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Verbal Phonology and Morphology of Ndebele

by

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Verbal Phonology and Morphology of Ndebele

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ABSTRACT

Verbal Phonology And Morphology of Ndebele

By

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Doctor of Philosophy in Linguistics

University of California, Berkeley

Professor Larry M. Hyman, Chair

The main goal of this dissertation is to provide a comprehensive study of verbal phonology and morphology of Zimbabwean Ndebele, a Bantu language. Although the approach is mainly descriptive, important theoretical issues are also discussed. While to a greater extent the study is carried out within Lexical Phonology (Kiparsky (1982, 1985), Mohanan (1982), Booij and Rubach 1987 and other), other theoretical frameworks such as Autosegmental Phonology (Goldsmith 1976, 1990), Underspecification (Kiparsky 1985, Archangeli 1984, Pulleyblank 1986a, Archangeli and Pulleyblank 1986 and Inkelas 1995), CV Phonology and the Moraic theory (Hyman 1985 and Hayes 1989) are also exploited as the different types of data dealt with lend themselves to different types of analysis. Chapter 1 provides a general introduction to the study. Chapter 2 deals with a variety of issues such as the verb structure, description of affixes and ordering of prefixes while Chapter 3 provides an in depth study of suffix ordering. Chapter 4 and 5 unveil the intricate nature of Ndebele verbal morpho-phonology, with Chapter 4 focusing on root structure and processes such as coalescence, gliding and deletion which arise due to morpheme concatenation, and Chapter 5 on palatalization. Chapter 6 and 7 treat tone and

reduplication, respectively. The study ends with a brief summary and discussion in Chapter 8.

This dissertation is dedicated to my parents, Ntlongo and Julia Sibanda, who without their support and encouragement from the moment I was born I would not have come this far with my education.

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LIST OF SYMBOLS AND ABBREVIATIONS

Symbols

→	=	becomes
>	=	changes into
/	=	in the environment of
<	=	develops out of

Abbreviations

APP/A	=	applicative
Approx	=	approximant
C	=	consonant
C ₁ , C ₂ , etc	=	first consonant, second consonant, etc
CAUS/C	=	causative
cl.	=	class
CONS	=	consonant
D	=	depressor consonant
Depr.	=	depressor
D-Stem	=	derived stems
Eject.	=	ejective
Ext(s)	=	extension(s)
Fric.	=	fricative
Fr. Suff(s)	=	'frozen suffix(es)'
FV	=	final vowel

G	=	glide
H	=	high tone
IFS	=	inflectional final suffix
INT/I	=	Intensive
IP	=	implication prefix
IS	=	inflectional suffix
I-Stem	=	inflectional stem
Lat.	=	lateral
L	=	Low tone
M-Stem	=	micro-stem
N	=	negative
Nzd	=	nasalized
Non-Depr.	=	non-depressor
OM	=	object marker
PASS/P	=	passive
PB	=	Proto-Bantu
PI	=	Pre-Initial
pl.	=	plural
Pre-Nzd	=	pre-nasalized
PS	=	post-subject
R	=	root
RCM	=	Repeated Morph Constraint
REC/R	=	reciprocal

RED	=	reduplicant
sg.	=	singular
SM	=	subject marker
STAT/S	=	stative
TL	=	toneless
TM	=	tense marker
Unasp.	=	unaspirated
V	=	vowel
V ₁ , V ₂ , etc	=	first vowel, second vowel, etc
Vd	=	voiced
Vls	=	voiceless

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CHAPTER 1: INTRODUCTION

1.0 Introduction.

The primary goal of this study is to provide a detailed description of Ndebele verbal phonology and morphology without the limitations of working within a single theoretical framework, but putting to use the best available linguistic tool(s) for dealing with a particular set of data where a general description would be less revealing. While the main aim of the study is to expose the intricacy of Ndebele verbal morphophonology by looking closely at the verb structure and morphophonologically interesting aspects of morpheme concatenation, another objective is to highlight important theoretical issues that arise from such an exposition. Although the study is obviously not exhaustive given the limitations of a dissertation of this nature, it should be an important step in documenting the language's morphophonology which has for long been ignored partly due to over reliance on Zulu linguistic materials often considered adequate to cover all important parts of Ndebele grammar.

