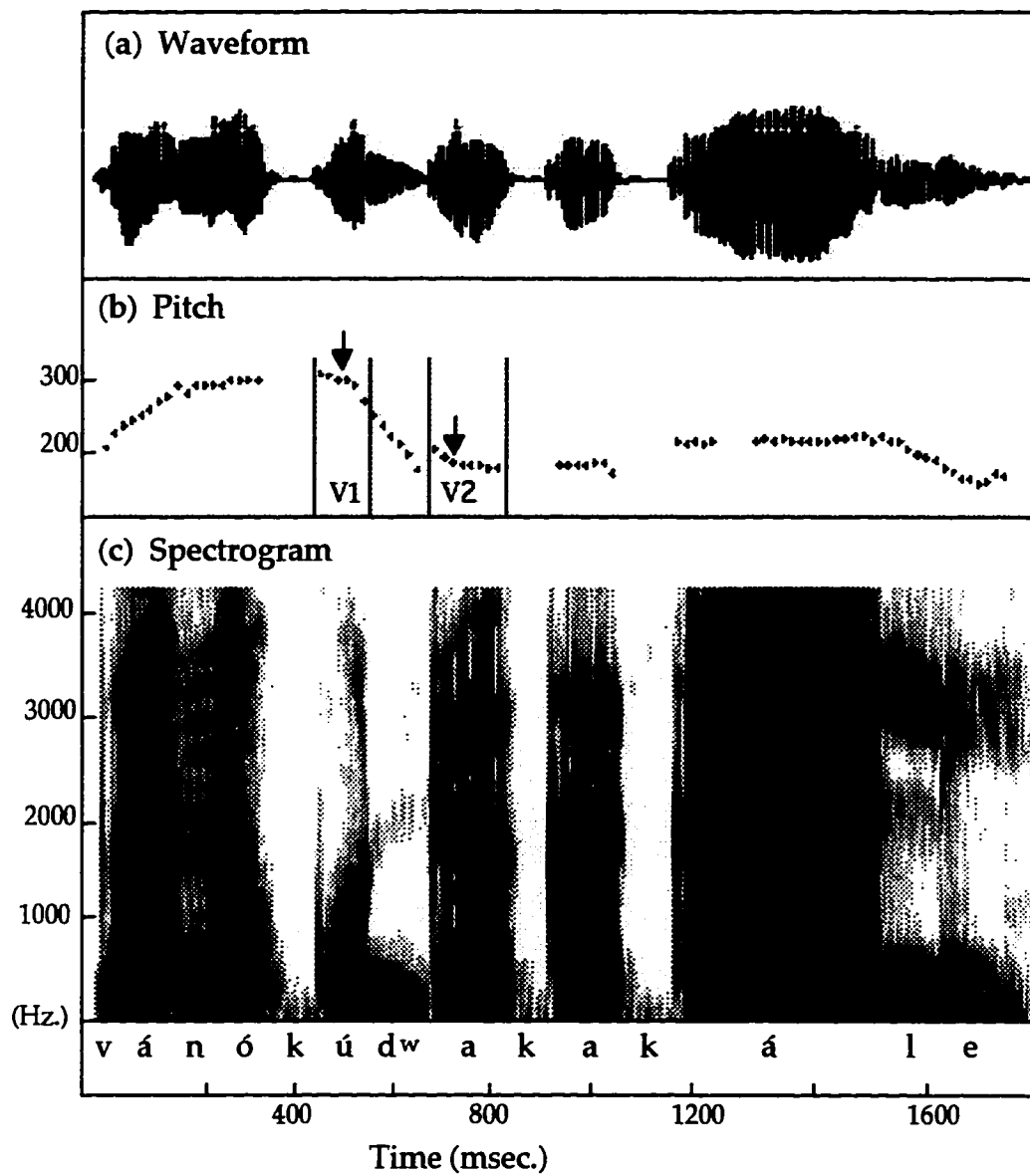


Figure 7.3. An analysis of the phrase *vá-nó-kú-dw a kakále* - 'they mean you again'. Just as in Figure 2 above, the pitch difference between V1 and V2 is more pronounced.

7.3 Tone in Ikalanga

Ikalanga, as in many other Bantu languages, has an underlying two-tone system, that is a High and a Low tone. A number of words are found in which the only contrastive element between two words is tone. (18) below gives tonal pairs of words which illustrate this point.

(18) Tonal minimal pairs

ʃaká	'bird's nest'	(L-H)	ʃaka	'search'	(L-L)
zulá	'frog'	(L-H)	zula	'open'	(L-L)
g ^w isá	'flour'	(L-H)	g ^w isa	'try'	(L-L)
ʃajá	'gossip'	(L-H)	ʃaja	'lack'	(L-L)
ṽjéla	'draw (water)'	(H-L)	ṽjela	'pluck off (fruit)'	(L-L)
líma	'darkness'	(H-L)	lima	'cultivate'	(L-L)
g ^w ála	'be ill'	(H-L)	g ^w alá	'coward'	(L-H)
fúlá	'blow (air)'	(H-H)	fula	'graze'	(L-L)
kúlá	'grow up'	(H-H)	kula	'clear grass'	(L-L)
k ^h óná	'turn'	(H-H)	k ^h ona	'manage'	(L-L)
ɲálá	'fingernails'	(H-H)	ɲala	'be tired'	(L-L)
z ^w ímbá	'swell'	(H-H)	z ^w imba	'hide (n)'	(L-L)

Tables 2 and 3 show the possible tonal patterns for disyllabic, trisyllabic, and quadrisyllabic verbs and nouns respectively.

Table 2. Tonal Patterns in Verbs

Tone Patterns	Examples
a. Bisyllabic verbs	
L-L	fem-a 'breathe'
H-H	káŋg-á 'fry'
H-L	tól-a 'take'
b. Trisyllabic verbs	
L-L-L	ʃalul-a 'choose'
L-H-L	ḍzimúl-a 'allay'
H-H-L	kúmbíl-a 'request'
c. Quadrisyllabic verbs	
L-L-L-L	tu kuʃil-a 'sweat'
H-H-H-L	léuélék-a 'speak'
H-L-H-L	páḍzamúk-a 'startle'
L-H-H-L	vulúláʃ-a 'shut one's eyes'

Note that the pattern L-H-L is only found in trisyllabic verb stems in which the initial consonant is a depressor consonant, as exemplified in the Table. Only twenty-four (24) verb stems with this pattern were found in the database.

Table 3. Tonal Patterns in Nouns

Tone Patterns	Examples
a. Bisyllabic nouns	
L-L	ndove 'dung'
L-H	ʃaká 'bird's nest'
H-H	fúpá 'bone'
H-L	ndílo 'plate'
b. Trisyllabic nouns	
L-L-L	ma-lopa 'blood'
L-L-H	ma-simbá 'strength'
L-H-H	i-kómbó 'navel'
H-H-H	ɲéɲédzǐ 'star'
H-H-L	ndóúólo 'marriage'
c. Quadrisyllabic nouns	
L-L-L-L	gorokoro 'throat'
L-L-L-H	i-kopaná 'insect'
L-L-H-H	n-zekúlú 'nephew; niece'
L-L-H-L	n-z ^w aláni 'friend'
L-H-H-L	m-ɲsájílo 'broom'
L-H-H-H	i-kókólá 'elbow'
H-H-H-L	uíléúíle 'hot pepper'
H-H-L-L	uásékulu 'uncle'

The following generalizations emerge from the above tables: 1) Ikalanga nouns present more tonal patterns than those found in verb infinitives; 2) except in the case of disyllabic verbs where we observe a H-H pattern ending in a H tone, trisyllabic and quadrisyllabic verbs always end in a L tone; 3) most

tonal patterns in nouns begin with a L tone. This follows simply from the fact that noun class prefixes, as in most Bantu languages, are L tone. The only class prefix with an underlying H tone in Ikalanga is the class 2a prefix uó- (see §2.3.1). As will be shown in the following subsections, different tone spreading rules apply in this language to derive the remaining surface patterns at the stem level and also some tone patterns in larger units, such as, the phonological phrase and utterance.

7.3.1 Ikalanga Tonal Rules

Over the past years, two frameworks have led to our understanding of the different levels at which a given rule applies. Lexical Phonology has provided us with useful insights for determining whether a given rule applies lexically or postlexically (Kiparsky (1982); Mohanan (1986)). The second framework, the prosodic domain theory, has focussed on the interaction between phonology and syntax (Nespor & Vogel (1986); Selkirk (1986) etc.). According to advocates of this second framework, the interaction between phonology and syntax is mediated in the prosodic structure organized into a phonological hierarchy which includes a phonological word, a clitic group, a phonological phrase, an intonational phrase and an utterance. As will be shown below, Ikalanga tonal rules provide an example of such a case whereby a single H tone undergoes several applications at different prosodic domains.

According to Hyman & Mathangwane (to appear), Ikalanga has a process of left-to-right high tone spreading (HTS) which applies cumulatively by prosodic domain. The three relevant domains in this case are the prosodic stem, the phonological phrase and the utterance domain. This means that an underlying H tone undergoes three applications of tone spreading identified as HTS₁, HTS₂ and HTS₃ respectively. These three rules apply in the order given. Of interest about these rules is that each one has its own properties different from those of the other two. For ease of exposition, I will also consider these rules beginning with HTS₃, next HTS₁, and then HTS₂.

7.3.1.1 HTS₃

HTS₃ is a postlexical rule which applies across words. This rule is formulated as in (19).

$$(19) \text{ HTS}_3: \begin{array}{ccc} \text{V} & \text{C}_0 & \text{V} \\ | & \text{---} & / \\ \text{H} & & \end{array}$$

(20) gives two nouns and a pronoun to illustrate the application of this rule. Note that, unlike in the rest of the dissertation where low tones are not transcribed, some L tones are transcribed in this section when looking at these Ikalanga tonal rules for illustration.

- (20)a. $\widehat{\text{tʃi-tʰu}}$ / $\widehat{\text{tʃi-tʰu}}$ / 'thing' $\widehat{\text{tʃi-po}}$ / $\widehat{\text{tʃi-po}}$ / 'gift'
 b. $\widehat{\text{tʃi-tʃi-ó}}$ / $\widehat{\text{tʃi-tʃi-ó}}$ / 'your (sg.)'²⁸

(20a) gives two nouns of class 7, the first of which has a L-L tone pattern while the second one has a L-H tone pattern. (20b) gives the pronoun which has an underlying H on the final vowel. We observe that in all the words given (within slashes) that the initial prefix $\widehat{\text{tʃi-}}$ has a long vowel. As mentioned in §3.2, Ikalanga does not have distinctive vowel length; the vowel length we see in these examples is a result of the Penultimate Lengthening Rule, applying at the right edge of an intonational phrase (IP).

(21) Penultimate Lengthening Rule (Hyman & Mathangwane (to appear))

$$\emptyset \rightarrow V / V _ C_0 V]_{\text{IP}}$$

The Penultimate Lengthening Rule (PL) feeds HTS_3 , as shown in (22).

- | | | | | |
|--------|---|----|--|----------------|
| (22)i. | $\widehat{\text{tʃi-tʰu}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | b. | $\widehat{\text{tʃi-po}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | UR |
| |
H | |
H H | |
| ii. | $\widehat{\text{tʃi-tʰu}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | | $\widehat{\text{tʃi-po}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | PL |
| |
H | |
H H | |
| iii. | $\widehat{\text{tʃi-tʰu}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | | $\widehat{\text{tʃi-po}}$ $\widehat{\text{tʃi-tʃi-ó}}$ | HTS_3 |
| |
H | |
H H | |
- $\widehat{\text{tʃi-tʰu}}$ $\widehat{\text{tʃi-tʃi-ó}}$ - 'your thing' $\widehat{\text{tʃi-po}}$ $\widehat{\text{tʃi-tʃi-ó}}$ - 'your gift'

²⁸ Morphologically, this 2nd person pronoun is a reduplication of the class 7 prefix $\widehat{\text{tʃi-}}$ and the pronominal stems /-ó/.

HTS₃ does not just apply across words, it can also apply within words. To show that, we must first consider the application of HTS₁ below.

7.3.1.2 HTS₁

Following Hyman & Mathangwane (to appear), I assume that Ikalanga roots are either underlyingly toneless or have an underlying H tone. (23) and (24) give some examples of toneless and H tone verbs respectively preceded by the low tone infinitive prefix ku- (see also Appendix B for more examples). All these examples are given as they occur in an intonational phrase with penultimate vowel length.

(23) Toneless verbs

kuu-w-a	'to fall'
ku-liim-a	'to cultivate'
ku-palaad̄z-a	'to disperse'
ku-ʃaluul-a	'to choose'
ku-amuʃiil-a	'to receive'

(24) High Tone verbs

kuu-ʃá	'to fear'
ku-uúumb-á	'to build'
ku-ʃháam-á	'to make'
ku-púvúúl-a	'to pierce'
ku-símúúl-a	'to uproot'
ku-póʃéléék-a	'to surround'

The lexically toneless verbs in (23) are assigned a Low tone by default. The lexical H in the verbs in (24) links to the first vowel in the verb stem. HTS₁ then applies at the stem level, spreading this H tone rightwards to all the

visible vowels. I am assuming that the final vowel in the longer stems, that is, trisyllabic or longer, is not visible to this rule indicated by the brackets < > as is normally done in the literature. (25) gives some derivations to illustrate.

- (25) a. $\widehat{\text{tj}}\text{-a}$ b. vumb-a c. $\text{simul-}\langle\text{a}\rangle$ d. $\text{potelek-}\langle\text{a}\rangle$
- | | | |
- H H H H

The final vowel in the monosyllabic stem in (25a) and in the disyllabic stem in (25b), however, are not extrametrical because, like in a number of Bantu languages, this language also invokes a disyllabic minimum (see Myers (1987) on Shona).²⁹

But in cases where these H tone verbs are followed by another word within an intonational phrase, HTS₃ also applies to these verbs. (26) restates these verbs from (24) above followed by vu-síikú ‘at night’.

(26) H tone verbs followed by vu-síikú

kuu- $\widehat{\text{tj}}\text{-á}$	→	ku- $\widehat{\text{tj}}\text{-á}$	vú-síikú	‘to fear at night’
ku-vúumb-á	→	ku-vúmb-á	vú-síikú	‘to build at night’
ku- $\text{t}^{\text{h}}\text{ám-á}$	→	ku- $\text{t}^{\text{h}}\text{ám-á}$	vú-síikú	‘to make at night’
ku-púvúúl-a	→	ku-púvúúl-á	vu-síikú	‘to pierce at night’
ku-símúúl-a	→	ku-símúúl-á	vu-síikú	‘to uproot at night’
ku-pótéléék-a	→	ku-pótéléék-á	vu-síikú	‘to surround at night’

²⁹ Hyman and Mathangwane found some exceptions to this minimality in the language, for example,

ku-tóól-a ‘to take’ → ku-tólá vu-síikú ‘to take at night’

Hyman and Mathangwane propose that the reason why this verb behaves differently from other disyllabic verbs is that its final vowel is extrametrical, ie. tól-⟨a⟩, at the application of HTS₁. They give a historical explanation for this difference in disyllabic roots, and that is, in PB, roots like tól-a (< PB *tóod-) were reconstructed with a long vowel unlike in the other verb roots as in (24b). Thus, even though Ikalanga has lost distinctive vowel length, it may be the case that these roots meet the disyllabic minimality requirement in themselves.

We observe in the case of the monosyllabic and disyllabic verb stems that the stem H tone spreads by HTS₃ onto the vowel of the class 14 prefix of the following word vu-síikú ‘at night’. But in the case of the longer verb stems, when the word vu-síikú follows, we observe a H tone on the final vowel -a which was not there before when these verbs occurred in isolation. This means that after the application of HTS₁ and with the addition of another word, the extrametricality is removed. This H tone then spreads by HTS₃ onto the final vowel. This shows that as a postlexical rule, HTS₃ can spread both within and across words.

7.3.1.3 HTS₂

Although HTS₂ applies at the phrase level, it can be illustrated by the object prefix before verb stems. This prefix is exemplified by the noun class 7 agreement marker ʃí- which has an underlying H tone. I begin by looking at this object prefix with H tone verbs as shown in (27) below.

(27) High tone verbs with ʃí- object prefix

ku-ʃíi-ʃ-á	‘to fear it’
ku-ʃí-vúumb-á	‘to build it’
ku-ʃí-ʃ ^h ám-á	‘to make it’
ku-ʃí-púbúúl-a	‘to pierce it’
ku-ʃí-símúúl-a	‘to uproot it’
ku-ʃí-póʃéélék-a	‘to surround it’

In this case, nothing seem to happen with both the H tone of the object prefix retained as well as that of verb stem. A different situation emerges though when this object prefix precedes toneless verbs. As seen in (28) below, when this object prefix is followed by toneless verb stems, the H tone of the object prefix spreads twice onto the following vowels of the verb stem, first by HTS₂ and second by HTS₃ (see §7.3.1.1).

(28) Toneless verbs

ku-ŋí-ŋ-a	'to defecate it'
ku-ŋí-líím-a	'to cultivate it'
ku-ŋí-ŋálúul-a	'to choose it'
ku-ŋí-ámúŋiil-a	'to receive it'
ku-ŋí-lémbéleedz-a	'to hang it (dangling)'

From the longer forms in (28), it becomes even clearer that this rule is not HTS₁ which, as shown above, targets all the visible vowels in a stem. This particular H tone though fails to spread onto the third vowel in the longer verb stems which would be the case if it were HTS₁.

7.3.2 Additional properties of these tone spreading rules

In the above sections, it was shown the HTS₁ applies iteratively at the stem level targeting all the visible vowels in a stem; HTS₂ applies at the phrase level spreading a H tone once rightwards; and HTS₃ applies at an utterance level both within and across words. In this section, I look at other

properties of these tone spreading rules which will provide information on the nature of these rules. Following Hyman & Mathangwane (to appear) the analysis adopted here is in terms of prosodic domains.

As noted in Hyman & Mathangwane, there is a second source of HTS₁ within verbs which is found in most dependent clauses and that is, the suffixal H tone. (29a) gives some main clauses with toneless verbs while in (29b) these clauses occur as dependent clauses and also followed by the class 14 noun vu-síikú in (29c). The following examples illustrate this H tone.

(29)a. Main Clauses

vá-nó-ŋ-a	vá-nó-ŋ-á vu-síikú	'the defecate at night'
vá-nó-líim-a	vá-nó-lím-á vu-síikú	'they cultivate at night'
vá-nó-ṭóveel-a	vá-nó-ṭóvel-a vu-síikú	'they follow at night'
vá-nó-námaṭiil-a	vá-nó-námaṭil-a vu-síikú	'they attach to at night'

b. Dependent Clauses

ṭṭi-t ^h u ṭṭa vá-nó-ŋ-á	'the thing that they defecate'
ṭṭi-t ^h u ṭṭa vá-nó-líim-á	'the thing that they cultivate'
ṭṭi-t ^h u ṭṭa vá-nó-ṭóvéél-a	'the thing that they follow'
ṭṭi-t ^h u ṭṭa vá-nó-námáṭiil-a	'the thing that they attach to'

c. Dependent Clauses with vu-síikú

ṭṭi-t ^h u ṭṭa vá-nó-ŋ-á vú-síikú	'the thing that they defecate at night'
ṭṭi-t ^h u ṭṭa vá-nó-lím-á vú-síikú	'the thing that they cultivate at night'
ṭṭi-t ^h u ṭṭa vá-nó-ṭóvéél-á vu-síikú	'the thing that they follow at night'
ṭṭi-t ^h u ṭṭa vá-nó-námáṭil-á vu-síikú	'the thing that they attach to at night'

We observe in (29a) the H tone of the subject prefix vá- spreading twice, first onto the present tense marker -no- by HTS₂ and then by HTS₃ onto the first

vowel of the verb stem. In (29b-c) where these clauses are dependent clauses, we observe in (b) that the H tones on the verb phrase stretch up to the penultimate vowel in the verb stem, which H then spreads onto the final vowel in (c) when vu-síikú follows. As shown in the derivations in (30a) below, there is a second H which links to the second syllable of the verb stem when the verb root is non-High. This H tone then spreads by HTS₁ onto all the visible moras in the verb stem. But when the extrametricality is removed as shown in (30c) and followed by penultimate lengthening in (30d). HTS₃ then applies spreading this H tone onto the final vowel in the verb stem.³⁰

(30)a.	namaṭil-<a> Ⓜ	namaṭil-<a> Ⓜ	Extrametricality & Linking of Suffixal H
b.	namaṭil-<a> / H	namaṭil-<a> / H	HTS ₁
c.	namaṭil-a / H	namaṭil-a / H	Removal of Extrametricality
d.	namaṭiil-a / H		Penultimate lengthening
e.	namaṭiil-a / H	namaṭil-a vu-síikú / H	HTS ₃

³⁰ For an explanation why HTS₂ does not apply in these derivations, the reader is referred to (35) below.

This suffixal H, however, links to the final vowel when H tone verb stems occur in the dependent clauses preventing the extrametricality on the final vowel. (31) gives examples of H tone verb stems in the main and dependent clauses to illustrate.

(31)a. Main clauses with H tone verbs

vá-nó- $\overline{\text{tj}}\text{-}\overline{\text{á}}$	vá-nó- $\overline{\text{tj}}\text{-}\overline{\text{á}}$ vú-síikú	'they fear at night'
vá-nó-lúum-á	vá-nó-lúm-á vú-síikú	'they bite at night'
vá-nó-pálúul-a	vá-nó-pálúl-á vu-síikú	'they tear at night'
vá-nó-pótleék-a	vá-nó-pótleék-á vu-síikú	'they surround at night'

b. Dependent Clauses

$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó- $\overline{\text{tj}}\text{-}\overline{\text{á}}$	'the thing that they fear'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-lúúm-a	'the thing that they bite'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-pálúul-á	'the thing that they tear'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-pótleek-á	'the thing that they surround'

c. Dependent Clauses with vu-síikú

$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó- $\overline{\text{tj}}\text{-}\overline{\text{á}}$ vú-síikú	'the thing that they fear at night'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-lúm-á vu-síikú	'the thing that they bite at night'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-pálúl-á vú-síikú	'the thing that they tear at night'
$\overline{\text{tj}}\text{-t}^{\text{h}}\text{u}$ $\overline{\text{tj}}\text{a}$ vá-nó-pótleek-á vu-síikú	'the thing that they surround at night'

(32) gives some derivations to illustrate.

(32)a.	$\begin{array}{cc} \text{potelek-a} & \text{potelek-a} \\ & \\ \text{H} & \text{H} \\ & \textcircled{\text{H}} \end{array}$	Underlying Root H & Linking of Suffixal H
b.	$\begin{array}{cc} \text{poteleek-a} & \\ & \\ \text{H} & \text{H} \end{array}$	Penultimate Lengthening
c.	$\begin{array}{cc} \text{poteleek-a} & \text{potelek-a vu-síikú} \\ \diagdown & \diagdown \\ \text{H} & \text{H} \end{array}$	HTS ₃

(32a) shows the root H tone linked to the first vowel and the suffixal H linking to the final vowel in the verb stem. In (32b), Penultimate Lengthening applies only in the case where this verb stem occurs at the end of the intonational phrase. Then HTS_3 applies twice spreading the root H onto the following vowel and the suffixal H onto the vowel of the class 14 prefix uu- in the following word. Evidence that it is HTS_3 which applies spreading the root H onto the following vowel and not HTS_1 or HTS_2 can be seen when the second syllable in the verb stem is a depressor consonant. We observe the failure of this root H to spread onto the second vowel of the verb stem in (33c) below because HTS_3 is blocked by the depressor consonant (see §7.4).

(33)a. Main clauses with depressor consonants

uá-nó-uígaáŋ-a	uá-nó-uígaŋ-á uu-síikú	‘they bury at night’
uá-nó-kódzoóng-a	uá-nó-kódzong-á uu-síikú	‘they stir at night’

b. Dependent clauses

ŋí-t ^h u ŋa uá-nó-uígaŋ-á	‘the thing that they bury’
ŋí-t ^h u ŋa uá-nó-kódzong-á	‘the thing that they stir’

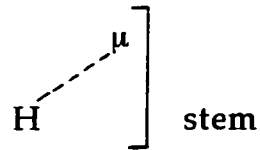
c. Dependent clauses with uu-síikú

ŋí-t ^h u ŋa uá-nó-uígaŋ-á uu-síikú	‘the thing that they bury at night’
ŋí-t ^h u ŋa uá-nó-kódzong-á uu-síikú	‘the thing that they stir at night’

Two important facts are obvious from the examples in (31) and the derivations in (32) above. First, we observe that HTS_1 does not apply to the root H when there is a second H linked to the final vowel. This shows that

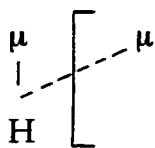
HTS₁ applies only when the edge of the domain is available, making it a domain-limit rule (Selkirk 1980, Nespor & Vogel 1986) formulated as in (34).

(34) HTS₁: (from Hyman & Mathangwane (to appear))



The second observation is the failure of HTS₂ to apply in these dependent clauses as well. If this rule had applied in (32) above, we'd expect to see the root H tone spreading twice first by HTS₂ and then HTS₃, but this is not the case. As noted in Hyman & Mathangwane, this shows that HTS₂ is a domain-juncture rule which applies only when it crosses a left bracket. This rule is formulated in (35) below.

(35) HTS₂:



Hyman & Mathangwane further note that HTS₂ is also subject to the OCP effects which stops it from spreading when a suffixal H is linked to the dependent clauses. The Obligatory Contour Principle (or OCP) forbids sequences of adjacent identical features. (36) below gives examples of main and dependent clauses to illustrate the failure of HTS₂ to apply because of its OCP effects. The verb stems in these examples are given with the applicative suffix -iɪ- and preceded by the class 2 object prefix vá-. I underline this object

prefix to differentiate it from the preceding subject agreement marker with a similar phonological shape.

(36)a. Main clauses with toneless verbs

vá-nó- <u>v</u> á-ŋ-ííl-a	'they defecate for them'
vá-nó- <u>v</u> á-pós-éél-a	'they throw for them'
vá-nó- <u>v</u> á-ʃókól-eel-a	'they harvest for them'
vá-nó- <u>v</u> á-súmbík-iil-a	'they conceal for them'

b. Main clauses with vu-síikú

vá-nó- <u>v</u> á-ŋ-ííl-á vu-síikú	'they defecate for them at night'
vá-nó- <u>v</u> á-pós-él-á vu-síikú	'they throw for them at night'
vá-nó- <u>v</u> á-ʃókól-el-a vu-síikú	'they harvest for them at night'
vá-nó- <u>v</u> á-súmbík-il-a vu-síikú	'they conceal for them at night'

c. Dependent clauses

ʃí-t ^h u ʃá vá-nó- <u>v</u> á-ŋ-ííl-á	'the thing that they defecate for them'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-pós-éél-a	'the thing that they throw for them'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-ʃókól-éél-a	'the thing that they harvest for them'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-súmbík-ííl-a	'the thing that they conceal for them'

d. Dependent clauses with vu-síikú

ʃí-t ^h u ʃá vá-nó- <u>v</u> á-ŋ-ííl-á vú-síikú	'...that they defecate for them at night'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-pós-él-á vu-síikú	'...that they throw for them at night'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-ʃókól-él-á vu-síikú	'...that they harvest for them at night'
ʃí-t ^h u ʃá vá-nó- <u>v</u> á-súmbík-ííl-á vu-síikú	'...that they conceal for them at night'

In (36a) we observe the H tone of the object prefix vá- spreading twice by HTS₂ and then HTS₃ into the first and second vowels in the verb stem. But when a suffixal H tone is linked to second syllable of the verb stem in the dependent clauses in (36c) (cf. exx. (29) and (30) above), only HTS₃ can apply spreading

the H tone of the object prefix uá- onto the first vowel of the verb stem. HTS₂ fails to apply because it is subject to OCP effects, as mentioned above. Evidence that this rule is HTS₃ and not HTS₂ comes from the interaction of these rules with depressor consonants to which I turn to in the following section.

7.4 High Tone Spreading Rules and Depressor Consonants

In this section, the discussion is restricted to how depressor consonants interact with the three tone spreading rules discussed in §7.3. I begin by looking at HTS₃ which, as was shown in §7.3.1.1 and §7.3.1.2 applies both word internally and across words. First, I look at how this rule interacts with depressor consonants across words. Below are given some examples from (22) above only this time in the plural with the class 8 prefix z^{wi}- which has an initial depressor consonant. (37b) gives the 2nd person pronoun showing agreement with the nouns.

- (37)a. z^{wi}-t^{fi}u /z^{wi}-t^{fi}u/ 'things'
 z^{wi}-pó /z^{wi}-pó/ 'gifts'
- b. z^{wi}-z^{wi}-ó /z^{wi}-zó/ 'your (sg.)'³¹

³¹ Note that the secondary labialization is lost before the back round vowel. See §2.2.1 in Chapter Two above for the distribution of round vowel after labialized consonants, and §5.6 in Chapter Five gives an historical explanation why round vowels are not found after labialized consonants in this language.

However, when these nouns and pronoun occur in an intonational phrase a different behavior is observed from what we saw happening in (22) above.

Unlike in (22), HTS₃ fails to apply after the Penultimate Lengthening Rule because of the initial depressor consonant of the pronoun. (38) illustrates.

(38)i.	z ^w i-t ^h u	z ^w izo		b.	z ^w i-po	z ^w izo		UR
		H			H	H		
ii.	z ^w i-t ^h u	z ^w iiz ^w o		z ^w i-po	z ^w iizo			PL
		H		H	H			
	z ^w i-t ^h u	z ^w iizó	'your things'	z ^w i-pó	z ^w iizó		'your gifts'	

This shows that HTS₃ is blocked from spreading by the depressor consonants, in this case, the pronoun initial labialized voiced alveolar fricative /z^w/. This blocking, however, does not just occur where HTS₃ applies across words, even word internally, this rule is blocked by depressor consonants. (39) gives some verb stems with depressor consonants in the final syllable to illustrate.

(39) Depressor consonants block HTS₃ word internally

ku-tíí3-a	→	ku-tí3-a	vu-síikú	'to run at night'
ku-tʃéngéédz-a	→	ku-tʃéngédz-a	vu-síikú	'to deceive at night'
ku-ts ^h íkítíídz-a	→	ku-ts ^h íkítídz-a	vu-síikú	'to rub at night'
ku-támbúnúúdz-a	→	ku-támbúnúdz-a	vu-síikú	'to straighten at night'

Unlike in (26) where we observed the H tone of the verb spreading once again by HTS₃ onto the final vowel when these verb stems are followed by the

word vu-síikú, in (39) the root H tone fails to spread once again onto the final vowel when the root final consonant is a depressor consonant, as seen in the second column in (39).

As mentioned above, H tone spreading rules in Ikalanga have different tonal properties, which makes it possible to identify each one of them. Below I show that even though depressor consonants block HTS_3 , this is not the case with the HTS_1 and HTS_2 .

I begin by looking at HTS_1 . In (40) below are given some examples of H tone verbs with depressor consonants / $\widehat{d}z, g$ / stem final in the bisyllabic verbs and word internally in the longer ones.

(40) Depressor consonants do not block HTS_1

ku-péed $\widehat{d}z$ -á	→	ku-péd $\widehat{d}z$ -a vu-síikú	'to finish at night'
ku-uígaáŋ-<a>	→	ku-uígaŋ-á vu-síikú	'to bury at night'
ku-kódzoóŋg-<a>	→	ku-kódzoŋg-á vu-síikú	'to stir at night'

Essential to note is that when these verbs occur in isolation (shown in the first column), the stem H tone spreads to the following vowel in the verb stem except for the extrametrical vowel in the longer verbs. This shows that HTS_1 applies across depressor consonants. Even though HTS_1 is able to spread across these depressor consonant, this H tone is then caused to delink from the vowel following the depressor consonants. This is a result of the third effect of this class of consonants, which, as shown in §7.2, causes H tones

to delink. Thus, unlike HTS₃ discussed above, HTS₁ is not blocked by depressor consonants.

Likewise, HTS₂ is not blocked by depressor consonants. Once again this rule is illustrated by the class 7 object prefix $\widehat{\text{tʃi-}}$ with an underlying H tone. In (41) are given some examples of toneless verbs in the infinitive and preceded by the object prefix $\widehat{\text{tʃi-}}$.

(41) Depressor consonants do not block HTS₂

a. ku- $\widehat{\text{tʃi-}}$ n-a	ku- $\widehat{\text{tʃi-}}$ n-á vu-síikú	'to defecate it at night'
b. ku- $\widehat{\text{tʃi-}}$ wáán-a	ku- $\widehat{\text{tʃi-}}$ wán-á vu-síikú	'to find it at night'
c. ku- $\widehat{\text{tʃi-}}$ ḍííl-a	ku- $\widehat{\text{tʃi-}}$ ḍil-á vusíikú	'to pour it at night'
d. ku- $\widehat{\text{tʃi-}}$ buúz ^w -a	ku- $\widehat{\text{tʃi-}}$ buz ^w -a vu-síikú	'to ask it at night'
e. ku- $\widehat{\text{tʃi-}}$ ḵálúul-a	ku- $\widehat{\text{tʃi-}}$ ḵálúl-a vu-síikú	'to choose it at night'
f. ku- $\widehat{\text{tʃi-}}$ duvúik-a	ku- $\widehat{\text{tʃi-}}$ duvúk-a vu-síikú	'to immerse it at night'
g. ku- $\widehat{\text{tʃi-}}$ lízaaŋ-a	ku- $\widehat{\text{tʃi-}}$ lizaaŋ-a vu-síikú	'to try it on at night'

Note that the only H tone in these forms is that of the object prefix. This H tone spreads twice onto the verb stems, first by HTS₂ and then by HTS₃. Important to note are the examples in (41c, d, f) where the verb stem has an initial depressor consonant. This H tone is able to spread across these stem initial depressor consonants. But, observe that in (41g) where a depressor consonant /z/ occurs in the second syllable, only HTS₂ applies while HTS₃ is blocked from applying by this depressor consonant.

From the above, it becomes obvious that of the three tonal rules in Ikalanga, HTS₃ alone is blocked by depressor consonants. HTS₁ and HTS₂, on the other hand, can apply across depressor consonants.

7.5 Summary

In conclusion, I have shown above that Ikalanga has a large heterogeneous inventory of depressor consonants. Not all these consonants are voiced segments, some of them are voiceless which shows that voiced is not a determinant of depression in this language. These sounds are characterized by four different effects. In addition, it was shown that Ikalanga has three H tone spreading rules, HTS₁, HTS₂ and HTS₃, which apply cumulatively by domain. These rules are characterized by different properties making it possible to identify each one of them. Table 4 (from Hyman & Mathangwane) below summarizes the different properties of these Ikalanga tonal rules discussed above.

Table 4. Properties of Ikalanga Tone Rules

Properties	HTS₁	HTS₂	HTS₃
Iterative	+	-	-
Blocked by Dep.	-	-	+
OCP-sensitive	?	+	-
Domain	Stem	Phrase	Utterance
Rule Type	D-limit	D-juncture	D-span

It is not clear though from the data if HTS₁ is OCP-sensitive or not, hence the question mark in the Table.

Chapter Eight

Conclusion and Summary

This study considers a wide range of processes in Ikalanga dealing with sounds, sound change and the tone system. This study was prompted by the desire to understand the basic phonetics and phonology of Ikalanga which will lay a foundation for more research in this language. With a large consonant inventory such as Ikalanga has, it often the case that some misrepresentations of the data may result unless a detailed study outlining the sound system is carried out. Thus, it became necessary to begin by looking at the Ikalanga sound system and the diachronic and synchronic processes which led to the development of these sounds. By so doing, explanations why certain sounds are more restricted than others can at times be derived by looking into their history.

I began by looking at the segment inventory of Ikalanga. Most of the problems resulting from the latest work on the consonant inventory were brought to light and an amended consonant inventory was proposed. Phonetic evidence was provided in the classification of selected segments and a distributional analysis of these sounds in the phonology was given. A number of segments were shown to be restricted in the type of vowels they can occur with. For example, all the labialized consonants do not occur followed by the back and round vowels.

Different processes of sound change were considered, namely, High Vowel Frication, Palatalization, Velarization and Aspiration. Of particular

interest about these is that all were shown to have occurred as diachronic sound changes and synchronic processes in this language. In other words, changes which occur synchronically in morphophonemic alternations in Ikalanga are a reflection of the diachronic processes that took place in this language. Table 1 gives a summary of these processes of sound change.

Table 1. A summary of the processes of sound change in Ikalanga

Processes	Diachronic changes	Synchronic changes
1. High Vowel Frication (spirantization)	(A)frication of PB stops before close vowels *i, *u.	Affrication in verb causatives with the short suffix *-i-.
2. Palatalization	Velar Palatalization	Noun Diminutives
3. Velarization	Velarization of PB stops before /w/ (< *uV)	a. Noun Diminutives b. Verb Passives c. Agreement Markers
4. Aspiration	Breathy Aspiration from PB *NC clusters.	Breathy aspiration in adjectives modifying nouns of class 9/10.

As a result of these processes of sound change, Ikalanga attests to complex segments in its inventory, such as, doubly articulated stops /p^hk/ and /b^hg/. Even more interesting is the distinction made by this language between breathy aspirates derived from Proto-Bantu *NC clusters and regular aspirates, a distinction never been made before in the literature.

In addition to giving both the diachronic and synchronic analyses of these processes of sound change in Ikalanga, phonetic explanations were given on how these different changes occurred. And where relevant some laboratory experiments were carried out in order to provide some insights on how some changes occurred diachronically in this language. Typological evidence from other languages, both within and outside the Bantu family, was given. An advantage in this type of approach is that, not only does it show us what sound changes are attested in other languages of the world, but, we get to understand why certain sound changes are most likely to occur than others.

While the main focus of this study were sounds and sound change, the second part is devoted to the tone system of Ikalanga. It is shown that Ikalanga has three rules of high tone spreading which apply cumulatively by prosodic domain. As a result, a single High tone undergoes several applications at different prosodic domains. The three tone spreading rules are identified as HTS_1 , HTS_2 and HTS_3 . Another issue brought to light by this study, is the presence of a class of depressor consonants in Ikalanga. Just as in other Bantu languages, these consonants were shown to behave in a similar fashion in their interaction with High tones in this language.

8.1 Summary

The following are some of the highlights of this study:

- Development of distinct aspirated voiceless stops from Proto-Bantu forms of a stop plus close vowel (i.e. *i, *u).
- Development of distinct aspirated stops from sequences of a consonant plus glide, which glide originated from a high back round vowel in the environment of a following non-back vowel (w < *uV).
- The occurrence of velar palatalization in Ikalanga.
- The existence of doubly articulated stops /p̠k̠, b̠g̠/ historically derived from labialized labials *pw and *bw respectively. (This is a different historical origin for labial-velar stops than that speculated for stops in West African languages in that they came from labialized velars.)
- The existence of breathy voiceless aspirated stops in contrast to plain voiceless aspirated stops. (These breathy voiceless aspirated stops are tone depressors.)
- The historical development of these breathy voiceless aspirated stops from sequences of Proto-Bantu *NÇ.
- Sound changes and resulting morphological processes giving alternations such as,

bola	→	bod̠za	'cause to rot'	(Affrication)
golé	→	god̠záná	'small cloud'	(Palatalization)
tóla	→	tóg ^w a	'be taken'	(Velarization)
nóká + ɬaɬú	→	nóká t ^h aɬú	'three snakes'	(Aspiration)

- The existence of three high tone spreading rules in Ikalanga which apply cumulatively by prosodic domain.
- Finally, the existence of a large heterogeneous inventory of depressor consonants in Ikalanga.

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APPENDIX A

IKALANGA REFLEXES OF PROTO-BANTU

(before the seven PB vowels)³²

Proto-Bantu	*i	*i	*e	*a	*o	*u	*u
*p	s ^w	p	p	p	p	p	f
*b	z ^w	v	v	v	v	v	v
*t	t ^h	t	t	t	t	t	t ^h
*d	d ^z	l	l	l	l	l	d
*k	s	t ^h	t ^h	k	k	k	f
*g	z	∅	∅	w	w	w	v
*c	s	s	s	ʃ	ʃ	ʃ	s
*j	ʒ	z	ʒ	ʒ	ʒ	ʒ	ʒ
*N + p	s	p ^h	p ^h	p ^h	p ^h	p ^h	
*mp							
*N + b		mb	mb	mb	mb	mb	
*mb		mb	mb	mb	mb	mb	
N + t	t ^h	t ^h	t ^h	t ^h	t ^h	t ^h	
*nt				t ^h	t ^h	t ^h	
*N + d	d ^z	nd	nd	nd		nd	nd
*nd		nd	nd	nd	nd	nd	
*N + k				fi	fi	fi/w ^h	
*ŋk							

³² Note that the blanks in the Table indicate sequences for which no Ikalanga reflexes could be found in the database in Appendix C below. Two reflexes within the same box means that the sequence has more one reflex in the language.