1.1 Focus Of The Study.

This study is restricted to Zimbabwean Ndebele spoken mainly in the southwestern part of the country. It focuses only on the verb, looking at the root, prefixes, suffixes and related morphophonological processes. No attempt is made to describe every aspect of the verb in detail but the study focuses on those areas that appear interesting morphophonologically especially considering current theories. Thus, moods for example, are discussed in the context of affix ordering but other details such as those provided by

Doke (1965) for Zulu are left out. The database used is an electronic version of Pelling's (1971) dictionary and includes a few words that I added. It has 5000 words of which 1984 are verbs. Besides the words, I also added to the searchable database a number of other things such as tone and perfective forms absent in Pelling's dictionary. Although there are many words not included in the database, I believe it is a balanced representation of the language's vocabulary. In addition to the database, the study is also based on my own intuitions and those of my immediate family, extended family and a few friends who I communicate with from time to time.

1.2 Theoretical Assumptions.

In spite of the fact that the study focuses only on the verb the data and issues considered vary a lot. Since different types of data lend themselves to different types of analysis no single theoretical framework would be best suited to handle each and every set of data. The discussion will generally be kept descriptive but in many cases exploiting tools provided by Lexical Phonology as advanced by for example Kiparsky (1982, 1985), Mohanan (1982), Booij and Rubach 1987 and other. Insights from Underspecification, CV Phonology and the Moraic theories¹, will also be drawn upon where appropriate. Tone will be dealt with mainly within the Autosegmental Phonology framework. (For details about the theory see for example, Goldsmith 1976, 1990; Halle and Vergnaud 1981). While currently many linguistic studies are carried out within the Optimality

¹ For the underspecification theory see, for example, Kiparsky 1985, Archangeli 1984, Pulleyblank 1986a, Archangeli and Pulleyblank 1986 and Inkelas 1995. For the Moraic Theory see Hyman 1985 and Hayes 1989.

Theory² (OT) framework there will be no attempt to provide a detailed OT analysis here but important issues raised by the theory will be commented on where they are relevant.

1.3 Segment Inventory, Orthography and Syllable Structure.

Ndebele has the five phonemic vowels given in (1)³. Although four distinctive features, [high], [low], [back] and [round], are provided, the feature [back] does not seem to play any significant role in phonological processes as will be seen in the main discussion.

(1) Vowels.

	i	e	a	o	u
High	+	-	-	-	+
Low	-	-	+	-	-
Back	-	-	+	+	+
Round	-	-	-	+	+

Examples of how the vowels are used in words are given in (2). Note that, although [a] is used here, the symbol that will be used for the [+low] vowel in the rest of the dissertation is the regular keyboard [a].

(2) Vowels in words (verbs)

thatha	'take'
phela	'cook'
sika	'cut'
bona	'see'
thuma	'send'

All other vowels will be represented by the symbols in (1) throughout this work as they are the ones used in standard Ndebele orthography.

² This is a theory proposed by Prince and Smolensky (1993). See also McCarthy and Prince (1993, 1994) and others for more details about the theory.

³ Phonetically seven vowels may be identified as in other Nguni languages. (See for example Doke 1965, 1954).

Although Ndebele has only five phonemic vowels, it has a large consonant inventory as can be seen in (3) where standard Ndebele orthography symbols are used. Equivalent phonetic symbols are bracketed. The consonants can be divided into three groups, non-clicks, clicks and affricates. Note that phonetically clicks are also affricates as spectrographs normally show that they have a stop + fricative sequence. Abbreviations Approx., Depr., Eject., Fric., Lat., Non-Depr., Nzd, Pre-Nzd, Unasp., Vd and Vls, used in the table stand for Approximant, Depressed, Ejective, Fricative, Lateral, Non-depressor, Nasalized, Pre-nasalized, Unaspirated, Vd and Voiceless, respectively.