Proto-Bantu	*i	*i	*e	*a	*o	*u	*u
*N + g		nd̥ʒ	nd̥ʒ	ŋg	ŋg	ŋg	
*ŋg		nd̥ʒ	nd̥ʒ	ŋg	ŋg	ŋg	
*N + c	s	s	s	ʃ	ʃ		s
*nc		s			ʃ		
*N + j		nd̥ʒ		ɲ/ʒ	ʒ	ɲ	
*nj			ʒ	ʒ			
*m	m	m	m	m		m	
*n	ɲ	n	n	n		n	
*ɲ				ɲ	ɲ		

APPENDIX B

IKALANGA VERB PARADIGMS

1. Infinitive Tone Patterns

1.1. Low tone verbs with *vu-síku* 'at night'

kuu-w-a	'to fall'	ku-w-a	(vu-síku)
kuu-g ^w -a	'to fight'	ku-g ^w -a	(vu-)
ku-waan-a	'to find'	ku-wan-a	(vu-)
ku-ḍiil -a	'to pour'	ku-ḍil-a	(vu-)
ku-veez-a	'to carve'	ku-veɜ-a	(vu-)
ku-buuz ^w -a	'to ask'	ku-buz ^w -a	(vu-)
ku-ʃaluul-a	'to choose'	ku-ʃalul-a	(vu-)
ku-sumbiik-a	'to conceal'	ku-sumbik-a	(vu-)
ku-duviik-a	'to dip'	ku-duvik-a	(vu-)
ku-lizaan-a	'to try on'	ku-lizaaŋ-a	(vu-)
ku-palaad̄z-a	'to disperse'	ku-palaad̄z-a	(vu-)
ku-ʃalul-iil-a	'to choose for'	ku-ʃalul-iil-a	(vu-)
ku-buz ^w isiis-a	'to ask alot'	ku-buz ^w isis-a	(vu-)

1.2. High tone verbs

kuu-t̄ʃ-á	'to fear'	ku-t̄ʃ-á	(vú-síku)
kuu-ḍ-á	'to like'	ku-ḍ-a	(vú-)
ku-t̄úm-á	'to send'	ku-t̄úm-á	(vú-)
ku-d̄zim-á	'to extinguish'	ku-d̄zim-á	(vú-)
ku-péed̄z-á	'to finish'	ku-péed̄z-à	(vú-)
ku-t̄ól-a	'to take'	ku-t̄ólá	(vu-)
ku-baát-a	'to catch'	ku-baát-á	(vu-)
ku-k ^h úg-a	'to lift (on head)'	ku-k ^h úg-a	(vu-)
ku-zaád̄z-a	'to fill up'	ku-zaád̄z-a	(vu-)
ku-fúmík-a	'to cover'	ku-fúmík-á	(vu-)
ku-dzimúúl-a	'to allay'	ku-dzimúúl-á	(vu-)
ku-vígaan-a	'to bury'	ku-vígaan-á	(vu-)
ku-mílíd̄z-a	'to lift'	ku-mílíd̄z-a	(vu-)
ku-g ^w ád̄zis-a	'to hurt (s.o.)'	ku-g ^w ád̄zis-á	(vu-)

1.3. Low tone verbs with -tʃi- object prefix

ku-tʃi-wáán-a	'to find it'	ku-tʃi-wán-á	(vu-síku)
ku-tʃi-ɖiil-a	'to pour it'	ku-tʃi-ɖil-á	(vu-)
ku-tʃi-uééz-a	'to carve it'	ku-tʃi-uéz-a	(vu-)
ku-tʃi-buúz ^w -a	'to ask it'	ku-tʃi-büz ^w -a	(vu-)
ku-tʃi-ʃálúùl-a	'to choose it'	ku-tʃi-ʃálúl-a	(vu-)
ku-tʃi-súmbûk-a	'to conceal it'	ku-tʃi-súmbík-a	(vu-)
ku-tʃi-duvûk-a	'to dip it'	ku-tʃi-duvík-a	(vu-)
ku-tʃi-lízaaŋ-a	'to try on it'	ku-tʃi-lízaŋ-a	(vu-)
ku-tʃi-páláàdž-a	'to disperse it'	ku-tʃi-páládž-a	(vu-)
ku-tʃi-ʃálúl-iil-a	'to choose for it'	ku-tʃi-ʃálúl-il-a	(vu-)
ku-tʃi-büz ^w isiis-a	'to ask it alot'	ku-tʃi-büz ^w isisa	(vu-)

1.4. High tone verbs with -tʃɪ- object prefix

ku-tʃɪ-tʃ-á	'to fear it'	ku-tʃɪ-tʃ-á	(vú-síku)
ku-tʃɪ-ɖ-á	'to like it'	ku-tʃɪ-ɖ-a	(vú-)
ku-tʃɪ-túùm-á	'to send it'	ku-tʃɪ-túm-á	(vú-)
ku-tʃɪ-ɖzîm-á	'to extinguish it'	ku-tʃɪ-ɖzim-á	(vú-)
ku-tʃɪ-péèdž-á	'to finish it'	ku-tʃɪ-pédž-à	(vú-)
ku-tʃɪ-tóól-a	'to take it'	ku-tʃɪ-tólá	(vu-)
ku-tʃɪ-bààt-a	'to catch it'	ku-tʃɪ-bat-á	(vu-)
ku-tʃɪ-k ^h íg-a	'to lift (on head) it'	ku-tʃɪ-k ^h íg-a	(vu-)
ku-tʃɪ-ʒàádž-a	'to fill up it'	ku-tʃɪ-ʒádž-a	(vu-)
ku-tʃɪ-fúmíik-a	'to cover it'	ku-tʃɪ-fúmík-á	(vu-)
ku-tʃɪ-ɖzimúul-a	'to allay it'	ku-tʃɪ-ɖzimúl-á	(vu-)
ku-tʃɪ-vígàaŋ-a	'to bury it'	ku-tʃɪ-vigaŋ-á	(vu-)
ku-tʃɪ-mílídž-a	'to lift it'	ku-tʃɪ-mílídž-a	(vu-)
ku-tʃɪ-g ^w ádžis-a	'to hurt it'	ku-tʃɪ-g ^w ádžis-á	(vu-)

1.5. Low tone verbs with -z^wi- (class 8) object prefix

ku-z ^w i-wáán-a	'to find them'	ku-z ^w i-wán-á	(vu-síku)
ku-z ^w ĩ-dííl-a	'to pour them'	ku-z ^w ĩ-díl-á	(vu-)
ku-z ^w i-uééǝ-a	'to carve them'	ku-z ^w i-uéǝ-a	(vu-)
ku-z ^w ĩ-bùúẀ-a	'to ask them'	ku-z ^w ĩ-bűẀ-a	(vu-)
ku-z ^w i-ǰálúùl-a	'to choose them'	ku-z ^w i-ǰálúl-a	(vu-)
ku-z ^w i-súmbûk-a	'to conceal them'	ku-z ^w i-súmbík-a	(vu-)
ku-z ^w ĩ-duuûk-a	'to dip them'	ku-z ^w ĩ-duuík-a	(vu-)
ku-z ^w i-lízaaŋ-a	'to try on them'	ku-z ^w i-lízaŋ-a	(vu-)
ku-z ^w i-páláàǰz-a	'to disperse them'	ku-z ^w i-páláǰz-a	(vu-)
ku-z ^w i-ǰálúl-iil-a	'to choose for them'	ku-z ^w i-ǰálúl-il-a	(vu-)
ku-z ^w ĩ-bűẀisiis-a	'to ask them alot'	ku-z ^w ĩ-bűẀisis-a	(vu-)

1.6. High tone verbs with -z^wi- (cl. 8) object prefix

ku-z ^w ĩ-tǰ-a	'to fear them'	ku-z ^w i-tǰ-á	(uú-síku)
ku-z ^w ĩ-d-á	'to like them'	ku-z ^w ĩ-d-a	(uú-)
ku-z ^w i-túùm-á	'to send them'	ku-z ^w i-túm-á	(uú-)
ku-z ^w ĩ-ǰzîm-á	'to extinguish them'	ku-z ^w ĩ-ǰzim-á	(uú-)
ku-z ^w i-péèǰz-á	'to finish them'	ku-z ^w i-péǰz-a	(uú-)
ku-z ^w i-tóól-a	'to take them'	ku-z ^w i-tóla	(vu-)
ku-z ^w ĩ-baáǰ-a	'to catch them'	ku-z ^w ĩ-baǰ-a	(vu-)
ku-z ^w i-k ^h íǰ-a	'to lift (on head) them'	ku-z ^w i-k ^h íǰ-a	(vu-)
ku-z ^w ĩ-ǰaáǰz-a	'to fill up them'	ku-z ^w ĩ-ǰáǰz-a	(vu-)
ku-z ^w i-fúmíik-a	'to cover them'	ku-z ^w i-fúmík-á	(vu-)
ku-z ^w ĩ-ǰzimúúl-a	'to allay them'	ku-z ^w ĩ-ǰzimúl-á	(vu-)
ku-z ^w i-vígaáŋ-a	'to bury them'	ku-z ^w i-vígaŋ-á	(vu-)
ku-z ^w i-mílíǰz-a	'to lift them'	ku-z ^w i-mílíǰz-a	(vu-)
ku-z ^w ĩ-g ^w ǰǰziis-a	'to hurt them'	ku-z ^w ĩ-g ^w ǰǰzis-á	(vu-)

1.7. Low tone verbs with -z^wi- reflexive prefix

ku-z ^w i-wàan-a	'to find self'	ku-z ^w i-wán-a	(vu-síku)
ku-z ^w i-ḍiil-a	'to pour self'	ku-z ^w i-ḍil-a	(vu-)
ku-z ^w i-veèz-a	'to carve self'	ku-z ^w i-vež-a	(vu-)
ku-z ^w i-buuz ^w -a	'to ask self'	ku-z ^w i-buz ^w -a	(vu-)
ku-z ^w i-fáluul-á	'to choose self'	ku-z ^w i-fálul-á	(vú-)
ku-z ^w i-súmbiik-á	'to conceal self'	ku-z ^w i-súmbik-á	(vú-)
ku-z ^w i-ḍuviik-á	'to dip self'	ku-z ^w i-ḍuvik-á	(vú-)
ku-z ^w i-lízaaṅ-á	'to try on self'	ku-z ^w i-lízaṅ-á	(vú-)
ku-z ^w i-pálaad̄z-á	'to disperse self'	ku-z ^w i-pálaḍz-a	(vú-)
ku-z ^w i-fálul-iil-á	'to choose for self'	ku-z ^w i-fálul-il-á	(vú-)
ku-z ^w i-buz ^w isiis-á	'to ask self alot'	ku-z ^w i-buz ^w isis-á	(vú-)

1.8. High tone verbs with -z^wi- reflexive prefix

ku-z ^w i-t̄j-a	'to fear self'	ku-z ^w i-t̄j-a	(vu-síku)
ku-z ^w i-ḍ-a	'to like self'	ku-z ^w i-ḍ-a	(vu-)
ku-z ^w i-t̄júm-a	'to send self'	ku-z ^w i-t̄júm-a	(vu-)
ku-z ^w i-ḍziim-a	'to extinguish self'	ku-z ^w i-ḍzim-a	(vu-)
ku-z ^w i-péèḍz-a	'to finish self'	ku-z ^w i-péḍz-a	(vu-)
ku-z ^w i-t̄óḍl-a	'to take self'	ku-z ^w i-t̄óla	(vu-)
ku-z ^w i-baaṅ-a	'to catch self'	ku-z ^w i-baṅ-a	(vu-)
ku-z ^w i-k ^h ŋg-a	'to lift (on head) self'	ku-z ^w i-k ^h ŋg-a	(vu-)
ku-z ^w i-zaad̄z-a	'to fill up self'	ku-z ^w i-zaḍz-a	(vu-)
ku-z ^w i-fúmiik-á	'to cover self'	ku-z ^w i-fúmik-á	(vú-)
ku-z ^w i-ḍzimuul-á	'to allay self'	ku-z ^w i-ḍzimul-á	(vú-)
ku-z ^w i-vígaṅ-á	'to bury self'	ku-z ^w i-vígaṅ-á	(vú-)
ku-z ^w i-míliid̄z-á	'to lift self'	ku-z ^w i-míliḍz-a	(vú-)
ku-z ^w i-g ^w ad̄ziis-á	'to hurt self'	ku-z ^w i-g ^w ad̄zis-á	(vú-)

2. Tone Patterns in the Present Tense

1.1. Low tone verbs with ndi- 'I sg.' subject prefix

nd-óó-w-a	'I fall'	nd-ó-w-á	(vú-síku)
nd-óó-g ^w -a	'I fight'	nd-ó-g ^w -a	(vú-)
nd-ó-wáàn-a	'I find'	nd-ó-wán-a	(vu-)
nd-ó-ḍiil-a	'I pour'	nd-ó-ḍil-a	(vu-)
nd-ó-úéèz-a	'I carve'	nd-ó-úéz-a	(vu-)
nd-ó-buuz ^w -a	'I ask'	nd-ó-buz ^w -a	(vu-)
nd-ó-ǰáluul-a	'I choose'	nd-ó-ǰálul-a	(vu-)
nd-ó-súmbiik-a	'I conceal'	nd-ó-súmbik-a	(vu-)
nd-ó-duviik-a	'I dip'	nd-ó-duvik-a	(vu-)
nd-ó-lízaaṅ-a	'I try on'	nd-ó-lízaṅ-a	(vu-)
nd-ó-pálaad̄z-a	'I disperse'	nd-ó-pálaḍz-a	(vu-)
nd-ó-ǰálul-iil-a	'I choose for'	nd-ó-ǰálul-iil-a	(vu-)
nd-ó-buz ^w isiis-a	'I ask alot'	nd-ó-buz ^w isis-a	(vu-)

1.2. Low tone verbs with vá- (class 2) subject prefix

vá-nóó-w-a	'they fall'	vá-nó-w-á	(vu-síku)
vá-nóó-g ^w -a	'they fight'	vá-nó-g ^w -a	(vu-)
vá-nó-wáàn-a	'they find'	vá-nó-wán-a	(vu-)
vá-nó-ḍiil-a	'they pour'	vá-nó-ḍil-a	(vu-)
vá-nó-úéèz-a	'they carve'	vá-nó-úéz-a	(vu-)
vá-nó-buuz ^w -a	'they ask'	vá-nó-buz ^w -a	(vu-)
vá-nó-ǰáluul-a	'they choose'	vá-nó-ǰálul-a	(vu-)
vá-nó-súmbiik-a	'they conceal'	vá-nó-súmbik-a	(vu-)
vá-nó-duviik-a	'they dip'	vá-nó-duvik-a	(vu-)
vá-nó-lízaaṅ-a	'they try on'	vá-nó-lízaṅ-a	(vu-)
vá-nó-pálaad̄z-a	'they disperse'	vá-nó-pálaḍz-a	(vu-)
vá-nó-ǰálul-iil-a	'they choose for'	vá-nó-ǰálul-il-a	(vu-)
vá-nó-buz ^w isiis-a	'they ask alot'	vá-nó-buz ^w isis-a	(vu-)

1.3. High tone verbs with ndi- 'I sg.' subject prefix

nd-óò-t̃-á	'I fear'	nd-ó-t̃-á	(vú-síiku)
nd-óò-d̃-á	'I like'	nd-ó-d̃-a	(vú-)
nd-ó-t̃úùm-á	'I send'	nd-ó-t̃úm-á	(vú-)
nd-ó-d̃z̃im-á	'I extinguish'	nd-ó-d̃zim-á	(vú-)
nd-ó-péèd̃z̃-á	'I finish'	nd-ó-péd̃z̃-à	(vú-)
nd-ó-t̃óól-a	'I take'	nd-ó-t̃ólá	(vu-)
nd-ó-baát̃-a	'I catch'	nd-ó-baṭ̃-á	(vu-)
nd-ó-k ^h íg-a	'I lift (on head)'	nd-ó-k ^h ig-a	(vu-)
nd-ó-zaád̃z̃-a	'I fill up'	nd-ó-žád̃z̃-a	(vu-)
nd-ó-fúmík-a	'I cover'	nd-ó-fúmík-á	(vu-)
nd-ó-d̃zimúúl-a	'I allay'	nd-ó-d̃zimúl-á	(vu-)
nd-ó-vígaáj̃-a	'I bury'	nd-ó-vígaṭ̃-á	(vu-)
nd-ó-mílíd̃z̃-a	'I lift'	nd-ó-mílíd̃z̃-a	(vu-)
nd-ó-g ^{wx} ád̃ziís-a	'I hurt (s.o.)'	nd-ó-g ^{wx} ád̃zis-á	(vu-)

1.4. High tone verbs with vá- (class 2) subject prefix

vá-nóò-t̃-á	'they fear'	vá-nó-t̃-á	(vú-síiku)
vá-nóò-d̃-á	'they like'	vá-nó-d̃-a	(vú-)
vá-nó-t̃úùm-á	'they send'	vá-nó-t̃úm-á	(vú-)
vá-nó-d̃z̃im-á	'they extinguish'	vá-nó-d̃zim-á	(vú-)
vá-nó-péèd̃z̃-á	'they finish'	vá-nó-péd̃z̃-a	(vú-)
vá-nó-t̃óól-a	'they take'	vá-nó-t̃ólá	(vu-)
vá-nó-baát̃-a	'they catch'	vá-nó-baṭ̃-á	(vu-)
vá-nó-k ^h íg-a	'they lift (on head)'	vá-nó-k ^h ig-a	(vu-)
vá-nó-zaád̃z̃-a	'they fill up'	vá-nó-žád̃z̃-a	(vu-)
vá-nó-fúmík-a	'they cover'	vá-nó-fúmík-á	(vu-)
vá-nó-d̃zimúúl-a	'they allay'	vá-nó-d̃zimúl-á	(vu-)
vá-nó-vígaáj̃-a	'they bury'	vá-nó-vígaṭ̃-á	(vu-)
vá-nó-mílíd̃z̃-a	'they lift'	vá-nó-mílíd̃z̃-a	(vu-)
vá-nó-g ^{wx} ád̃ziís-a	'they hurt (s.o.)'	vá-nó-g ^{wx} ád̃zis-á	(vu-)

1.5. Low tone verbs with ndi- 'I sg.' subject prefix and -tʃí- object prefix

nd-ó-tʃí-wáán-a	'I find it'	nd-ó-tʃí-wán-á	(vu-síku)
nd-ó-tʃí-dííl -a	'I pour it'	nd-ó-tʃí-díl-á	(vu-)
nd-ó-tʃí-veéz-a	'I carve it'	nd-ó-tʃí-vez-a	(vu-)
nd-ó-tʃí-buúz ^w -a	'I ask it'	nd-ó-tʃí-büz ^w -a	(vu-)
nd-ó-tʃí-ǰálúùl-a	'I choose it'	nd-ó-tʃí-ǰálúl-a	(vu-)
nd-ó-tʃí-súmbûk-a	'I conceal it'	nd-ó-tʃí-súmbík-a	(vu-)
nd-ó-tʃí-duvûk-a	'I dip it'	nd-ó-tʃí-duvík-a	(vu-)
nd-ó-tʃí-lízaaŋ-a	'I try on it'	nd-ó-tʃí-lízaŋ-a	(vu-)
nd-ó-tʃí-páláádž-a	'I disperse it'	nd-ó-tʃí-páláđž-a	(vu-)
nd-ó-tʃí-ǰálúl-iil-a	'I choose for it'	nd-ó-tʃí-ǰálúl-il-a	(vu-)
nd-ó-tʃí-büz ^w isiis-a	'I ask it alot'	nd-ó-tʃí-büz ^w isisa	(vu-)

1.6. Low tone verbs with vá- (cl. 2) subject prefix and -tʃí- object prefix

vá-nó-tʃí-wáán-a	'they find it'	vá-nó-tʃí-wán-á	(vu-síku)
vá-nó-tʃí-dííl-a	'they pour it'	vá-nó-tʃí-díl-á	(vu-)
vá-nó-tʃí-veéz-a	'they carve it'	vá-nó-tʃí-vez-a	(vu-)
vá-nó-tʃí-buúz ^w -a	'they ask it'	vá-nó-tʃí-büz ^w -a	(vu-)
vá-nó-tʃí-ǰálúùl-a	'they choose it'	vá-nó-tʃí-ǰálúl-a	(vu-)
vá-nó-tʃí-súmbûk-a	'they conceal it'	vá-nó-tʃí-súmbík-a	(vu-)
vá-nó-tʃí-duvûk-a	'they dip it'	vá-nó-tʃí-duvík-a	(vu-)
vá-nó-tʃí-lízaaŋ-a	'they tried on it'	vá-nó-tʃí-lízaŋ-a	(vu-)
vá-nó-tʃí-páláádž-a	'they disperse it'	vá-nó-tʃí-páláđž-a	(vu-)
vá-nó-tʃí-ǰálúl-iil-a	'they choose for it'	vá-nó-tʃí-ǰálúl-il-a	(vu-)
vá-nó-tʃí-büz ^w isiis-a	'they ask it alot'	vá-nó-tʃí-büz ^w isisa	(vu-)

1.7. High tone verbs with ndi- 'I sg.' subject prefix and -t̃í- object prefix

nd-ó-t̃í-t̃í-á	'I fear it'	nd-ó-t̃í-t̃í-á	(vú-síku)
nd-ó-t̃í-d-á	'I like it'	nd-ó-t̃í-d-a	(vú-)
nd-ó-t̃í-túùm-á	'I send it'	nd-ó-t̃í-túùm-á	(vú-)
nd-ó-t̃í-dzìim-á	'I extinguish it'	nd-ó-t̃í-dzim-á	(vú-)
nd-ó-t̃í-péèd̃z-á	'I finish it'	nd-ó-t̃í-pédz-a	(vú-)
nd-ó-t̃í-tóól-a	'I take it'	nd-ó-t̃í-tólá	(vu-)
nd-ó-t̃í-baát-a	'I catch it'	nd-ó-t̃í-bat-á	(vu-)
nd-ó-t̃í-k ^h íg-a	'I lift it (on head)'	nd-ó-t̃í-k ^h ig-a	(vu-)
nd-ó-t̃í-zaád̃z-a	'I fill up it'	nd-ó-t̃í-žád̃z-a	(vu-)
nd-ó-t̃í-fúmíik-a	'I cover it'	nd-ó-t̃í-fúmík-á	(vu-)
nd-ó-t̃í-dzìimúúl-a	'I allay it'	nd-ó-t̃í-dzimúl-á	(vu-)
nd-ó-t̃í-vígaáj-a	'I bury it'	nd-ó-t̃í-vigan-á	(vu-)
nd-ó-t̃í-mílíd̃z-a	'I lift it'	nd-ó-t̃í-mílíd̃z-a	(vu-)
nd-ó-t̃í-g ^w ád̃ziis-a	'I hurt it'	nd-ó-t̃í-g ^w ád̃zis-á	(vu-)

1.8. High tone verbs with vá- (cl. 2) subject prefix and -t̃í- object prefix

vá-nó-t̃í-t̃í-á	'they fear it'	vá-nó-t̃í-t̃í-á	(vú-síku)
vá-nó-t̃í-d-á	'they like it'	vá-nó-t̃í-d-a	(vú-)
vá-nó-t̃í-túùm-á	'they send it'	vá-nó-t̃í-túùm-á	(vú-)
vá-nó-t̃í-dzìim-á	'they extinguish it'	vá-nó-t̃í-dzim-á	(vú-)
vá-nó-t̃í-péèd̃z-á	'they finish it'	vá-nó-t̃í-pédz-à	(vú-)
vá-nó-t̃í-tóól-a	'they take it'	vá-nó-t̃í-tólá	(vu-)
vá-nó-t̃í-baát-a	'they catch it'	vá-nó-t̃í-bat-á	(vu-)
vá-nó-t̃í-k ^h íg-a	'they lift it (on head)'	vá-nó-t̃í-k ^h ig-a	(vu-)
vá-nó-t̃í-zaád̃z-a	'they fill it'	vá-nó-t̃í-žád̃z-a	(vu-)
vá-nó-t̃í-fúmíik-a	'they cover it'	vá-nó-t̃í-fúmík-á	(vu-)
vá-nó-t̃í-dzìimúúl-a	'they allay it'	vá-nó-t̃í-dzimúl-á	(vu-)
vá-nó-t̃í-vígaáj-a	'they bury it'	vá-nó-t̃í-vigan-a	(vu-)
vá-nó-t̃í-mílíd̃z-a	'they lift it'	vá-nó-t̃í-mílíd̃z-a	(vu-)
vá-nó-t̃í-g ^w ád̃ziis-a	'they hurt it'	vá-nó-t̃í-g ^w ád̃zis-á	(vu-)

1.9. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-ó-z ^w i-wáán-a	'I find them'	nd-ó-z ^w i-wán-á	(vu-)
nd-ó-z ^w i-ḍìl-a	'I pour them'	nd-ó-z ^w i-ḍil-á	(vu-)
nd-ó-z ^w i-úéé3-a	'I carve them'	nd-ó-z ^w i-úé3-a	(vu-)
nd-ó-z ^w i-bùú3 ^w -a	'I ask them'	nd-ó-z ^w i-bú3 ^w -a	(vu-)
nd-ó-z ^w i-ǰálúùl-a	'I choose them'	nd-ó-z ^w i-ǰálúl-a	(vu-)
nd-ó-z ^w i-súmbûk-a	'I conceal them'	nd-ó-z ^w i-súmbík-á	(vu-)
nd-ó-z ^w i-duvûk-a	'I dip them'	nd-ó-z ^w i-duvík-á	(vu-)
nd-ó-z ^w i-lízaaŋ-a	'I try on them'	nd-ó-z ^w i-lízaŋ-á	(vu-)
nd-ó-z ^w i-páláàḍz-a	'I disperse them'	nd-ó-z ^w i-páláḍz-a	(vu-)
nd-ó-z ^w i-ǰálúl-iil-a	'I choose for them'	nd-ó-z ^w i-ǰálúl-il-a	(vu-)
nd-ó-z ^w i-bù z ^w isiis-a	'I ask them alot'	nd-ó-z ^w i-bù z ^w isis-a	(vu-)

2.0. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

vá-nó-z ^w i-wáán-a	'they find them'	vá-nó-z ^w i-wán-á	(vu-síku)
vá-nó-z ^w i-ḍìl-a	'they pour them'	vá-nó-z ^w i-ḍil-á	(vu-)
vá-nó-z ^w i-úéé3-a	'they carve them'	vá-nó-z ^w i-úé3-a	(vu-)
vá-nó-z ^w i-bùú3 ^w -a	'they ask them'	vá-nó-z ^w i-bú3 ^w -a	(vu-)
vá-nó-z ^w i-ǰálúùl-a	'they choose them'	vá-nó-z ^w i-ǰálúl-á	(vu-)
vá-nó-z ^w i-súmbûk-a	'they conceal them'	vá-nó-z ^w i-súmbík-á	(vu-)
vá-nó-z ^w i-duvûk-a	'they dip them'	vá-nó-z ^w i-duvík-á	(vu-)
vá-nó-z ^w i-lízaaŋ-a	'they try on them'	vá-nó-z ^w i-lízaŋ-a	(vu-)
vá-nó-z ^w i-páláàḍz-a	'they disperse them'	vá-nó-z ^w i-páláḍz-a	(vu-)
vá-nó-z ^w i-ǰálúl-iil-a	'they choose for them'	vá-nó-z ^w i-ǰálúlil-a	(vu-)
vá-nó-z ^w i-bù z ^w isiis-a	'they ask them alot'	vá-nó-z ^w i-bù z ^w isis-á	(vu-)

2.1. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-ó-z ^w ii-t̃j-á	'I fear them'	nd-ó-z ^w i-t̃j-á	(vú-)
nd-ó-z ^w ii-d̃-á	'I like them'	nd-ó-z ^w i-d̃-á	(vú-)
nd-ó-z ^w ii-t̃úùm-á	'I send them'	nd-ó-z ^w i-t̃úm-á	(vú-)
nd-ó-z ^w i-d̃z̃im-á	'I extinguish them'	nd-ó-z ^w i-d̃zim-á	(vú-)
nd-ó-z ^w i-péèd̃z̃-á	'I finish them'	nd-ó-z ^w i-péd̃z̃-a	(vú-)
nd-ó-z ^w i-t̃óól-a	'I take them'	nd-ó-z ^w i-t̃ólá	(vu-)
nd-ó-z ^w i-baát̃-a	'I catch them'	nd-ó-z ^w i-baṭ̃-á	(vu-)
nd-ó-z ^w i-k ^h íg-a	'I lift (on head) them'	nd-ó-z ^w i-k ^h ig-a	(vu-)
nd-ó-z ^w i-zaád̃z̃-a	'I fill up them'	nd-ó-z ^w i-zaḍ̃z̃-a	(vu-)
nd-ó-z ^w i-fúmíik-a	'I cover them'	nd-ó-z ^w i-fúmík-á	(vu-)
nd-ó-z ^w i-d̃zimúúl-a	'I allay them'	nd-ó-z ^w i-d̃zimúl-á	(vu-)
nd-ó-z ^w i-vígaáj̃-a	'I bury them'	nd-ó-z ^w i-vígaṗ̃-á	(vu-)
nd-ó-z ^w i-mílíd̃z̃-a	'I lift them'	nd-ó-z ^w i-mílíd̃z̃-a	(vu-)
nd-ó-z ^w i-g ^w ḍ̃ziís-a	'I hurt them'	nd-ó-z ^w i-g ^w ḍ̃zis-á	(vu-)

2.2. High tone verbs with uá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

uá-nó-z ^w ii-t̃j-á	'they fear them'	uá-nó-z ^w i-t̃j-á	(vú-)
uá-nó-z ^w ii-d̃-á	'they like them'	uá-nó-z ^w i-d̃-a	(vú-)
uá-nó-z ^w i-t̃úùm-á	'they send them'	uá-nó-z ^w i-t̃úm-á	(vú-)
uá-nó-z ^w i-d̃z̃im-á	'they extinguish them'	uá-nó-z ^w i-d̃zim-á	(vú-)
uá-nó-z ^w i-péèd̃z̃-á	'they finish them'	uá-nó-z ^w i-péd̃z̃-a	(vú-)
uá-nó-z ^w i-t̃óól-a	'they take them'	uá-nó-z ^w i-t̃ól-á	(vu-)
uá-nó-z ^w i-baát̃-a	'they catch them'	uá-nó-z ^w i-baṭ̃-á	(vu-)
uá-nó-z ^w i-k ^h íg-a	'they lift (on head) them'	uá-nó-z ^w i-k ^h ig-a	(vu-)
uá-nó-z ^w i-zaád̃z̃-a	'they fill up them'	uá-nó-z ^w i-zaḍ̃z̃-a	(vu-)
uá-nó-z ^w i-fúmíik-a	'they cover them'	uá-nó-z ^w i-fúmík-á	(vu-)
uá-nó-z ^w i-d̃zimúúl-a	'they allay them'	uá-nó-z ^w i-d̃zimúl-á	(vu-)
uá-nó-z ^w i-vígaáj̃-a	'they bury them'	uá-nó-z ^w i-vígaṗ̃-á	(vu-)
uá-nó-z ^w i-mílíd̃z̃-a	'they lift them'	uá-nó-z ^w i-mílíd̃z̃-a	(vu-)
uá-nó-z ^w i-g ^w ḍ̃ziís-a	'they hurt them'	uá-nó-z ^w i-g ^w ḍ̃zis-á	(vu-)

2.3. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wí- reflexive prefix

nd-ó-z ^w i-wáàn-a	'I find self'	nd-ó-z ^w i-wán-a	(vu-)
nd-ó-z ^w ĩ-ḍiil-a	'I pour self'	nd-ó-z ^w ĩ-ḍil-a	(vu-)
nd-ó-z ^w i-υéèz-a	'I carve self'	nd-ó-z ^w i-υéz-a	(vu-)
nd-ó-z ^w ĩ-buuz ^w -a	'I ask self'	nd-ó-z ^w ĩ-buz ^w -a	(vu-)
nd-ó-z ^w i-fáluul-á	'I choose self'	nd-ó-z ^w i-fálul-á	(vú-)
nd-ó-z ^w i-súmbiik-á	'I conceal self'	nd-ó-z ^w i-súmbik-á	(vú-)
nd-ó-z ^w ĩ-duviik-á	'I dip self'	nd-ó-z ^w ĩ-duvik-á	(vú-)
nd-ó-z ^w i-lízaaᵗ-á	'I try on self'	nd-ó-z ^w i-lízaᵗ-á	(vú-)
nd-ó-z ^w i-pálaaḍz-á	'I disperse self'	nd-ó-z ^w i-pálaḍz-a	(vú-)
nd-ó-z ^w i-fálul-iil-á	'I choose for self'	nd-ó-z ^w i-fálul-il-á	(vú-)
nd-ó-z ^w ĩ-buz ^w isiis-á	'I ask self alot'	nd-ó-z ^w ĩ-buz ^w isis-á	(vú-)

2.4. Low tone verbs with uá- (cl. 2)subject prefix and -z^wí- reflexive prefix

uá-nó-z ^w i-wáàn-a	'they find selves'	uá-nó-z ^w i-wán-a	(vu-)
uá-nó-z ^w ĩ-ḍiil-a	'they pour selves'	uá-nó-z ^w ĩ-ḍil-a	(vu-)
uá-nó-z ^w i-υéèz-a	'they carve selves'	uá-nó-z ^w i-υéz-a	(vu-)
uá-nó-z ^w ĩ-buuz ^w -a	'they ask selves'	uá-nó-z ^w ĩ-buz ^w -a	(vu-)
uá-nó-z ^w i-fáluul-á	'they choose selves'	uá-nó-z ^w i-fálul-á	(vú-)
uá-nó-z ^w i-súmbiik-á	'they conceal selves'	uá-nó-z ^w i-súmbik-á	(vú-)
uá-nó-z ^w ĩ-duviik-á	'they dip selves'	uá-nó-z ^w ĩ-duvik-á	(vú-)
uá-nó-z ^w i-lízaaᵗ-á	'they try on selves'	uá-nó-z ^w i-lízaᵗ-á	(vú-)
uá-nó-z ^w i-pálaaḍz-á	'they disperse selves'	uá-nó-z ^w i-pálaḍz-a	(vú-)
uá-nó-z ^w i-fálul-iil-á	'they choose for selves'	uá-nó-z ^w i-fálulil-á	(vú-)
uá-nó-z ^w ĩ-buz ^w isiis-á	'they ask alot selves'	uá-nó-z ^w ĩ-buz ^w isis-á	(vú-)

2.5. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nd-ó-z ^w í-t̃j̃-a	'I fear self'	nd-ó-z ^w í-t̃j̃-á	(vu-)
nd-ó-z ^w í-ɖ̃-a	'I like self'	nd-ó-z ^w í-ɖ̃-a	(vu-)
nd-ó-z ^w i-t̃úùm-a	'I send self'	nd-ó-z ^w i-t̃úm-a	(vu-)
nd-ó-z ^w í-ḍziim-a	'I extinguish self'	nd-ó-z ^w í-ḍzim-a	(vu-)
nd-ó-z ^w i-péèḍz-a	'I finish self'	nd-ó-z ^w i-péḍz-a	(vu-)
nd-ó-z ^w i-t̃óòl-a	'I take self'	nd-ó-z ^w i-t̃óla	(vu-)
nd-ó-z ^w í-baaɖ̃-a	'I catch self'	nd-ó-z ^w í-baaɖ̃-a	(vu-)
nd-ó-z ^w i-k ^h ŋg-a	'I lift (on head) self'	nd-ó-z ^w i-k ^h ŋg-a	(vu-)
nd-ó-z ^w í-zaaḍz-a	'I fill up self'	nd-ó-z ^w í-zaḍz-a	(vu-)
nd-ó-z ^w i-fúmiik-á	'I cover self'	nd-ó-z ^w i-fúmik-á	(vú-)
nd-ó-z ^w í-ḍzimuul-á	'I allay self'	nd-ó-z ^w í-ḍzimul-á	(vú-)
nd-ó-z ^w i-vígaan-á	'I bury self'	nd-ó-z ^w i-vígan-á	(vú-)
nd-ó-z ^w i-míliidz-á	'I lift self'	nd-ó-z ^w i-mílidz-a	(vú-)
nd-ó-z ^w í-g ^w adziis-á	'I hurt self'	nd-ó-z ^w í-g ^w adzis-á	(vú-)

2.6. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- reflexive prefix

vá-nó-z ^w í-t̃j̃-a	'they fear selves'	vá-nó-z ^w í-t̃j̃-á	(vu-)
vá-nó-z ^w í-ɖ̃-a	'they like selves'	vá-nó-z ^w í-ɖ̃-a	(vu-)
vá-nó-z ^w i-t̃úùm-a	'they send selves'	vá-nó-z ^w i-t̃úm-a	(vu-)
vá-nó-z ^w í-ḍziim-a	'they extinguish selves'	vá-nó-z ^w í-ḍzim-a	(vu-)
vá-nó-z ^w i-péèḍz-a	'they finish selves'	vá-nó-z ^w i-péḍz-a	(vu-)
vá-nó-z ^w i-t̃óòl-a	'they take selves'	vá-nó-z ^w i-t̃óla	(vu-)
vá-nó-z ^w í-baaɖ̃-a	'they catch selves'	vá-nó-z ^w í-baaɖ̃-a	(vu-)
vá-nó-z ^w i-k ^h ŋg-a	'they lift (on head) selves'	vá-nó-z ^w i-k ^h ŋg-a	(vu-)
vá-nó-z ^w í-zaaḍz-a	'they fill up selves'	vá-nó-z ^w í-zaḍz-a	(vu-)
vá-nó-z ^w i-fúmiik-á	'they cover selves'	vá-nó-z ^w i-fúmik-á	(vú-)
vá-nó-z ^w í-ḍzimuul-á	'they allayed selves'	vá-nó-z ^w í-ḍzimul-á	(vú-)
vá-nó-z ^w i-vígaan-á	'they bury selves'	vá-nó-z ^w i-vígan-á	(vú-)
vá-nó-z ^w i-míliidz-á	'they lift selves'	vá-nó-z ^w i-mílidz-a	(vú-)
vá-nó-z ^w í-g ^w adziis-á	'they hurt selves'	vá-nó-z ^w í-g ^w adzis-á	(vú-)

3. Recent Past Tones

1.1. Low tone verbs with ndi- 'I sg.' subject prefix

nd-aa-w-á	'I fell'	nd-a-w-á	(vú-)
nd-aa-g ^w -ǎ	'I fought'	nd-a-g ^w -a	(vú-)
nd-a-wáán-a	'I found'	nd-a-wán-á	(vu-)
nd-a-ḍìíl-a	'I poured'	nd-a-ḍil-á	(vu-)
nd-a-úéé3-a	'I carved'	nd-a-úé3-a	(vu-)
nd-a-buúz ^w -a	'I asked'	nd-a-büz ^w -a	(vu-)
nd-a-ḵálúul-a	'I chose'	nd-a-ḵálúl-a	(vu-)
nd-a-súmbûk-a	'I concealed'	nd-a-súmbík-a	(vu-)
nd-a-duvûk-a	'I dipped'	nd-a-duvík-a	(vu-)
nd-a-lízaaḵ-a	'I tried on'	nd-a-lízaḵ-a	(vu-)
nd-a-pálááḍz-a	'I dispersed'	nd-a-páláḍz-a	(vu-)
nd-a-ḵálúl-iil-a	'I chose for'	nd-a-ḵálúl-iil-a	(vu-)
nd-a-büz ^w isiis-a	'I asked alot'	nd-a-büz ^w isis-a	(vu-)

1.2. Low tone verbs with vá- (class 2) subject prefix

vá-à-w-á	'they fell'	v-á-w-á	(vú-)
vá-à-g ^w -ǎ	'they fought'	v-á-g ^w -a	(vú-)
v-á-wáán-a	'they found'	v-á-wán-á	(vu-)
v-á-ḍìíl-a	'they poured'	v-á-ḍil-á	(vu-)
v-á-úéé3-a	'they carved'	v-á-úé3-a	(vu-)
v-á-buúz ^w -a	'they asked'	v-á-büz ^w -a	(vu-)
v-á-ḵálúul-a	'they chose'	v-á-ḵálúl-a	(vu-)
v-á-súmbûk-a	'they concealed'	v-á-súmbík-a	(vu-)
v-á-duvûk-a	'they dipped'	v-á-duvík-a	(vu-)
v-á-lízaaḵ-a	'they tried on'	v-á-lízaḵ-a	(vu-)
v-á-pálááḍz-a	'they dispersed'	v-á-páláḍz-a	(vu-)
v-á-ḵálúl-iil-a	'they chose for'	v-á-ḵálúl-il-a	(vu-)
v-á-büz ^w isiis-a	'they asked alot'	v-á-büz ^w isiis-a	(vu-)