(3) Ndebele Consonants

a. Non-clicks.

	Bilabial	Labio -dental	Alveolar	(Pre-) Palatal	Velar	Glottal
Voiced Stop	bh (b)		d (d)		g (g)	
Vls Aspirated Stop	ph (p ^h)		th (t ^h)		kh (k ^h)	
Vls Unasp. Stop (Eject.)	p (p')		t (t')		k (t')	
Pre-Nzd Stop (Depr.)	mb (^m b)		nd (ⁿ d)		ng (^ŋ g)	
Pre-Nzd Stop (Eject.)	mp (^m p)		nt (ⁿ t)		nk (^ŋ k)	
Nasal	m (m)		n (n)	ny (ɲ)	ng (ŋ)	
Nasal (Depressed)	m (m)		n (n)	ny (ɲ)	ng (ŋ)	
Voiced Fricative	b (β)	v (v)	z (z)	zh (ʒ)	[k (ɣ)]	h (ɦ)
Vd Fric. (Non-Depr.)	b (β)				[k (ɣ)]	
Voiceless Fricative		f (f)	s (s)			h (h)
Pre-Nzd Fric. (Depr.)		mv (ɱv)	nz (ⁿ z)			
Pre-Nzd.Fricative		mf (ɱf)	ns (ⁿ s)			
Voiced Lat. Fricative			dl (ɖ)			
Vls Lat. Fricative			hl (ɬ)			
Pre-Nzd Lat. Fric. (Depr.)			ndl (ⁿ ɖ)			
Pre-Nzd Lat. Fric.			nhl (ⁿ ɬ)			
Voiced Approximant	w (w)			y (j)		
Vd Approx. (Depr.)	w (w)			y (j)		
Voiced Lat. Approx.			l (l)			
Vd. Lat. Approx. (Depr.)			l (l)			

b. Clicks (affricated)

	Dental	Post-Alveolar	Alveolar Lateral
Voiceless Unaspirated	c (k)	q (k!)	x (kl)
Voiceless Aspirated	ch (k ^h)	qh (k! ^h)	xh (kl ^h)
Voiced (Depressed)	gc (g)	gq (g!)	gx (g)
Voiced Nasalized	nc (ŋ)	nq (ŋ!)	nx (ŋ)
Voiced Nzd (Depr.)	ngc (ŋ)	ngq (ŋ!)	ngx (ŋ)

c. Affricates

	Alveolar	(Pre-) Palatal	Velar
Voiced		j (d ₃)	
Voiceless (aspirated)	tsh (ts ^h)	tsh (tʃ ^h)	
Voiceless (ejective)	ts (ts')	tsh (tʃ')	kl (kx)
Pre-nasalized (Depr.)		nj (^p d ₃)	
Pre-nasalized	nts (nts')	ntsh (^p tʃ')	nkl (^h kx)

As can be seen in (3a.), Ndebele has five series of stops, plain voiced stops, voiceless aspirated stops, ejective voiceless unaspirated stops, ‘depressed’ pre-nasalized stops and ejective pre-nasalized stops. The two series of pre-nasalized stops cannot be distinguished in terms of voicing as at least the first part is voiced in each case and hence the exploitation of the feature ‘depressed’ which will be discussed in detail in Chapter 6. There are also two series of nasals one of which is ‘depressed’. Both voiced and voiceless fricatives also occur in Ndebele. Note that for the velar continuant /k/ which is weakly voiced the closest phonetic symbol is that of a voiced velar fricative, [ɣ]. The consonants **b** and **k** are the only voiced non-pre-nasalized fricatives or obstruents which have non-depressor series. All other non-pre-nasalized obstruents can be characterized as ‘depressed’. The language also has depressed and non-depressed pre-nasalized fricatives that one cannot tell apart in terms of voicing just like pre-nasalized stops. These could also be viewed as affricates if taken to be sequences of nasal + fricative since nasals are

actually stops. There are also voiced and voiceless lateral fricatives which can also be pre-nasalized like stops and the regular fricatives. Finally, there are also ‘voiced’ and ‘voiced lateral’ approximants which have depressor series just like nasals. Examples of words with non-click consonants in (3a.) are given in (4).