1.3. High tone verbs with ndi- 'I sg.' subject prefix

nd-aa-t̃j-á	'I feared'	nd-a-t̃j-á	(vú-)
nd-aa-d-á	'I liked'	nd-a-d-a	(vú-)
nd-a-t̃úùm-á	'I sent'	nd-a-t̃úm-á	(vú-)
nd-a-d̃zim-á	'I extinguished'	nd-a-d̃zim-á	(vú-)
nd-a-péèd̃z-á	'I finished'	nd-a-péd̃z-à	(vú-)
nd-a-t̃óól-a	'I took'	nd-a-t̃óla	(vu-)
nd-a-baát-a	'I caught'	nd-a-baɾ-á	(vu-)
nd-a-k ^h íg-a	'I lifted (on head)'	nd-a-k ^h íg-a	(vu-)
nd-a-zaád̃z-a	'I filled up'	nd-a-zađ̃z-a	(vu-)
nd-a-fúmíik-a	'I covered'	nd-a-fúmík-á	(vu-)
nd-a-d̃zimúúl-a	'I allayed'	nd-a-d̃zimúl-á	(vu-)
nd-a-vígaɾ-a	'I buried'	nd-a-vígaɾ-á	(vu-)
nd-a-mílíd̃z-a	'I lifted'	nd-a-mílíd̃z-a	(vu-)
nd-a-g ^w ád̃ziis-a	'I hurt (s.o.)'	nd-a-g ^w ád̃zis-á	(vu-)

1.4. High tone verbs with uá- (class 2) subject prefix

uá-à-t̃j-á	'they feared'	u-á-t̃j-á	(vú-)
uá-à-d-á	'they liked'	u-á-d-a	(vú-)
u-á-t̃úùm-a	'they sent'	u-á-t̃úm-a	(vu-)
u-á-d̃ziim-a	'they extinguished'	u-á-d̃zim-a	(vu-)
u-á-péèd̃z-a	'they finished'	u-á-péd̃z-a	(vu-)
u-á-t̃óól-a	'they took'	u-á-t̃óla	(vu-)
u-á-baát-a	'they caught'	u-á-baɾ-a	(vu-)
u-á-k ^h íg-a	'they lifted (on head)'	u-á-k ^h íg-a	(vu-)
u-á-zaad̃z-a	'they filled up'	u-á-zađ̃z-a	(vu-)
u-á-fúmiik-a	'they covered'	u-á-fúmík-a	(vu-)
u-á-d̃zimuul-a	'they allayed'	u-á-d̃zimul-a	(vu-)
u-á-vígaɾ-a	'they buried'	u-á-vígaɾ-a	(vu-)
u-á-mílíd̃z-a	'they lifted'	u-á-mílíd̃z-a	(vu-)
u-á-g ^w ád̃ziis-a	'they hurt (s.o.)'	u-á-g ^w ád̃zis-a	(vu-)

1.5. Low tone verbs with ndi- 'I sg.' subject prefix and -t̄jí- object prefix

nd-a-t̄jí-wáán-a	'I found it'	nd-a-t̄jí-wán-á	(vu-)
nd-a-t̄jí-d̄iíl-a	'I poured it'	nd-a-t̄jí-d̄il-á	(vu-)
nd-a-t̄jí-vééz-a	'I carved it'	nd-a-t̄jí-véz-a	(vu-)
nd-a-t̄jí-buúz ^w -a	'I asked it'	nd-a-t̄jí-bűz ^w -a	(vu-)
nd-a-t̄jí-fálúùl-a	'I chose it'	nd-a-t̄jí-fálúl-a	(vu-)
nd-a-t̄jí-súmbûk-a	'I concealed it'	nd-a-t̄jí-súmbík-a	(vu-)
nd-a-t̄jí-duvûk-a	'I dipped it'	nd-a-t̄jí-duvík-a	(vu-)
nd-a-t̄jí-lízaaṅ-a	'I tried it on'	nd-a-t̄jí-lízaṅ-a	(vu-)
nd-a-t̄jí-páláàd̄z-a	'I dispersed it'	nd-a-t̄jí-pálád̄z-a	(vu-)
nd-a-t̄jí-fálúl-iil-a	'I chose for it'	nd-a-t̄jí-fálúl-il-a	(vu-)
nd-a-t̄jí-bűz ^w isiis-a	'I asked it alot'	nd-a-t̄jí-bűz ^w isisa	(vu-)

1.6. Low tone verbs with v-á- (cl. 2) subject prefix and -t̄jí- object prefix

v-á-t̄jí-wáán-a	'they found it'	v-á-t̄jí-wán-á	(vu-)
v-á-t̄jí-d̄iíl-a	'they poured it'	v-á-t̄jí-d̄il-á	(vu-)
v-á-t̄jí-vééz-a	'they carved it'	v-á-t̄jí-véz-a	(vu-)
v-á-t̄jí-buúz ^w -a	'they asked it'	v-á-t̄jí-bűz ^w -a	(vu-)
v-á-t̄jí-fálúùl-a	'they chose it'	v-á-t̄jí-fálúl-a	(vu-)
v-á-t̄jí-súmbûk-a	'they concealed it'	v-á-t̄jí-súmbík-a	(vu-)
v-á-t̄jí-duvûk-a	'they dipped it'	v-á-t̄jí-duvík-a	(vu-)
v-á-t̄jí-lízaaṅ-a	'they tried it on'	v-á-t̄jí-lízaṅ-a	(vu-)
v-á-t̄jí-páláàd̄z-a	'they dispersed it'	v-á-t̄jí-pálád̄z-a	(vu-)
v-á-t̄jí-fálúl-iil-a	'they chose for it'	v-á-t̄jí-fálúl-il-a	(vu-)
v-á-t̄jí-bűz ^w isiis-a	'they asked it alot'	v-á-t̄jí-bűz ^w isis-a	(vu-)

1.7. High tone verbs with ndi- 'I sg.' subject prefix and -t̄j̄i- object prefix

nd-a-t̄j̄i-t̄j̄-a	'I feared it'	nd-a-t̄j̄i-t̄j̄-á	(vu-)
nd-a-t̄j̄i-d̄-a	'I liked it'	nd-a-t̄j̄i-d̄-a	(vu-)
nd-a-t̄j̄i-t̄úùm-a	'I sent it'	nd-a-t̄j̄i-t̄úm-a	(vu-)
nd-a-t̄j̄i-d̄ziim-a	'I extinguished it'	nd-a-t̄j̄i-d̄zim-a	(vu-)
nd-a-t̄j̄i-péèd̄z-a	'I finished it'	nd-a-t̄j̄i-péd̄z-à	(vu-)
nd-a-t̄j̄i-t̄óòl-a	'I took it'	nd-a-t̄j̄i-t̄óla	(vu-)
nd-a-t̄j̄i-baāt-a	'I caught it'	nd-a-t̄j̄i-baṭ-a	(vu-)
nd-a-t̄j̄i-k ^h ŋg-a	'I lifted (on head) it'	nd-a-t̄j̄i-k ^h ig-a	(vu-)
nd-a-t̄j̄i-zaad̄z-a	'I filled up it'	nd-a-t̄j̄i-zaḍz-a	(vu-)
nd-a-t̄j̄i-fúmiik-a	'I covered it'	nd-a-t̄j̄i-fúmik-a	(vu-)
nd-a-t̄j̄i-d̄zimuul-a	'I allayed it'	nd-a-t̄j̄i-d̄zimul-a	(vu-)
nd-a-t̄j̄i-vígaan-a	'I buried it'	nd-a-t̄j̄i-vígaṅ-a	(vu-)
nd-a-t̄j̄i-míliid̄z-a	'I lifted it'	nd-a-t̄j̄i-mílíd̄z-a	(vu-)
nd-a-t̄j̄i-g ^w ad̄ziis-a	'I hurt it'	nd-a-t̄j̄i-g ^w ad̄zis-a	(vu-)

1.8. High tone verbs with vá- (cl. 2) subject prefix and -t̄j̄i- object prefix

v-á-t̄j̄i-t̄j̄-á	'they feared it'	v-á-t̄j̄i-t̄j̄-á	(vú-)
v-á-t̄j̄i-d̄-á	'they liked it'	v-á-t̄j̄i-d̄-a	(vú-)
v-á-t̄j̄i-t̄úùm-á	'they sent it'	v-á-t̄j̄i-t̄úm-á	(vú-)
v-á-t̄j̄i-d̄ziim-á	'they extinguished it'	v-á-t̄j̄i-d̄zim-á	(vú-)
v-á-t̄j̄i-péèd̄z-á	'they finished it'	v-á-t̄j̄i-péd̄z-à	(vú-)
v-á-t̄j̄i-t̄óól-a	'they took it'	v-á-t̄j̄i-t̄óla	(vu-)
v-á-t̄j̄i-baāt-a	'they caught it'	v-á-t̄j̄i-baṭ-á	(vu-)
v-á-t̄j̄i-k ^h ŋg-a	'they lifted (on head) it'	v-á-t̄j̄i-k ^h ig-a	(vu-)
v-á-t̄j̄i-zaad̄z-a	'they filled up it'	v-á-t̄j̄i-zaḍz-a	(vu-)
v-á-t̄j̄i-fúmiík-a	'they covered it'	v-á-t̄j̄i-fúmík-á	(vu-)
v-á-t̄j̄i-d̄zimuúl-a	'they allayed it'	v-á-t̄j̄i-d̄zimul-a	(vu-)
v-á-t̄j̄i-vígaán-a	'they buried it'	v-á-t̄j̄i-vígaṅ-a	(vu-)
v-á-t̄j̄i-míliid̄z-a	'they lifted it'	v-á-t̄j̄i-mílíd̄z-a	(vu-)
v-á-t̄j̄i-g ^w ad̄ziis-a	'they hurt it'	v-á-t̄j̄i-g ^w ad̄zis-á	(vu-)

1.9. Low tone verbs with ndi- '1 sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-a-z ^w i-wáán-a	'I found them'	nd-a-z ^w i-wán-á	(vu-)
nd-a-z ^w i-ḍíl-a	'I poured them'	nd-a-z ^w i-ḍil-á	(vu-)
nd-a-z ^w i-úééz-a	'I carved them'	nd-a-z ^w i-úéz-a	(vu-)
nd-a-z ^w i-bùúz ^w -a	'I asked them'	nd-a-z ^w i-büz ^w -a	(vu-)
nd-a-z ^w i-ǰálúùl-a	'I chose them'	nd-a-z ^w i-ǰálúl-a	(vu-)
nd-a-z ^w i-súmbûk-a	'I concealed them'	nd-a-z ^w i-súmbík-a	(vu-)
nd-a-z ^w i-duvûk-a	'I dipped them'	nd-a-z ^w i-duvík-a	(vu-)
nd-a-z ^w i-lízaaŋ-a	'I tried on them'	nd-a-z ^w i-lízaŋ-á	(vu-)
nd-a-z ^w i-páláàḍz-a	'I dispersed them'	nd-a-z ^w i-páláḍz-a	(vu-)
nd-a-z ^w i-ǰálúl-iil-a	'I chose for them'	nd-a-z ^w i-ǰálúl-il-a	(vu-)
nd-a-z ^w i-büz ^w isiis-a	'I asked alot them'	nd-a-z ^w i-büz ^w isis-a	(vu-)

2.0. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

v-á-z ^w i-wáán-a	'they found them'	v-á-z ^w i-wán-á	(vu-)
v-á-z ^w i-ḍíl-a	'they poured them'	v-á-z ^w i-ḍil-á	(vu-)
v-á-z ^w i-úééz-a	'they carved them'	v-á-z ^w i-úéz-a	(vu-)
v-á-z ^w i-bùúz ^w -a	'they asked them'	v-á-z ^w i-büz ^w -a	(vu-)
v-á-z ^w i-ǰálúùl-a	'they chose them'	v-á-z ^w i-ǰálúl-a	(vu-)
v-á-z ^w i-súmbûk-a	'they concealed them'	v-á-z ^w i-súmbík-a	(vu-)
v-á-z ^w i-duvûk-a	'they dipped them'	v-á-z ^w i-duvík-a	(vu-)
v-á-z ^w i-lízaaŋ-a	'they tried on them'	v-á-z ^w i-lízaŋ-a	(vu-)
v-á-z ^w i-páláàḍz-a	'they dispersed them'	v-á-z ^w i-páláḍz-a	(vu-)
v-á-z ^w i-ǰálúl-iil-a	'they chose for them'	v-á-z ^w i-ǰálúílil-a	(vu-)
v-á-z ^w i-büz ^w isiis-a	'they asked them alot'	v-á-z ^w i-büz ^w isis-á	(vu-)

2.1. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-a-z ^w i-ṭí-a	'I feared them'	nd-a-z ^w i-ṭí-á	(vu-)
nd-a-z ^w i-ḍ-a	'I liked them'	nd-a-z ^w i-ḍ-á	(vu-)
nd-a-z ^w i-túùm-a	'I sent them'	nd-a-z ^w i-túm-a	(vu-)
nd-a-z ^w i-ḍziim-a	'I extinguished them'	nd-a-z ^w i-ḍzim-a	(vu-)
nd-a-z ^w i-péèḍz-a	'I finished them'	nd-a-z ^w i-péḍz-a	(vu-)
nd-a-z ^w i-tóòl-a	'I took them'	nd-a-z ^w i-tóla	(vu-)
nd-a-z ^w i-baṭ-a	'I caught them'	nd-a-z ^w i-baṭ-a	(vu-)
nd-a-z ^w i-k ^h íg-a	'I lifted (on head) them'	nd-a-z ^w i-k ^h ig-a	(vu-)
nd-a-z ^w i-zaáḍz-a	'I filled up them'	nd-a-z ^w i-zaḍz-a	(vu-)
nd-a-z ^w i-fúmiik-a	'I covered them'	nd-a-z ^w i-fúmik-a	(vu-)
nd-a-z ^w i-ḍzimuul-a	'I allayed them'	nd-a-z ^w i-ḍzimul-a	(vu-)
nd-a-z ^w i-uígaṗ-a	'I buried them'	nd-a-z ^w i-uígaṗ-a	(vu-)
nd-a-z ^w i-míliḍz-a	'I lifted them'	nd-a-z ^w i-míliḍz-a	(vu-)
nd-a-z ^w i-g ^w adziis-a	'I hurt them'	nd-a-z ^w i-g ^w adzis-a	(vu-)

2.2. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

v-á-z ^w ii-ṭí-á	'they feared them'	v-á-z ^w i-ṭí-á	(vú-)
v-á-z ^w ii-ḍ-á	'they liked them'	v-á-z ^w i-ḍ-á	(vú-)
v-á-z ^w i-túùm-á	'they sent them'	v-á-z ^w i-túm-á	(vú-)
v-á-z ^w i-ḍziim-á	'they extinguished them'	v-á-z ^w i-ḍzim-á	(vú-)
v-á-z ^w i-péèḍz-á	'they finished them'	v-á-z ^w i-péḍz-a	(vú-)
v-á-z ^w i-tóól-a	'they took them'	v-á-z ^w i-tól-á	(vu-)
v-á-z ^w i-baṭ-a	'they caught them'	v-á-z ^w i-baṭ-á	(vu-)
v-á-z ^w i-k ^h íg-a	'they lifted (on head) them'	v-á-z ^w i-k ^h ig-a	(vu-)
v-á-z ^w i-zaáḍz-a	'they filled up them'	v-á-z ^w i-zaḍz-a	(vu-)
v-á-z ^w i-fúmiik-a	'they covered them'	v-á-z ^w i-fúmík-á	(vu-)
v-á-z ^w i-ḍzimuul-a	'they allayed them'	v-á-z ^w i-ḍzimul-á	(vu-)
v-á-z ^w i-uígaṗ-a	'they buried them'	v-á-z ^w i-uígaṗ-á	(vu-)
v-á-z ^w i-míliḍz-a	'they lifted them'	v-á-z ^w i-míliḍz-a	(vu-)
v-á-z ^w i-g ^w adziis-a	'they hurt them'	v-á-z ^w i-g ^w adzis-á	(vu-)

2.3. Low tone verbs with ndi- '1 sg.' subject prefix and -z^wi- reflexive prefix

nd-a-z ^w i-wáàn-a	'I found self'	nd-a-z ^w i-wán-a	(vu-)
nd-a-z ^w ĩ-d̥iil-a	'I poured self'	nd-a-z ^w ĩ-d̥il-a	(vu-)
nd-a-z ^w i-uéèz-a	'I carved self'	nd-a-z ^w i-uééz-a	(vu-)
nd-a-z ^w ĩ-buuz ^w -a	'I asked self'	nd-a-z ^w ĩ-buz ^w -a	(vu-)
nd-a-z ^w i-ǰáluul-á	'I chose self'	nd-a-z ^w i-ǰálul-á	(uú-)
nd-a-z ^w i-súmbiik-á	'I concealed self'	nd-a-z ^w i-súmbik-á	(uú-)
nd-a-z ^w ĩ-duviik-á	'I dipped self'	nd-a-z ^w ĩ-duvik-á	(uú-)
nd-a-z ^w i-lízaaŋ-á	'I tried on self'	nd-a-z ^w i-lízaŋ-á	(uú-)
nd-a-z ^w i-pálaad̥z-á	'I dispersed self'	nd-a-z ^w i-pálaad̥z-a	(uú-)
nd-a-z ^w i-ǰálul-iil-á	'I chose for self'	nd-a-z ^w i-ǰálul-il-á	(uú-)
nd-a-z ^w ĩ-buz ^w isiis-á	'I asked self alot'	nd-a-z ^w ĩ-buz ^w isis-á	(uú-)

2.4. Low tone verbs with uá- 'class 2' subject prefix and -z^wi- reflexive prefix

u-á-z ^w i-wáàn-a	'they found selves'	u-á-z ^w i-wán-a	(vu-)
u-á-z ^w ĩ-d̥iil-a	'they poured selves'	u-á-z ^w ĩ-d̥il-a	(vu-)
u-á-z ^w i-uéèz-a	'they carved selves'	u-á-z ^w i-uééz-a	(vu-)
u-á-z ^w ĩ-buuz ^w -a	'they asked selves'	u-á-z ^w ĩ-buz ^w -a	(vu-)
u-á-z ^w i-ǰáluul-á	'they chose selves'	u-á-z ^w i-ǰálul-á	(uú-)
u-á-z ^w i-súmbiik-á	'they concealed selves'	u-á-z ^w i-súmbik-á	(uú-)
u-á-z ^w ĩ-duviik-á	'they dipped selves'	u-á-z ^w ĩ-duvik-á	(uú-)
u-á-z ^w i-lízaaŋ-á	'they tried on selves'	u-á-z ^w i-lízaŋ-á	(uú-)
u-á-z ^w i-pálaad̥z-á	'they dispersed selves'	u-á-z ^w i-pálaad̥z-a	(uú-)
u-á-z ^w i-ǰálul-iil-á	'they chose for selves'	u-á-z ^w i-ǰálulil-á	(uú-)
u-á-z ^w ĩ-buz ^w isiis-á	'they asked selves alot'	u-á-z ^w ĩ-buz ^w isis-á	(uú-)

2.5. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nd-a-z ^w i-t̃f-a	'I feared self'	nd-a-z ^w i-t̃f-á	(vu-)
nd-a-z ^w i-d̃-a	'I liked self'	nd-a-z ^w i-d̃-a	(vu-)
nd-a-z ^w i-t̃ùm-a	'I sent self'	nd-a-z ^w i-t̃ùm-a	(vu-)
nd-a-z ^w i-d̃ziim-a	'I extinguished self'	nd-a-z ^w i-d̃zim-a	(vu-)
nd-a-z ^w i-pèèd̃z-a	'I finished self'	nd-a-z ^w i-péd̃z-a	(vu-)
nd-a-z ^w i-t̃òl-a	'I took self'	nd-a-z ^w i-t̃óla	(vu-)
nd-a-z ^w i-baaṭ-a	'I caught self'	nd-a-z ^w i-baṭ-a	(vu-)
nd-a-z ^w i-k ^h ûg-a	'I lifted (on head) self'	nd-a-z ^w i-k ^h íg-a	(vu-)
nd-a-z ^w i-zaad̃z-a	'I filled up self'	nd-a-z ^w i-zaḍz-a	(vu-)
nd-a-z ^w i-fúmiik-á	'I covered self'	nd-a-z ^w i-fúmik-á	(vú-)
nd-a-z ^w i-d̃zimuul-á	'I allayed self'	nd-a-z ^w i-d̃zimul-á	(vú-)
nd-a-z ^w i-uígaṇ-á	'I buried self'	nd-a-z ^w i-uígaṇ-á	(vú-)
nd-a-z ^w i-míliid̃z-á	'I lifted self'	nd-a-z ^w i-mílid̃z-a	(vú-)
nd-a-z ^w i-g ^w ad̃ziis-á	'I hurt self'	nd-a-z ^w i-g ^w ad̃zis-á	(vú-)

2.6. High tone verbs with uá- (cl. 2) subject prefix and -z^wi- reflexive prefix

v-á-z ^w i-t̃f-a	'they feared selves'	v-á-z ^w i-t̃f-á	(vu-)
v-á-z ^w i-d̃-a	'they liked selves'	v-á-z ^w i-d̃-a	(vu-)
v-á-z ^w i-t̃ùm-a	'they sent selves'	v-á-z ^w i-t̃ùm-a	(vu-)
v-á-z ^w i-d̃ziim-a	'they extinguished selves'	v-á-z ^w i-d̃zim-a	(vu-)
v-á-z ^w i-pèèd̃z-a	'they finished selves'	v-á-z ^w i-péd̃z-a	(vu-)
v-á-z ^w i-t̃òl-a	'they took selves'	v-á-z ^w i-t̃óla	(vu-)
v-á-z ^w i-baaṭ-a	'they caught selves'	v-á-z ^w i-baṭ-a	(vu-)
v-á-z ^w i-k ^h ûg-a	'they lifted (on head) selves'	v-á-z ^w i-k ^h íg-a	(vu-)
v-á-z ^w i-zaad̃z-a	'they filled up selves'	v-á-z ^w i-zaḍz-a	(vu-)
v-á-z ^w i-fúmiik-á	'they covered selves'	v-á-z ^w i-fúmik-á	(vú-)
v-á-z ^w i-d̃zimuul-á	'they allayed selves'	v-á-z ^w i-d̃zimul-á	(vú-)
v-á-z ^w i-uígaṇ-á	'they buried selves'	v-á-z ^w i-uígaṇ-á	(vú-)
v-á-z ^w i-míliid̃z-á	'they lifted selves'	v-á-z ^w i-mílid̃z-a	(vú-)
v-á-z ^w i-g ^w ad̃ziis-á	'they hurt selves'	v-á-z ^w i-g ^w ad̃zis-á	(vú-)

4. General (Remote) Past Tones

1.1. Low tone verbs with ndi- 'I sg.' subject prefix

nd-a-káá-w-a	'I fell'	nd-a-ká-w-á	(vú-)
nd-a-káá-g ^w -a	'I fought'	nd-a-ká-g ^w -a	(vú-)
nd-a-ká-wáán-a	'I found'	nd-a-ká-wán-á	(vu-)
nd-a-ká-ḍìil-a	'I poured'	nd-a-ká-ḍil-á	(vu-)
nd-a-ká-úéé3-a	'I carved'	nd-a-ká-úé3-a	(vu-)
nd-a-ká-buú3 ^w -a	'I asked'	nd-a-ká-bú3 ^w -a	(vu-)
nd-a-ká-ḵálúul-a	'I chose'	nd-a-ká-ḵálúl-a	(vu-)
nd-a-ká-súmbûk-a	'I concealed'	nd-a-ká-súmbík-a	(vu-)
nd-a-ká-duvûk-a	'I dipped'	nd-a-ká-duvík-a	(vu-)
nd-a-ká-lízaaŋ-a	'I tried on'	nd-a-ká-lízaŋ-a	(vu-)
nd-a-ká-páláàḍz-a	'I dispersed'	nd-a-ká-páláḍz-a	(vu-)
nd-a-ká-ḵálúl-iil-a	'I chose for'	nd-a-ká-ḵálúl-iil-a	(vu-)
nd-a-ká-bú3 ^w isiis-a	'I asked alot'	nd-a-ká-bú3 ^w isis-a	(vu-)

1.2. Low tone verbs with vá- (cl. 2) subject prefix

vá-káá-w-a	'they fell'	v-á-ká-w-á	(vú-)
vá-káá-g ^w -a	'they fought'	v-á-ká-g ^w -a	(vú-)
v-á-ká-wáán-a	'they found'	v-á-ká-wán-á	(vu-)
v-á-ká-ḍìil-a	'they poured'	v-á-ká-ḍil-á	(vu-)
v-á-ká-úéé3-a	'they carved'	v-á-ká-úé3-a	(vu-)
v-á-ká-buú3 ^w -a	'they asked'	v-á-ká-bú3 ^w -a	(vu-)
v-á-ká-ḵálúul-a	'they chose'	v-á-ká-ḵálúl-a	(vu-)
v-á-ká-súmbûk-a	'they concealed'	v-á-ká-súmbík-a	(vu-)
v-á-ká-duvûk-a	'they dipped'	v-á-ká-duvík-a	(vu-)
v-á-ká-lízaaŋ-a	'they tried on'	v-á-ká-lízaŋ-a	(vu-)
v-á-ká-páláàḍz-a	'they dispersed'	v-á-ká-páláḍz-a	(vu-)
v-á-ká-ḵálúl-iil-a	'they chose for'	v-á-ká-ḵálúl-il-a	(vu-)
v-á-ká-bú3 ^w isiis-a	'they asked alot'	v-á-ká-bú3 ^w isiis-a	(vu-)

1.3. High tone verbs with ndi- 'I sg.' subject prefix

nd-a-káá-t̃-a	'I feared'	nd-a-ká-t̃-á	(vú-)
nd-a-káá-d̃-a	'I liked'	nd-a-ká-d̃-a	(vú-)
nd-a-ká-t̃úùm-a	'I sent'	nd-a-ká-t̃úm-a	(vú-)
nd-a-ká-d̃ziim-a	'I extinguished'	nd-a-ká-d̃zim-a	(vú-)
nd-a-ká-péèd̃z-á	'I finished'	nd-a-ká-péd̃z-a	(vú-)
nd-a-ká-t̃óòl-a	'I took'	nd-a-ká-t̃óla	(vu-)
nd-a-ká-baáṭ-a	'I caught'	nd-a-ká-baṭ-a	(vu-)
nd-a-ká-k ^h íg-a	'I lifted (on head)'	nd-a-ká-k ^h ig-a	(vu-)
nd-a-ká-zaád̃z-a	'I filled up'	nd-a-ká-zaḍz-a	(vu-)
nd-a-ká-fúmiik-a	'I covered'	nd-a-ká-fúmik-a	(vu-)
nd-a-ká-d̃zimuul-a	'I allayed'	nd-a-ká-d̃zimul-a	(vu-)
nd-a-ká-vígaṇ-a	'I buried'	nd-a-ká-vigaṇ-a	(vu-)
nd-a-ká-míliíd̃z-a	'I lifted'	nd-a-ká-mílíd̃z-a	(vu-)
nd-a-ká-g ^w ad̃ziis-a	'I hurt (s.o.)'	nd-a-ká-g ^w ad̃zis-a	(vu-)

1.4. High tone verbs with vá- (cl. 2) subject prefix

vá-káà-t̃-á	'they feared'	v-á-ká-t̃-á	(vú-)
vá-káà-d̃-á	'they liked'	v-á-ká-d̃-a	(vú-)
v-á-ká-t̃úùm-á	'they sent'	v-á-ká-t̃úm-á	(vú-)
v-á-ká-d̃zim-á	'they extinguished'	v-á-ká-d̃zim-á	(vú-)
v-á-ká-péèd̃z-á	'they finished'	v-á-ká-péd̃z-a	(vú-)
v-á-ká-t̃óól-a	'they took'	v-á-ká-t̃óla	(vu-)
v-á-ká-baáṭ-a	'they caught'	v-á-ká-baṭ-á	(vu-)
v-á-ká-k ^h íg-a	'they lifted (on head)'	v-á-ká-k ^h ig-a	(vu-)
v-á-ká-zaád̃z-a	'they filled up'	v-á-ká-zaḍz-a	(vu-)
v-á-ká-fúmiík-a	'they covered'	v-á-ká-fúmík-á	(vu-)
v-á-ká-d̃zimúúl-a	'they allayed'	v-á-ká-d̃zimúl-á	(vu-)
v-á-ká-vígaṇ-a	'they buried'	v-á-ká-vigaṇ-á	(vu-)
v-á-ká-míliíd̃z-a	'they lifted'	v-á-ká-mílíd̃z-a	(vu-)
v-á-ká-g ^w ad̃ziis-a	'they hurt (s.o.)'	v-á-ká-g ^w ad̃zis-á	(vu-)

1.5. Low tone verbs with ndi- 'I sg.' subject prefix and -tʃí- object prefix

nd-a-ká-tʃí-wáán-a	'I found it'	nd-a-ká-tʃí-wán-á	(vu-)
nd-a-ká-tʃí-dííl-a	'I poured it'	nd-a-ká-tʃí-díl-á	(vu-)
nd-a-ká-tʃí-úééz-a	'I carved it'	nd-a-ká-tʃí-úéz-a	(vu-)
nd-a-ká-tʃí-buúz ^w -a	'I asked it'	nd-a-ká-tʃí-büz ^w -a	(vu-)
nd-a-ká-tʃí-ǰálúùl-a	'I chose it'	nd-a-ká-tʃí-ǰálúl-a	(vu-)
nd-a-ká-tʃí-súmbûk-a	'I concealed it'	nd-a-ká-tʃí-súmbík-a	(vu-)
nd-a-ká-tʃí-duvûk-a	'I dipped it'	nd-a-ká-tʃí-duvík-a	(vu-)
nd-a-ká-tʃí-lízaaŋ-a	'I tried on it'	nd-a-ká-tʃí-lízaŋ-a	(vu-)
nd-a-ká-tʃí-páláàdž-a	'I dispersed it'	nd-a-ká-tʃí-páládž-a	(vu-)
nd-a-ká-tʃí-ǰálúùl-iil-a	'I chose for it'	nd-a-ká-tʃí-ǰálúl-il-a	(vu-)
nd-a-ká-tʃí-büz ^w isiis-a	'I asked it alot'	nd-a-ká-tʃí-büz ^w isisa	(vu-)

1.6. L tone verbs with vá- (cl. 2) subject prefix and -tʃí- object prefix

v-á-ká-tʃí-wáán-a	'they found it'	v-á-ká-tʃí-wán-á	(vu-)
v-á-ká-tʃí-dííl-a	'they poured it'	v-á-ká-tʃí-díl-á	(vu-)
v-á-ká-tʃí-úééz-a	'they carved it'	v-á-ká-tʃí-úéz-a	(vu-)
v-á-ká-tʃí-buúz ^w -a	'they asked it'	v-á-ká-tʃí-büz ^w -a	(vu-)
v-á-ká-tʃí-ǰálúùl-a	'they chose it'	v-á-ká-tʃí-ǰálúl-a	(vu-)
v-á-ká-tʃí-súmbûk-a	'they concealed it'	v-á-ká-tʃí-súmbík-a	(vu-)
v-á-ká-tʃí-duvûk-a	'they dipped it'	v-á-ká-tʃí-duvík-a	(vu-)
v-á-ká-tʃí-lízaaŋ-a	'they tried it on'	v-á-ká-tʃí-lízaŋ-a	(vu-)
v-á-ká-tʃí-páláàdž-a	'they dispersed it'	v-á-ká-tʃí-páládž-a	(vu-)
v-á-ká-tʃí-ǰálúùl-iil-a	'they chose for it'	v-á-ká-tʃí-ǰálúl-il-a	(vu-)
v-á-ká-tʃí-büz ^w isiis-a	'they asked it alot'	v-á-ká-tʃí-büz ^w isis-a	(vu-)

1.7. High tone verbs with ndi- 'I sg.' subject prefix and -tʃi- object prefix

nd-a-ká-tʃi-tʃ-á	'I feared it'	nd-a-ká-tʃi-tʃ-á	(vu-)
nd-a-ká-tʃi-tʃ-d-á	'I liked it'	nd-a-ká-tʃi-tʃ-d-a	(vu-)
nd-a-ká-tʃi-tʃ-túùm-á	'I sent it'	nd-a-ká-tʃi-tʃ-túm-á	(vu-)
nd-a-ká-tʃi-tʃ-dzím-á	'I extinguished it'	nd-a-ká-tʃi-tʃ-dzim-á	(vu-)
nd-a-ká-tʃi-tʃ-péèdZ-á	'I finished it'	nd-a-ká-tʃi-tʃ-pédZ-a	(vu-)
nd-a-ká-tʃi-tʃ-tóól-a	'I took it'	nd-a-ká-tʃi-tʃ-tólá	(vu-)
nd-a-ká-tʃi-tʃ-baát-a	'I caught it'	nd-a-ká-tʃi-tʃ-baɾ-á	(vu-)
nd-a-ká-tʃi-tʃ-kʰíg-a	'I lifted (on head) it'	nd-a-ká-tʃi-tʃ-kʰig-a	(vu-)
nd-a-ká-tʃi-tʃ-zaádZ-a	'I filled up it'	nd-a-ká-tʃi-tʃ-žádZ-a	(vu-)
nd-a-ká-tʃi-tʃ-fúmíik-a	'I covered it'	nd-a-ká-tʃi-tʃ-fúmik-á	(vu-)
nd-a-ká-tʃi-tʃ-dzimúúl-a	'I allayed it'	nd-a-ká-tʃi-tʃ-dzimúl-á	(vu-)
nd-a-ká-tʃi-tʃ-vígaáj-a	'I buried it'	nd-a-ká-tʃi-tʃ-vigaɾ-á	(vu-)
nd-a-ká-tʃi-tʃ-mílídZ-a	'I lifted it'	nd-a-ká-tʃi-tʃ-mílídZ-a	(vu-)
nd-a-ká-tʃi-tʃ-gʷádziís-a	'I hurt it'	nd-a-ká-tʃi-tʃ-gʷádziís-á	(vu-)

1.8. High tone verbs with vá- (cl. 2) subject prefix and -tʃi- object prefix

v-á-ká-tʃi-tʃ-á	'they feared it'	v-á-ká-tʃi-tʃ-á	(vú-)
v-á-ká-tʃi-tʃ-d-á	'they liked it'	v-á-ká-tʃi-tʃ-d-a	(vú-)
v-á-ká-tʃi-tʃ-túùm-á	'they sent it'	v-á-ká-tʃi-tʃ-túm-á	(vú-)
v-á-ká-tʃi-tʃ-dzím-á	'they extinguished it'	v-á-ká-tʃi-tʃ-dzim-á	(vú-)
v-á-ká-tʃi-tʃ-péèdZ-á	'they finished it'	v-á-ká-tʃi-tʃ-pédZ-à	(vú-)
v-á-ká-tʃi-tʃ-tóól-a	'they took it'	v-á-ká-tʃi-tʃ-tólá	(vu-)
v-á-ká-tʃi-tʃ-baát-a	'they caught it'	v-á-ká-tʃi-tʃ-baɾ-á	(vu-)
v-á-ká-tʃi-tʃ-kʰíg-a	'they lifted (on head) it'	v-á-ká-tʃi-tʃ-kʰig-a	(vu-)
v-á-ká-tʃi-tʃ-zaádZ-a	'they filled up it'	v-á-ká-tʃi-tʃ-žádZ-a	(vu-)
v-á-ká-tʃi-tʃ-fúmíik-a	'they covered it'	v-á-ká-tʃi-tʃ-fúmik-á	(vu-)
v-á-ká-tʃi-tʃ-dzimúúl-a	'they allayed it'	v-á-ká-tʃi-tʃ-dzimul-a	(vu-)
v-á-ká-tʃi-tʃ-vígaáj-a	'they buried it'	v-á-ká-tʃi-tʃ-vigaɾ-a	(vu-)
v-á-ká-tʃi-tʃ-mílídZ-a	'they lifted it'	v-á-ká-tʃi-tʃ-mílídZ-a	(vu-)
v-á-ká-tʃi-tʃ-gʷádziís-a	'they hurt it'	v-á-ká-tʃi-tʃ-gʷádziís-á	(vu-)

1.9. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-a-ká-z ^w i-wáán-a	'I found them'	nd-a-ká-z ^w i-wán-á	(vu-)
nd-a-ká-z ^w i-ḍìíl-a	'I poured them'	nd-a-ká-z ^w i-ḍil-á	(vu-)
nd-a-ká-z ^w i-uééz-a	'I carved them'	nd-a-ká-z ^w i-uéz-a	(vu-)
nd-a-ká-z ^w i-bùúz ^w -a	'I asked them'	nd-a-ká-z ^w i-büz ^w -a	(vu-)
nd-a-ká-z ^w i-ǰálúùl-a	'I chose them'	nd-a-ká-z ^w i-ǰálúl-a	(vu-)
nd-a-ká-z ^w i-súmbûk-a	'I concealed them'	nd-a-ká-z ^w i-súmbík-a	(vu-)
nd-a-ká-z ^w i-duvûk-a	'I dipped them'	nd-a-ká-z ^w i-duvík-a	(vu-)
nd-a-ká-z ^w i-lízaaŋ-a	'I tried them on'	nd-a-ká-z ^w i-lízaŋ-á	(vu-)
nd-a-ká-z ^w i-páláàḍz-a	'I dispersed them'	nd-a-ká-z ^w i-páláḍz-a	(vu-)
nd-a-ká-z ^w i-ǰálúl-iil-a	'I chose for them'	nd-a-ká-z ^w i-ǰálúl-il-a	(vu-)
nd-a-ká-z ^w i-büz ^w isiis-a	'I asked them alot'	nd-a-ká-z ^w i-büz ^w isis-a	(vu-)

2.0. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

v-á-ká-z ^w i-wáán-a	'they found them'	v-á-ká-z ^w i-wán-á	(vu-)
v-á-ká-z ^w i-ḍìíl-a	'they poured them'	v-á-ká-z ^w i-ḍil-á	(vu-)
v-á-ká-z ^w i-uééz-a	'they carved them'	v-á-ká-z ^w i-uéz-a	(vu-)
v-á-ká-z ^w i-bùúz ^w -a	'they asked them'	v-á-ká-z ^w i-büz ^w -a	(vu-)
v-á-ká-z ^w i-ǰálúùl-a	'they chose them'	v-á-ká-z ^w i-ǰálúl-a	(vu-)
v-á-ká-z ^w i-súmbûk-a	'they concealed them'	v-á-ká-z ^w i-súmbík-a	(vu-)
v-á-ká-z ^w i-duvûk-a	'they dipped them'	v-á-ká-z ^w i-duvík-a	(vu-)
v-á-ká-z ^w i-lízaaŋ-a	'they tried them on'	v-á-ká-z ^w i-lízaŋ-a	(vu-)
v-á-ká-z ^w i-páláàḍz-a	'they dispersed them'	v-á-ká-z ^w i-páláḍz-a	(vu-)
v-á-ká-z ^w i-ǰálúl-iil-a	'they chose for them'	v-á-ká-z ^w i-ǰálúlil-a	(vu-)
v-á-ká-z ^w i-büz ^w isiis-a	'they asked them alot'	v-á-ká-z ^w i-büz ^w isis-á	(vu-)

2.1. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-a-ká-z ^w ii-t̥j-á	'I feared them'	nd-a-ká-z ^w i-t̥j-á	(vú-)
nd-a-ká-z ^w ii-d-á	'I liked them'	nd-a-ká-z ^w i-d-a	(vú-)
nd-a-ká-z ^w i-túùm-á	'I sent them'	nd-a-ká-z ^w i-túm-á	(vú-)
nd-a-ká-z ^w i-d̥z̥im-á	'I extinguished them'	nd-a-ká-z ^w i-d̥zim-á	(vú-)
nd-a-ká-z ^w i-péèd̥z̥-á	'I finished them'	nd-a-ká-z ^w i-péd̥z̥-a	(vú-)
nd-a-ká-z ^w i-t̥óól-a	'I took them'	nd-a-ká-z ^w i-tólá	(vu-)
nd-a-ká-z ^w i-baát-a	'I caught them'	nd-a-ká-z ^w i-baṭ-á	(vu-)
nd-a-ká-z ^w i-k ^h íg-a	'I lifted (on head) them'	nd-a-ká-z ^w i-k ^h ig-a	(vu-)
nd-a-ká-z ^w i-zaád̥z̥-a	'I filled them up'	nd-a-ká-z ^w i-žád̥z̥-a	(vu-)
nd-a-ká-z ^w i-fúmíík-a	'I covered them'	nd-a-ká-z ^w i-fúmík-á	(vu-)
nd-a-ká-z ^w i-d̥zimúúl-a	'I allayed them'	nd-a-ká-z ^w i-d̥zimúl-á	(vu-)
nd-a-ká-z ^w i-vígaáj̥n-a	'I buried them'	nd-a-ká-z ^w i-vígaṅ-á	(vu-)
nd-a-ká-z ^w i-mílííd̥z̥-a	'I lifted them'	nd-a-ká-z ^w i-mílíd̥z̥-a	(vu-)
nd-a-ká-z ^w i-g ^w ád̥ziís-a	'I hurt them'	nd-a-ká-z ^w i-g ^w ád̥zis-á	(vu-)

2.2. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

v-á-ká-z ^w ii-t̥j-á	'they feared them'	v-á-ká-z ^w i-t̥j-á	(vú-)
v-á-ká-z ^w ii-d-á	'they liked them'	v-á-ká-z ^w i-d-a	(vú-)
v-á-ká-z ^w i-túùm-á	'they sent them'	v-á-ká-z ^w i-túm-á	(vú-)
v-á-ká-z ^w i-d̥z̥im-á	'they extinguished them'	v-á-ká-z ^w i-d̥zim-á	(vú-)
v-á-ká-z ^w i-péèd̥z̥-á	'they finished them'	v-á-ká-z ^w i-péd̥z̥-a	(vú-)
v-á-ká-z ^w i-t̥óól-a	'they took them'	v-á-ká-z ^w i-tól-á	(vu-)
v-á-ká-z ^w i-baát-a	'they caught them'	v-á-ká-z ^w i-baṭ-á	(vu-)
v-á-ká-z ^w i-k ^h íg-a	'they lifted (on head) them'	v-á-ká-z ^w i-k ^h ig-a	(vu-)
v-á-ká-z ^w i-zaád̥z̥-a	'they filled them up'	v-á-ká-z ^w i-žád̥z̥-a	(vu-)
v-á-ká-z ^w i-fúmíík-a	'they covered them'	v-á-ká-z ^w i-fúmík-á	(vu-)
v-á-ká-z ^w i-d̥zimúúl-a	'they allayed them'	v-á-ká-z ^w i-d̥zimúl-á	(vu-)
v-á-ká-z ^w i-vígaáj̥n-a	'they buried them'	v-á-ká-z ^w i-vígaṅ-á	(vu-)
v-á-ká-z ^w i-mílííd̥z̥-a	'they lifted them'	v-á-ká-z ^w i-mílíd̥z̥-a	(vu-)
v-á-ká-z ^w i-g ^w ád̥ziís-a	'they hurt them'	v-á-ká-z ^w i-g ^w ád̥zis-á	(vu-)

2.3. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nd-a-ká-z ^w i-wáàn-a	'I found self'	nd-a-ká-z ^w i-wán-a	(vu-)
nd-a-ká-z ^w i-ḍiil-a	'I poured self'	nd-a-ká-z ^w i-ḍil-a	(vu-)
nd-a-ká-z ^w i-uéèz-a	'I carved self'	nd-a-ká-z ^w i-uéž-a	(vu-)
nd-a-ká-z ^w i-buuz ^w -a	'I asked self'	nd-a-ká-z ^w i-buz ^w -a	(vu-)
nd-a-ká-z ^w i-ǰáluul-á	'I chose self'	nd-a-ká-z ^w i-ǰálul-á	(vú-)
nd-a-ká-z ^w i-súmbiik-á	'I concealed self'	nd-a-ká-z ^w i-súmbik-á	(vú-)
nd-a-ká-z ^w i-duviik-á	'I dipped self'	nd-a-ká-z ^w i-duvik-á	(vú-)
nd-a-ká-z ^w i-lízaaṅ-á	'I tried on self'	nd-a-ká-z ^w i-lízaṅ-á	(vú-)
nd-a-ká-z ^w i-pálaad̄z-á	'I dispersed self'	nd-a-ká-z ^w i-pálaḍz-a	(vú-)
nd-a-ká-z ^w i-ǰálul-iil-á	'I chose for self'	nd-a-ká-z ^w i-ǰálul-il-á	(vú-)
nd-a-ká-z ^w i-buz ^w isiis-á	'I asked self alot'	nd-a-ká-z ^w i-buz ^w isis-á	(vú-)

2.4. Low tone verbs with uá- (cl. 2) subject prefix and -z^wi- reflexive prefix

u-á-ká-z ^w i-wáàn-a	'they found selves'	u-á-ká-z ^w i-wán-a	(vu-)
u-á-ká-z ^w i-ḍiil-a	'they poured selves'	u-á-ká-z ^w i-ḍil-a	(vu-)
u-á-ká-z ^w i-uéèz-a	'they carved selves'	u-á-ká-z ^w i-uéž-a	(vu-)
u-á-ká-z ^w i-buuz ^w -a	'they asked selves'	u-á-ká-z ^w i-buz ^w -a	(vu-)
u-á-ká-z ^w i-ǰáluul-á	'they chose selves'	u-á-ká-z ^w i-ǰálul-á	(vú-)
u-á-ká-z ^w i-súmbiik-á	'they concealed selves'	u-á-ká-z ^w i-súmbik-á	(vú-)
u-á-ká-z ^w i-duviik-á	'they dipped selves'	u-á-ká-z ^w i-duvik-á	(vú-)
u-á-ká-z ^w i-lízaaṅ-á	'they tried on selves'	u-á-ká-z ^w i-lízaṅ-á	(vú-)
u-á-ká-z ^w i-pálaad̄z-á	'they dispersed selves'	u-á-ká-z ^w i-pálaḍz-a	(vú-)
u-á-ká-z ^w i-ǰálul-iil-á	'they chose for selves'	u-á-ká-z ^w i-ǰálulil-á	(vú-)
u-á-ká-z ^w i-buz ^w isiis-á	'they asked selves alot'	u-á-ká-z ^w i-buz ^w isis-á	(vú-)

2.5. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nd-a-ká-z ^w í-ṭṭ-a	'I feared self'	nd-a-ká-z ^w í-ṭṭ-á	(vu-)
nd-a-ká-z ^w í-ḍ-a	'I liked self'	nd-a-ká-z ^w í-ḍ-a	(vu-)
nd-a-ká-z ^w i-ṭùùm-a	'I sent self'	nd-a-ká-z ^w i-ṭùùm-a	(vu-)
nd-a-ká-z ^w í-ḍziim-a	'I extinguished self'	nd-a-ká-z ^w í-ḍzim-a	(vu-)
nd-a-ká-z ^w i-péèḍz-a	'I finished self'	nd-a-ká-z ^w i-péḍz-a	(vu-)
nd-a-ká-z ^w i-ṭòḍl-a	'I took self'	nd-a-ká-z ^w i-ṭòla	(vu-)
nd-a-ká-z ^w í-baṭ-a	'I caught self'	nd-a-ká-z ^w í-baṭ-a	(vu-)
nd-a-ká-z ^w i-k ^h ṭg-a	'I lifted (on head) self'	nd-a-ká-z ^w i-k ^h ṭg-a	(vu-)
nd-a-ká-z ^w í-ṣaadz-a	'I filled up self'	nd-a-ká-z ^w í-ṣadz-a	(vu-)
nd-a-ká-z ^w i-fúmiik-á	'I covered self'	nd-a-ká-z ^w i-fúmik-á	(vú-)
nd-a-ká-z ^w í-ḍzimuul-á	'I allayed self'	nd-a-ká-z ^w í-ḍzimul-á	(vú-)
nd-a-ká-z ^w i-vígaṇ-á	'I buried self'	nd-a-ká-z ^w i-vígaṇ-á	(vú-)
nd-a-ká-z ^w i-míliidz-á	'I lifted self'	nd-a-ká-z ^w i-mílidz-a	(vú-)
nd-a-ká-z ^w í-g ^w adziis-á	'I hurt self'	nd-a-ká-z ^w í-g ^w adzis-á	(vú-)

2.6. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- reflexive prefix

v-á-ká-z ^w í-ṭṭ-a	'they feared selves'	v-á-ká-z ^w í-ṭṭ-á	(vu-)
v-á-ká-z ^w í-ḍ-a	'they liked selves'	v-á-ká-z ^w í-ḍ-a	(vu-)
v-á-ká-z ^w i-ṭùùm-a	'they sent selves'	v-á-ká-z ^w i-ṭùùm-a	(vu-)
v-á-ká-z ^w í-ḍziim-a	'they extinguished selves'	v-á-ká-z ^w í-ḍzim-a	(vu-)
v-á-ká-z ^w i-péèḍz-a	'they finished selves'	v-á-ká-z ^w i-péḍz-a	(vu-)
v-á-ká-z ^w i-ṭòḍl-a	'they took selves'	v-á-ká-z ^w i-ṭòla	(vu-)
v-á-ká-z ^w í-baṭ-a	'they caught selves'	v-á-ká-z ^w í-baṭ-a	(vu-)
v-á-ká-z ^w i-k ^h ṭg-a	'they lifted (on head) selves'	v-á-ká-z ^w i-k ^h ṭg-a	(vu-)
v-á-ká-z ^w í-ṣaadz-a	'they filled up selves'	v-á-ká-z ^w í-ṣadz-a	(vu-)
v-á-ká-z ^w i-fúmiik-á	'they covered selves'	v-á-ká-z ^w i-fúmik-á	(vú-)
v-á-ká-z ^w í-ḍzimuul-á	'they allayed selves'	v-á-ká-z ^w í-ḍzimul-á	(vú-)
v-á-ká-z ^w i-vígaṇ-á	'they buried selves'	v-á-ká-z ^w i-vígaṇ-á	(vú-)
v-á-ká-z ^w i-míliidz-á	'they lifted selves'	v-á-ká-z ^w i-mílidz-a	(vú-)
v-á-ká-z ^w í-g ^w adziis-á	'they hurt selves'	v-á-ká-z ^w í-g ^w adzis-á	(vú-)

5. Yesterday Past Tense Tones

1.1. Low tone verbs with ndi- 'I sg.' subject prefix

nda-lála ndáá-w-a	'I fell'	nda-lála ndá-w-á	(vu-)
nda-lála ndáá-g ^w -a	'I fought'	nda-lála ndá-g ^w -a	(vu-)
nda-lála ndá-wáàn-á	'I found'	nda-lála ndá-wán-á	(vu-)
nda-lála ndá-ḍiil-á	'I poured'	nda-lála ndá-ḍil-á	(vu-)
nda-lála ndá-veèz-á	'I carved'	nda-lála ndá-veéz-a	(vu-)
nda-lála ndá-buuz ^w -á	'I asked'	nda-lála ndá-buz ^w -á	(vu-)
nda-lála ndá-ḵálúúl-a	'I chose'	nda-lála ndá-ḵálúl-á	(vu-)
nda-lála ndá-súmbíík-a	'I concealed'	nda-lála ndá-súmbík-á	(vu-)
nda-lála ndá-duvíík-a	'I dipped'	nda-lála ndá-duvík-á	(vu-)
nda-lála ndá-lízààṅ-a	'I tried on'	nda-lála ndá-lízàṅ-á	(vu-)
nda-lála ndá-pálááḍz-a	'I dispersed'	nda-lála ndá-páláḍz-a	(vu-)
nda-lála ndá-ḵálúl-íl-a	'I chose for'	nda-lála ndá-ḵálúl-íl-á	(vu-)
nda-lála ndá-buz ^w isíís-a	'I asked alot'	nda-lála ndá-buz ^w isíís-á	(vu-)

1.2. Low tone verbs with vá- (cl. 2) subject prefix

vá-lála váá-w-a	'they fell'	vá-lála vá-w-á	(vu-)
vá-lála váá-g ^w -a	'they fought'	vá-lála vá-g ^w -a	(vu-)
vá-lála vá-wáàn-á	'they found'	vá-lála vá-wán-á	(vu-)
vá-lála vá-ḍiil-á	'they poured'	vá-lála vá-ḍil-á	(vu-)
vá-lála vá-veèz-á	'they carved'	vá-lála vá-veéz-a	(vu-)
vá-lála vá-buuz ^w -á	'they asked'	vá-lála vá-buz ^w -á	(vu-)
vá-lála vá-ḵálúúl-a	'they chose'	vá-lála vá-ḵálúl-á	(vu-)
vá-lála vá-súmbíík-a	'they concealed'	vá-lála vá-súmbík-á	(vu-)
vá-lála vá-duvíík-a	'they dipped'	vá-lála vá-duvík-á	(vu-)
vá-lála vá-lízààṅ-a	'they tried on'	vá-lála vá-lízàṅ-á	(vu-)
vá-lála vá-pálááḍz-a	'they dispersed'	vá-lála vá-páláḍz-a	(vu-)
vá-lála vá-ḵálúl-íl-a	'they chose for'	vá-lála vá-ḵálúl-íl-á	(vu-)
vá-lála vá-buz ^w isíís-a	'they asked alot'	vá-lála vá-buz ^w isíís-á	(vu-)

1.3. High tone verbs with ndi- 'I sg.' subject prefix

nda-lálá ndáá-t̃j̃-a	'I feared'	nda-lálá ndá-t̃j̃-á	(vú-)
nda-lálá ndáá-d̃-a	'I liked'	nda-lálá ndá-d̃-a	(vú-)
nda-lálá ndá-t̃úúm-a	'I sent'	nda-lálá ndá-t̃úm-á	(vú-)
nda-lálá ndá-d̃zim-a	'I extinguished'	nda-lálá ndá-d̃zim-á	(vú-)
nda-lálá ndá-pééd̃z-a	'I finished'	nda-lálá ndá-péd̃z-a	(vú-)
nda-lálá ndá-t̃óól-a	'I took'	nda-lálá ndá-t̃ól-á	(vu-)
nda-lálá ndá-bàát̃-a	'I caught'	nda-lálá ndá-baṭ̃-á	(vu-)
nda-lálá ndá-k̃h̃íg-a	'I lifted (on head)'	nda-lálá ndá-k̃h̃íg-a	(vu-)
nda-lálá ndá-ʒàád̃z-a	'I filled up'	nda-lálá ndá-ʒád̃z-a	(vu-)
nda-lálá ndá-fúm̃ik-á	'I covered'	nda-lálá ndá-fúm̃ik-á	(vú-)
nda-lálá ndá-d̃zimúùl-á	'I allayed'	nda-lálá ndá-d̃zimúl-á	(vú-)
nda-lálá ndá-vígaṇ-á	'I buried'	nda-lálá ndá-vígaṇ-á	(vú-)
nda-lálá ndá-míl̃id̃z-á	'I lifted'	nda-lálá ndá-míl̃id̃z-a	(vú-)
nda-lálá ndá-g ^w ád̃ziis-á	'I hurt (s.o.)'	nda-lálá ndá-g ^w ád̃zis-á	(vú-)

1.4. High tone verbs with vá- (cl. 2) subject prefix

vá-lála váá-t̃j̃-a	'they feared'	vá-lála vá-t̃j̃-á	(vú-)
vá-lála váá-d̃-a	'they liked'	vá-lála vá-d̃-a	(vú-)
vá-lála vá-t̃úúm-a	'they sent'	vá-lála vá-t̃úm-á	(vú-)
vá-lála vá-d̃zim-a	'they extinguished'	vá-lála vá-d̃zim-á	(vú-)
bá-lála bá-pééd̃z-a	'they finished'	vá-lála vá-péd̃z-a	(vú-)
vá-lála vá-t̃óól-a	'they took'	vá-lála vá-t̃ól-á	(vu-)
vá-lála vá-bàát̃-a	'they caught'	vá-lála vá-baṭ̃-á	(vu-)
vá-lála vá-k̃h̃íg-a	'they lifted (on head)'	vá-lála vá-k̃h̃íg-a	(vu-)
vá-lála vá-ʒàád̃z-a	'they filled up'	vá-lála vá-ʒád̃z-a	(vu-)
vá-lála vá-fúm̃ik-á	'they covered'	vá-lála vá-fúm̃ik-á	(vú-)
vá-lála vá-d̃zimúùl-á	'they allayed'	vá-lála vá-d̃zimúl-á	(vú-)
vá-lála vá-vígaṇ-á	'they buried'	vá-lála vá-vígaṇ-á	(vú-)
vá-lála vá-míl̃id̃z-á	'they lifted'	vá-lála vá-míl̃id̃z-a	(vú-)
vá-lála vá-g ^w ád̃ziis-á	'they hurt (s.o.)'	vá-lála vá-g ^w ád̃zis-á	(vú-)

1.5. Low tone verbs with ndi- 'I sg.' subject prefix and -tʃí- object prefix

nda-lála ndá-tʃí-n-á	'I defecated it'	nda-lála ndá-tʃí-n-á	(vú-)
nda-lála ndá-tʃí-wáàn-á	'I found it'	nda-lála ndá-tʃí-wán-á	(vú-)
nda-lála ndá-tʃí-ḍiil-á	'I poured it'	nda-lála ndá-tʃí-ḍil-á	(vú-)
nda-lála ndá-tʃí-veèz-ǎ	'I carved it'	nda-lála ndá-tʃí-veʒ-a	(vu-)
nda-lála ndá-tʃí-buuz ^w -ǎ	'I asked it'	nda-lála ndá-tʃí-buz ^w -a	(vú-)
nda-lála ndá-tʃí-ʃálúúl-a	'I chose it'	nda-lála ndá-tʃí-ʃálúl-á	(vu-)
nda-lála ndá-tʃí-súmbíík-a	'I concealed it'	nda-lála ndá-tʃí-súmbík-á	(vu-)
nda-lála ndá-tʃí-duvíík-a	'I dipped it'	nda-lála ndá-tʃí-duvík-á	(vu-)
nda-lála ndá-tʃí-lízaáŋ-a	'I tried on it'	nda-lála ndá-tʃí-lízaŋ-á	(vu-)
nda-lála ndá-tʃí-páláádž-a	'I dispersed it'	nda-lála ndá-tʃí-páládž-a	(vu-)
nda-lála ndá-tʃí-ʃálúl-ííl-a	'I chose for it'	nda-lála ndá-tʃí-ʃálúl-íl-á	(vu-)
nda-lála ndá-tʃí-buz ^w isíís-a	'I asked it alot'	nda-lála ndá-tʃí-buz ^w isísá	(vu-)

1.6. Low tone verbs with vá- (cl. 2) subject prefix and -tʃí- object prefix

vá-lála vá-tʃí-wáàn-á	'they found it'	vá-lála vá-tʃí-wán-á	(vú-)
vá-lála vá-tʃí-ḍiil-á	'they poured it'	vá-lála vá-tʃí-ḍil-á	(vú-)
vá-lála vá-tʃí-veèz-ǎ	'they carved it'	vá-lála vá-tʃí-veʒ-a	(vú-)
vá-lála vá-tʃí-buuz ^w -ǎ	'they asked it'	vá-lála vá-tʃí-buz ^w -a	(vú-)
vá-lála vá-tʃí-ʃálúúl-a	'they chose it'	vá-lála vá-tʃí-ʃálúl-á	(vu-)
vá-lála vá-tʃí-súmbíík-a	'they concealed it'	vá-lála vá-tʃí-súmbík-á	(vu-)
vá-lála vá-tʃí-duvíík-a	'they dipped it'	vá-lála vá-tʃí-duvík-á	(vu-)
vá-lála vá-tʃí-lízaáŋ-a	'they tried on it'	vá-lála vá-tʃí-lízaŋ-á	(vu-)
vá-lála vá-tʃí-páláádž-a	'they dispersed it'	vá-lála vá-tʃí-páládž-a	(vu-)
vá-lála vá-tʃí-ʃálúl-ííl-a	'they chose for it'	vá-lála vá-tʃí-ʃálúl-íl-á	(vu-)
vá-lála vá-tʃí-buz ^w isíís-a	'they asked it alot'	vá-lála vá-tʃí-buz ^w isísá	(vu-)

1.7. High tone verbs with ndi- 'I sg.' subject prefix and -t̃j̃i- object prefix

nda-lála ndá-t̃j̃i-t̃j̃-á	'I feared it'	nda-lála ndá-t̃j̃i-t̃j̃-á	(vú-)
nda-lála ndá-t̃j̃i-d̃-á	'I liked it'	nda-lála ndá-t̃j̃i-d̃-a	(vú-)
nda-lála ndá-t̃j̃i-t̃úúm-a	'I sent it'	nda-lála ndá-t̃j̃i-t̃úm-á	(vu-)
nda-lála ndá-t̃j̃i-d̃ziím-a	'I extinguished it'	nda-lála ndá-t̃j̃i-d̃zim-á	(vu-)
nda-lála ndá-t̃j̃i-péédz-a	'I finished it'	nda-lála ndá-t̃j̃i-pédz-a	(vu-)
nda-lála ndá-t̃j̃i-t̃óól-a	'I took it'	nda-lála ndá-t̃j̃i-t̃ólá	(vu-)
nda-lála ndá-t̃j̃i-baát-a	'I caught it'	nda-lála ndá-t̃j̃i-baṭ-á	(vu-)
nda-lála ndá-t̃j̃i-k ^h íg-a	'I lifted (on head) it'	nda-lála ndá-t̃j̃i-k ^h ig-a	(vu-)
nda-lála ndá-t̃j̃i-zaádz-a	'I filled up it'	nda-lála ndá-t̃j̃i-žádz-a	(vu-)
nda-lála ndá-t̃j̃i-fúmîk-á	'I covered it'	nda-lála ndá-t̃j̃i-fúmík-á	(vú-)
nda-lála ndá-t̃j̃i-d̃zimúùl-á	'I allayed it'	nda-lála ndá-t̃j̃i-d̃zimúl-á	(vú-)
nda-lála ndá-t̃j̃i-vígaan-á	'I buried it'	nda-lála ndá-t̃j̃i-vígan-á	(vú-)
nda-lála ndá-t̃j̃i-mílîdz-á	'I lifted it'	nda-lála ndá-t̃j̃i-mílîdz-a	(vú-)
nda-lála ndá-t̃j̃i-g ^w ádziis-á	'I hurt it'	nda-lála ndá-t̃j̃i-g ^w ádzis-á	(vú-)

1.8. High tone verbs with vá- (cl. 2) subject prefix and -t̃j̃i- object prefix

vá-lála vá-t̃j̃i-t̃j̃-á	'they feared it'	vá-lála vá-t̃j̃i-t̃j̃-á	(vú-)
vá-lála vá-t̃j̃i-d̃-á	'they liked it'	vá-lála vá-t̃j̃i-d̃-a	(vú-)
vá-lála vá-t̃j̃i-t̃úúm-a	'they sent it'	vá-lála vá-t̃j̃i-t̃úm-á	(vu-)
vá-lála vá-t̃j̃i-d̃ziím-a	'they extinguished it'	vá-lála vá-t̃j̃i-d̃zim-á	(vu-)
vá-lála vá-t̃j̃i-péédz-a	'they finished it'	vá-lála vá-t̃j̃i-pédz-a	(vu-)
vá-lála vá-t̃j̃i-t̃óól-a	'they took it'	vá-lála vá-t̃j̃i-t̃ólá	(vu-)
vá-lála vá-t̃j̃i-baát-a	'they caught it'	vá-lála vá-t̃j̃i-baṭ-á	(vu-)
vá-lála vá-t̃j̃i-k ^h íg-a	'they lifted (on head) it'	vá-lála vá-t̃j̃i-k ^h ig-a	(vu-)
vá-lála vá-t̃j̃i-zaádz-a	'they filled up it'	vá-lála vá-t̃j̃i-žádz-a	(vu-)
vá-lála vá-t̃j̃i-fúmîk-á	'they covered it'	vá-lála vá-t̃j̃i-fúmík-á	(vú-)
vá-lála vá-t̃j̃i-d̃zimúùl-á	'they allayed it'	vá-lála vá-t̃j̃i-d̃zimúl-á	(vú-)
vá-lála vá-t̃j̃i-vígaan-á	'they buried it'	vá-lála vá-t̃j̃i-vígan-á	(vú-)
vá-lála vá-t̃j̃i-mílîdz-á	'they lifted it'	vá-lála vá-t̃j̃i-mílîdz-a	(vú-)
vá-lála vá-t̃j̃i-g ^w ádziis-á	'they hurt it'	vá-lála vá-t̃j̃i-g ^w ádzis-á	(vú-)

1.9. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nda-lálá ndá-z ^w i-waan-á	'I found them'	nda-lálá ndá-z ^w i-wan-á	(vú-)
nda-lálá ndá-z ^w i-ḍiil-á	'I poured them'	nda-lálá ndá-z ^w i-ḍil-á	(vú-)
nda-lálá ndá-z ^w i-vee3-á	'I carved them'	nda-lálá ndá-z ^w i-ve3-a	(vú-)
nda-lálá ndá-z ^w i-buuz ^w -á	'I asked them'	nda-lálá ndá-z ^w i-buz ^w -a	(vú-)
nda-lálá ndá-z ^w i-ḡalúúl-a	'I chose them'	nda-lálá ndá-z ^w i-ḡalúl-á	(vu-)
nda-lálá ndá-z ^w i-sumbík-a	'I concealed them'	nda-lálá ndá-z ^w i-sumbík-á	(vu-)
nda-lálá ndá-z ^w i-duvík-a	'I dipped them'	nda-lálá ndá-z ^w i-duvík-á	(vu-)
nda-lálá ndá-z ^w i-lizaǎn-a	'I tried them on'	nda-lálá ndá-z ^w i-lizǎn-á	(vu-)
nda-lálá ndá-z ^w i-palááḍz-a	'I dispersed them'	nda-lálá ndá-z ^w i-palááḍz-a	(vu-)
nda-lálá ndá-z ^w i-ḡalúl-iil-a	'I chose for them'	nda-lálá ndá-z ^w i-ḡalúl-il-a	(vu-)
nda-lálá ndá-z ^w i-buz ^w isís-a	'I asked them alot'	nda-lálá ndá-z ^w i-buz ^w isís-á	(vu-)

2.0. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

vá-lála vá-z ^w i-waan-á	'they found them'	vá-lála vá-z ^w i-wan-á	(vú-)
vá-lála vá-z ^w i-ḍiil-á	'they poured them'	vá-lála vá-z ^w i-ḍil-á	(vú-)
vá-lála vá-z ^w i-vee3-á	'they carved them'	vá-lála vá-z ^w i-ve3-a	(vú-)
vá-lála vá-z ^w i-buuz ^w -á	'they asked them'	vá-lála vá-z ^w i-buz ^w -a	(vú-)
vá-lála vá-z ^w i-ḡalúúl-a	'they chose them'	vá-lála vá-z ^w i-ḡalúl-á	(vu-)
vá-lála vá-z ^w i-sumbík-a	'they concealed them'	vá-lála vá-z ^w i-sumbík-á	(vu-)
vá-lála vá-z ^w i-duvík-a	'they dipped them'	vá-lála vá-z ^w i-duvík-á	(vu-)
vá-lála vá-z ^w i-lizaǎn-a	'they tried on them'	vá-lála vá-z ^w i-lizǎn-á	(vu-)
vá-lála vá-z ^w i-palááḍz-a	'they dispersed them'	vá-lála vá-z ^w i-palááḍz-a	(vu-)
vá-lála vá-z ^w i-ḡalúl-íil-a	'they chose for them'	vá-lála vá-z ^w i-ḡalúlíl-á	(vu-)
vá-lála vá-z ^w i-buz ^w isís-a	'they asked them alot'	vá-lála vá-z ^w i-buz ^w isís-á	(vu-)

2.1. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nda-lálá ndá-z ^w ii-t̃j-á	'I feared them'	nda-lálá ndá-z ^w i-t̃j-á	(vú-)
nda-lálá ndá-z ^w ii-d̃-á	'I liked them'	nda-lálá ndá-z ^w i-d̃-a	(vú-)
nda-lálá ndá-z ^w i-t̃úúm-a	'I sent them'	nda-lálá ndá-z ^w i-t̃úm-a	(vu-)
nda-lálá ndá-z ^w i-d̃z̃im-a	'I extinguished them'	nda-lálá ndá-z ^w i-d̃zim-á	(vu-)
nda-lálá ndá-z ^w i-pééd̃z-a	'I finished them'	nda-lálá ndá-z ^w i-péd̃z-a	(vu-)
nda-lálá ndá-z ^w i-t̃óól-a	'I took them'	nda-lálá ndá-z ^w i-t̃ólá	(vu-)
nda-lálá ndá-z ^w i-baaṭ-a	'I caught them'	nda-lálá ndá-z ^w i-baṭ-a	(vu-)
nda-lálá ndá-z ^w i-k ^h íg-a	'I lifted (on head) them'	nda-lálá ndá-z ^w i-k ^h ig-a	(vu-)
nda-lálá ndá-z ^w i-zaád̃z-a	'I filled up them'	nda-lálá ndá-z ^w i-žád̃z-a	(vu-)
nda-lálá ndá-z ^w i-fúmíik-á	'I covered them'	nda-lálá ndá-z ^w i-fúmík-á	(vú-)
nda-lálá ndá-z ^w i-d̃zimúul-á	'I allayed them'	nda-lálá ndá-z ^w i-d̃zimúl-á	(vú-)
nda-lálá ndá-z ^w i-vígaṇ-á	'I buried them'	nda-lálá ndá-z ^w i-vígaṇ-á	(vú-)
nda-lálá ndá-z ^w i-mílíid̃z-á	'I lifted them'	nda-lálá ndá-z ^w i-mílíd̃z-a	(vú-)
nda-lálá ndá-z ^w i-g ^w ád̃ziis-á	'I hurt them'	nda-lálá ndá-z ^w i-g ^w ád̃zis-á	(vú-)

2.2. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

vá-lála vá-z ^w ii-t̃j-á	'they feared them'	vá-lála vá-z ^w i-t̃j-á	(vú-)
vá-lála vá-z ^w ii-d̃-á	'they liked them'	vá-lála vá-z ^w i-d̃-a	(vú-)
vá-lála vá-z ^w i-t̃úúm-a	'they sent them'	vá-lála vá-z ^w i-t̃úm-a	(vú-)
vá-lála vá-z ^w i-d̃z̃im-a	'they extinguished them'	vá-lála vá-z ^w i-d̃zim-á	(vú-)
vá-lála vá-z ^w i-pééd̃z-a	'they finished them'	vá-lála vá-z ^w i-péd̃z-a	(vu-)
vá-lála vá-z ^w i-t̃óól-a	'they took them'	vá-lála vá-z ^w i-t̃ól-á	(vu-)
vá-lála vá-z ^w i-bàáṭ-a	'they caught them'	vá-lála vá-z ^w i-baṭ-á	(vu-)
vá-lála vá-z ^w i-k ^h íg-a	'they lifted (on head) them'	vá-lála vá-z ^w i-k ^h ig-a	(vu-)
vá-lála vá-z ^w i-zaád̃z-a	'they filled them up'	vá-lála vá-z ^w i-žád̃z-a	(vu-)
vá-lála vá-z ^w i-fúmíik-á	'they covered them'	vá-lála vá-z ^w i-fúmík-á	(vú-)
vá-lála vá-z ^w i-d̃zimúul-á	'they allayed them'	vá-lála vá-z ^w i-d̃zimúl-á	(vú-)
vá-lála vá-z ^w i-vígaṇ-á	'they buried them'	vá-lála vá-z ^w i-vígaṇ-á	(vú-)
vá-lála vá-z ^w i-mílíid̃z-á	'they lifted them'	vá-lála vá-z ^w i-mílíd̃z-a	(vú-)
vá-lála vá-z ^w i-g ^w ád̃ziis-á	'they hurt them'	vá-lála vá-z ^w i-g ^w ád̃zis-á	(vú-)

2.3. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nda-lála ndá-z ^w i-wáan-a	'I found self'	nda-lála ndá-z ^w i-wán-á	(vu-)
nda-lála ndá-z ^w i-ḍiil-a	'I poured self'	nda-lála ndá-z ^w i-ḍil-a	(vu-)
nda-lála ndá-z ^w i-uéèz-a	'I carved self'	nda-lála ndá-z ^w i-uéèz-a	(vu-)
nda-lála ndá-z ^w i-buuz ^w -a	'I asked self'	nda-lála ndá-z ^w i-buz ^w -a	(vu-)
nda-lála ndá-z ^w i-fáluul-á	'I chose self'	nda-lála ndá-z ^w i-fálul-á	(vú-)
nda-lála ndá-z ^w i-súmbiik-á	'I concealed self'	nda-lála ndá-z ^w i-súmbik-á	(vú-)
nda-lála ndá-z ^w i-duviik-á	'I dipped self'	nda-lála ndá-z ^w i-duvik-á	(vú-)
nda-lála ndá-z ^w i-lízaaṅ-á	'I tried on self'	nda-lála ndá-z ^w i-lízaṅ-á	(vú-)
nda-lála ndá-z ^w i-pálaad̄z-á	'I dispersed self'	nda-lála ndá-z ^w i-pálaad̄z-a	(vú-)
nda-lála ndá-z ^w i-fálul-iil-á	'I chose for self'	nda-lála ndá-z ^w i-fálul-il-á	(vú-)
nda-lála ndá-z ^w i-buz ^w isiis-á	'I asked self alot'	nda-lála ndá-z ^w i-buz ^w isis-á	(vú-)

2.4. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- reflexive prefix

vá-lála vá-z ^w i-wáan-a	'they found selves'	vá-lála vá-z ^w i-wán-a	(vu-)
vá-lála vá-z ^w i-ḍiil-a	'they poured selves'	vá-lála vá-z ^w i-ḍil-a	(vu-)
vá-lála vá-z ^w i-uéèz-a	'they carved selves'	vá-lála vá-z ^w i-uéèz-a	(vu-)
vá-lála vá-z ^w i-buuz ^w -a	'they asked selves'	vá-lála vá-z ^w i-buz ^w -a	(vu-)
vá-lála vá-z ^w i-fáluul-á	'they chose selves'	vá-lála vá-z ^w i-fálul-á	(vú-)
vá-lála vá-z ^w i-súmbiik-á	'they concealed selves'	vá-lála vá-z ^w i-súmbik-á	(vú-)
vá-lála vá-z ^w i-duviik-á	'they dipped selves'	vá-lála vá-z ^w i-duvik-á	(vú-)
vá-lála vá-z ^w i-lízaaṅ-á	'they tried on selves'	vá-lála vá-z ^w i-lízaṅ-á	(vú-)
vá-lála vá-z ^w i-pálaad̄z-á	'they dispersed selves'	vá-lála vá-z ^w i-pálaad̄z-a	(vú-)
vá-lála vá-z ^w i-fálul-iil-á	'they chose for selves'	vá-lála vá-z ^w i-fálulil-á	(vú-)
vá-lála vá-z ^w i-buz ^w isiis-à	'they asked selves alot'	vá-lála vá-z ^w i-buz ^w isis-á	(vú-)

2.5. High tone verbs with ndi- 'I sg.' subject prefix and -z^wí- reflexive prefix

nda-lálá ndá-z ^w í-t̥-a	'I feared self'	nda-lálá ndá-z ^w í-t̥-á	(vu-)
nda-lálá ndá-z ^w í-d-a	'I liked self'	nda-lálá ndá-z ^w í-d-a	(vu-)
nda-lálá ndá-z ^w í-túùm-a	'I sent self'	nda-lálá ndá-z ^w í-túm-a	(vu-)
nda-lálá ndá-z ^w í-ḍziim-a	'I extinguished self'	nda-lálá ndá-z ^w í-ḍzim-a	(vu-)
nda-lálá ndá-z ^w í-péèḍz-a	'I finished self'	nda-lálá ndá-z ^w í-péḍz-a	(vu-)
nda-lálá ndá-z ^w í-tóòl-a	'I took self'	nda-lálá ndá-z ^w í-tóla	(vu-)
nda-lálá ndá-z ^w í-baaṭ-a	'I caught self'	nda-lálá ndá-z ^w í-baṭ-a	(vu-)
nda-lálá ndá-z ^w í-k ^h íg-a	'I lifted (on head) self'	nda-lálá ndá-z ^w í-k ^h íg-a	(vu-)
nda-lálá ndá-z ^w í-zaaḍz-a	'I filled up self'	nda-lálá ndá-z ^w í-zaḍz-a	(vu-)
nda-lálá ndá-z ^w í-fúmiik-á	'I covered self'	nda-lálá ndá-z ^w í-fúmik-á	(vú-)
nda-lálá ndá-z ^w í-ḍzimuul-á	'I allayed self'	nda-lálá ndá-z ^w í-ḍzimul-á	(vú-)
nda-lálá ndá-z ^w í-úígaṇ-á	'I buried self'	nda-lálá ndá-z ^w í-úígaṇ-á	(vú-)
nda-lálá ndá-z ^w í-míliidz-á	'I lifted self'	nda-lálá ndá-z ^w í-mílidz-a	(vú-)
nda-lálá ndá-z ^w í-g ^w adziis-á	'I hurt self'	nda-lálá ndá-z ^w í-g ^w adzis-á	(vú-)

2.6. High tone verbs with vá- (cl. 2) subject prefix and -z^wí- reflexive prefix

vá-lála vá-z ^w í-t̥-a	'they feared selves'	vá-lála vá-z ^w í-t̥-á	(vu-)
vá-lála vá-z ^w í-d-a	'they liked selves'	vá-lála vá-z ^w í-d-a	(vu-)
vá-lála vá-z ^w í-túùm-a	'they sent selves'	vá-lála vá-z ^w í-túm-a	(vu-)
vá-lála vá-z ^w í-ḍziim-a	'they extinguished selves'	vá-lála vá-z ^w í-ḍzim-a	(vu-)
vá-lála vá-z ^w í-péèḍz-a	'they finished selves'	vá-lála vá-z ^w í-péḍz-a	(vu-)
vá-lála vá-z ^w í-tóòl-a	'they took selves'	vá-lála vá-z ^w í-tóla	(vu-)
vá-lála vá-z ^w í-baaṭ-a	'they caught selves'	vá-lála vá-z ^w í-baṭ-a	(vu-)
vá-lála vá-z ^w í-k ^h íg-a	'they lifted (on head) selves'	vá-lála vá-z ^w í-k ^h íg-a	(vu-)
vá-lála vá-z ^w í-zaaḍz-a	'they filled up selves'	vá-lála vá-z ^w í-zaḍz-a	(vu-)
vá-lála vá-z ^w í-fúmiik-á	'they covered selves'	vá-lála vá-z ^w í-fúmik-á	(vú-)
vá-lála vá-z ^w í-ḍzimuul-á	'they allayed selves'	vá-lála vá-z ^w í-ḍzimul-á	(vú-)
vá-lála vá-z ^w í-úígaṇ-á	'they buried selves'	vá-lála vá-z ^w í-úígaṇ-á	(vú-)
vá-lála vá-z ^w í-míliidz-á	'they lifted selves'	vá-lála vá-z ^w í-mílidz-a	(vú-)
vá-lála vá-z ^w í-g ^w adziis-á	'they hurt selves'	vá-lála vá-z ^w í-g ^w adzis-á	(vú-)

6. Future Tense Tones

1.1. Low tone verbs with ndi- 'I sg.' subject prefix

nd-óòð-w-a	'I'll fall'	nd-óòð-w-a	(vu-)
nd-óòð-g ^w -a	'I'll fight'	nd-óòð-g ^w -a	(vu-)
nd-óòð-waan-a	'I'll find'	nd-óòð-wan-a	(vu-)
nd-óòð-ḍiil-a	'I'll pour'	nd-óòð-ḍil-a	(vu-)
nd-óòð-veez-a	'I'll carve'	nd-óòð-vez-a	(vu-)
nd-óòð-buuz ^w -a	'I'll ask'	nd-óòð-buz ^w -a	(vu-)
nd-óòð-ḥaluul-a	'I'll choose'	nd-óòð-ḥalul-a	(vu-)
nd-óòð-sumbiik-a	'I'll conceal'	nd-óòð-sumbik-a	(vu-)
nd-óòð-duviik-a	'I'll dip'	nd-óòð-duvik-a	(vu-)
nd-óòð-lizaḥ-a	'I'll try on'	nd-óòð-lizaḥ-a	(vu-)
nd-óòð-palaad̄z-a	'I'll disperse'	nd-óòð-palad̄z-a	(vu-)
nd-óòð-ḥalul-iil-a	'I'll choose for'	nd-óòð-ḥalul-il-a	(vu-)
nd-óòð-buz ^w isiis-a	'I'll ask alot'	nd-óòð-buz ^w isis-a	(vu-)