(4) Words with Non-click Consonants.

- a. Voiced Stops

bhala	‘write’	dala	‘create’	gula	‘be sick’
--------------	---------	-------------	----------	-------------	-----------
- b. Voiceless Stops

pheka	‘cook’	thuma	‘send’	khula	‘grow’
patshaza	‘burst’	totoza	‘spoil’	kekela	‘sing (especially of women)’
- c. Pre-nasalized Stops

hamba	‘go, walk’	ndiza	‘glide	ngena	‘enter’
zompola	‘snatch’	khunta	‘go mouldy’	nkenteza	‘resound’
- d. Non-depressed Nasals.

khuluma	‘speak’	natha	‘drink’	ngunguna	‘mutter’
----------------	---------	--------------	---------	-----------------	----------
- e. Depressed Nasals

mana	‘stop’	thenga	‘buy’
-------------	--------	---------------	-------
- f. Voiced Fricatives.

buya	‘come (back)’	vula	‘open’
zama	‘try’	zhazhamuka	‘be too forward’
keze	‘let him come’ [ka-iz-e]		
- g. Voiced Non-depressor Fricatives.

bona	‘see’	fika	‘arrive’
-------------	-------	-------------	----------
- h. Voiceless Fricatives

faka	‘put’	sika	‘cut	hola	‘earn’
dlala	‘play’	hlala	‘sit’		
- i. Pre-nasalized fricatives

sebenza	‘work’	vumvuza	‘sprinkle (powder)’
phandla	‘blind temporarily’	fumfusa	‘begin to bud’
chinsa	‘do or experience for the first time’	hlanhlatha	‘take a short cut’

g. Non-Depressed Approximants.

bhewuka 'overturn' tshaya 'hit, beat' vala 'close'

h. Depressed Approximants

wula 'be a prostitute' yana 'go to' letha 'bring'

There are no verbs in the database with depressed **n** and **h** (h) but these consonants occur in words from other parts of speech.

The chart in (3b.) shows that there are three major classes of clicks: dental, post-alveolar and alveolar lateral. The clicks can be voiceless, voiced, aspirated and nasalized. There are two nasalized series both of which are voiced but differing in that one of them is depressed. Here are some examples of words with clicks.

(5) Words with click Consonants.

Dental	Post-alveolar	Alveolar lateral.
cina 'end'	guqa 'kneel'	xoxa 'converse'
chitha 'spill'	qhuqha 'shiver'	xhuma 'join together'
gcina 'keep'	gqoka 'wear'	gxoba 'trample'
nceda 'help'	thunqa 'smoke'	nxusa 'invite'
ngcola 'become dirty'	ngqathuza 'snap with teeth'	ngxama 'be very angry'

In (3c.) we see that affricates may be alveolars, (pre-)palatals or velars and that they can be voiced, voiceless aspirated, voiceless unaspirated (ejective), pre-nasalized and depressed pre-nasalized. Provided in (6) are examples of verbs that have affricates in them.

(6) Words with Affricates.

Voiced	cija 'sharpen'	
Vless Aspirated	tshona 'be deep'	
Vless Unaspirated (Ej.)	tsaka 'squirt out of mouth'	tshopoka 'spring'
	klabalala 'shout loudly'	
Pre-nasalized	ntsanya 'sting'	ntsheza 'swim'

nklinkliza ‘choke’

In the database pre-nasalized **nj** does not occur in verbs although it may be found in other parts of speech.

All the consonants in (3) can also be labialized except bilabials. Regular [w] is the symbol used for labialization in standard Ndebele orthography when it comes immediately after another consonant (i.e. Cw for [C^w]), as in the following examples.

(7) Words with labialized consonants

kho.hlwa	‘forget’
khwe.la	‘climb’
u.ku.m.thwa.la	‘to carry her/him’
a.lwa	‘they fought’

Note that these examples also illustrates the three possible syllables in Ndebele. As in other Bantu languages the default syllable is CV but a V syllable is also acceptable word-initially. Also acceptable is syllabic **m** but this C syllable can only be the contracted class 1 object marker⁴.

1.4 Organization Of The Dissertation.

The rest of the dissertation is organized as follows. Chapter 2 and 3 deal mainly with the morphology of the language. While a wide range of morphological issues such as verb and morpheme structure are discussed in Chapter 2, Chapter 3 focuses on suffix ordering. Morphophonology is dealt with in Chapter 4 and 5 where Chapter 4 looks at a variety of issues such as consonant and vowel processes and Chapter 5 is an analysis of

⁴ See the next chapter for a full list of object markers.

palatalization. Chapter 6 looks specifically at tone and reduplication is discussed in Chapter 7. Chapter 8 is the main summary of the dissertation.

CHAPTER 2: VERB MORPHOLOGY

2.0 Introduction

As in other Bantu languages the Ndebele verb at word level consists of the root and affix(es). Only verbs in the affirmative singular imperative such as those in (1) take, in addition to the root, only one affix, default final vowel **-a**. A prefix is not required in such forms.

- (1) thath-a ‘take’
 qoqod-a ‘knock’

Otherwise the verb usually consists of the root and more than one affix, at least one of which must be a suffix as will be seen in the next sections.

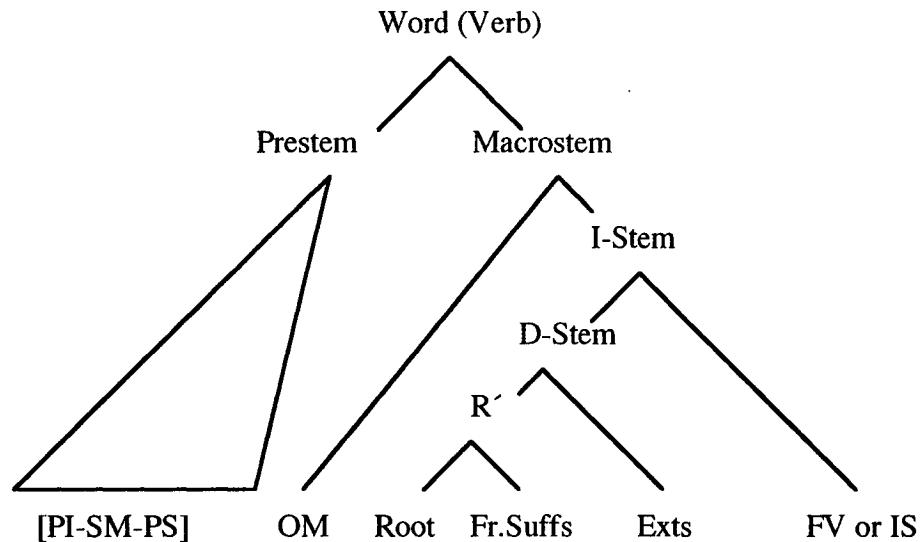
This chapter looks at how the different morphemes (roots and affixes) are organized in the Ndebele verb. First to be considered is the general structure of the verb in 2.1 before looking at the shape of the root and the organization of the different types of affixes in the following sections. Note that, with the exception of some Proto-Bantu forms which are included with their tone markings, tone will not be marked on the actual verb in this chapter or discussed. However, the letters H and TL for High tone and Toneless, respectively, will be used after each verb to mark the underlying tone of the root. Affixes not attached to the verb, particularly those in tables, will also be marked by these letters. In most of the following chapters tone will be ignored as it will be the focus of discussion in Chapter 6 and in section 7.7.

2.1 Verb Structure

The structure of the Ndebele verb is that typically identifiable in other Bantu languages. The tree diagram in (2), adopted from Ngunga (1997) (but with some slight modification) shows

how the verb root and affixes are organized in Bantu languages, including Ndebele. (See also Downing (1997a et seq.) for a similar but less articulated tree structure).