1.2. Low tone verbs with vá- (cl. 2) subject prefix

vá-nooo-w-a	'they'll fall'	vá-noo-w-a	(vu-)
vá-nooo-g ^w -a	'they'll fight'	vá-noo-g ^w -a	(vu-)
vá-noo-waan-a	'they'll find'	vá-noo-wan-a	(vu-)
vá-noo-ḍiil-a	'they'll pour'	vá-noo-ḍil-a	(vu-)
vá-noo-veez-a	'they'll carve'	vá-noo-vez-a	(vu-)
vá-noo-buuz ^w -a	'they'll ask'	vá-noo-buz ^w -a	(vu-)
vá-noo-ḥaluul-a	'they'll choose'	vá-noo-ḥalul-a	(vu-)
vá-noo-sumbiik-a	'they'll conceal'	vá-noo-sumbik-a	(vu-)
vá-noo-duviik-a	'they'll dip'	vá-noo-duvik-a	(vu-)
vá-noo-lizaḥ-a	'they'll try on'	vá-noo-lizaḥ-a	(vu-)
vá-noo-palaad̄z-a	'they'll disperse'	vá-noo-palad̄z-a	(vu-)
vá-noo-ḥalul-iil-a	'they'll choose for'	vá-noo-ḥalul-il-a	(vu-)
vá-noo-buz ^w isiis-a	'they'll ask alot'	vá-noo-buz ^w isis-a	(vu-)

1.3. High tone verbs with ndi- 'I sg.' subject prefix

nd-óò-ṽ-á	'I'll fear'	nd-óò-ṽ-á	(vú-)
nd-óò-ḍ-á	'I'll like'	nd-óò-ḍ-a	(vú-)
nd-óò-ṽùm-á	'I'll send'	nd-óò-ṽúm-á	(vú-)
nd-óò-ḍṽm-á	'I'll extinguish'	nd-óò-ḍzim-á	(vú-)
nd-óò-péèḍz-á	'I'll finish'	nd-óò-péḍz-à	(vú-)
nd-óò-ṽól-a	'I'll take'	nd-óò-ṽólá	(vu-)
nd-óò-baáṽ-a	'I'll catch'	nd-óò-baṽ-á	(vu-)
nd-óò-k ^h íg-a	'I'll lift (on head)'	nd-óò-k ^h íg-a	(vu-)
nd-óò-zaáḍz-a	'I'll fill up'	nd-óò-zaḍz-a	(vu-)
nd-óò-fúmík-a	'I'll cover'	nd-óò-fúmík-á	(vu-)
nd-óò-ḍzimúúl-a	'I'll allay'	nd-óò-ḍzimúl-á	(vu-)
nd-óò-úígaṽ-a	'I'll bury'	nd-óò-úígaṽ-á	(vu-)
nd-óò-mílíḍz-a	'I'll lift'	nd-óò-mílíḍz-a	(vu-)
nd-óò-g ^w ḍziís-a	'I'll hurt (s.o.)'	nd-óò-g ^w ḍzis-á	(vu-)

1.4. High tone verbs with vá- (cl. 2) subject prefix

vá-noo-ṽ-á	'they'll fear'	vá-noo-ṽ-á	(vú-)
vá-noo-ḍ-á	'they'll like'	vá-noo-ḍ-a	(vú-)
vá-noo-ṽùm-á	'they'll send'	vá-noo-ṽúm-á	(vú-)
vá-noo-ḍṽm-á	'they'll extinguish'	vá-noo-ḍzim-á	(vú-)
vá-noo-péèḍz-á	'they'll finish'	vá-noo-péḍz-a	(vú-)
vá-noo-ṽól-a	'they'll take'	vá-noo-ṽólá	(vu-)
vá-noo-baáṽ-a	'they'll catch'	vá-noo-baṽ-á	(vu-)
vá-noo-k ^h íg-a	'they'll lift (on head)'	vá-noo-k ^h íg-a	(vu-)
vá-noo-zaáḍz-a	'they'll fill up'	vá-noo-zaḍz-a	(vu-)
vá-noo-fúmík-a	'they'll cover'	vá-noo-fúmík-á	(vu-)
vá-noo-ḍzimúúl-a	'they'll allay'	vá-noo-ḍzimúl-á	(vu-)
vá-noo-úígaṽ-a	'they'll bury'	vá-noo-úígaṽ-á	(vu-)
vá-noo-mílíḍz-a	'they'll lift'	vá-noo-mílíḍz-a	(vu-)
vá-noo-g ^w ḍziís-a	'they'll hurt (s.o.)'	vá-noo-g ^w ḍzis-á	(vu-)

1.5. Low tone verbs with ndi- '1 sg.' subject prefix and -tʃí- object prefix

nd-ód-tʃí-wáán-a	'I'll find it'	nd-ód-tʃí-wán-á	(vu-)
nd-ód-tʃí-dííl-a	'I'll pour it'	nd-ód-tʃí-díl-á	(vu-)
nd-ód-tʃí-úéé3-a	'I'll carve it'	nd-ód-tʃí-úé3-a	(vu-)
nd-ód-tʃí-buúz ^w -a	'I'll ask it'	nd-ód-tʃí-büz ^w -a	(vu-)
nd-ód-tʃí-ǰálúùl-a	'I'll choose it'	nd-ód-tʃí-ǰálúl-a	(vu-)
nd-ód-tʃí-súmbûk-a	'I'll conceal it'	nd-ód-tʃí-súmbík-a	(vu-)
nd-ód-tʃí-duvûk-a	'I'll dip it'	nd-ód-tʃí-duvík-a	(vu-)
nd-ód-tʃí-lízaaŋ-a	'I'll try on it'	nd-ód-tʃí-lízaŋ-a	(vu-)
nd-ód-tʃí-pálááǰz-a	'I'll disperse it'	nd-ód-tʃí-páláǰz-a	(vu-)
nd-ód-tʃí-ǰálúl-iil-a	'I'll choose for it'	nd-ód-tʃí-ǰálúl-il-a	(vu-)
nd-ód-tʃí-büz ^w isiis-a	'I'll ask it alot'	nd-ód-tʃí-büz ^w isisa	(vu-)

1.6. Low tone verbs with vá- (cl. 2) subject prefix and -tʃí- object prefix

vá-noo-tʃí-wáán-a	'they'll find it'	vá-noo-tʃí-wán-á	(vu-)
vá-noo-tʃí-dííl-a	'they'll pour it'	vá-noo-tʃí-díl-á	(vu-)
vá-noo-tʃí-úéé3-a	'they'll carve it'	vá-noo-tʃí-úé3-a	(vu-)
vá-noo-tʃí-buúz ^w -a	'they'll ask it'	vá-noo-tʃí-büz ^w -a	(vu-)
vá-noo-tʃí-ǰálúùl-a	'they'll choose it'	vá-noo-tʃí-ǰálúl-a	(vu-)
vá-noo-tʃí-súmbûk-a	'they'll conceal it'	vá-noo-tʃí-súmbík-a	(vu-)
vá-noo-tʃí-duvûk-a	'they'll dip it'	vá-noo-tʃí-duvík-a	(vu-)
vá-noo-tʃí-lízaaŋ-a	'they'll tried on it'	vá-noo-tʃí-lízaŋ-a	(vu-)
vá-noo-tʃí-pálááǰz-a	'they'll disperse it'	vá-noo-tʃí-páláǰz-a	(vu-)
vá-noo-tʃí-ǰálúl-iil-a	'they'll choose for it'	vá-noo-tʃí-ǰálúl-il-a	(vu-)
vá-noo-tʃí-büz ^w isiis-a	'they'll ask it alot'	vá-noo-tʃí-büz ^w isisa	(vu-)

1.7. High tone verbs with ndi- '1 sg.' subject prefix and -tʃí- object prefix

nd-óò-tʃí-tʃ-á	'I'll fear it'	nd-óò-tʃí-tʃ-á	(vú-)
nd-óò-tʃí-d-á	'I'll like it'	nd-óò-tʃí-d-a	(vú-)
nd-óò-tʃí-túùm-á	'I'll send it'	nd-óò-tʃí-túm-á	(vú-)
nd-óò-tʃí-dzím-á	'I'll extinguish it'	nd-óò-tʃí-dzim-á	(vú-)
nd-óò-tʃí-péèdz-á	'I'll finish it'	nd-óò-tʃí-pédz-a	(vú-)
nd-óò-tʃí-tóól-a	'I'll take it'	nd-óò-tʃí-tólá	(vu-)
nd-óò-tʃí-baát-a	'I'll catch it'	nd-óò-tʃí-bat-á	(vu-)
nd-óò-tʃí-kʰíg-a	'I'll lift (on head) it'	nd-óò-tʃí-kʰig-a	(vu-)
nd-óò-tʃí-zaádz-a	'I'll fill up it'	nd-óò-tʃí-zădz-a	(vu-)
nd-óò-tʃí-fúmík-a	'I'll cover it'	nd-óò-tʃí-fúmík-á	(vu-)
nd-óò-tʃí-dzimúúl-a	'I'll allay it'	nd-óò-tʃí-dzimúl-á	(vu-)
nd-óò-tʃí-vígaán-a	'I'll bury it'	nd-óò-tʃí-vígan-á	(vu-)
nd-óò-tʃí-mílídž-a	'I'll lift it'	nd-óò-tʃí-mílídž-a	(vu-)
nd-óò-tʃí-gʷădzíís-a	'I'll hurt it'	nd-óò-tʃí-gʷădzis-á	(vu-)

1.8. High tone verbs with vá- (cl. 2) subject prefix and -tʃí- object prefix

vá-noo-tʃí-tʃ-á	'they'll fear it'	vá-noo-tʃí-tʃ-á	(vú-)
vá-noo-tʃí-d-á	'they'll like it'	vá-noo-tʃí-d-a	(vú-)
vá-noo-tʃí-túùm-á	'they'll send it'	vá-noo-tʃí-túm-á	(vú-)
vá-noo-tʃí-dzím-á	'they'll extinguish it'	vá-noo-tʃí-dzim-á	(vú-)
vá-noo-tʃí-péèdz-á	'they'll finish it'	vá-noo-tʃí-pédz-à	(vú-)
vá-noo-tʃí-tóól-a	'they'll take it'	vá-noo-tʃí-tólá	(vu-)
vá-noo-tʃí-baát-a	'they'll catch it'	vá-noo-tʃí-bat-á	(vu-)
vá-noo-tʃí-kʰíg-a	'they'll lift (on head) it'	vá-noo-tʃí-kʰig-a	(vu-)
vá-noo-tʃí-zaádž-a	'they'll fill up it'	vá-noo-tʃí-zădz-a	(vu-)
vá-noo-tʃí-fúmík-a	'they'll cover it'	vá-noo-tʃí-fúmík-á	(vu-)
vá-noo-tʃí-dzimúúl-a	'they'll allay it'	vá-noo-tʃí-dzimúl-á	(vu-)
vá-noo-tʃí-vígaán-a	'they'll bury it'	vá-noo-tʃí-vígan-a	(vu-)
vá-noo-tʃí-mílídž-a	'they'll lift it'	vá-noo-tʃí-mílídž-a	(vu-)
vá-noo-tʃí-gʷădzíís-a	'they'll hurt it'	vá-noo-tʃí-gʷădzis-á	(vu-)

1.9. Low tone verbs with ndi- 'I sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-óò-z ^w i-wáán-a	'I'll find them'	nd-óò-z ^w i-wán-á	(uu-)
nd-óò-z ^w i-ḍìl-a	'I'll pour them'	nd-óò-z ^w i-ḍil-á	(uu-)
nd-óò-z ^w i-úéé-z-a	'I'll carve them'	nd-óò-z ^w i-úé-z-a	(uu-)
nd-óò-z ^w i-bùú-z ^w -a	'I'll ask them'	nd-óò-z ^w i-bűz ^w -a	(uu-)
nd-óò-z ^w i-ḥálúùl-a	'I'll choose them'	nd-óò-z ^w i-ḥálúl-a	(uu-)
nd-óò-z ^w i-súmbûk-a	'I'll conceal them'	nd-óò-z ^w i-súmbík-a	(uu-)
nd-óò-z ^w i-duvûk-a	'I'll dip them'	nd-óò-z ^w i-duvík-a	(uu-)
nd-óò-z ^w i-lízaaŋ-a	'I'll try on them'	nd-óò-z ^w i-lízaŋ-a	(uu-)
nd-óò-z ^w i-páláàḍz-a	'I'll disperse them'	nd-óò-z ^w i-páláḍz-a	(uu-)
nd-óò-z ^w i-ḥálúl-iil-a	'I'll choose for them'	nd-óò-z ^w i-ḥálúl-il-a	(uu-)
nd-óò-z ^w i-bűz ^w isiis-a	'I'll ask them alot'	nd-óò-z ^w i-bűz ^w isis-a	(uu-)

2.0. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl.8) object prefix

vá-noo-z ^w i-wáán-a	'they'll find them'	vá-noo-z ^w i-wán-á	(uu-)
vá-noo-z ^w i-ḍìl-a	'they'll pour them'	vá-noo-z ^w i-ḍil-á	(uu-)
vá-noo-z ^w i-úéé-z-a	'they'll carve them'	vá-noo-z ^w i-úé-z-a	(uu-)
vá-noo-z ^w i-bùú-z ^w -a	'they'll ask them'	vá-noo-z ^w i-bűz ^w -a	(uu-)
vá-noo-z ^w i-ḥálúùl-a	'they'll choose them'	vá-noo-z ^w i-ḥálúl-a	(uu-)
vá-noo-z ^w i-súmbûk-a	'they'll conceal them'	vá-noo-z ^w i-súmbík-a	(uu-)
vá-noo-z ^w i-duvûk-a	'they'll dip them'	vá-noo-z ^w i-duvík-a	(uu-)
vá-noo-z ^w i-lízaaŋ-a	'they'll try them on'	vá-noo-z ^w i-lízaŋ-a	(uu-)
vá-noo-z ^w i-páláàḍz-a	'they'll disperse them'	vá-noo-z ^w i-páláḍz-a	(uu-)
vá-noo-z ^w i-ḥálúl-iil-a	'they'll choose for them'	vá-noo-z ^w i-ḥálúliil-a	(uu-)
vá-noo-z ^w i-bűz ^w isiis-a	'they'll ask them alot'	vá-noo-z ^w i-bűz ^w isis-á	(uu-)

2.1. High tone verbs with ndi- '1 sg.' subject prefix and -z^wi- (cl. 8) object prefix

nd-óò-z ^w ii-t̃-á	'I'll fear them'	nd-óò-z ^w i-t̃-á	(vú-)
nd-óò-z ^w ii-d-á	'I'll like them'	nd-óò-z ^w i-d-a	(vú-)
nd-óò-z ^w i-t̃ùùm-á	'I'll send them'	nd-óò-z ^w i-t̃ùm-á	(vú-)
nd-óò-z ^w i-d̃z̃im-á	'I'll extinguish them'	nd-óò-z ^w i-d̃zim-á	(vú-)
nd-óò-z ^w i-péédz̃-á	'I'll finish them'	nd-óò-z ^w i-pédz̃-a	(vú-)
nd-óò-z ^w i-t̃óól-a	'I'll take them'	nd-óò-z ^w i-t̃ólá	(vu-)
nd-óò-z ^w i-baát̃-a	'I'll catch them'	nd-óò-z ^w i-baṭ-á	(vu-)
nd-óò-z ^w i-k ^h íg-a	'I'll lift (on head) them'	nd-óò-z ^w i-k ^h ig-a	(vu-)
nd-óò-z ^w i-zaádz̃-a	'I'll fill up them'	nd-óò-z ^w i-žádz̃-a	(vu-)
nd-óò-z ^w i-fúmíik-a	'I'll cover them'	nd-óò-z ^w i-fúmík-á	(vu-)
nd-óò-z ^w i-d̃zimúúl-a	'I'll allay them'	nd-óò-z ^w i-d̃zimúl-á	(vu-)
nd-óò-z ^w i-úígaáj̃-a	'I'll bury them'	nd-óò-z ^w i-úigaj̃-á	(vu-)
nd-óò-z ^w i-mílíd̃z̃-a	'I'll lift them'	nd-óò-z ^w i-mílíd̃z̃-a	(vu-)
nd-óò-z ^w i-g ^w ádziís-a	'I'll hurt them'	nd-óò-z ^w i-g ^w ádzis-á	(vu-)

2.2. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- (cl. 8) object prefix

vá-noo-z ^w ii-t̃-á	'they'll fear them'	vá-noo-z ^w i-t̃-á	(vú-)
vá-noo-z ^w ii-d-á	'they'll like them'	vá-noo-z ^w i-d-a	(vú-)
vá-noo-z ^w i-t̃ùùm-á	'they'll send them'	vá-noo-z ^w i-t̃ùm-á	(vú-)
vá-noo-z ^w i-d̃z̃im-á	'they'll extinguish them'	vá-noo-z ^w i-d̃zim-á	(vú-)
vá-noo-z ^w i-péédz̃-á	'they'll finish them'	vá-noo-z ^w i-pédz̃-a	(vú-)
vá-noo-z ^w i-t̃óól-a	'they'll take them'	vá-noo-z ^w i-t̃ól-á	(vu-)
vá-noo-z ^w i-baát̃-a	'they'll catch them'	vá-noo-z ^w i-baṭ-á	(vu-)
vá-noo-z ^w i-k ^h íg-a	'they'll lift (on head) them'	vá-noo-z ^w i-k ^h ig-a	(vu-)
vá-noo-z ^w i-zaádz̃-a	'they'll fill up them'	vá-noo-z ^w i-žádz̃-a	(vu-)
vá-noo-z ^w i-fúmíik-a	'they'll cover them'	vá-noo-z ^w i-fúmík-á	(vu-)
vá-noo-z ^w i-d̃zimúúl-a	'they'll allay them'	vá-noo-z ^w i-d̃zimúl-á	(vu-)
vá-noo-z ^w i-úígaáj̃-a	'they'll bury them'	vá-noo-z ^w i-úigaj̃-á	(vu-)
vá-noo-z ^w i-mílíd̃z̃-a	'they'll lift them'	vá-noo-z ^w i-mílíd̃z̃-a	(vu-)
vá-noo-z ^w i-g ^w ádziís-a	'they'll hurt them'	vá-noo-z ^w i-g ^w ádzis-á	(vu-)

2.3. Low tone verbs with ndi- '1 sg.' subject prefix and -z^wi- reflexive prefix

nd-óð-z ^w i-wáàn-a	'I'll find self'	nd-óð-z ^w i-wán-a	(vu-)
nd-óð-z ^w i-ḍiil-a	'I'll pour self'	nd-óð-z ^w i-ḍil-a	(vu-)
nd-óð-z ^w i-uéèz-a	'I'll carve self'	nd-óð-z ^w i-uéz-a	(vu-)
nd-óð-z ^w i-buuz ^w -a	'I'll ask self'	nd-óð-z ^w i-buz ^w -a	(vu-)
nd-óð-z ^w i-ǰáluul-á	'I'll choose self'	nd-óð-z ^w i-ǰálul-á	(vú-)
nd-óð-z ^w i-súmbiik-á	'I'll conceal self'	nd-óð-z ^w i-súmbik-á	(vú-)
nd-óð-z ^w i-duviik-á	'I'll dip self'	nd-óð-z ^w i-duvik-á	(vú-)
nd-óð-z ^w i-lízaaṅ-á	'I'll try on self'	nd-óð-z ^w i-lízaṅ-á	(vú-)
nd-óð-z ^w i-pálaad̄z-á	'I'll disperse self'	nd-óð-z ^w i-pálaḍz-a	(vú-)
nd-óð-z ^w i-ǰálul-iil-á	'I'll choose for self'	nd-óð-z ^w i-ǰálul-il-á	(vú-)
nd-óð-z ^w i-buz ^w isiis-á	'I'll ask self alot'	nd-óð-z ^w i-buz ^w isis-á	(vú-)

2.4. Low tone verbs with vá- (cl. 2) subject prefix and -z^wi- reflexive prefix

vá-noo-z ^w i-wáàn-a	'they'll find selves'	vá-noo-z ^w i-wán-a	(vu-)
vá-noo-z ^w i-ḍiil-a	'they'll pour selves'	vá-noo-z ^w i-ḍil-a	(vu-)
vá-noo-z ^w i-uéèz-a	'they'll carve selves'	vá-noo-z ^w i-uéz-a	(vu-)
vá-noo-z ^w i-buuz ^w -a	'they'll ask selves'	vá-noo-z ^w i-buz ^w -a	(vu-)
vá-noo-z ^w i-ǰáluul-á	'they'll choose selves'	vá-noo-z ^w i-ǰálul-á	(vú-)
vá-noo-z ^w i-súmbiik-á	'they'll conceal selves'	vá-noo-z ^w i-súmbik-á	(vú-)
vá-noo-z ^w i-duviik-á	'they'll dip selves'	vá-noo-z ^w i-duvik-á	(vú-)
vá-noo-z ^w i-lízaaṅ-á	'they'll try on selves'	vá-noo-z ^w i-lízaṅ-á	(vú-)
vá-noo-z ^w i-pálaad̄z-á	'they'll disperse selves'	vá-noo-z ^w i-pálaḍz-a	(vú-)
vá-noo-z ^w i-ǰálul-iil-á	'they'll choose for selves'	vá-noo-z ^w i-ǰálulil-á	(vú-)
vá-noo-z ^w i-buz ^w isiis-à	'they'll ask selves alot'	vá-noo-z ^w i-buz ^w isis-à	(vú-)

2.5. High tone verbs with ndi- 'I sg.' subject prefix and -z^wi- reflexive prefix

nd-òò-z ^w í-t̃j̃-a	'I'll fear self'	nd-òò-z ^w í-t̃j̃-á	(vu-)
nd-òò-z ^w í-d̃-a	'I'll like self'	nd-òò-z ^w í-d̃-a	(vu-)
nd-òò-z ^w i-t̃úùm-a	'I'll send self'	nd-òò-z ^w i-t̃úm-a	(vu-)
nd-òò-z ^w í-d̃ziim-a	'I'll extinguish self'	nd-òò-z ^w í-d̃zim-a	(vu-)
nd-òò-z ^w i-péèd̃z-a	'I'll finish self'	nd-òò-z ^w i-péd̃z-a	(vu-)
nd-òò-z ^w i-t̃óòl-a	'I'll take self'	nd-òò-z ^w i-t̃óla	(vu-)
nd-òò-z ^w í-baṭ-a	'I'll catch self'	nd-òò-z ^w í-baṭ-a	(vu-)
nd-òò-z ^w i-k ^h ūg-a	'I'll lift (on head) self'	nd-òò-z ^w i-k ^h īg-a	(vu-)
nd-òò-z ^w í-zaad̃z-a	'I'll fill up self'	nd-òò-z ^w í-zaḍ̃z-a	(vu-)
nd-òò-z ^w i-fúmiik-á	'I'll cover self'	nd-òò-z ^w i-fúmik-á	(vú-)
nd-òò-z ^w í-d̃zimuul-á	'I'll allay self'	nd-òò-z ^w í-d̃zimul-á	(vú-)
nd-òò-z ^w i-úígaṅ-á	'I'll bury self'	nd-òò-z ^w i-úígaṅ-á	(vú-)
nd-òò-z ^w i-míliid̃z-á	'I'll lift self'	nd-òò-z ^w i-míliḍ̃z-a	(vú-)
nd-òò-z ^w í-g ^w ad̃ziis-á	'I'll hurt self'	nd-òò-z ^w í-g ^w ad̃zis-á	(vú-)

2.6. High tone verbs with vá- (cl. 2) subject prefix and -z^wi- reflexive prefix

vá-noo-z ^w í-t̃j̃-a	'they'll fear selves'	vá-noo-z ^w í-t̃j̃-á	(vu-)
vá-noo-z ^w í-d̃-a	'they'll like selves'	vá-noo-z ^w í-d̃-a	(vu-)
vá-noo-z ^w i-t̃úùm-a	'they'll send selves'	vá-noo-z ^w i-t̃úm-a	(vu-)
vá-noo-z ^w í-d̃ziim-a	'they'll extinguish selves'	vá-noo-z ^w í-d̃zim-a	(vu-)
vá-noo-z ^w i-péèd̃z-a	'they'll finish selves'	vá-noo-z ^w i-péd̃z-a	(vu-)
vá-noo-z ^w i-t̃óòl-a	'they'll take selves'	vá-noo-z ^w i-t̃óla	(vu-)
vá-noo-z ^w í-baṭ-a	'they'll catch selves'	vá-noo-z ^w í-baṭ-a	(vu-)
vá-noo-z ^w i-k ^h ūg-a	'they'll lift (on head) selves'	vá-noo-z ^w i-k ^h īg-a	(vu-)
vá-noo-z ^w í-zaad̃z-a	'they'll fill up selves'	vá-noo-z ^w í-zaḍ̃z-a	(vu-)
vá-noo-z ^w i-fúmiik-á	'they'll cover selves'	vá-noo-z ^w i-fúmik-á	(vú-)
vá-noo-z ^w í-d̃zimuul-á	'they'll allay selves'	vá-noo-z ^w í-d̃zimul-á	(vú-)
vá-noo-z ^w i-úígaṅ-á	'they'll bury selves'	vá-noo-z ^w i-úígaṅ-á	(vú-)
vá-noo-z ^w i-míliid̃z-á	'they'll lift selves'	vá-noo-z ^w i-míliḍ̃z-a	(vú-)
vá-noo-z ^w í-g ^w ad̃ziis-á	'they'll hurt selves'	vá-noo-z ^w í-g ^w ad̃zis-á	(vú-)

7. Imperative Tones

1.1. Low tone verbs

iiw-á	'fall!'	w-á	(vú-)
iig ^w -á	'fight!'	g ^w -a	(vú-)
waan-á	'find!'	wan-á	(vú-)
ḍiil-á	'pour!'	ḍil-á	(vú-)
veez-ǎ	'carve!'	vez-a	(vú-)
buuz ^w -ǎ	'ask!'	buz ^w -a	(vú-)
ʃalúùl-á	'choose!'	ʃalúl-á	(vú-)
sumbûk-á	'conceal!'	sumbík-á	(vú-)
duvûk-á	'dip!'	duvík-á	(vú-)
lizáàŋ-á	'try on!'	lizàŋ-á	(vú-)
paláàḍz-á	'disperse!'	paláḍz-a	(vú-)
ʃalúl-îl-á	'choose for!'	ʃalúl-íl-á	(vú-)
buz ^w isîs-á	'ask alot!'	buz ^w isís-á	(vú-)

1.2. High tone verbs

iiŋ̄-á	'fear!'	ŋ̄-á	(vú-)
iid̄-á	'like!'	ḍ-a	(vú-)
túùm-á	'send!'	túm-á	(vú-)
ḍzim-á	'extinguish!'	ḍzim-á	(vú-)
péèḍz-á	'finish!'	péḍz-a	(vú-)
tóòl-á	'take!'	tólá	(vú-)
báàt̄-á	'catch!'	baṭ-á	(vú-)
k ^h ŋ̄g-á	'lift (on head)!'	k ^h ŋ̄g-a	(vú-)
zǎàḍz-á	'fill up!'	zǎḍz-a	(vú-)
fúmûk-á	'cover!'	fúmík-á	(vú-)
ḍzimúùl-á	'allay!'	ḍzimúl-á	(vú-)
vígaaŋ-á	'bury!'	vigaŋ-á	(vú-)
mílîḍz-á	'lift!'	mílíḍz-á	(vú-)
g ^w ǎḍziis-á	'hurt (s.o.)!'	g ^w ǎḍzis-á	(vú-)

1.3. Low tone verbs with -tʃí- object prefix

ú-tʃí-wààn-é	'find it!'	ú-tʃí-wán-é	(vú-)
ú-tʃí-ḍiil-é	'pour it!'	ú-tʃí-ḍil-é	(vú-)
ú-tʃí-veèz-é	'carve it!'	ú-tʃí-veʒ-e	(vú-)
ú-tʃí-buuz ^w -é	'ask it!'	ú-tʃí-buz ^w -e	(vú-)
ú-tʃí-ʃálúúl-e	'choose it!'	ú-tʃí-ʃálúúl-é	(vu-)
ú-tʃí-súmbíík-e	'conceal it!'	ú-tʃí-súmbík-é	(vu-)
ú-tʃí-duvíík-e	'dip it!'	ú-tʃí-duvik-é	(vu-)
ú-tʃí-lízaáɲ-e	'try it on!'	ú-tʃí-lízaɲ-é	(vu-)
ú-tʃí-páláád̄z-e	'disperse it!'	ú-tʃí-pálád̄z-é	(vu-)
ú-tʃí-ʃálúúl-ííl-e	'choose for it!'	ú-tʃí-ʃálúúl-ííl-é	(vu-)
ú-tʃí-buz ^w isíís-e	'ask it alot!'	ú-tʃí-buz ^w isis-é	(vu-)

1.4. High tone verbs with -tʃí- object prefix

ú-tʃí-ḥ-é	'fear it!'	ú-tʃí-ḥ-é	(vú-)
ú-tʃí-ḍ-é	'like it!'	ú-tʃí-ḍ-e	(vú-)
ú-tʃí-túúm-e	'send it!'	ú-tʃí-túúm-é	(vú-)
ú-tʃí-ḍziím-e	'extinguish it!'	ú-tʃí-ḍzim-é	(vú-)
ú-tʃí-pééd̄z-e	'finish it!'	ú-tʃí-péd̄z-e	(vu-)
ú-tʃí-tóól-e	'take it!'	ú-tʃí-tólé	(vu-)
ú-tʃí-bàát-e	'catch it!'	ú-tʃí-bat-é	(vu-)
ú-tʃí-k ^h íg-e	'lift (on head) it!'	ú-tʃí-k ^h ig-e	(vu-)
ú-tʃí-ʒáád̄z-e	'fill up it!'	ú-tʃí-ʒád̄z-e	(vu-)
ú-tʃí-fúmîk-é	'cover it!'	ú-tʃí-fúmik-é	(vú-)
ú-tʃí-ḍzimúúl-é	'allay it!'	ú-tʃí-ḍzimúúl-é	(vú-)
ú-tʃí-vígaɲ-é	'bury it!'	ú-tʃí-vigaɲ-é	(vú-)
ú-tʃí-mílíd̄z-é	'lift it!'	ú-tʃí-mílíd̄z-e	(vú-)
ú-tʃí-g ^w ād̄zis-é	'hurt it!'	ú-tʃí-g ^w ádzis-é	(vú-)

1.5. Low tone verbs with -z^wi- (class 8) object prefix

ú-z ^w i-waan-é	'find them!'	ú-z ^w i-wan-é	(vú-)
ú-z ^w i-d̄il-é	'pour them!'	ú-z ^w i-d̄il-é	(vú-)
ú-z ^w i-veèz-é	'carve them!'	ú-z ^w i-veʒ-e	(vú-)
ú-z ^w i-bùz ^w -é	'ask them!'	ú-z ^w i-buz ^w -e	(vú-)
ú-z ^w i-ʃalúúl-e	'choose them!'	ú-z ^w i-ʃalúl-é	(vu-)
ú-z ^w i-sumbík-e	'conceal them!'	ú-z ^w i-sumbík-é	(vu-)
ú-z ^w i-duvík-e	'dip them!'	ú-z ^w i-duvík-é	(vu-)
ú-z ^w i-lizaʒ-e	'try them on!'	ú-z ^w i-lizaʒ-é	(vu-)
ú-z ^w i-paláàdz-e	'disperse them!'	ú-z ^w i-paládz-e	(vu-)
ú-z ^w i-ʃalúl-íl-e	'choose for them!'	ú-z ^w i-ʃalúl-íl-é	(vu-)
ú-z ^w i-buz ^w isís-e	'ask them alot!'	ú-z ^w i-buz ^w isís-é	(vu-)

1.6. High tone verbs with -z^wi- (class 8) object prefix

ú-z ^w i-íj-é	'fear them!'	ú-z ^w i-íj-é	(vú-)
ú-z ^w i-d̄-e	'like them!'	ú-z ^w i-d̄-e	(vú-)
ú-z ^w i-túúm-e	'send them!'	ú-z ^w i-túúm-é	(vu-)
ú-z ^w i-d̄zim-e	'extinguish them!'	ú-z ^w i-d̄zim-é	(vu-)
ú-z ^w i-péédz-e	'finish them!'	ú-z ^w i-pédz-e	(vu-)
ú-z ^w i-tóól-e	'take them!'	ú-z ^w i-tóolé	(vu-)
ú-z ^w i-baát-e	'catch them!'	ú-z ^w i-baát-é	(vu-)
ú-z ^w i-k ^h íg-e	'lift (on head) them!'	ú-z ^w i-k ^h íg-e	(vu-)
ú-z ^w i-zaádz-e	'fill up them!'	ú-z ^w i-zaádz-e	(vu-)
ú-z ^w i-fúmík-é	'cover them!'	ú-z ^w i-fúmík-é	(vú-)
ú-z ^w i-d̄zimúúl-é	'allay them!'	ú-z ^w i-d̄zimúúl-é	(vú-)
ú-z ^w i-vígaʒ-é	'bury them!'	ú-z ^w i-vígaʒ-é	(vú-)
ú-z ^w i-mílídz-e	'lift them!'	ú-z ^w i-mílídz-e	(vú-)
ú-z ^w i-g ^w ádzis-é	'hurt them!'	ú-z ^w i-g ^w ádzis-é	(vú-)

1.7. Low tone verbs with -z^wi- reflexive prefix

z ^w i-wáàn-e	'find self!'	z ^w i-wán-é	(vu-)
z ^w ĩ-d̄iil-e	'pour self!'	z ^w ĩ-d̄il-e	(vu-)
z ^w i-vèèz-e	'carve self!'	z ^w i-véz-e	(vu-)
z ^w ĩ-buuz ^w -e	'ask self!'	z ^w ĩ-buz ^w -e	(vu-)
z ^w i-ǰáluul-é	'choose self!'	z ^w i-ǰálul-é	(vú-)
z ^w i-súmbiik-é	'conceal self!'	z ^w i-súmbik-é	(vú-)
z ^w ĩ-duviik-é	'dip self!'	z ^w ĩ-duvik-é	(vú-)
z ^w i-lízaaŋ-é	'try on self!'	z ^w i-lízaŋ-é	(vú-)
z ^w i-pálaad̄z-é	'disperse self!'	z ^w i-pálađz-e	(vú-)
z ^w i-ǰálul-iil-é	'choose for self!'	z ^w i-ǰálul-il-é	(vú-)
z ^w ĩ-buz ^w isiis-é	'ask self alot!'	z ^w ĩ-buz ^w isis-é	(vú-)

1.8. High tone verbs with -z^wi- reflexive prefix

z ^w ĩ-ǰ̄-e	'fear self!'	z ^w ĩ-ǰ̄-e	(vu-)
z ^w ĩ-ǰ̄-e	'like self!'	z ^w ĩ-ǰ̄-e	(vu-)
z ^w i-t̄úùm-e	'send self!'	z ^w i-t̄úm-e	(vu-)
z ^w ĩ-d̄ziim-e	'extinguish self!'	z ^w ĩ-d̄zim-e	(vu-)
z ^w i-péèd̄z-e	'finish self!'	z ^w i-péđz-e	(vu-)
z ^w i-t̄óòl-e	'take self!'	z ^w i-t̄ólé	(vu-)
z ^w ĩ-baaŋ-e	'catch self!'	z ^w ĩ-baŋ-e	(vu-)
z ^w i-k ^h ̄ŋg-e	'lift (on head) self!'	z ^w i-k ^h ̄ŋg-e	(vu-)
z ^w ĩ-zaad̄z-e	'fill up self!'	z ^w ĩ-zađz-e	(vu-)
z ^w i-fúmiik-é	'cover self!'	z ^w i-fúmik-é	(vú-)
z ^w ĩ-d̄zimuul-é	'allay self!'	z ^w ĩ-d̄zimul-é	(vú-)
z ^w i-vígaan-é	'bury self!'	z ^w i-vígaŋ-é	(vú-)
z ^w i-míliid̄z-é	'lift self!'	z ^w i-míliđz-é	(vú-)
z ^w ĩ-g ^w ad̄ziis-é	'hurt self!'	z ^w ĩ-g ^w ad̄zis-é	(vú-)

APPENDIX C

KALANGA-ENGLISH LEXICON

Pfx	Root	POS	Cl.	Gloss
	áá	adv.		no, a word of denial or refusal
	ádirési	n	9	an address
	ádzíma	v		lend; borrow
	áína	v		press, as of clothes
	áíni	n	9	an iron used for pressing clothes
	áíníka	v		be well ironed
	ajeé	dem.		those
	ákábála	v		wonder; perplexed; amazed; hesitate
chi-	ako	n	7	corn head
zwi-	ako	n	8	corn heads
	ákúgwa	v		be enjoyed
	ákúla	v		to enjoy
	akúna	adv.		nothing
	alakana	v		remember
	alakanisa	v		remind; advise; cause to remember
zw-	ambá	n	8	lovers
	amba	v		plead
ch-	ambá	n	7	lover
	ambaamba	v		grope, in search of something
	ambadza	v		clothe or help put on clothing
	ambala	v		put on clothes or garments
chi-	ambalo	n	7	type of clothing
	ambuka	v		clear up, as of smoke or clouds; come off, as a shoe
	ambula	v		undress or take-off your clothes
	áméni	n	9	Amen
ch-	ámpúpúlúdze	n	7	dust storm
zw-	ámpúpúlúdze	n	8	dust storms
	amuchidza	v		pay, as a salary
	amuchila	v		receive
	amula	v		relieve someone of some burden
b-	aná	n	2	children
	ng'w-aná	n	1	child
ba-	ánadí	n	2	girls; young women
ng'w-ananá		n	1	girl; female child

ng'w-	anángu	n	1	my child
	ándáma	adj.		scattered about in all directions
ng'w-	anédu	n	1	young sibling
	anga	v		freeze; congeal
	ángáma	v		float; be buoyant
	angudza	v		bathe someone, as a child
	angula	v		menstruate; to bathe
	angulanya	v		stop a fight
	angulila	v		help someone from being beaten
ma-	ano	n	6	plans; devices; schemes
	apájeé	dem.		place yonder; over there
	ápúli	n	9	apple
	arámétsa	v		cause to inhale medicinal fumes or steam
ch-	árobí	n	7	cooked entrails
	ásháma	v		broad; wide; open one's mouth; yawn
	áthúla	v		decide; judge; arbitrate; pass judgement
	áwára	n	9	hour
	azha	v		help someone
chi-	azha	n	7	hand; the palm of a hand
	báákánya	v		prepare; to repair; to make ready or set in order
m-	báákányi	n	1	repairer
	bába	v		itch
m-	bábá-shúlo	n	3	nettles; plant of the nettle family
	bábáíla	v		walk softly on account of tender or sore feet; walk stealthily
	bábáni	n	5	hairy caterpillar
	bábátádza	v		make to lie flat on the ground
	bábátála	v		lie flat on the ground, as of some lizard
	báchílálú	n	1a	name used for calling women whose totem is a hare
	báchínábumí	n	1a	name used for calling women whose totem is a heart
li-	badhu	n	11	rib
	báká	v		build; construct
chi-	baka	n	7	time
m-	bákí	n	1/2	builder; an inhabitant
	bala	v		read; count
chi-	bálá	n	7	light complexion
li-	bálá	n	11	clearing; an open place

m-	bálá	n	3	colour
ma-	bálábala	n	6	multi-coloured; with many shades of colour
m-	balabali	n	1	rumour monger; a gossip
m-	bali	n	1	reader; an enumerator
lu-	balilo	n	11	binding round the grass roof onto which the thatch is tied; lath
m-	balilo	n	10	bindings under the thatch of a house; laths
	balisa	v		cause to read
	bámákúlúkúsá	n	1a	name used for calling women of a particular totem
	bámáthámbó	n	1a	name used for calling women whose totem is a duiker
	bambá	n	5	prostitute
bu-	bambá	n	11	prostitution
m-	bambo	n	10	pegs
lu-	bambo	n	11	peg
	bambula	v		crucify; stretch out the skin of a slaughtered animal with wooden pegs in the sun to dry
	bámpéngo	n	1a	name used for calling women of a particular totem
chi-	bandaná	n	7	beast of prey; a wild beast
	banga	n	5	scar
	bángálála	v		be extreme
	báníkúáná	n	1a	name used for calling women of a particular totem
chi-	banjóro	n	7	one-string violin; a fiddle
	bánká	n	9	bank
chi-	bánká	n	7	piece of ground missed by the plough or hoe when cultivating
li-	bánte	n	11	belt
	bári	n	5	scar
	básékulu	n	1a	maternal uncle
chi-	bat'a	n	7	patch
	bat'ela	v		patch, as of a torn garment
li-	bat'í	n	11	door
	bátátégulu	n	1a	grandfather
	bátátégulugulu	n	1a	great grandfather
	bátáténíni	n	1a	father's younger brother, a paternal uncle
	bátétshi	n	1a	owner
lu-	batsha	n	11	splinter of wood
bu-	bavá	n	14	theft

	bazha	n	5	heat period, as of a cow
	bé	aux. v		be
chi-	bebe	n	7	numbness; a tingling sensation in the numb limb
bu-	bélété	n	14	prostitution
chi-	belú	n	7	African hoopoe bird
	bende	n	5/6	gap from a missing tooth
	bendzwa	v		pout; push out the lips as a sign of contempt
	benga	v		make biltong
	béngá	v		hate
lu-	béngo	n	11	hatred
	besa	v		set alight, as of a fire; start a fire
m-	besi	n	1	baker; one who grills or roasts
chi-	beso	n	7	cooking places; grates; grid-irons; fire place; a hearth
	bezha	v		curve
m-	bezhi	n	1	carpenter; one who carves; a wood worker
m-	bgá	n	9/10	dog
chi-	bgá	n	7	stray dog
chi-	bganá	n	7	small round stone used for grinding tobacco
m-	bgánáná	n	9/10	puppy
	bge	n	5	stone
m-	bgeti	n	3	type of tree
	bgilíla	v		return; go back
	bgilílána	v		re-establish friendship; re-establish diplomatic relations
m-	bhá	n	3	stick split in the middle used for carrying stuff by herdboys
	bhabha	v		carry a baby or another person on ones back
m-	bhabhi	n	1	nanny
	bhabhú	interj.		said to a baby when coaxing it to be carried on the back
	bhádi	n	9	bad luck
	bhadzá	n	5	plough; hoe
	bhaíbhili	n	9	bible
	bhaisíkílí	n	9/6	bicycle
	bhaisíkópó	n	9	movie
	bhakasa	n	5	pole enclosure around living quarters
	bhákhwá	v		be arrested; be drunk
chi-	bháko	n	7	snuff box or horn
	bhalázá	n	5	manmade deep pool which

	bhalo	n	5	cattle drink from
	bhambá	n	5	bald head
	bhamula	v		famine; hunger; drought
				smack or hit hard with the palm of the hand
	bhanána	n	9	banana
	bhandábúko	n	5	front leg of an animal
	bhandé	n	7a/2a	type of sweet wild bulb
	bhangwaná	n	5	small log
	bhantíti	n	5	prisoner
	bhapiro	n	5	wing, as of a bird
	bhapú	n	5	lung
	bhára	n	9	bar
	bharámpára	n	5	wild person
	bháta	v		hold; touch
	bhatá-kholé	v		lead, as of oxen inspanned
	bhatána	v		hold each other
	bhatííla	v		stand in for; assist a calf to suckle from a cow not its mother
	bhatísa	v		help someone carry something; to ask someone to run an errand; cause to hold; have someone arrested
	bháto	n	5	buttock
	bhátsha	v		help; assist
	bhatshánya	v		connect; join one to the other
	bhatshíla	v		catch something on a trap
	bhávu	n	5	bath tub
	bhaya	v		poke or pierce something; slaughter, as an animal
chi-	bhayo	n	7	pneumonic pain; shooting pains
	bházza-mbgá	n	5	unripe fruit; fruit in the first stage of ripening
	bhe	n	5	honey comb
	bhechu	n	5	euphemism for penis
	bhelélo	n	5	end
chi-	bhembézhá	n	7	carry a child on the back without a blanket
	bhende	n	6	tail of a horse
	bhepe	n	5	calabashes
	bhépHó	n	5	common cold; a catarrhal cold
	bhésú	n	5	squirrel's tail; sheep's tail
	bhézi	n	9	bass voice in music
	bhika	v		cook; to question closely

m-	bhiki	n	1	cook
	bhindá	n	5	spinster
	bhirikiti	interj.		fall heavily
	bhizha	v		leak
	bhobola	n	5	greens from the leaves of a pumpkin plant
	bhofu	n	5	blind person or animal
	bhokísi	n	5	box; suitcase; coffin
	bhóla	n	9	ball
	bhóma	v		smear, as with body lotion; anoint with oil
	bhombo	n	5	grasshopper; a species of locust
	bhoméla	v		smear cow teats with dung to prevent calf from sucking
	bhonyóngédza	v		make rough sketches; carelessly sown or knotted
	bhoró	n	9	Bushman dance
	bhothókó	n	5	Ndebele speaker
	bhubhunú	n	7	cartilage
	bhubúzebé	n	5	deaf person
	bhúdá	v		come out
	bhudá-nkotá	v		bleed through the nose
	bhudzí	n	5	melon
	bhukucha	v		swim
	bhula	v		take (pot) off fire
	bhulómu	n	5	flower
	bhulúbúsí	n	5	thick smoke
	bhulúgwe	n	5	blue headed big lizard
	bhulúma	n	14	type of female underwear
	bhumú	n	5	crest of feathers on a bird's head
	bhúndú	n	5	swelling; a knot in a string; a knob on a stick
	bhupHé	n	5	greedy person
	bhuráma	n	5	cow or ox of the Brahman breed
	bhuríki	n	14	brake, as of a car
ma-	bhutánlámú	n	6	mumps
	bhuté	n	5	small peanut, a result of poor crop
	bhútshi	n	5	boot (a shoe)
	bhutu	n	5	testicles
	bhuzo	n	9	question
	bhuzwa	v		ask; question; enquire
	bhuzwisisa	v		make enquiries endlessly
	bí	adj.		bad; ugly
bu-	bí	n	14	ugliness
zwi-	bí	n	8	sins

chi-	bí	n	7	sin
	bíbi	n	5	pile of cutoff trees awaiting being burnt
	bídwá	v		ripen; be well cooked
	bídwísa	v		cause to ripen or get cooked
	bídwísá-zila	v		go regularly; visit very often
	bidza	v		cause to become sour; ferment
	bíga	v		put ; store
	bígánya	v		keep safely; bury; store away
	bíganyíwa	v		be buried
	bígíla	v		lay eggs, as of a hen
	bígílídza	v		lay-away; engaged to marry
	bíibi	adj.		ugly
	bíka	v		give a report; report a matter
chi-	bíkíri	n	7	tin; can
	bila	v		boil, as of water
	bílébíle	n	5	hot pepper
ma-	bilí	n	6	twins
m-	bili	n	3	the body of a living person; the body of a thing
chi-	bili	n	7	bodily form; in person
lu-	bilo	n	11	speed, in running; rapid pace
	binga	v		confront
	bípá-moyo	adj.		be cruel; be evil
	bípíla	v		fit badly, as of clothing
m-	bísáná	n	1	boy
li-	bísí	n	11	fresh milk
	bísi	n	5	watermelon
li-	bísi	n	11	watermelon plant
m-	bísi	n	10	watermelon plants
	biyapidza	v		make smooth
	bóbóla	v		howl as of an animal
	bodzeka	v		cause something to rot
	boka	v		praise in song; give thanks
lu-	bókó	n	11	arm
	bókóléla	v		cry out loud; wail
	bola	v		rot or go bad
lu-	bolelá	n	11	bee or wasp sting
lu-	bomba	n	11	cream from fresh milk
	bomba	v		snarl; roar, as a bull
	bonya	v		blink, as of an eye
	bónyólóla	v		reveal; tell something private
	bóra	v		bore; drill
	buba	v		lie down, of a bird or a hare
chi-	bubi	n	7	spider
chi-	búdzaná	n	7	kid goat

	búdzulúla	v		speak scornfully; be spiteful
	búkúla	v		bark, as of a dog
	bula	n	5	intestine
m-	búláyi	n	1	killer; murderer
	búlí	n	5	hole
	búlúla	v		livestock going out to pasture
chi-	búlúlú	n	7	small brown lizard
m-	búmbí	n	1	creator; builder; maker; a moulder
	búmbíka	v		well-formed or well-shaped
chi-	búmbíko	n	7	features
	búmbúlú	n	5	egg
	búmbúlúka	v		roll on the ground
	búndó	n	5	pleat
m-	bungú	n	3	stalk turned reddish brown
	bunguka	v		turn reddish brown of a stalk
m-	búso	n	3	government; reign
	búthá	v		repose; rest, as of animals
	buthaká	adj.		of same age
	bútili	n	5	bottle
	butuká	adj.		better; improved
	butyarara	adj.		acidic; sour
lu-	búwa	n	11	enclosed place in which the harvest before threshing and stored away
	búwa	v		smear much
	buwe	n	5	gad-fly
	búya	v		return; come back
bu-	buya	n	14	beauty; handsomeness
	búyá-móyo	v		feel nausea
	búyílíla	v		repeat; return again
m-	búyú	n	3	baobab tree
	búza	v		return something; bring back
	búzilídza	v		revenge
chi-	bza	n	7	thigh
	bza	v		belch
	bzála	v		sow; plant
chi-	bzálo	n	7	seed or plant
	chá	v		fear; have fear
i-	chaba	n	7	nation; tribe
	chachama	v		sizzle of something cooking; a painful ache as from a burn
	cháíni	n	9	chain
	chaisa	v		knock off from work; knock something, as with a car
ma-	chákányugwá	n	6	small bits and pieces of wood;

	chákányúla	v		small crumbs of bread
	chambá	n	7	chop into small bits and pieces
	chanáná	n	7	lover; paramour
	chángu	pron.		kid
bu-	chapá	n	14	mine (cl.7)
	chapá	n	5	carelessness; clumsiness;
	chébúka	v		uncleanliness
bu-	chechaná	n	14	careless person
n-	chéchaná	n	1	look sideways; look back
n-	chéchéni	n	3	youth
	chedzá	n	7	young one
	chéfi	n	9	type of tree
	chéka	v		light
	chékélédza	v		poison
	chékéléla	v		cut
	chékésa	v		go by a short route
n-	chéko	n	3	cut into pieces, as of meat
	chéla	v		cause to cut up
	chÉla	n	9	sewing pattern
	chela	v		draw or fetch water
	chéléléla	v		space underneath the granary
	chéma	v		pluck off, as of a fruit or greens
	chémba	n	9	draw water for someone
	chéméla	v		scream
n-	chémo	n	3	chamber pots
	chena	adj.		reprove; scold; chide
	chénáma	v		loud scream or cry
	chenchí	n	9	white
ma-	chende	n	6	surprised or amazed
	chenesa	v		change (from money)
	chenesela	v		testicles
	cheneso	n	9	clean
	chéngédza	v		clarify for
	chéngéla	v		enlightenment; explanation
	chengeta	v		deceive
n-	chenje	n	3	cheat; deceive
bu-	chénjédhú	n	14	take care; take heed
	chénjéléla-ntomé	v		white ant; nest of white ants
	chíla	v		wisdom; cleverness
n-	chili	n	3	deceitfulness; cunning; cheat
i-	chíli	n	7	live; survive
	chíliánya	v		rope; shoe lace
	chíliála	n	9/10	living person; well-off person
bu-	chílo	n	14	lay across the other
				species of wild animal
				life

	chimuka	adv.		the following day
	chíngá	v		receive with both hands
	chínga	adv.		since; eversince
	chíngáma	v		lie across; slant
	chíngámídza	v		run across to meet someone; put by the fire
	chíngámíla	v		bask, as in the sun
	chíngámísa	v		cause to lie across
	chíní	adv.		how
	chínya	v		spoil; destroy
	chínyá-búsó	v		show displeasure facially
	chínyá-ntúmbu	v		abort illegally
	chínyá-zina	v		defamation of character
i-	chínyi	n	7	wasteful person
	chínyídzíla	v		spoil for someone; destroy
	chínyíka	v		be spoiled; be destroyed
	chínyíkígwa	v		have a miscarriage
	chínyíkílo	n	10	expenses; damages; losses
	chinyólócho	adv.		soon; quickly; rapidly
	chipa	v		cheap
	chísa	v		frighten; cause to be afraid
	chíwa	v		be feared
	chólópó	n	9	fly, as of trousers
	chóná	v		be penniless; be broke
	chova	v		pedal, as a bike
	chúbhu	n	9	tube
	chúlúdza	v		cause to jump; skip
	chúlúka	v		jump up or over
	chúlúká-chuluka	v		hop about
	chúlúkíla	v		jump onto
i-	chúu	n	7	stew; well cooked food
	dá	v		love; like
	dabgá	n	5	type of bird
	dabí	n	5	branch, of a tree
	dabíla	v		answer or reply
	dada	n	5	duck
	dada	v		mock someone
	daísi	n	5	dice
lu-	daka	n	11	wet cow dung in a kraal
	daka	v		intoxicate; make drunk
chi-	dakwá	n	7	drunkard
	dála	n	5	receptable for unthreshed corn made of poles
	dáma	n	5	word; cheek
	dambá	n	5	large sour monkey plum
	dána	v		call; love each other

	dánda	n	5	log; block of wood
lu-	dandí	n	11	spider web
	dangá	n	5	kraal; sheep fold; pen
	dani	n	5	slippery liquid, as from okra
	datHá	n	5	large anthill
	debge	n	5	kaross; leather blanket
	déeléla	v		look down upon
	déenyá	n	5	skull
	delele	n	5	okra
	deluka	v		descend; come down
bu-	delukilo	n	14	platform; station
	delusa	v		cause to descend; bring down
	demégwá	n	5	part of a field where the trees are still being cleared
	dendeli	n	5	type of temporary door made from tree branches
	dénga	n	5	overhead covering
	dengézéla	v		carry something on the head without holding it
	denje	n	5	small bush
	déri	n	9	dairy
	dhubika	v		dip in water; immerse
	dhubula	v		take something out of liquid
	dhukudza	v		shake to remove dust
	dhuma	v		agree
	dhumano	n	9	mutual agreement
n-	dhumbí	n	3	drizzle; continuous rain
n-	dhumíla	n	3	type of tree
	dhumila	v		believe, as in God
	dhumilana	v		agree with each other
	dhumíláni	n	9	conventional way of greeting
	dhumilano	n	9	agreement
n-	dhumili	n	1	believer; a christian
	dhumiligwa	v		be admitted, as in a school
	dhumilila	v		allow; permit
	díbhi	n	9	dip, type of pesticide
	didima	v		rumble, as of lightning
	diíka	v		be educated
	diíla	v		educate for/at
n-	diíwá	n	1	pupil; student
	dila	v		pour
	dilidzila	v		water, as of plants
	dindi	n	5	thick beef steak without bone
	dindingwe	n	5	leopard
	diráyá	v		wind up, as a bucket from a well
	dishwá	n	5	standing grass

	ditima	n	5	pumpkin
n-	díwa	n	1	loved one; beloved one
	díyá	v		teach; preach
n-	díyí	n	1	teacher; priest
lu-	dó	n	11	love
	dobí	n	5	relish from shredded meat and ground peanuts
	dodola	v		walk on your toes
	dóhóna	v		pound meat or peanuts in a mortar
	dole	n	5	lean meat
	doló	n	5	corn measured in terms of threshing loads
	dombó	n	5	mountain; hill
	dongo	n	5	ruin; deserted house or home
	donkána	n	7	foal of a donkey; grey low quality blanket
	donkí	n	7/6	donkey
	dope	n	5	muddy water; mud
	dororo	n	5	fowl excreta
	dotHa	v		drip, as liquid
	dotHedza	v		pour a small drop onto
	dotHí	n	5	drop of some liquid; a drop of rain
	dotómósi	n	5	type of reptile lives on the rocks
lu-	dózo	n	11	walking stick
	dozo	n	6	leg of a chicken
	dubúla	v		remove dirt from one's body by rubbing
	dukuta	n	5	perspiration; sweat
	dúla	n	5	granary
	dúmba	n	5	drum
	dumba	n	5	shack
	dumbú	adv.		truly; surely
	dumúla	v		shoot
	dundila-bazwéle	n	5	blister beetle
	duní	n	5	mortar
	dusa	v		take out; remove
	dútHu	n	5	low hill; heap
	dútsHi	n	5	huge shadow; ill luck
	dútu	n	5	whirlwind; a cyclone
	dwa	v		say; come from
	dwa-moyo	v		envy; desire
chi-	dwí	n	7	knee
	dwilidzila	v		catch water slowly seeping through in a well

	dwilila	v		water seeping through in a spring; advance
	dwilila-mbelí	v		make progress
bu-	dwilo	n	14	beginning or origins of something
	dzamula	v		snatch from someone
	dzata	v		jump down or off; dismount
	dzeté	n	5	big hole on the ground, used by antbears
lu-	dzi	n	11	descents; relations
nju-	dzi	n	10	nations; relations
n-	dzi	n	3	root
mi-	dzi	n	4	roots
	dziba	v		prevent a person from doing something; bring back livestock
	dziba	n	5	deep pool of water in a river bed
	dzibila	v		prevent someone from doing something; restrain
	dzidzimuka	v		shudder, either from the cold or something unpleasant
	dzii dza	v		cause to suffer; trouble
	dziila	v		suffer; be poor
n-	dziili	n	1	sufferer; poor person
	dziísa	v		warm something up
	dzikila	v		transplant
	dzikunuka	v		become uprooted
	dzikunula	v		uproot something
	dzílá	v		smear the floor with mud mixed with cow dung and water
bu-	dzílo	n	14	floor newly smeared with mud
	dzilúnúla	v		re-do the floor, smear with mud
	dzímá	v		extinguish; go out, as a fire
	dzimídza	v		cause to get lost
	dzimíla	v		go astray; get lost
ba-	dzímu	n	2	spirits of dead ancestors
ku-	dzímu	n	17	heaven
N-	dzímu	n	1	God
	dzimúla	v		allay
mi-	dzing'wáná	n	2	troubled ancestral spirits
	dziya	v		be warm; warm oneself
	dzondola	v		look askance at
ma-	dzongé	n	6	sediments
	dzu	n	5	eagle
	dzudzú	n	5	turncoat; cheat
	dzuka	v		develop a rash
	dzula	v		rape

	dzulúla	v		smear mud on the wall
	dzúngu	n	9	dizziness; vertigo
	dzungúdza	v		rinse out something
n-	dzwá	n	3	strap
	dzwa	v		belch
chi-	dzwa	n	7	thigh
	dzwála	v		plant
	edza	v		imitate
	édzísá	v		evening pasttime
ma-	édzíso	n	6	evening time games or conversations; social functions
	ee	adv.		yes
	éméri	n	5	bucket
	emugwa	v		be desired
	emula	v		desire; want
	enda	v		go; go away
ma-	enda-mbelí	n	6	first fruits; corn that ripens before the rest of the harvest
bu-	endasí	n	14	frustration; sadness and boredom
	endisa	v		hasten; cause to walk
gu-	endo	n	11	journey; pilgrimage
nj-	endo	n	10	journeys; travels; pilgrimages
chi-	énga	n	7	piece of broken clay pot
	engemala	adj.		still, as of water; Holy
ba-	engi	n	2	nurses
ng'w-	ení	n	1	owner; master
b-	ení	n	2	owners
m-	enó	n	6	teeth
	erébhu	n	10	Pods that grow on a tree, eaten by goats
m-	eshó	n	6	eyes
	ezedza	v		put to sleep, as a child
	ezela	v		sleep; go to bed
ng'w-	ezí	n	1	visitor or guest
b-	ezí	n	2	visitors; guests
bu-	fá	n	14	inheritance
	fá	v		die
zwi-	fáfa	n	8	epilepsy; epileptic fits
chi-	faní	n	7	surname
	fáníla	v. aux.		ought; must
	fáníla	v		look nice on someone, as clothes
	fánílo	n	9	obligation; duty; requirement
i-	fáno	n	7	physical likeness; resemblances
	féidza	v		cause to fail

	féla	v		fail
	fele	n	5	cockroach
	fema	v		breathe
	femeleka	v		breath heavily from over-exertion
	fépHá	v		blow the nose
	fésítère	n	5	window
n-	fí	n	1	dead person
	fídza	v		finish
	fíko	n	5	small tree branch put in a bucket of water to prevent spilling while carrying it
	ffla	v		get to the end; die at
	fívará	n	9	fever
	fójo	n	9	tobacco
	fóro	n	9	furrow in a ploughed field
	fórókó	n	9	fork
	foromu	n	9	mould, for moulding bricks
	fóshólo	n	9	spade
	fóúni	n	9	telephone
nji-	fú	n	10	deaths
lu-	fú	n	11	death
i-	fúbá	n	7	chest; breast as of chicken; a cough; sputum; phlegm
	fúbá	v		become useless; not grow
	fúka	v		wear, as a blanket
	fukula	n	9/10	bitch
	fula	v		graze, as of animals
	fúlá	v		blow off by breath, as of dust
	fuláwa	n	9	bread flour
	fúlélé	n	9	mist; fog
	fulémáchíni	n	9	flying machines; aeroplanes
	fúléni	n	9	flannel
	fúló	n	5	foam; froth; scum on water
	fúlúka	v		depart; migrate; move house
	fúmá	v		be rich
	fúmbátíla	v		make a fist; clasp, as of a fist
n-	fúmí	n	1	rich person
	fúmíka	v		cover up something
	fúmúla	v		uncover, as of a lid
	fúndá	v		keep food in mouth
	fúng'wa	n	9	riches
	fúnyá	v		sit crosslegged
	fúnye	n	7	go-away bird
	fúpá	n	5	bone; jealousy
	fúpátíla	v		turn one's back upon

	fúpi	adj.		short
	fúpi-fupi	adj.		very short
	fúrisilaxa	n	9	thin rope at the end of a whip used cracking the whip
ma-	fútá	n	6	oil; body creams of all types
	fútá	n	5	piece of fat
	gaberi	n	7a	turtle
	gabhá	n	5	bucket; tin
	gabí	n	5	lash; euphemism for a snake at night
	gabuka	v		have a large opening
	gabula	v		rip open
ma-	gadá	n	6	sediments or dregs of traditional beer
	gagadzahámba	n	5	crab
ma-	gai	n	6	eggs or nits of fleas or lice
	gaísa	v		grind, as of corn
n-	gaíso	n	3	grinding mills; ground corn
	gákHwa	n	5	pool of water
	gala	v		sit down; dwell; live
	gala-bge	v		trust; believe in
	gala-bhéya	v		sit indecently exposing some private parts
	gala-moyo	v		be satisfied
n-	gali	n	1	dweller; inhabitant of
	galí-demá	n	5	gathering by family and relatives after a bereavement to distribute a dead person's belongings among the children
	galidza	v		sit on someone's place or seat
	galila	v		wait for; stay or live for
zwi-	galila-migóti	n	8	the first small breasts that a young girl grows
	gama	v		catch in the hand, as of a ball
	gámu	n	5	relative
	gánda	n	5	skin; peel
	gandáná	n	5	tattered garment
	gando	n	5	lean animal; an emaciated animal
	gangári	n	5	sweet wild bulb
	gangwa	n	5	peel of a watermelon
	ganyú	n	5	membrane
	garáji	n	9	garage
	gaswá	n	5	half; remainder
	gat'é	n	5	bitter wild melon
	gavú	n	5	species of gourd eaten when

				tender
bu-	gebéng'a	n	14	gangstership
	geídi	n	9	gate
	gele	v		be seated
	gési	n	9	gas
	geyará	n	9	gear
n-	gibélo	n	3	Saturday
nji-	go	n	10	serving spoons; ladles
lu-	go	n	11	ladle
	go	n	5	wasp
ma-	go	n	6	wasps; hornets
n-	gobháni	n	3	intestinal disorder
n-	godí	n	3	mine
chi-	gogoro	n	7	hardened caterpillar in the ground before it hatches to be a butterfly
	góla	n	5	vulture; a black vulture
	golé	n	5	year; cloud
	golélínó	n	5	this year
	gololwani	n	5	white-billed storks
	gombá	n	5	hole; opening dug on the ground
	gómbo	n	5	new field ploughed the first time
	gómbó	n	5	enlarged navel
	gondalume	n	5	tall and stout male person
	gonde	n	5	cactus
	gondoló	n	5	big calf; grown up child
	gónya	v		sleep with ones legs folded back
	gonyaná	n	5	worm; maggot
	gonye	n	5	big worm
ma-	gonye	n	6	game of touching by kids
	gonye-dangá	n	5	worm of the type found in the kraal
	gopó	n	5	blind eye; blind thing or person (derogative)
n-	góro	n	3	trough; boat or canoe
chi-	góro	n	7	cow or goat with little milk
	gorokoro	n	5	windpipe
	gorokorwana	n	5	creek
	gorua	n	5	thin emancipated animal
lu-	góti	n	11	big wooden spoon or ladle
	gotsha	n	5	shoot from the previous year's corn stalk
	góvu	n	5	greedy person
bu-	góvu	n	14	greed

	gubúngáno	n	5	assembly or gathering
n-	gudugudu	n	3	rectum
	gukhwá	n	5	bag from ox hide used for carrying sour milk
	gukúno	n	5	salt licks in the veld
	gukúrúme	n	5	cock
	gukúta	n	5	unbrayed and shrivelled skin
	gula	n	5	field in fallow
	gulú	n	5	stomach
	gululu	n	5	big lizard, lives on big boulders
	gumá	n	5	wall
	gumbátíla	v		hold hard onto something;
	gumbo	n	5	leg; wheel; foot
	gúmi	n	5	ten
	gumú	n	5	ox or cow without horns
	gumula	v		hit another with the head
	gunda	n	5	owl
	gungubudza	n	5	large poisonous scorpion
	gungwaná	n	5	wheel
	gúní	n	5	log
	gúse	n	5	big lump of fur
	gúta	v		be full or satisfied from food
	gutégute	n	5	species of grasshopper
	gutukutu	n	5	verandah
	gúwó	n	5	scream
	gúwú	n	5	cave
	gwa	v		fight; quarrel
bu-	gwá	n	14	pus
	gwádza	v		hurt emotionally or physically.
	gwádza-moyo	v		grieve; be hurt; sorrow
	gwakwa	n	5	spineless monkey orange fruit
	gwákwa	n	5	dry veld
bu-	gwalá	n	14	timidity; cowardice
	gwála	v		sick; ill
	gwalá	n	5	coward
	gwamú	n	5	human milk
nji-	gwaná	n	10	spoons; cutlery
lu-	gwaná	n	11	spoon
	gwani	n	5	leaf of corn, off the stalk
	gwata	v		hide oneself
	gwatí	n	5	outer bark of a tree
bu-	gwéle	n	14/6	illness; disease
n-	gwéle	n	1/2	patient; sick person
	gwenyá	n	5	scabies
	gweré-gweré	n	5	type of wild bird
	gwilí	n	5	potato

	gwilikwiti	n	5	measles
	gwilííla	v		repeat; go over again; revise
	gwisá	n	14	powder; flour
	gwisa	v		struggle; try
	gwisanya	v		cause to quarrel or fight
n-	gwisanyi	n	1	mischief-maker
	ha	conj.		if; when
	hádzí	adj.		female, as of an animal
	hakáta	n	10	divining bones
lu-	halá	n	10	shotgun; ball bearings
	hálí	n	9	pot
	halúla	v		escape; survive
n-	hama	n	3	half of the body
	hámá	n	9	relative
	hámbá	n	9/10	tortoise
	hamílo	n	9	small milking bucket
	hamújaná	n	9	small hammer
	hamúli	n	9	hammer
	hang'ará	n	9	hanger
	hángá	n	9/10	guinea fowl
	hangáng'wá	n	10	forgetfulness
	hanya	n	10	shame
	hanyaa-paladza	n	9	rhinoceros
	hanyánísi	n	9	onion
	hapkhá	n	9/10	armpit
	haráká	n	9	rake, used in the garden
	háté	n	9/10	headpad
	házwadzi	n	9/10	brother; sister; sibling
	hlama	n	9	fermented beer before it is boiled
	hobaná	n	10	streams
chi-	hóbe	n	9/10	fish
	hóke	n	7	hook, as of a stick
	hóko	n	9	enclosure for fowls
	hola	n	9	grown-up; elder
	hólo	n	9	hall
	hombáná	n	10	finger or toe nails
	hombela	n	9/10	antbears
	hómó	n	9/10	bags; sacks
	hong'wáná	n	9	small bag or sack; pouch
	honyaná	n	10	worms
	hópé	n	10	eye lashes; sleep
	hotéla	n	9	hotel
	hubádzi	n	10	injuries
	hudzúlulu	n	9	blackbird
	húkú	n	9/10	fowl; chicken

	hukwáná	n	9	chick; chicken
	huléha	v		inspan; tie up an animal
	hulo	n	9/10	tonsils
	hulúba	n	9	dust; powder
	hulúla	v		unbound, as of oxen inspan
	hulunula	v		unload
	huma	n	9	big protruding forehead
	hungúbelé	n	9/10	butterfly
	húní	n	10	firewood
	húpa	n	9/10	ticks; bush lice
n-	húta	n	3	kind or type
	hutará	n	9	hooter
n-	hútha	n	4	fenced passages for handling cattle for spray dipping
	hútshe	n	9/10	hat
mi-	hwá	n	3/4	thorn
	hwá	v		hear
	hwachulo	n	9/10	mushrooms
	hwakwa	n	10	dried fruit of wild orange
	hwalí	n	9	partridge
	hwálo	n	10	books; letters
	hwanáno	n	9	mutual friendship
	hwarakwara	n	10	type of birds
ma-	hwí	n	6	voices
	hwí	n	5	voice
	hwídza	v		make to taste
	hwíka	v		audible; heard of; taste, as salt
	hwíla	v		feel, as with pain
	hwílá-zogwádza	v		show mercy, compassion
	hwilíla	v		hear about; hear of; listen
	hwísa	v		cause to hear; give one to taste
	hwisísa	v		understand
bu-	hwola	n	14	position of sinority; adulthood
	hwosó	n	9	type of traditional dancing
	hwotó	n	9	hornbill bird
	hwudo	n	10	baboons
	hwúmbu	n	9/10	hunchback
pa-	hwúnde	adv.		near; nearby
mu-	hwúnde	n	18	alongside; besides
	ícho	pron.		it (class 7)
	íkwéno	dem.		there
	ila	v		abstain from certain practices
	imí	pron.		I; me
	ing'wí	dem.		you (pl)
	iní	pron.		what
	ínvilópó	n	9	an envelop

	ípapa	dem.		right here; here
	ípi	pron.		which (cl.9)
	iribadza	v		cause to faint; apply anaesthesia
	iribala	v		faint
	isa	v		take something to someone
zwi-	ísáná	n	8	small boys
ba-	ísáná	n	2	boys
chi-	ísáná	n	7	small boy
	iswí	pron.		we; us
	ita	v		do
	íye	pron.		he; she
	íyeje	dem.		that one, over there
	íyejee	dem.		that one, far away
	íyeyi	dem.		this one, nearest me
bu-	izelo	n	14/6	place for sleeping; bedroom
zwi-	ja	n	8	goods; household utensils
	já	v		eat
chi-	ja	n	7	plate or household utensils
n-	ja	n	3	errand
	jabáthu	n	5	cannibal
	jacha	n	5	old hut which is almost in ruin
	jaíva	v		jive
	jáji	n	9	judge
n-	jaká	n	3	sound made with fingers when pounding corn
n-	jalákáng'wa	n	10	thoughts; ideas
	jálo	v		say so
	jarádá	n	9	yard or compound; yard length of material
ma-	jaratíni	n	6	explosives; dynamite
	jási	n	5	coat
	jaxa	v		hasten
	jaxá	n	5	youth; young man
	jekechéké	n	5	big knife
n-	jekésa	n	10	prostitute
	jéki	n	9	jug; jack
	jele	n	9	prison
n-	jelélé	n	9	type of hawk
	jéli	n	9/10	jelly
	jému	n	9/10	jam
	jenámíso	n	5	surprise; wondering
	jende	n	5	testicle
	jenéthá	n	5	straw ant
	jenjédhú	n	5	clever person
	jerémani	n	5	traditional dress for women
	jesí	n	7	sweater; jersey

lu-	jí	n	11	right hand
n-	jiba	n	9	dove
	jílá	n	5	cloth
	jínyo	n	5	damages, money paid to a girl's parents after impregnating her
chi-	jíso	n	7	oral poison
n-	jitá	n	3	fellow
ma-	jó	n	6	lots of types of food
	jóki	n	5	yoke
n-	jújurú	n	3	wild plant
	káamúdza	v		stop raining
	kábhukána	adv.		splash and spill, as water
n-	kabo	n	3	type of calabash
	kádúla	v		hit another
n-	kádzí	n	1	woman; a wife
chi-	kádzí	n	7	female one; womanly
i-	káka	n	7	desert
n-	kaka	n	3	milk
	kakále	adv.		again; once more
	kakang'wa	v		stammer; stutter
n-	kákhwa	n	3	cooked and dried maize
ma-	kakí	n	6	khakhi-coloured clothes
	kála	v		weigh
bu-	kálágwa	n	14	of parents-in-law, on wife's side
n-	kálágwa	n	1	parent-in-law, of the wife's side
	káláká	n	9	lime; whitewash
i-	kále	n	7	measure; amount; a scale
	kale	adv.		already
	kámá	v		milk, as of cows; comb
i-	kámbá	n	7	back of the body
	kámbáíla	v		crawl, as of a baby
	kaméla	n	9	camel
n-	kámi	n	1	someone who does the milking
	kámpá	n	9	camp
ma-	kámu	n	6	relatives
	kámu	n	9	comb
	káng'wázá	adv.		intentionally
	kánga	v		roast; fry
	kángáng'wa	v		forget
	kángúla	v		wear something new
	kanya	v		roll up, as shirt sleeves
	kányi	n	17	home
	kápá	v		unsettle, as sediments in water
	kápi	n	9	baby's sun hat
	kapúku	n	9	snow
i-	kára	n	7	share, of a plough

	kára	n	9	car
	kárátá	n	9	cards
mo-	kashe	n	3	lean starved dog
	kat'a	v		become tame; docile
	kát'á	v		play on something or spoiling it
	kát'ána	v		coiled up, as a snake
	kat'isa	v		discipline or train an animal
n-	kat'iswani	n	3	animal being trained
lu-	kátá	n	11	heirloom
	kátára	n	9	guitar, musical instrument
	káThúlo	n	9	sentence or judgement
pa-	katí	n	16	middle
	kátíla	v		cushion with headpad
	katsha	v		crush s.o., as with a stone
	kátsi	n	7	cat
	kaya	v		describe; say
	káyá	v		tie together the hind legs of a cow for milking
i-	kayí	n	7	example
n-	káyó	n	3	rope used for fastening a cow's legs when milked
	kéétani	n	9	chain
	kékédza	v		cackle, as a hen
	kéléka	v		examine; look into carefully
	kene	conj.		perhaps; or; either
	kénta	v		inject
n-	kénto	n	3	injection; vaccination
i-	képé	n	7	ship
	képési	n	9	cap
	kéra	v		cut hair; shave
n-	kerí	n	1	barber
i-	kéro	n	7	pair of scissors
	kéta	v		play a counting game
i-	kéte	n	7	skirt
	ketHa	v		pluck off as a fruit
dzi-	kéto	n	10	counting game of stones
i-	kéyi	n	7	yoke-pin
dzi-	khába	n	10	curses
	khaba	v		dress up; show off
	khabánkáka	n	9	type of wild plant
	khabidza	v		sit properly
	khabisa	v		decorate; make beautiful
n-	khabiso	n	4	decoration; embroideries
n-	khabo	n	3	smart clothes; fashion
	khábóti	n	9	cupboard
n-	khacha	n	3	valley; dale

	kháisa	v		excel; surpass
	kháísána	v		compete with each other
	kháma	v		choke a person or thing; throttle
	khándelá	n	5	candle
	khání	n	10	news; court case
	khapa	v		decoate floor or wall with dung
	khápíta	v		choke, when drinking or eating
li-	khapo	n	11	patterns made on floor or wall with cow dung
	khari	n	5	slice of water melon
	khátá	v		amuse; cause to laugh
	kháúla	v		stop doing an undesirable thing, due punishment
	khawa	n	9	dew
	khéfi	n	9	cafe
	khéípi	n	9	collar
ma-	khékhé	n	6	fat cakes; dornuts
	khéróti	n	9	carrot
	khetha	v		pay tax; select or choose
n-	khethi	n	1	taxpayer
n-	khethísi	n	1	tax collector
	khúba	n	9	apron; pinafore
	khúga	v		help lift load on one's head
	khina	v		knee-halter a donkey or a horse
	khírísímusi	n	9	Christmas
	khíyi	n	9	key
	kholé	n	9	rope held to lead cattle inspan
	khona	v		manage; accomplish
	khóná	v		turn at a corner
	khong'wána	n	9	young yearling ox
	khónsatá	n	9	concert
	khóódza-ntánda	n	7a/2a	woodpecker
	khúbu	n	9	swing
	khúbúla	v		swing
	khúnóu	adj.		denotes male animal reddish brown in colour
	khúnwána	adj.		denotes female animal reddish brown in colour
	khupe	n	7	hare (used as a totem)
	khuta	v		miss a target
	khútá	n	9	enclosure where the community assembles to discuss matters of importance to the community; a council
	khúwa	n	5	white person; European
i-	khúwa	n	7	English language

chi-	khwa	n	7	veld; bush on the countryside
	khwá	v		dry up; pound, as with corn
n-	khwá	n	1	Bushman, or Mosarwa
zwi-	khwa	n	8	forests; clumps of trees; jungles
	kHwána	n	9/10	wild animal of the jackal family
	khwathé	n	9/10	inguana
	khwathisa	v		strike on the back using either a big stick or a whip
	kHwé	n	9/10	sweet reed; sugar cane
n-	khwe	n	3	crack
n-	khwéétsi	n	1	driver
	khwíla	v		pound, as of some grain, for/at; to dry up, as of a pot on fire
bu-	khwílo	n	14	flour from grounded peanuts
	khwiriri	n	5	snore
	khwiriridza	v		snore
	khwísa	v		dry-up of a cow's milk
	kHwizaná	n	9/10	lamb
	kHwizha	n	9/10	giraffe
	kHwizi	n	9/10	sheep
	kítíli	n	9	kettle
	kóáma	v		stay put, as of people
	koba	v		give away
n-	koba	n	3	door; an entrance; gateway
	kobana	v		apportion tasks or things mutually
li-	kobaná	n	11	stream
	kobanya	v		distribute indiscriminately
	kobeka	v		be distributable
n-	kobi	n	1	distributor
	kóbóla	v		stamp wild raisins in a mortar
	kóbóto	n	9	cupboard
ma-	koda	n	6	bow-legged
	kodhú	adj.		fat; big
	kódzóngá	v		stir; row a boat
	kóga	aux. v		however; nevertheless; only
	kóga	conj.		only
n-	kojwaná	n	3	small opening
i-	kóka	n	7	blackjack
	kóká	v		invite
bu-	kókó	n	14/6	crust on pot
	kókódza	v		knock, as on a door
i-	kókólá	n	7	elbow
	kokonola	v		remove something that had hardened onto hard surface
	kókóróbhána	v		corrugate; crimp

	kókóta	v		eat or scrape with a finger
	kologwé	n	7a/2a	last-born child
n-	kólóló	n	1	son of; daughter of
	kólómóla	v		dismantle; destroy
	kólóta	v		owe; take on credit
	kólóyi	n	9	wagon; vehicle
bu-	komba	n	14	stubbornness
	kómbá	v		surround something
	kómbáma	adj.		crooked, not straight
n-	kómbe	n	3	dry gourd
	kómbéla	v		help in a fight by also beating the person being fought
i-	kómbó	n	7	navel; belly button
lu-	kombo	n	11	threshing stick; a big stick
	kómétHéla	v		nail to; knock in, as of a nail
n-	kómóto	n	3	traditional dancing to drums
	kona	v		refuse
	konesa	v		cause to be difficult
	kong'wa	v		fail; not succeed
i-	kongo	n	7	clitoris
n-	kóno	n	3	bull
mi-	kóno	n	3	January; bulls
i-	kónsi	n	7	scone
i-	kontíri	n	7	tar
i-	konyaná	n	7	insect
	kóobédza	v		kill an animal already wounded
i-	kopelo	n	7	safety pin
	kópélo	n	9	hymn book
	kópi	n	9	cup
	kópódza	v		get something in the eye; dazzle
	korokorwana	n	9	padlock
	koróni	n	9	crown
	kóse	pron.		all
n-	kosho	n	3	type of tree
	kóshódza	v		cause to cough
	kóshóla	v		cough
n-	kotá	n	3	epistaxis; haemorrhage from nose
	kotama	v		stoop; crouch, as if hiding; bend
	kotamuka	v		unbend; to straighten
	kótHoméla	v		nail into, as with a nail
	kotoka	v		arrive; reach one's destination
bu-	kotokelo	n	14	place of arrival; station
	kotosa	v		bring cattle home; marry a wife
	kotoshío	n	7a	small type of owl
i-	kótsíkára	n	7	donkey cart

i-	kowa	n	7	weakling; sickling
	koyí	n	9	skipping rope
	ku-kwé	pron.		his; hers
n-	kúba	n	3	Acacia burkei; Acacia negriscens tree
i-	kúba	n	7	chaff from grain; a useless person or animal
	kúbádza	v		hurt someone where it is sore or where there is a sore
	kúbála	v		get hurt or injured
	kubí	adv.		lot
	kubíkubi	adv.		lot more
	kúbúngána	v		assemble; gather together
	kúbúngánya	v		gather things together into a group
mu-	kúchúkúchú	n	3	watermelon full of water
	kúdúla	v		knock one with head
	kúdza	v		bring-up a child; cause to grow
	kudzá	conj.		until
	kúéléla	v		jeer at someone; make fun of by loud abusive shouts
	kúkáma	n	9	gemsbok or oryx gazelles
n-	kuku	n	3	stream
	kukú	n	1a	grandmother
	kúkúbúgwani	n	7a/2a	beetle
	kúkúla	v		scrape a surface
i-	kúkúlo	n	7	scraper, used on pots
	kukumuka	v		increase; raise as of dough
	kúkúna	v		eat meat off a bone
	kúlá	v		grow up
	Kúla	n	5	Indian
	kula	v		weed, using a hoe or a spade
bu-	kule	n	14	far; distance
	kulekule	adv.		far away; far off
	kúlídzíla	v		pull up trousers or underwear
	kúlígwa	v		advanced stage of pregnancy
bu-	kúlu	n	14	greatness; age
i-	kulú	n	7	impetigo; ringworm
n-	kúlu	n	1	an elder; an older sibling
	kúlúkúgwi	adj.		old, as of a garment or utensil
bu-	kúlúkulu	n	14	largeness; huge
	kulúkulu	adj.		big; huge
	kúlúmúka	v		come in large numbers
	kuma	v		touch lightly
	kúma	v		roar as of a bull or a lion; groan
	kumba	v		visit

	kúmbíla	v		beg; ask for; request
	kúmbúdzána	v		remind each other
	kúmbúla	v		think; ponder; consider
n-	kúmbúlo	n	3	idea; thought
	kúmbúlúdzá	v		cause to recollect; remind
	kúndá	v		defeat
n-	kúndi	n	1	victor; conqueror
	kúndíwa	v		being overpowered or defeated
	kung'we	adv.		anywhere
	kúngúlúdzá	v		roll on the ground; cause a thing to roll down, as a tank
	kúngúlúka	v		roll down a steep slope
i-	kúngúlulú	n	7	reel of thread
lu-	kúni	n	11	piece of wood
n-	kúnúnú	n	3	creeper like plant that grows small edible melons
	kúnúpo	n	9	button
i-	kúnyána	n	7	twig
n-	kúpá-vula	n	3	ox's dewlap
i-	kupú	n	7	water container
	kúrukídza	v		pacify an infant
bu	kúse	n	14	fur; animal hair
	kusí	adv.		underneath; below
	kúswa	v		sharpen, as a knife
li-	kúta	n	11	hedge; fence
i-	kúta	n	7	motorbike
	kutHa	v		come in contact with
	kutHiwa	v		trip on; stumble on
n-	kutHú	n	3	type of tree
n-	kutHu-lífúmo	n	3	type of tree
	kútHubúla	v		remove leaves and twigs from a branch from a tree
	kúti	conj.		so that; in order that
	kuti	conj.		that
	kúwa	v		shout loudly; scream
i-	kuyú	n	7	water bottle; large container
	kúzwá	v		be with small chicks of a hen
n-	kwakwa	n	3	spineless monkey orange tree
ma-	kwákwa	n	6	dry velds
n-	kwalá	n	3	foot mark, as of an animal
	kwála	v		write
n-	kwáléri	n	1	secretary
n-	kwáli	n	1	writer
lu-	kwálo	n	11	book; letter
i-	kwámá	n	7	purse
	kwamula	v		break off something

	kwanga	v		be full of milk, as of an animal; have plenty of fruits in a tree
	kwanyula	v		remove the corn from the stalks
ma-	kwapa	n	6	rough surface, as a reptile
bu-	kwásha	n	14	of the in-laws, of husband's side
n-	kwásha	n	1	son-in-law; the bridegroom
i-	kwáshi	n	7	squash
i-	kwata	n	7	group of people
	kwáúla	v		break off a branch or twig
ma-	kwáyi	n	6	rumours; hearsay
	kwázo	adv.		much; hard
	kwázokwázo	adv.		lot more
	kweba	v		pull; draw in or out
	kweba-makumbo	v		walk slowly; drag one's feet
	kwégúla	v		become old, or aged
i-	kwéle	n	7	school
	kwemula	v		break off a piece, as of a cup
	kwemulanya	v		separate mutually amongst
i-	kwéya	n	7	square or platform
lu-	kwézha	n	11	millet or grain used in brewing traditional beer
	kwíba	v		steal; pilfer
	kwíla	v		mate, as of animals
n	kwínya	n	1	peer; companion; comrade
	kwiya	v		grind, as corn to make flour
	labana	v		take turns at something
	labanya	v		make alternate; make take turns
	lábhúla	v		throw away abruptly, as with a hand or with a stick
	labidza	v		cause to taste food
	labila	v		taste food especially while cooking
	lábúka	v		run
	lábúkíla	v		go after; run after
	ládzíka	v		cause to lie down; be hospitalized
ma-	ládzwa	n	6	leftover food
	lákídza	v		show; point out to
ma-	lala	n	6	refuse; gabbage
	lálá	v		lie down; spend the night
n-	lala	n	3	wild plant used for making baskets
n-	lalabúngu	n	3	rainbow
n-	láláhánga	n	3	type of tree
	lálána	v		have sexual intercourse
	lálíla	v		brood over, as of hen on eggs;

	lálúka	aux. v		an evening meal refers to a time past, especially the past year
	lamba	v		refuse
	lámbi	n	5	lantern; lamp
	lambiwa	v		be rejected; divorced
n-	landa	n	1	slave; servant; serf
n-	landú	n	3	fault; error; debt
	landula	v		deny a fault; give a negative answer
n-	landuli	n	1	one who gives the condolence message at the funeral
	lang'wa	v		sulk; refuse
	lang'wilana	v		refuse to associate with each other
	langa	n	5	white discharge of the eye
	lángwá	n	5	sputum
	lapa	v		cure; heal
n-	lapi	n	1	healer; doctor
	lapkha	v		be cured or healed
	lásha	v		cast away; throw away; misplace
	láshúka	v		get lost; become cast away
	láshíla	v	t	throw into; throw to
n-	laúri	n	1	governor; a ruler
mu-	lávu	n	3	rabies; animal with rabies
bu-	láwo	n	14/6	bed
n-	lawo	n	3	law; regulation; rule
	laya	v		lay down the rules; give advice
chi-	láyi	n	7	slice
	layila	v		guide; direct; give a message
	layilila	v		give message for someone
chi-	láyílo	n	7	evening meal; dinner
	láyíta	v		light some fire, a torch or a lamp
	léba	v		talk; speak
	lébánya	v		babble; chatter or talk too much
chi-	lébányi	n	7	babblers; gossip
n-	lébélékéli	n	3	lawyer
chi-	lébéléki	n	7	speaker; an orator
	lébésa	v		cause to speak; speak to; tell the truth
	lébéswá	n	5	truth
	lecha	v		leave alone
	lechedza	v		leave alone
	lechedzela	v		allow; permit
chi-	ledhu	n	7	chin

	lefú	adj.		tall; long
	lefúlefu	adj.		very long or tall
	léisa	v		cause to avoid something
	lékúla	v		visit; call to enquire after the health of a sick person
	lékúlisa	v		tell friends or relatives on the health of someone sick
	léle	n	5	ladder
	lélé	v		asleep
bu-	lélú	n	14	lightness in weight; not heavy
	lélu	adj.		light in weight
	lema	adj.		heavy
	léma	v		make a habit of; spoilt child
chi-	léma	n	7	disabled person or animal
	lémála	v		get injured and be disabled; make a habit of something; get spoiled
	lembedza	v		dangle or carry by holding down loosely
	lemeledza	v		hang down; suspend on
	léngúdza	v		make light (decrease weight)
bu-	léngwe	n	14	foolishness
chi-	léngwe	n	8	foolish person
n-	lenje	n	3	custom; tradition
n-	leta	n	3	wedding feast
	léte	v		bring
	léúka	v		be sprained, as of an ankle
	léúla	v		cause to sprain
	lévu	n	5	edible inside of a watermelon
	léyá	v		avoid; go around something
	léyána	v		alternate; take turns; be mad at one another; pass each other going in opposite directions
	léyánya	v		make to cross the other
chi-	léyi	n	7	sledge
chi-	léyítí	n	7	slate
	lézwá	v		play with a baby
	líbílídza	adj.		do something quickly; hurry; be in haste
n-	líbo	n	3	type of greens
	lidza	v		cause to cry; play a musical instrument
n-	lídzo	n	3	whistle, produced by the lips
chi-	lidzo	n	7	musical instrument
	liga	v		let fall; drop something
	ligila	v		finish; drop into

	likhwa	v		be paid; be rewarded
	lila	v		cry; weep; wail
chi-	lilo	n	7	cry; mourning
	lima	v		plough; till the ground
	líma	n	5	darkness
lu-	lími	n	11	tongue; language
n-	limi	n	1	farmer; ploughman; a tiller of soil
chi-	lími	n	7	speech empidement, as of a child learning to talk
n-	limisi	n	1	agricultural officer
chi-	limo	n	7	summer season
	limunula	v		replough a patch
	linda	v		wait for; to stay in guard
n	lindi	n	1	one who guards corn against birds
chi-	líng'wáná	n	7	velum
	língá	v		look
	língá	n	5	type of bracelet
chi-	língá	n	7	tendency to stare
	língánya	v		look in all directions, as when suspicious
	língílíla	v		watch; gaze at
	língísána	v		be opposite each other
	língísísa	v		examine; look into carefully
	líní	adv.		when
	lipa	v		pay a debt; fine; or payment for services rendered
	lipisa	v		cause to pay one for some destruction
n-	lipo	n	3	handle of a bucket or a cup
	lísa	v		herd or look after, as of livestock
n-	lísi	n	1	shepherd; herdboy
	litsatsaná	adj.		delicate or thin, as of a cloth
	lizana	v		fit properly
	lizanya	v		make equal; measure; try on
	lóba	v		beat or hit
chi-	lobe	n	7	large cakes of dry dung
	lobódza	v		give away, as in marriage; officiate a marriage
	lobóla	v		marry
ma-	lobólo	n	6	lobola; money or cattle paid by the groom to the bride's parents
	lógwa	v		be spanked; be beaten; be hit
chi-	lokó	n	7	black earth; hard baked earth

n-	lólwání	n	3	border; boundary
	lombe	n	5	singer
n-	lomo	n	3	mouth; beak of a bird; an opening
	londa	n	5	boil; sore
	londa	v		go after; follow; trace
	longa	v		put into; insert
	longa-zhobá	v		make noise
	longanilo	n	5	joint, in the body
chi-	longó	n	7	water pot; earthen pot; a clay pot
n-	longo	n	1	bride; daughter-in-law
	longoloka	v		follow each other in order, as when in a queue
	longolosa	v		set in order; arrange in order
n-	lóngwe	n	3	type of tree
	lonjelela	v		thread something, as beads
chi-	lopa	n	7	liver
ma-	lopa	n	6	blood
	lopa	n	5	drop of blood
chi-	lópo	n	7	pillow case
n-	lota	n	3	ash
	lowa	v		bewitch
n-	loyi	n	1	wizard; witch
bu-	loyi	n	14	witchcraft
	lubá	n	5	cotton wool; flower
bu-	lubi	n	14	brain; intelligence
	luka	v		knit; plait; weave
	luka-maano	v		plan; devise means
n-	luki	n	1	weaver; one who knits or crotch
n-	luko	n	3	pattern of weaving; a knitting pattern; plait pattern
	lulwama	v		nice; honest; just
n-	lulwamisi	n	1	one who puts things right or straight
	lúma	v		bite; sting; infect with venereal disease; eat the first fruits
n-	lúmé	n	1	man
chi-	lúmé	n	7	pertaining to man; manly
n-	lúmétáté	n	1	grown man
	lúmíka	v		cupping
chi-	lumiki	n	7	one who cups or extracts blood by means of a horn
chi-	lungwani	n	7	pinnacle, as of a hut
n-	lúnyáná	n	1	best man; the young brother of ones husband

	lutsHí	n	11	soft inner bark of a tree used for making a string
	m á	v		stand; stop
	mááma	v		wander about aimlessly
	mábashéto	n	7a	type of weed
	máchibogwé	n	7a/2a	type of tree
	madékwaná	n	17	evening
	madékwe	n	17	yesterday
	mága	n	9/10	mug
	máhádzí	n	1a	father's sister, an aunt
	mákásitiráta	n	1a/2a	magistrate
	makát'e	n	7a/2a	bridesmaid
	makényi	n	17	last year
	makényúja	n	17	year before last
	mámpányámányá	n	7a/2a	wasp, seen after the rain falls
	mána	v		too small a size; too tight
	mánchése	n	7a	big beetle
	mándána	v		be crowded
chi-	manga	n	7	maize; maize cob
	mangwána	n	17	tomorrow
	mangwánáná	n	17	early morning; early mornings
	máníkána	v		be crowded
	máníkáno	n	10	problems; inconveniences
	máníkánya	v		cause to be crowded; make uncomfortable
	máníla	v		get stuck in something
	máníni	n	1a/2a	mother's younger sister; an aunt
	mánkhwákwárara	n	7a/2a	cricket
	mánkhwanyaháli	n	7a/2a	praying mantis
	mánlémbe	n	7a/2a	bat, a bird
	mánnyóngóví	n	7a/2a	snail
	mántHúmbe	n	7a/2a	insect that lives in a grass-woven case and moves around carrying it
	mántokwé	n	7a/2a	honey made by small black bees in hollows of dead trees
chi-	mata	n	7	fool; idiot
	maúru	n	6	cooked dry maize
	mbá	v		sing
	mbáákányo	n	9	preparation; a correction
	mbábá	n	9	Winter season
	mbadhu	n	10	ribs
	mbáko	n	9	the process of building; bulding
	mbalé	n	10	burns or scorchmarks due to basking by the fire or the sun

	mbanjé	n	10	dagga; marijuana drug
	mbano	n	9/10	firstborn child
	mbaséla	n	9	bonus
	mbatátá	n	9/10	type of sandal shoe made from tyres
	mbatsha	n	10	splinters of wood; danger
	mbavá	n	9/10	thief
	mbeba	n	9/10	rat; mouse
	mbeleko	n	9/10	skin or cloth in which a baby is carried on the back
	mbelí	n	17	genital organs; in front of; ahead
	mbéwu	n	9	seeds, to be sown when ploughing
	mbezho	n	9/10	adze
chi-	mbí	n	7	singer
	mbidzo	n	9	yeast
	mbígányo	n	9	funeral
	mbíla	n	9/10	rock rabbits
	mbilá	n	9	gruel, a very thin porridge
	mbípo	n	9	ugliness
	mbísa	v		cause to sing; conduct a choir
	mbiyo	n	10	labia
	mbízí	n	9/10	communal work; a horse
	mbizi-yé-shango	n	9	zebra
nji-	mbó	n	10	songs
lu-	mbó	n	11	song; tune
	mbodza	n	9	badly prepared food
	mbómbóró	n	10	ants
	mbonje	n	10	injuries
	mbotaná	n	9	small calf, a few days or weeks old
	mbuba	n	9	provision; food for the journey
	mbúdzaná	n	9/10	kid goat
	mbúdzí	n	9/10	goat
	mbújo	adj.		naked
	mbumula	v		beat hard
	mbuno	n	9/10	pip of a fruit or berry
ma-	mburumburu	n	6	crumbs
	mela	v		germinate; sprout
ma-	mela	n	6	sprouted corn, used in brewing traditional beer
m-	mela	n	3	small corn plants just sprouting
chi-	melamela	n	7	sweet beer
li-	ménde	n	11/6	spleen
	ménya	v		peel off
	ményéka	v		capable of being peeled off

chi-	ményénga	n	3	food without relish
	ményéngéla	v		eat food without relish
li-	ményo	n	11	small black ants
li-	meshwé	n	11	left hand
m-	méte	n	3	mat; carpet
	métHá	v		pluck off feathers
	métHú	adj		be pregnant, of an animal
	meyá	n	3	spirit; breath
chi-	meyá	n	7	spiritual; pertaining to spirit
	mézwale	n	1a	mother-in-law
chi-	mí	n	7	whip, the type used on oxen
	mídúla	v		lift something that is heavy
	midza	v		swallow down food
zhi-	midza-mbilá	n	21	huge mamba snake
m-	midzo	n	3	throat; oesophagus
	mígwa	v		have an erection
	mijaná	n	3	small mucus
	míla	v		call to express condolences
ma-	mila	n	6	mucus
	mila	v		get lost; set, as of the sun
	míle	v		be standing
m-	mílí	n	3	native chess game
	mílídza	v		lift up, as of something
	mílídza-zebé	v		be alert; be watchful
m-	mílídzi	n	1	one who lifts up
	mílíka	v		stand up
	mílíla	v		wait for
n-	mílíli	n	1	defence counsel; legal practitioner
bu-	mílo	n	14	station, as of buses, train, etc.
chi-	milo	n	7	nose
	míma	n	9	alarm; loud shout; a scream
	mímíla	v		scream; shout or cry loudly
chi-	mímílá	n	7	rotten egg that refused to hatch
	mimina	v		strain, as of liquid
	mínístará	n	9	government minister
	mínyálála	v		walk straight, with chest out and head backwards
	mmé	n	1a	mother
	mmébakúlu	n	1a	maternal aunt, older than one's mother
	mméyabé	n	1a	his/her mother
	mméyabó	n	1a	your mother
chi-	mó	n	7	status
ma-	mó	n	6	rank; position of importance
zwi-	mó	n	8	statuses

bu-	mó	adv.		instead
	momó	n	3	shin bone
	móná	v		twist; wring
chi-	mónámóni	n	7	very thick or hard porridge
	monga	n	9	honey made underground by small black bees
	mongó	n	3	bone marrow
	motó	n	3	fire; heat
	mótókára	n	3	car
	móúlo	n	3	mule
	mowa	n	5	cockscorn, species of vegetable
	moyo	n	3	heart
	moyo-mbí	n	3	evil-heartedness
	moyo-mbuya	n	3	nice or good-hearted
	moyo-nchena	n	3	merry-hearted; happiness
	moyo-nlefú	n	3	patience
	mphéechani	n	7a/2a	sandal (a shoe)
	mphééswani	n	7a/2a	rhinoceros
chi-	muamua	n	7	idiot
	muka	v		wake up; get up
	mukigwa	v		have an erection
	mukila	v		rise up against; rebel against
ma-	muko	n	6	health; state of wellbeing
	múma	v		shut one's mouth
	múmákánya	v		unite; piece together
chi-	múmu	n	7	dumb person
	mundambeli	n	1a	name used for calling men of a particular totem
chi-	munika-nyemba	n	7	glow-worms; greenfly
	múno	adv.		here, as of a place
	munya	v		eat, by white ants or termites
m-	múru	n	3	screw; bolt; nut
	musa	v		wake someone from sleep
	múthá	v		hold by the head while milking, as a goat
	Mwalí	n	1	God
	N'ómpéla	det.		one
	na	conj.		with; and
	na	v		rain
	naka	v		be beautiful
	nakisa	v		make beautiful; to beautify
	nako	n	9	time
	nalá	adj.		red brown markings on an ox
	námá	n	7	type of creeper has white thorns
	namatila	v		cling to; stick on or adhere to
	namatilana	v		cling or stick to each other

	námbará	n	9	number
	namúni	n	9/10	orange
	namutshuka	v		become loose or detached
	namutshula	v		detach
chi-	náná	n	7	rain frog
ba-	náná	n	2	girls
zwa-	náná	n	8	group of small children
	nánáyíla	v		walk slowly
	nángáyíla	v		walk
	nángúba	adv.		even though
	naráki	n	9	naartjie (a type of fruit)
	nási	adv.		today
	nátHá	v		separate flour from coarse grain; sift or winnow
	natsha	v		make beautiful; beautify
	názwá	v		lick, as with a tongue
	ndá	n	9/10	lice
n-	nda	n	3	field
	ndabhatání	n	3	month of March
	ndákídzílo	n	9	revelation
	ndalamá	n	9/10	beads; necklaces
	ndalé	n	9	traditional beer being sold
	ndálo	n	9	sexual intercourse
	ndapo	n	9	cure; treatment
	ndázulá	n	9	type of traditional dancing
	ndéba	n	9	whistle
	ndébó	n	9/10	dialogue; meeting; a conversation
	ndechedzelo	n	9	permit; permission
	ndedhu	n	10	beard
	ndére	n	7	type of wild bulb edible
	ndígwaná	n	9	bread plate; small plate or bowl
	ndílo	n	9	dish; plate
	ndimá	n	9	small subdivisions of a field when ploughed; plots
	ndimo	n	9	ploughing season; agriculture
	ndipo	n	9	payment
	ndobe	n	9	newly deposited dung of cattle
	ndóbólo	n	9	wedding; a marriage
	ndóga	adv.		alone (1sg.)
	ndongoloso	n	9	agenda; programme
	ndóri	n	7	sweet wild bulb
	ndugwi	n	9	bile
	ndulamo	n	9	righteousness; justness
	ndulo	n	9	bile; gall
	ndúmé	adj.		maleness, as of an animal

	ndzéréma	v		make sound, as of a cricket
	ndzúnge	n	7/2a	type of wild sweet bulbs
	né	conj.		with; and
	nébúkhwá	n	1a	name used for calling men of a particular totem
	nekere	n	9/10	sweets; candy
	nékwé	prep.		about
chi-	nena	n	7	mons pubis; area above pubes
	nenededza	v		carry or use very carefully
	néngúba	conj.		even though
chi-	népe	n	7	photograph
	néswímbo	n	1a	name used for calling men of a particular totem
	ng'a	n	5	cut on the sole of one's foot
	ng'amuka	v		become stretched
	ng'amula	v		stretch
chi-	ng'ang'á	n	7	Acacia mellifera tree or bush
	ng'ang'a	v		argue
	ng'ang'aba	v		be on the verge of crying
bu-	ng'anga	n	14	doctoring; medicine
	ng'anga	n	9	doctor; witchdoctor
	ng'anga	v		scratch, as when itchy
	ng'angahádzí	n	9/10	stretchmarks on the body
	ng'apa	v		scratch, as a thorn or a cat
	ng'atha	v		take a bite, as of food
	ng'áya	adj.		tie something tightly
	ng'ína	n	5	ear-ring
	ng'olwána	adj.		denote a goat that is black
	ng'ombe	n	9/10	cattle
	ng'ong'ola	v		grumble; to show dissatisfaction
	ng'ong'olo	n	9	complaint
ma-	ng'oní	n	6	problems; bruises; pains
	ng'umbá	n	9/10	house; hut
	ng'wanána	n	1	girl
chi-	ng'wango	n	7	cultivating hoe
	ng'waya	v		gather thatching grass
	ng'wazá	adv.		wilfulness; intentionally
	ng'wazhá	n	3	trail made by livestock in the forest
ba-	ng'we	n	2	others
n-	ng'we	n	1	someone; somebody
chi-	ng'we	n	7	something
ku-	ng'we	n	17	another
	ng'wedzí	n	3	moon; month
chi-	ng'wí	n	7	heavy beer drinker
	ng'wíla	v		sink; drown

chi-	ng'wílo	n	7	drinking vessel; a cup
	ng'winá	n	3	holes as of ants or wild animals
	ng'wísa	v		cause to drink; breastfeed
	ng'wisé	n	3	tail
	ng'wísídzíla	v		watering, as with plants
	ngabé	n	9	ox
	ngamulá	n	9/10	grown-up young man
	ngano	n	10	folk tales
lu-	ngano	n	11	folk tale
	ngáyi	adv.		where
	ngee	ideo.		brighten, as at dawn
	ngéno	adv.		here
	ngína	v		enter
	ngínílíla	v		break in; jump the queue
	ngóbé	conj.		because
	ngoni	n	10	mercy
chi-	ngóringóri	n	7	small cap on the side of the ankle
	ngubo	n	9/10	blankets
	ngulube	n	9	pig
chi-	ngúngu	n	7	gizzard
	ngwa	n	9	fight; war
	ngwe	n	9	tiger
	ngwena	n	9	crocodile
	ngwenú	adv.		right now; at the present time
chi-	ngwenúgwenu	n	7	modern
	ngwingwi	n	10	gums
lu-	njí	n	11/10	knitting needle; a long needle used for sewing bags or sacks; an injection needle
bu-	njí	n	14	many; most
	njínji	adv.		many
	nkádzásha	n	1a	name used for calling men of a particular totem
	nkópé-shúlo	adj.		sleep with one's eyes open
chi-	nkwa	n	7	bread
bu-	nna	n	14	forty cents
	nna	det.		four
	nokHwé	n	1	so and so; such and such
	nokola	v		take a handful of food
	nóngó	n	5	groundnut
bu-	nonó	n	14	slowness
	nonoka	v		do something slowly
	norobáki	n	7a	waistcoat
ma-	nóto	n	6	musical notes
	nshashe	n	7a/2a	tick, causes tick fever

	nsúngwásha	n	1a	name used to refer to men of a particular totem
	nsunje	n	7/2a	small black ant with a very painful bite
	ntémáphulú	n	7/2a	species of agama lizard
	nThá	n	9	side
	ntoló	adj.		long ago
	ntolóntolo	adj.		very long time ago; in the past
	ntómbó	n	1a	name used when calling men a particular totem
	ntomé	adv.		aside; out of alignment
	ntúle	n	7/2a	spring hare
n-	nuhwo	n	3	smell, usually unpleasant; a stench
n-	núng'úna	n	1	young sibling
	núnga	v		pick; find a lost thing
	nungo	n	9	nodes; syllables
	nungú	n	9	porcupine
	nuwa	v		smell; sniff; inhale
	nxá	interj.		express disapproval, annoyance
	nya	v		defecate
bu-	nya	n	14	slowness, when doing something
zhi-	nyála	n	21	thumb; big toe
	nyala	v		be tired or weary; exhausted
li-	nyála	n	11	finger nail
chi-	nyála	n	7	finger; toe
	nyala-meyá	v		be discouraged
	nyáládza	v		silenced; stop one from crying
	nyálála	v		be silent; keep quiet
	nyálálíla	v		not speak to someone
ma-	nyalo	n	6	tiredness; weariness
	nyaluluka	v		rest a while
	nyama	n	9	meat
bu-	nyambí	n	14	neatness; skilfulness; cleverness
	nyambí	n	9	skilful person
chi-	nyame	n	7	poisonous wild onion
	nyáméla	v		varnish; disappear
lu-	nyangá	n	11	horn, as of an animal
	nyánga	v		move stealthily
	nyanya	v		worsen
	nyanyayidza	v		contradict; negate; oppose; deny
	nyasa	v		splatter or spray some liquid
	nyáti	n	9	buffalo
	nyatsa	v		belittle; treat with disdain
n-	nyatsho	n	3	baby bottle teat; nipple

	nyawuka	v		melt; thaw
	nyawusa	v		boil milk; warm food
	nyaya	v		dampen; moisten
	nyazukila	v		stand on tiptoe
bu-	nye	n	14	chaff
ma-	nye	n	6	type of dregs
lu-	nye	n	11	thick-sowing; overcrowded plants
	nyebezela	v		whisper
n-	nyebezeli	n	1	one who likes whispering
	nyekhwá	n	5/6	lie
	nyele	n	9	flute
	nyeledza	v		cause to disappear
chi-	nyélédzi	n	7	quietness; reserved person who does not talk much
	nyelesa	v		disappear; evaporate
	nyélélé	v		quiet
	nyeluka	v		abscond; run away secretly
	nyelukila	v		start first as in a race
	nyelusa	v		cause to abscond or run away
	nyemba	n	10	beans
li-	nyemba	n	11	bean plant
	nyemudza	v		tantalise by offering something and then refuse to give it
	nyénáma	v		show teeth; grin
	nyéngányénga	n	10	swallows
	nyénya	v		smile
	nyényédzí	n	9/10	stars
	nyényéngwá	n	5	rind, as of a sweet reed
	nyepa	v		lie
n-	nyepi	n	1	liar
	nyetsáni	n	9	spinal cord
	nyeví	n	9	wild spinach used as a vegetable
	nyeya	v		tell tales about; backbite
	nyéza	n	9	type of edible grub
	nyikishila	v		become infected and develop pus
	nyíma	v		withhold; refuse someone something
n-	nyímáni	n	1	stingy person
	nyimo	n	9/10	ground beans
	nyíng'we	n	7a/2a	type of wild sweet bulb
	nyísa	v		euphemism for giving one a thorough beating
n-	nyo	n	9	vagina
	nyóká	n	9	snake

	nyókáná	n	9	small snake
	nyóla	n	10	marks made on one's body by a traditional doctor
bu-	nyólo	n	14	wetness; dampness; slowness when doing something
	nyólóka	v		become wet
	nyololo	n	9/10	oval-shaped edible wild fruit
bu-	nyólónyolo	n	14	softness as of an overripe fruit; comfortable as of a cushion
chi-	nyóngwáni	n	7	greens from bean plant
	nyonje	n	9	gum from the bark of a tree
bu-	nyonyo	n	14	small black ants
	nyónyónga	v		write
	nyótá	n	9	thirst
	nyotsHa	v		be plentiful, as fruits on a tree
	nyúchi	n	10	bees; honey bees; honey
	nyúndá	n	9	hump on the bull's neck
	nyungela	v		disappear into water; sink
	nyúngúlá	n	9	toadpole
	nyungwí	interj.		plunge into water
	nyuni	n	9/10	bird
	nyunyidzila	v		sprinkle as of salt or pepper
	nyúnyu	n	9/10	mosquitoes
	nyunywáni	n	9	bird
	nywénya	v		make an ugly face at someone
	óútsi	n	9	oats
	oveni	n	9	oven
	pá	v		give; offer; present
bu-	pabí	n	14	width; broadness
	pádzamúka	v		start or jump
	pádzamúla	v		cause to start or jump
lu-	pai	n	11	soft cotton blanket
	páka	adj.		wearing the same color or type of clothing
	pákátídza	v		cause to carry with both arms
	pákátíla	v		carry with both hands
	pákúgwa	v		be served or dished
	pákúla	v		dish food; serve food
m-	pákúli	n	1	one who dishes food
i-	pákúpáku	n	7	cobra snake
	pala	v		burrow; dig a hole, like a rabbit or dog; paw the ground
	paladza	v		scatter or spread out
	palala	v		disperse; go different ways
	páláma	v		pass through; cut across
	palaménté	n	9	parliament

m-	pale	n	3	dried strips of melon
m-	páló	n	3	famine, as with livestock
	palo	n	9	maths problem
	pálúka	v		get torn
	pálúká-moyo	v		get a fright
	pálúla	v		tear something
m-	pamá	n	3	slap, as with the palm of a hand
	pampíri	n	9	paper
	panda	v		ache; chew something hard
m-	panda	n	3	type of tree
	pandila	v		plough dry soil, without moisture
i-	pánéri	n	7	wench; spanner
	pang'we	conj.		maybe; whether; perhaps
m-	pángá	n	3	knife
	pángúka	v		become discolored; fade
	pángúla	v		cause to become discolored
i-	páni	n	7	span, as of oxen
m-	páni	n	3	Colophospermum mopane tree
	pányáládza	v		cause to sit or stand with legs spread out
	pányálála	v		sit or stand with legs spread out
	pápámála	v		be exposed; be clearly seen
	papha	v		increase
	paphidza	v		increase something
	paphidzo	n	9	addition; increase; an increment
	paraffini	n	9	paraffin
ma-	parapara	n	6	upper inner part of one's thighs
	pasa	n	9	passport
	pasa	v		pass
	pát'á	n	9	main road
	pat'a	n	9	pocket in a garment
	pát'ána	v		accompany each other
	pát'íka	v		force someone; accuse falsely
i-	patéla	n	7	hospital
i-	páto	n	7	anus
	páwúla	v		sprain
	páyíka	v		hang onto something, as of a blanket
	pázhá	v		have diarrhoea (derogative and usually used of animals)
ma-	pe	n	6	honey-combs
	pédzá	v		finish; complete; end
	peípi	n	9	smoking pipe
i-	peíti	n	7	type of syringe used to give enema

	pejo	adj.		near or close
	pejopejo	adv.		very close or near
	péla-móyo	v		get impatient; be anxious
	pélédzéla	v		finish up; get used up
	pélegwa	v		run out of
	pélékédza	v		accompany part of the way; escort; take half-way
	péléla	v		get finished
	péléta	v		spell
i-	péléte	n	7	reader for beginners
bu-	péló	n	14	end; finishing point
	pémbéla	v		run wild
	péngá	v		go mad
bu-	péngo	n	14	madness; insanity
m-	péngo	n	1	lunatic; mad person
	péngúla	v		lift up so as to look under
	péni	n	9/10	pen
ma-	péni	n	6	pennies
	pénsele	n	9	pencil
	pénta	v		paint
	pénte	n	9	paint
	penya	v		shine; flash as of lightening
li-	penyo	n	11	lightning
	penyú	adj.		alive
	pépá	v		winnow grain to remove the chaff after pounding it
	pépéta	v		sift or winnow grain to remove the flour
	pérékisi	n	9/10	peach
i-	pésu	n	7	hare's tail; goat's tail
	peta	v		make a hem; fold
	petenula	v		unfold; unroll; undo a seam
m-	peto	n	3	hem; fold of material
	péyáma	v		tilted or bent; sit leaning
	péyíta	v		give an enema
	pézhugwí	adj.		high up; on top; above
	pHándá	n	10	rafters
	pháíla	v		first rains of the season
	pháíniápúli	n	9	pineapple
	pháíphi	n	9	pipe
	pHakátigwá	n	9	two ears of corn on one stalk
	phakela	v		rise early in the morning
	pHako	n	9/10	tree hollow
	pHalá	n	9	impala, roebuck
	pHandé	n	9/10	applause; clap of hands
	phang'a	v		eat greedily

li-	pHangú	n	11	hawk
	pHani	n	9	scorpion
	pHánje	n	9	unripe watermelon
	pHánje	n	9	barren animal
	pháphá	v		chop, as firewood; split
	pharáchuti	n	9	parachute
	pharama	v		sit or fall down on ones bottom
	pharela	v		plaster with mud mixed with sand and dung
	phásélá	n	9	parcel
	phasula	v		slap
	pHáta	n	9/10	whole side of a slaughtered animal
bu-	phatshwa	n	14	being black and white of an animal
	phatshwa	adj		black and white markings on an ox
	phatshwana	adj.		black and white markings on a cow
li-	phátu	n	11	fragment of a broken thing
	phátúka	v		be cracked, as an earthen vessel
	phátúla	v		crack something
m-	pháyílo	n	3	early rains
	pHázhá	n	9/10	forehead; luck
	phéé	n	9	pear
	pHejaná	n	9	small hyena
	phekú	n	9	charm; amulet
	pHele	n	9/10	hyena; spotted hyena
	pheleu	n	9	ram
	phembge	n	9/10	duiker
	pHende	n	9	object made from the tail of a horse carried by men
	pHené	n	9	steenbuck
	phénésélíni	n	9	penicillin
	phénsheni	n	9	pension
	phénti	n	9	panty
	pHépó	n	9	wind
	phíki	n	9	stallion; uncastrated donkey
	phíkóko	n	9	peacock
	phílé	n	9	bad singer
	phili	n	9/10	banks of a river or a stream
i	phirí	n	7	secret; confidential matter
	phizhá	n	1a	name used to call men of a particular totem
	pHobéla	v		sink, as in mud
	phóbóla	v		strike with something hard

	phódóla	v		break sharply; a clean break
	phóko	n	9	uncastrated billy goat
	pHokózhá	n	9	unmarried lady
	pHóla	n	9	beewax
	pHoni	n	9/10	blisters on the hands
	pHópó	n	9/10	warts
	phóri	n	9	rust in corn
	phórisá	n	5	policeman
chi-	phórisá	n	7	pertaining to police
	phoso	n	9	mistake
	pHóu	n	9/10	ostrich
	pHowána	n	9	small ostrich
	pHudzí	n	9	seeds of melon species
	pHuká	n	9/10	wild animal; an abscess
	pHulú	n	9/10	calves
	pHumbú	n	9	euphemism for vagina
	phumula	v		rest a while from work
	pHungúgwe	n	9	jackal
	phunyuka	v		come out of a grip
	phuphuma	v		rise, as of foam from some brew
	phururuka	v		fly
	phuthela	v		wrap up; wrap
m-	phutho	n	3	bundle
	phuthunula	v		unwrap, as of parcels
	phútúka	v		explode; burst, as a ballon
	phútúla	v		crack; smash; crack a whip
	pHúzu	n	10	sour wild raisins
	pijáma	n	9	pyjamas
	pika	v		carry one on shoulders
	píki	n	9	pick, sharpened metal used for digging
i-	píkiri	n	7	nail
	pílisi	n	9	pill or tablet
m-	pímbíla	n	3	shin of leg
	pindiwa	v		being passed by
m-	píni	n	3	axe or hoe handle
	piphila	v		pour from one container into another
	písa	v		burn; set alight
i-	píti	n	7	speed
	pítíkautu	n	7	petticoats
	pítíroli	n	9	petrol
	pitsí	n	9	water pits; boreholes
	pitugwa	v		be overturned
	pituka	v		roll over
	pitukana	v		overturn several times; turn

	pitula	v		and toss, as a sick person
	píya	v		make overturn
	pkhá	v		trip someone; hold a goat's leg
	pkhanya	v		under one's knee while milking
	pkhaya	v		dry up, as water
	pkhita	v		break
	pkhizi	n	9	remove extra chaff from grain
chi-	pó	n	7	by pounding softly
	poba	v		draw back forcibly; snatch
	pobedza	v		sheep
	pobedzeka	v		gift or present
	pódza	v		flatten, as of a tyre or swelling
bu-	pofu	n	14	impress, as with a finger; press
	pofunuka	v		become impressed; be dimpled
	pofupala	v		cause to heal
	póga	adj.		blindness
i-	póko	n	7	recover one's sight
	póla	v		become blind
	polóni	n	9	different
m-	polotíki	n	1	spoke, as on the wheel
	pómbe	v		be healed; get well after sickness
	pómbédza	v		polony
	pómbónóka	v		politician
	pómbónóla	v		wind something, as a thread
	pompí	n	9	wrap round
i-	pónchi	n	7	become untwisted
i-	póni	n	7	untwist; unwind
	póní	adv.		water tap; pump
	pontela	v		sponge
	poráimari	n	9	mirror
i-	póro	n	7	where
	porodza	v		search for water underground
	porofita	v		primary, as a primary school
m-	porofíti	n	1	rail; railway line
bu-	porofíti	n	14	miscarriage, as of an animal
	posa	v		prophecy
m-	posi	n	1	prophet
	póta	v		prophecy
	pótélédza	v		throw, as a stone; shoot
	pótéléka	v		one who's good at aiming a gun
	pótésa	v		feel cold; to freeze from the cold
	pótóla	v		make go around something
	psá	adj.		surround; go round something
				cause to feel cold
				wipe oneself after stool
				new

	psá	v		burn
li-	psá-bádzimu	n	11	burn on the skin, believed to by the dead ancestors; the will of the wisp
m-	psarara	n	3	fowl excreta
	psáyíla	v		sweep
ma-	psígwa	n	6	burnt food
	psíla	v		burn onto, as a pot
	púbúla	v		cut open; pierce through
i-	púku	n	7	ghost
	pukusha	v		blend, as corn flour into boiling water to make porridge
m-	pukusho	n	3	traditional blender made from a stick
	púlá	v		thresh corn or sorghum using threshing sticks; hit hard
	púlána	v		hit each other hard; palpitate, as the heart
i-	púle	n	7	cooked red beans
	pulula	v		remove leaves from a branch
m-	púlúlú	n	3	ululation
	púlúlúdzá	v		ululate
	púma	v		be blunt, as of a knife
	púmísa	v		cause to be blunt
	puna	v		bend over indecently
i-	púngú	n	7	an eagle
	púpélo	n	9	woman's womb
	púpúna	v		chew noisely something hard
	púpúníka	v		crunchable, as a nut
i-	púra	n	7	low stool
	purapura	n	9	loose garment
	puta	v		kiss; sip
	putanya	v		crush, as of a can
m-	puto	n	3	cooked soft sour porridge later fermented to make beer
m-	púzu	n	3	type of tree that bears sour wild raisins
mo-	rabaraba	n	3	traditional chess; draughts game
	raísi	n	9	rice
	rantáfúlí	n	9	roundavel; a big thatched house
	ratha	v		strike hard, as with a hand
	renke	n	9	rank
	rente	n	9	rent
	repa	v		become slack or loose
chi-	repúli	n	7	step; an embarkment around a hut

n-	réro	n	3	discussion; a secret meeting
	resíti	n	9	receipt
	réza	n	9	razor blades
	rí	n	5	small denomination of money
ma-	rí	n	6	money
ma-	ríla	n	6	sour milk
	ríyá	v		delay; make late
	rokotsa	v		sucking of milk, as a calf
chi-	rómo	n	7	infected sores; food not eaten by young people if older people are present, e.g. kidneys
ma-	rómu	n	6	border of ploughed land
	romúla	v		cause a span of oxen to turn round when ploughing
bu-	rótho	n	14	bread
chi-	rotswani	n	7	black quarter evil, illness common in cattle
n-	rúba	n	3	heifer
	rúéla	v		pay; reward
bu-	rúkwi	n	14/6	trouser; pants
	rusa	v		be pregnant, of an animal
	rúsi	n	9	rust
bu-	rúthu	n	14	loneliness; boredom
	rwabhá	n	9	whip
	sa	conj.		like
	sábási	n	9	red soil
bu-	sadá	n	14	carelessness; clumsiness
	sadá	n	9	careless person
	safári	n	9	safari suit
	ságwa	v		oversleep
	sáili	n	9	canvas; sail
	sáina	v		sign
	sáinísa	v		cause to sign
	sáka	n	5	sack
	sála	v		remain behind
	sále	n	9	saddle
	sálíla	v		be last to finish; remain for
ma-	sálílá	n	6	remnants of food
	sálísa	v		cause to remain; bade farewell
	saménté	n	9	cement
	sápa	n	5	insult; curse
n-	sapo	n	3	type of tree
	sási	n	9/10	sparks
	sázamíla	v		have a pillow under one's head
n-	sázamílo	n	3	pillow; cushion
ma-	se	n	6	spongy bone tissue

	se	n	5	soft edible part of a bone
	séba	v		whisper; gossip
	seba	v		relish; use a sauce
bu-	sebo	n	14	relish
i-	sechaná	n	7	small basket
	séche	n	10	small grain in the corn flour
n-	séche	n	3	sand, of a river or an ocean
i-	seche	n	7	basket
	sedza	v		shift; move out of the way
	sedzasedza	v		shift about while sitting; restlessness
	sedzela	v		come or move closer
	sedzesa	v		move something; move out of the way
	séfá	v		sift or strain
	séfo	n	9	strainer
	seka	v		laugh
	seka	n	5	bracelet
	sekaseka	v		giggle
	sekelana	v		laugh with each other
	sékerési	n	9	cigarette
i-	seko	n	7	laughter
	séli	adv.		across; the other side of a river; abroad
lu-	selo	n	11	flat winnowing basket
	selo	n	10	winnowing baskets
	semé	n	9/10	basket
	sena	v		go beneath
	séndáma	v		lean against
	sendedza	v		stir up the fire
	sendedzela	v		stir up for; provoke into action
	séndéka	v		put leaning
	senéte	n	9	senate
	senga	v		carry
	sengela	v		carry for
	sengesa	v		cause or help to carry
	sénké	n	5	corrugated iron sheet
	sénte	n	5	cent
n-	senya	n	3	sandy soil with a loose texture
	senyáná	n	9	small basket
dzi-	sérékisi	n	10	circus; spectacular performance
n-	sésányama	n	3	type of tree
n	shá	n	3	low wall or enclosure in a home; courtyard; family
bu-	shábá	n	14	redness
	shábá	adj.		red

	shaba	v		cut up a melon for cooking
	shábába	v		slightly bitter; sour
lu-	shabaná	n	11	small baby
	shábápála	v		become red; blush
	sháche	n	9	gap between the two front teeth
	shadza	n	5	porridge
	shaíma	n	9	type of wild plant
	shaká	n	5	bird's nest
	shaka	v		look for; search; seek; want
	shakadza	v		make old or wear until old
	shakadzila	v		used idiomatically to mean giving used clothes to someone
	shakala	v		become old or worn out
	shákáládzwá	n	10	type of wild fruit
n-	shákáládzwá	n	3	type of tree
	shakHwaná	n	5/6	small axe
	shakisisa	v		search a lot; scrutinize
	shakiwa	v		be looked for; be proposed for marriage
	shakula	v		weed; use a hoe to remove weeds
	shakulisa	v		help weed; cause to weed
	shala	v		choose; select
ma-	sháli	n	6	pebbles; gravel
n-	shamba	n	3	type of tree
	shambgá	n	9	dirt
	shambo	n	5	wilddog
	shamú	n	9/10	cane; lash
n-	shána	n	3/4	placenta of an animal
	shanduka	v		turn back or round; change
	shándúkíla	v		wear a garment inside out
	shandukila	v		turn against; turn for
	shándúkúnúla	v		turn inside out, as of a garment
	shandula	v		answer or reply ; turn over, as food when cooking
	shandulo	n	9/10	answer; reply
	shánga	n	10	steamed mixture of corn and beans; eyeballs; alphabetical letters
lu-	shanga	n	11	reed; stalk of a herbaceous plant; straw; stalk of corn
	shangamidzo	n	9	act of meeting someone
	shangana	v		meet each other
	shangana-nshóló	v		be confused; be insane
ma-	shanganilo	n	6	meeting point, as of roads; joints

	shangano	n	9	meeting
	shanganya	v		cause to meet; mix
	shanganyila	v		be in joint ownership
	shangashangana	v		be jumbled; be entangled; be mixed up
	shángo	n	9	country; land; earth; the world
	shangú	n	9/10	shoes; boots; sandals
n-	shangúle	n	3	blue bush
n-	shanje	n	3	green grass
	shánu	det.		five
	shanyashanya	v		drizzle
	shányúka	v		start getting done, as when pounding corn; fruit starting to get ripe
	shányúla	v		get half done as when threshing corn or stamping corn
	shápáila	v		boil for a long time
ma-	shapkhá	n	6	tasteless food
n-	shasha	n	3	makeshift dwelling structure made from tree branches
	sháshámúka	v		fall off, as of tree leaves during winter
	sháshámúla	v		brush off or dust off
	sháshíka	v		place by the side of the fire
	sháshúla	v		taste or eat from a pot while cooking
	shátHá	v		be happy; be glad; rejoice
	shátHíso	n	9	cause for happiness
	shátHó	n	9	happiness
	shatHu	n	5	axe
	sháto	n	9	python
	sháwára	n	9	shower
	shayá	n	10	cheekbones; petty talk
	shaya	v		be poor; miscarriage; find nothing
lu-	shayá	n	11	jaw; a cheekbone
n-	shayi	n	1	poor person; a destitute person
bu-	shayi	n	14	poverty
	sházhá	v		simmer or boil
n-	sházhó	n	3	over-zealousness
bu-	shé	n	14	chieftainship
	shé	n	1a/2a	chief
	shíma	v		hate; abhor; dislike
	shinga	v		work
n-	shingi	n	1	worker; an employee; a labourer
	shingidzana	v		cooperate; work together

n-	shingo	n	3	work; employment
n-	shito	n	3	sprouted corn flour boiled for making traditional beer
	shiya	v		show off; think highly of oneself
	shóba	v		be stale, as of bread or food
n-	shóbi	n	1	one who sets the tune; the leading voice of a choral group
	shobola	v		pound grain in mortar to remove chuff
n-	shódzi	n	3	tear
	shógwaná	n	10	grain from sifted ground corn
	shokó	n	7	monkey
	shóla	v		check on someone
n-	shólo	n	3	head
	shoma	adv.		much
	shomanána	adv.		few
	shomoka-moyo	v		feel pity; sympathize
	shomola	v		pull out; draw out; extract
	shomola-moyo	v		incite pity; pathetic
	shomú	n	9/10	nuts from dry plums from a sclerocarya caffra tree
	shondó	n	9	penis
	shóngótí	n	9	first internode of a sweet reed or corn stalk
	shóngózhéla	v		rejoice with others; be in jolly mood in a group of others
	shongwe	n	9	rock
	shóni	n	7	hedgehog
	shóni	n	10	shyness; shame
	shonjá	n	5	edible grub that feeds on the leaves of a mopane tree
	shosha	v		fence in with tree branches
	showá	n	10	marks made on the face
	showela	v		tuck in, as a shirt into one's pants
	shózhédza	v		cause to peep; cause to look into
	shózhéla	v		look into; peep through, as through the window
	shuba	v		desire; wish for
	shubo	n	9	desire; longing
	shudza	v		walk with a limp; hobble about
bu-	shudzi	n	14	portent; mysterious happening
i-	shudzi	n	7	lewd person
	shugwaná	n	7	small hare
	shula	v		portend

	shúle	adv.		behind; after; afterwards
	shúleshule	adv.		long after
	shulo	n	7/2a	hare
	shúmba	n	9/10	lion
bu-	shúngú	n	14	poison
	shunya	v		pinch
	shunyiwa	v		be pinched
	shúshúbála	v		become silent and reserved
chi-	shwá	n	7	bundle of thatching grass
	shwa	v		remain for a day
	shwaiwa	v		be poked at
	shwaya	v		hook out; poke at
	shwelela	v		do something for the whole day
	shweshwana	v		creased; crumpled
	shweshwanya	v		cause to be creased or crumpled
bu-	sí	n	14	smoke
n-	sí	n	3	particular day
n-	si	n	3	pestle
pa-	sí	n	16	ground
	síáng'wá	n	5	orphan
n-	síba	n	3	feather
	síla	v		give water or something to drink; leave food for someone
	síisa	v		cause to leave behind
	siká	n	10	small round marks on the arms made by burning the skin
	sika	v		make fire by rubbing two sticks
i-	sikálálá	n	7	wooden torch; a burning piece of wood
ma-	síkáti	n	6	daytime
	síkídzi	n	9	bed bug
	síkílí	n	9	sickle
bu-	síku	n	14/6	night
	sílinga	v		make noise; to irritate
	sílívará	n	9	silver
n-	sílízí	n	3	dried mark of dirty water on ones body
	símá	adj.		difficult
	símá-móyo	adj.		bravity; hardhearted
	símá-nshóló	v		be stubborn
	simaúsu	n	7	hawker's small caravan where he/she sells merchandise
	simbá	n	5	strength; power
	símba	n	9	genets
ma-	simbá	n	6	strength; power
	simbe	n	9/10	lazy person

bu-	simbe	n	14	laziness
	simbe	n	5	coal, hot or cold
	símúla	v		uproot
	símúlúla	v		begin
	siná	n	9	type of grass used for thatching; a mould or ball of mud used in plastering
	síndí	n	7a/2a	a squirrel
n-	síndo	n	3	echo
	sínyánga	v		mould mud used for plastering
i-	sípá	n	7	soap
n-	sípílí	n	3	walking pace; journey
	sirila	v		massage; rub hard
	sisila	v		trot
	sítíla	v		obstruct one's view
ma-	sítu	n	6	soot
	síya	v		leave behind
	siye	n	9	eyebrow
	síza-fúlo	v		foam at the mouth
	só	n	9/10	kidney
bu-	só	n	14/6	face
n-	só	n	3	light chaff from harvested grain
chi-	só	n	7/8	face
	soba	v		slide; move timidly while seated or asleep
	sodzoloka	v		slide; slip; break a promise
	sodzolokesa	v		be slippery; cause to slip
	sókísi	n	5	sock
	sókónyóla	v		sway one's waist from side to side, as when walking
	sókósa	v		rub an eye with a finger
	sóla	n	9	sole of a shoe
	sóle	n	9	hairy small worm that eats dried meat or biltong
	sole	n	5	soldier
chi-	sole	n	7	military
	sónyóka	v		sprain
	sópHedzéla	v		milk a cow or goat to the last drop; being sucked dry
	sópo	n	9	soup; gravy
	sósará	n	9	cup saucer
n-	sú	n	3	Acacia giraffe tree
	suba	n	9	vagina
	subuka	v		rub or wear off; peel; have abrasion
	subula	v		fray; make the skin peel off

	sudhu	n	5	maize cob without the grain
	sudza	v		do something irritating to someone intentionally
	sudzi	n	5	flatul
	sudzika	v		be fixed by someone for something you did
	súkésúke	n	9	flat poisonous centipede
bu-	sukwá	n	14	beer
	sula	v		fart; release bad air per rectum
	sulisa	v		cause to fart or release bad air
	suma	v		make a noise, a pot cooking, a river or a wind
	sumbika	v		hide; conceal
	sumbula	v		make oneself dirty by playing on the ground
	sunda	v		push
	sundú	n	5	skin shed by a snake or reptile
	súnga	v		bind or tie as of a rope
	súngána	v		be intertwined; tie each other
	súngílíla	v		tie onto something
	súngísa	v		cause to tie; get one arrested
n-	súngo	n	3	rope
	súngúnúka	v		become untied; be free
	súngúnúko	n	9	liberty; freedom
	súngúnúla	v		untie
	sunula	v		castrate
n-	supi	n	1	witness
bu-	supi	n	14	evidence; testimony
n-	súsú	n	3	type of tree
	súsúbúla	v		press clothes poorly such that the wrinkles remain
	sútu	n	9	suit
	swaba	v		wither; dry up; be disappointed
li-	swabí	n	11	dried sweet reeds; dried fruits
	swábíyá	n	5	albino
	swái	n	9	saw
chi-	swaí	n	7	shredded meat
	swáki	n	5	barrel
n-	swani	n	3	contents of animal stomach
	swánja	n	9/10	sour plum
n-	swánja	n	3	ximenia and caffra tree
	swáswábúla	v		beat; thrash, as of a child
	swaya	v		shred meat when cooked
n-	swázwi	n	3	type of tree
	swázwí	n	5	cut bush, used for fencing
	sweswá	n	5	large jet black ant

	swewuka	v		be stupid
	swííla	v		have sex, of humans
	swika	v		arrive
	swikidza	v		make sure something arrives
	swikidzana	v		arrive at the same time
	swikila	v		reach up to something; stay at
	swíkíri	n	9	sugar
	swímbó	n	9	knobkerrie; bat or club
	swina	v		squeeze
n-	swing'wá	n	3	type of tree
	swínga	n	9	type of bird with a long neck
	swíngá	n	5	bundle, as of firewood
i-	swíno	n	7	filter, used for straining traditional beer
	swinya	n	5	male genital
	swípa	v		suck something into the mouth
	swíswína	v		suck, as a candy
bu-	t'alá	n	14	green; blue
	t'alá	adj.		blue; green; raw; unripe
	t'ímélá	n	5	stray domestic animal
i-	t'ína	n	7/8	brick
	t'ina	v		irritate; hurt someone
	t'út'o	n	9	education
	twáéla	v		be used to
i-	t'wílo	n	7	chair
chi-	tá	n	7/8	enemy
	tábá	v		protect by medicine
i-	táchi	n	7	starch
	tádziveísi	n	1a	boxer
	táfúla	v		thatch
	táfúli	n	9	table
	táfúna	v		chew; masticate
	táká	v		color using coloring pencils
	tákána	v		splash out of soft porridge
mo-	takási	n	3	electricity
	tákhwa	adv.		before
	tákhwá	v		be chased away; be expelled
n-	táko	n	3	crayon; coloring pencil
	takula	v		drive cattle or livestock
	tálángána	v		spread out
	tálángánya	v		cause to spread out
n-	tálo	n	3	line
	tamáti	n	9	tomato
	támba	v		skip about, as young animals
n-	tambá	n	3	large sour monkey plum tree
i-	tamba-pHóu	n	7	creeper plant with thorns

	támbíka	v		hang over something
n-	tambo	n	3	string; cord
	támbúnúdzá	v		stretch out, as a blanket
	támbúnúka	v		be straight or upright
	tánatú	det.		six
	tanda	v		sew with big stitches
i-	tándá	n	7	endearment, refers to a girl
	tándábádza	v		cause to spread out as legs
	tándábála	v		spread out of legs
	tándábálíla	v		sit with legs stretched out towards
	táng'	n	9/10	pincer; tweezers
	tánga	v		be first
	tángíla	v		arrive first or finish first
	tángísa	v		begin; cause to be first
	tánká	n	9	tank
	tántábe	n	7a/2a	species of lizard or an agama
lu-	tapá	n	11	sewing machine
i-	tápa	n	7	wedding ceremony
	tápHúla	v		harvest fruit or greens
	tápúdzá	v		lessen; subtract
	tápúdzó	n	9	decrease; reduction
i-	tárádá	n	7	street
	tárátá	n	9	fence; wire
	tásílibómo	n	9	harness
	táswá	v		mount, as a horse
	tátá	v		chase away
bu-	tátá	n	14	chicken lice
i-	tatalala	n	7	argumentative person
	tátámídza	v		cause to chase or run after
	tátámíla	v		chase or run after; to drive away
	taté	n	1a	father
	tatHa	v		climb; ride
	tatHana	v		climb or mount each other
	tatHanya	v		put one on top of the other
	tatHi	n	1	climber
	tatHikana	v		be piled one on top of the other
	tatHikanya	v		pile on top of the other
	tatHilila	v		climb or ascend
	tatHisa	v		cause to climb; give a ride
	tátíla	v		chase to or for
	taula	v		relate or tell a folktale
n-	táya	n	1	foreigner; stranger
ma-	té	n	6	saliva
	tébétebé	n	7	whirling toy made from a stalk of grass and a seed

	tébúla	v		spill; throw out, as of water
	tébúlíla	v		spill onto
	techanána	adj.		thin
i-	téechani	n	7	station
	téédzesa	v		cause to listen
n-	téedzi	n	1	good listener
	tekedza	v		tickle; poke on the ribs
	tékéléla	v		cry without cause
ma-	telele	n	6	lots of okra
	temá	adj.		black
	téma	v		chop
	temátéma	adj.		pitch black
	témbézéla	v		pray
mi-	témbézélo	n	4	prayers; prayer sessions
i-	temé	n	7	calabash
n-	témi	n	1	one who cuts down trees
i-	témpá	n	7	stamp
	témpa	v		affix a stamp; stamp
	tenda	v		thank; show gratitude
	téndébúka	v		turn around
	téndébúla	v		turn something around
	téndéka	v		point out or at
	téndéléka	v		move around
i-	téndéléki	n	7	wanderer
	téngá	v		buy
	téngélána	v		buy for each other
	téngésa	v		sell
ma-	téngéségo	n	6	outlet or market place
	téngéséla	v		sell for/ to
n-	téngési	n	1	seller
n-	téngi	n	1	buyer
	terábúli	n	9	travelling rug
	téséla	v		shave off all the hair
	téswa	v		have a sharp end, as a needle
i-	tete	n	7	spoilt child
	tétédza	v		advertise, as being for sale
	tetema	v		tremble with fear; shiver
	tétHéla	v		put domestic animals into an enclosure or a kraal
bu-	tétHélo	n	14	place for keeping livestock
n-	tetHí	n	3	kick by a cow or goat
	téwúka	v		turn over, as of a container
ma-	téúko	n	6	afternoon
n-	téwa	n	3	giant raisin bush
n-	téwo	n	3	foundation
	téyá	v		set a trap

n-	téyí	n	1	one who sets a trap
	tézwale	n	1a	father-in-law
	Tháabádza	v		cause to be zealous, eager
	Tháabála	v		be anxious; be in haste to accomplish something
	thabí	n	5	new hut with the grass thatch only and without a wall
	Tháédza-meshó	v		look down upon
	Tháéla	v		come short; come short of
	thái	n	9	tie
bu-	thaká	n	14	peers; of same age
	tHáko	n	9	dress
	tHakó-yé-thunjí	n	9	skirt
	tháli	n	9	thread; fibre
	tHalú	n	9	calf of the leg
	Thámá	v		do; make
	thamé	n	9	secretary bird
	Thámísa	v		cause to do something
n-	Thámo	n	3	kind; type; variety
	TháN'wa	v		be made to do something
	thánda-chúkéla	n	5	light brown sugar ant
	tHangá	n	9/10	platform; playground
	tHango	n	9	piece of meat
	ThánThánúla	v		unstitch what was sewn
	thányá	v		wake up from sleep
	thápúla	v		snap, as of something stretched
ma-	tháthá	n	6	problems; difficulties; hardships
	tháthúbo	n	10	examination
	tHatú	det.		three (class 10)
	tHéko	n	9	hiccup
	tHéle	n	9	strip of skin or cloth worn by a boy to cover nakedness; euphemism for male genitals
	tHemá	n	9	rhinoceros
	tHenda	n	9	type of wild sweet root
	tHéngo	n	9	purchase; purchase price
	tHengú	n	9	raven; black crow
	théúka	v		turn off the road
	Théúla	v		separate
	tHéwa	n	10	wild berries of <i>Grewia flava</i>
i-	thíbó	n	7	lid
	thígáma	v		kneel
	thíkílí	n	5	string of thatching grass
	tHilili	n	9	wildcat
	thíwa	n	5	trivet or three-legged stand
	thíyani	n	7	porridge cooked with fresh milk

ma-	thó	n	6	vomit
	thó	n	9	sore; wound
	tHobedzano	n	10	children born one after another
	tHóbo	n	9	animal skin used as a sleeping mat, or sitting on
	thobolo	n	9	gun
	tHógwaná	n	9	baby's sleeping mat
	Thókóméla	v		care for; take care
	tHokótHoko	n	10	dung of goats, buck, hares etc.
	tHongó	n	9	castrated male goat
	tHongomaná	n	9	fontanelle of a baby's head
	tHonongolá	n	9	honey made by small bees found in trees hollows
	Thónyá	v		curdle, as milk
	tHosúla	n	9	syphilitic rashes; syphilis
	Thówá	v		hate; dislike
	thówá	n	9	whey
	tHozo	n	9/10	hoof of an animal
n-	tHu	n	1/2	person
chi-	tHu	n	7	thing
	thúbúkána	v		break a bond; cease being friends; separate
	thúbúkáno	n	9	separation; divorce
	thúbúkánya	v		divide
	thubula	v		remove upper garments
	thúbúla	v		cut, as a rope or string
	thúbúlídza	v		take a short cut
	thúbúlíla	v		snap at someone
n-	tHuchilúmé	n	1	male person
	thúdza	v		revived; come round
	thúdzí	n	5	shoulder
n-	thúdzi	n	3	dry dusty cattle dung; manure
i-	thuíwá	n	7	domestic animal
	thuka	v		forcibly break out of a kraal, enclosure, as of livestock
	thukila	v		break into a kraal or enclosure
	thukwa	adj.		dark brown, as an ox
	thukwana	adj.		brown, as a cow
n-	thúla	n	3	Sclerocarya caffra tree
	thúlá	v		kick
	thúlána	v		collide
	thúlánya	v		cause to collide
	thúlíla	v		thatch
n-	thúlíli	n	1	thatcher; one who roofs houses
	thúlílíka	v		be well thatched
	thúlúnúla	v		pull down, as roof

	thú má	v		sew
i-	thumba	n	7	goat whose kid has died and produces a lot a milk
	thumbí	n	9	puff adder
n-	thú mi	n	1	tailor
	thú mo	n	5	bullet
	thúmú gwa	v		be provoked or vexed
	thúmú la	v		provoke
	Thúná ma	v		sit as one in a state of despair
				look sullen or morose
	thú ndé	n	5	sorghum
ma-	thú ndé	n	6	sorghum
	tHú ndu	n	9	possessions; goods; merchandise
	tHú ngó	n	10	rafters
	tHun jí	n	10	loins; waist
n-	tHun taná	n	1/2	old man
i-	thú nyá	n	7	flower
	thú sá	v		help; assist
i-	thusi	n	7	small black beetle that bores dry wood or poles
	thuta	v		smoke a pipe or cigarette
	tHutHú gwa	n	10	fruit of a belladonna plant
	thutidza	v		blow air to induce a flame
n-	thuto	n	3	flame
	thú wa	v		rear, as of livestock
i-	thú wá	n	7	pinnacle; the top of a hut
	tHú zi	n	9/10	fly
	thwá	v		spit out; vomit
mi-	tí	n	4	drugs; trees
	ti	v		say
n-	tí	n	3	tree
n-	tí á koni	n	1/2	deacon, as in a church
	tí bé lelo	n	9	whole night gathering for prayers prior to a funeral
i-	tí bí lí	n	7	pedal, as of a bike
	tí chára	n	1	teacher
	tíkí ti	n	9	ticket
i-	tí ko	n	7	occiput; back of the head
	tí lí ka	v		hang or place above
	tí lí yána	v		be on top of another
	tí lí yána	v		put on top of another
i-	tí rá ki	n	7	strike
	tí ré kí tará	n	9	tractor
	tí rí na	n	9/10	train
	tí tha	n	9	torchwood

	tízha	v		run away from something
	tízhilíla	v		run after
bu-	tízhílo	n	14	refuge
	tízhísa	v		cause to flee; have diarrhoea
mi-	to	n	4	types of gravy or soups
n-	to	n	3	gravy; soup
	toba	v		massage
	tóbóka	v		loose hope on something
	tóbókána	v		loose trust on each other
n-	tóbóki	n	1	dispairer; a pessimist
	tóbósa	v		deny
n-	tochí	n	3	swelling in the armpit or groin
	tódza	v		take after or resemble another
i-	tófu	n	7	stove
	tóga	pron.		we alone
	tógwa	v		be taken; be married
n-	tógwe	n	3	snot-apple tree; Azanza garekeana
	tókónyóla	v		shred, as maize from a cob
	tóla	v		take
i-	tole	n	7	small child or a toddler
	tóléla	v		take for; take by force; seize
n-	tólo	n	3	burden; load
	tólóka	v		interpret
	tólókégwa	v		be interpreted for
	tólókéla	v		interpret for
n-	tólóki	n	1	interpreter
	tolóko	n	9	abell
i-	tombgáná	n	7	small hill
li-	tombó	n	11	flat rock
	tombola	v		extract thorn from flesh
	tómu	n	10	reins
	tóngó	aux. v		denotes an act that would take place or had already taken place
n-	topí	n	3	shepherd tree, <i>Boscia albitrunca</i>
	tópóla	v		pick very little using two fingers
	toróko	n	5	railway truck
	torónko	n	9	prison
	torópo	n	9	town or city
i-	torópo	n	7	thong or halter that passes between two yoke pins
	tóse	adv.		together; all of us
	tóse	det.		all of us
	tóta	v		seal a hole using beeswax
bu-	tótHó	n	14	coldness; very low temperature
	tótHódza	v		make cold

i-	toyí	n	7	thing in the eye; an impurity in food
	tsátúla	v		crush something soft or alive as an insect between two objects
	tsétse	n	5	flea; tsetse fly
n-	tsha	n	3	sharpened metal or wooden instrument used for digging
chi	tshá	n	8	stump of a tree
	tshá	v		dig
chi	tsha	n	7	site for a house or a field
	tshamba	v		tramp, or tread
	tshambilidza	v		oppress; emphasize; press down; pin down to the ground
	tshambisa	v		cause to step on something
	tshambo	n	5	paw
mi-	tshambo	n	4	ways of walking
	tshambuka	v		take one's foot off something; stop trampling on something
	tshatsharika	v		walk unsteadily on weak legs
	tshe	interj.		shift a little
	tshédúka	v		shift to one side
	tshédúla	v		shift a little, as something heavy
	tshépe	n	9/10	springboks
	tshethá	adj.		yellow
	tshetshe	n	5	bull frog
n-	tshí	n	1	digger
	tshibama	v		give birth, as of a person
n-	tshibamisi	n	1	midwife
n-	tshíbha	n	3	neck
	tshibika	v		turn container upside down
	tshíla	v		dig for; bury
	tshíma	n	5	well
	tshímúta	v		sneeze
	tshíndá	v		gasp or struggle, as a dying thing
	tshíndíka	v		push one forcefully
	tshíndínúka	v		come off, as the floor of a hut
	tshíndínúla	v		exhume; reveal what was concealed
	tsHíngá	n	10	veins or arteries
lu-	tshíngá	n	11	blood relative
n-	tshíngítshi	n	3	type of tree
	tshípí	n	10	week; metal
	tshípí	n	9	Sunday; church
i-	tshítshíno	n	7	heel of one's foot or shoe
	tshónyonga	v		irritate
	tshóo	interj.		introduces a request

	tshotshoma	v		be active; hyperactive
	tshu	adj.		black ox or bull
	tshúgwá	v		be wiped
	tshúlá	v		wipe
	tshúlisa	v		cause to wipe
	tshúlo	n	9	fat round gut; omentum
	tshung'ayidza	v		cause to be sleepy or drowsy
	tshung'ayila	v		feel sleepy; feel drowsy
	tshunyána	adj.		black cow
i-	tshururu	n	7	untalented person
	tshwá	adj.		new
	tshwá	v		burn
	tshwaisa	v		brand for and give
i-	tshwántsho	n	7	picture; image
	tshwaya	v		mark, as when branding
	tshwáyíla	v		sweep
mi-	tshwayo	n	4	small bells worn on during dancing
lu-	tshwayo	n	11	brand mark, as of cattle
	tsika	v		squint, as of an eye
n-	tsiná	n	3	thin fermented porridge
	tsítá	v		fasten a napkin or diaper
n-	tsító	n	3	baby's napkin; loin skin
	tswápúla	v		spoil, as of taste
i-	tswírírí	n	7	talented person
	tswiyí	n	9	sunbird
chi-	tú	n	7	silence; quietness
	túbátúba	v		come several times to a place within a short of time
	túbúla	v		manage
n-	tugwí	n	3	juice from a watermelon
	túká	v		insult; scold
	túkána	v		quarrel; scold each other
	túkísa	v		cause one to be scolded or insulted
	túkúnúnú	adj.		small; tiny
ma-	tukuta	n	6	lots of sweat
	tukutidza	v		cause to perspire or sweat
	tukutíla	v		perspire or sweat
	túkwána	n	9	handkerchief
	túkwi	n	9	head scarf; head dress
	túla	v		take a load off your head
	túlúgwa	v		be taken down
	túlúla	v		take down
	túmá	v		send
	túmbá	v		crouch; squat

ma-	tumbá	n	6	drums
n-	tumbu	n	3	belly; stomach
n-	tumbú	n	3	corpse
	túmíla	v		send; mail
	túmífla	v		send to or for
	túná	v		take an oath; abstain, as a taboo
	tunda	v		urinate; pass water
	tundila	v		urinate onto something
n-	tundo	n	3	urine
i-	túndú	n	7	basket used for harvesting
	tundubadza	v		cause a pain to subside
	tundubala	v		quieten down or subside
n-	túng'wa	n	1	messenger
	túngámídza	v		make a leader
	túngámíla	v		lead; go before one
n-	túngámíli	n	1	leader or guide
lu-	túngo	n	11	rafter
n-	tungulu	n	3	type of tree
ma-	tungutungu	n	6	blisters, as from fire burns
n-	túpo	n	3	totem
	túrá	adj.		be expensive
	tútá	v		remove or carry away in loads
	tútHumádza	v		elevate; heap up
	tútHumála	v		be elevated
	tutsHa	v		cause to urinate, as with a baby
n-	tútshi	n	3	shadow; umbrella
ma-	tútu	n	6	whirlwinds; cyclones
i-	tútújáni	n	7	corn cricket
	tutuma	v		boil up or over, as of milk
	tutumisa	v		cause to boil, as of milk
	tyajaná	n	7	small shawl
	tyáli	n	7	shawl; rug blanket
ma-	tyílá	n	6	cloths
lu-	tytya	n	11	flank; side of the body
	uma	v		threaten
chi-	unga	n	7	species of ceropegia
	vakacha	v		visit
	vala	v		dress-up
	vángá	v		knead or mix as some food
n-	vaváni	n	3	Lippisa jaranica; the leaves are infused and used as a drink for fevers or wild tea; wild mint
	veísí	n	9	fist
ma-	vele	n	6	overgrown hair
	ví	n	5	grey hair
bu-	viiló	n	14	place for flaying; a surgical or

	vika	v		operating theatre
	víma	v		avoid blows; ward off
n-	vími	n	1	hunt
	vingá	n	5	hunter
	viya	v		lump of clay
n-	vó	n	3	skin an animal
	vokomola	v		first milk after calving;
	vondómóka	v		colostrum
	voneka	v		grab a handful greedily
li-	voni	n	11/6	rise up instantly
	vú	n	5	provide light
	vubéla	v		lamp
	vubú	n	9	soil
	vudzi	n	5	ferment with yeast
	vukidza	v		hippopotamus
	vukidzika	v		single strand of hair
	vukula	v		fill-up hole with soil
	vúla	n	9	fill-up with mud; be silted up
chi-	vulá-mágwe	n	7	remove mud or sand out the
	vulúláta	v		ground using a shovel, or dig
	vulúlátúnúka	v		water; rain
	vumba	n	9	hailstorm; hail
	vumbika	v		close one's eyes
	vúna	v		open one's eyes
	vunánya	v		eland; gnu
	vuníka	v		put underneath some soil
	vuva	v		break or snap off
	wa	v		break into many pieces
	wáchi	n	9	have a broken bone; be broken
	wáiri	n	9	become mouldy or mildewed
	wala	v		fall
	walila	v		watch; clock
	walula	v		wire
	wanána	v		make bed ready for sleep.
	wanda	v		arrange a bundle of sticks ready
	wanéítíko	v		for tying up; cushion up
	wáníka	v		make a bed; rearrange bedding
	wanika	v		after use
	waya	v		get on well; have an
				understanding
				increase; become many;
				multiply
				lie on one's back
				spread out to dry or air.
				be found
				scatter or throw about

	wáyílesi	n	9	radio
	wédu	pron.		ours
	wényu	pron.		yours (pl)
	widza	v		finish
	wíki	n	9	wig
	wila-zwilopa	v		be calm; down-to-earth attitude
chi-	wilo	n	7	chance
	woba	v		bow down as of a tree branch
	wobeka	v		be bowed over
	wola	v		remove excreta or trash
	wolela	v		fill, or load; gather to, or into
	wólóbéla	v		get used to
	wólóta	v		dream; day-dream
n-	wólóti	n	1	dreamer
	wóma	v		dry
	wóndá	v		become thin or lean
	woneka	v		bid farewell
	wonga	v		nurse
	wótsHá	v		cause to be thin or loose weight
	wubama	v		become bent forward, as of a person or a tree
chi-	wulu	n	7	large antheap
	wuluka	v		fly
	wulusa	v		winnow; remove chaff from harvested grain; cause to fly
	wúnga	v		flow
n-	wunga	n	3	type of tree
	wupula	v		snatch; to remove quickly with an open hand
	xalási	n	9	drinking glass
	xaráwu	n	5	spade; shovel
	xáxámádza	v		tighten, stretch to make tight
	xáyá	v		rub soles of feet with a stone to get rid of the cracks
	xola	v		draw a salary or some form of reward for work done
	xóthá	v		scrub
i-	xwabhá	n	7	dried meat; biltong
i-	xweto	n	7	loop in a rope
	yápo	adv.		present; there
	yéelá	interj.		hey; hey there; ho
	yéno	adv.		over there
	zana	v		dance; play
	zangá	n	5	oaf
lu-	zangwí	n	11	type of creeper
n-	zani	n	1	player; dancer

n-	zano	n	3	type of dance; game
	zebé	n	9/10	ears
	zeeza	v		hesitate
n-	zekúlu	n	1/2	nephew or niece
	zengwe	n	9	millet
	zeu	n	5	molar tooth
	zeula	v		chewing of animals late at night
n-	zeze	n	3	type of tree
	zha	v		come
	zhádza	v		fill-up
	zhaívi	n	5	chameleon
	zhála	v		full; in abundance
	zhala	n	9	hunger; famine
chi-	zhala-nlota	n	7	midden; heap of waste
	zhalila	v		close; shut
	zhalíána	v		be angry; troubled or in distress
	zhalíma	n	5	darkness
	zhámú	n	5	human or animal breast
ma-	zhaná	n	6	part of the bee produce
	zháni	n	5	leaf; teabag
ku-	zhé	n	17	outside
	zhéko	n	6	small four-corner closure of a granary
chi-	zhemá	n	7	fool; idiot
chi-	zhi	n	7	foreigner; stranger
	zhibikiti	interj.		fall of something heavy
	zhíno	n	5	tooth
	zhisa	v		bring
	zhísho	n	5	eye
	zhizhá	n	5	time of the first ripe fruits; harvesting time
	zhobá	n	9	noise
	zhodza	v		apply lotion on body,
ma-	zhokoédza	n	6	early morning
	zhola	v		apply lotion onto one's body
chi-	zholo	n	7	ointment; a body lotion
	zhongólolo	n	5	millipede
	zhou	n	9/10	elephant
	zhowaná	n	9	elephant calf
	zhúba	n	5	sun; day
	zhuka	v		become open
	zhula	v		open
	zhulá	n	5	frog
	zhulo	adv.		day before yesterday
	zhulo-líja	adv.		few days ago
	zhunga	v		remove thin grain from the

				coarse one
n-	zhuzha	n	1	young man
nji-	zí	n	10	rivers
n-	zi	n	3	home; dwelling place
	ziba	v		know
n-	zibí	n	1	skilled person; knowledgeable person
	zibísa	v		notify; inform
lu-	zibo	n	11	knowledge
	zígwa	v		be known
	zijaná	n	9	foot or bicycle path
	zila	n	9/10	roads
n-	zila	n	3	line
	ziláwa	n	9	kudu
	zíná	n	5	name
	zipa	v		sweet
	zípi	n	9	zip
	zipisa	v		sweeten
n-	zipo	n	3	sweetness, as of honey or sugar
	zogwádza	n	8	anguish
	zojiwa	n	8	food
	zomola	v		pinch hard
n-	zonyó	n	3	bull's penis
	zuká	n	7	sixpence coin, equivalent to five cents
	zumbunuka	v		reveal; be in view
	zunguza	v		shake
	zunguzika	v		shake as of a tree or loose tooth
	zununula	v		uncork; unplug; remove a lid of a bottle
	zutula	v		glare; look hard at something
	zutula	v		look hard
	zutulila	v		look hard or fix the eyes at
	zuwa	v		chat; be engaged in a friendly conversation
	zwábo	pron.		theirs
n-	zwádzi	n	1	parent
	zwála	v		give birth
	zwalána	v		be related
bu-	zwaláni	n	14	friendship; intimate friendship
n-	zwaláni	n	1	friend
bu-	zwele	n	14	confinement, a lying in after giving birth; sitting on eggs of a hen to hatch them
n-	zwéle	n	1	woman in confinement after giving birth

bu-	zwí	n	14	honey; syrup
n-	zwí	n	3	syrup; honey
	zwi	ideo.		darken, as in the evening or before rainfall
	zwiámbadzá	v		dress oneself; be self supporting
	zwiámbulá	v		undress oneself
	zwibáakanyá	v		prepare oneself; get ready
	zwíbhatalilá	v		hold onto; be well off
ma-	zwíbhato	n	6	manners
	zwíbígilá	v		put away for later use
	zwibóka	v		praise oneself
	zwibúlayá	v		kill oneself; commit suicide
	zwibuyanáná	adv.		very well; nicely
ba-	zwichábáchaba	n	2	foreigners
	zwichéngedzá	v		deceive oneself
	zwída	v		selfish; conceited; be tidy
	zwidwa	v		say to oneself; insult oneself
n-	zwígwa	n	3/4	vangueria infauta tree
	zwígwa	n	9/10	fruits from the vangueria
	zwíisa-pasí	v		infauta tree
	zwíjisa	v		belittle oneself
	zwikáma	v		feed oneself; support oneself
	zwikéra	v		comb one's hair
	zwikólolá	v		cut one's hair
	zwikúmbulá	v		stretch out oneself, as the hand or arms
	zwilándulá	v		serious self-examination
	zwilápa	v		plead innocent
	zwilébelekelá	v		treat oneself
	zwilíka	v		defend oneself
	zwilínga	v		do one's best
	zwilízanilá	v		look at oneself, as in a mirror
	zwilóbesá-phepo	v		be fit
	zwímbá	v		take a stroll
	zwimba	n	5	swell
chi-	zwimbílá	n	7	hide on the ground, as of rabbits
	zwimbíla	v		swelling easily, of someone
	zwimbísa	v		constipate
	zwimbunula	v		cause to swell
	zwimísa	v		uncover; unveil
	zwimísidzilá	v		intend to; be determined to
	zwina	v		take responsibility
	zwing'ánga	v		mend or seal a hole
chi-	zwino	n	7	scratch oneself
	zwisénga	v		lid or stopper
				be pregnant

	zwiséngesá	v		impregnant a woman
	zwisénga	v		incriminate oneself
	zwiséngililá	v		hang oneself; commit suicide
	zwiséshúla	v		clean oneself; wipe oneself
	zwiséwa	v		feeling okay; hear oneself
ma-	zwiséwo	n	6	feelings; sensations
	zwiséya	v		crush between two objects
	zwisézhisa	v		bring oneself; come unescorted