(2) Bantu verb Structure (Ngunga 1997: 98 - Modified)

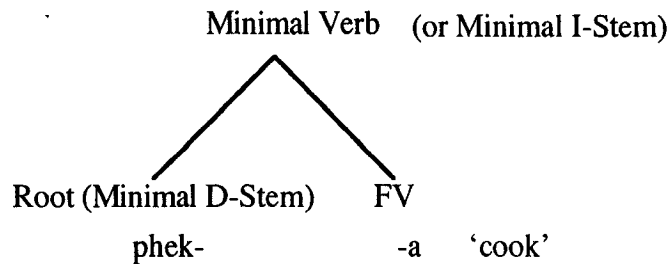


In this structure I-stem stands for Inflectional stem, D-stem for derivational stem, PI for Pre-Initial, SM for Subject marker, PS for Post-subject, OM for Object Marker, Fr. Suffs for Frozen Suffixes, Ext for Extensions and FV for Final Vowel. Where there is FV in Ngunga's tree diagram, IS (Inflectional Suffix) has been added as an option. IS is included because suffixes such as Ndebele imperative plural **-anini/enini** and negative **-anga** are longer than a vowel. It would therefore be inappropriate to use FV for all the suffixes. Downing (1997a et seq.) has Inflectional Final Suffix (IFS) in the same position where FV **-a** is treated as one of the inflectional final suffixes. However, in (2) a distinction is made between inflectional suffixes and default final vowel **-a** which is considered neither inflectional nor derivational in this study. More will be said about this **-a** in Chapter 4 and Chapter 7. Tense, aspect, mood and negation prefixes fall under PI and PS. In some cases tense, mood and negation are marked by suffixes and these take the final position in the verb, IS. As already alluded to, the final position can also be taken by default final vowel **-a**.

Also added to the tree is R' which takes into account the presence in some stems of 'frozen' or non-productive derivational suffixes which are often treated as part of the root.

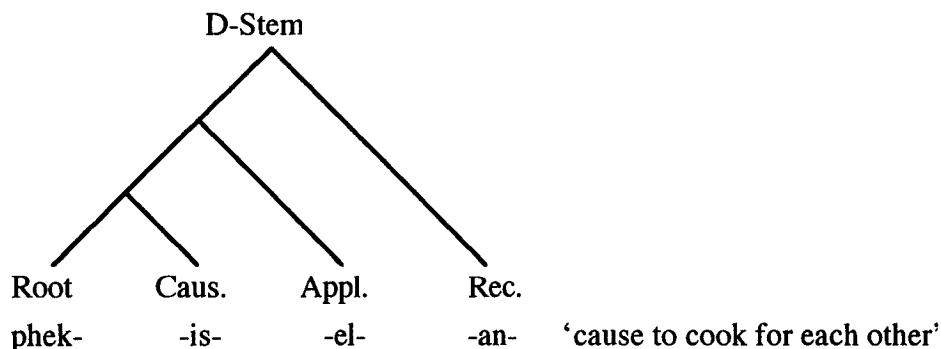
As was seen with Ndebele examples in (1), the minimal verb is Root plus FV, and occurs in the imperative mood. This can be presented in the form of a tree diagram as in (3).

(3) Minimal Verb.



The minimal verb can also be taken to be the minimal I-Stem. The root is in fact the minimal D-stem. This D-stem can be extended by attaching derivational suffixes (Extensions) some of which are no longer productive in Ndebele such as transitive reversive **-ul-** and intransitive reversive **-uk-**. As already implied Extensions may be present or absent in a verb. Thus, in (2) the D-Stem's Extensions brunch represent zero or more branches. With three suffixes the D-stem looks like the tree diagram in (4).

(4) D-Stem with three suffixes.



The three extensions used in this example are causative **-is-**, applicative **-el-** and reciprocal **-an-**. The D-Stem could be subdivided into D-Stem₁, D-Stem₂ and D-Stem₃ which

correspond to Root+Caus., Root+Caus.+Appl. and Root+Caus.+Appl.+Rec., respectively. A tree diagram such as the one in (4) does not always represent the surface ordering of suffixes. Details about suffix ordering are provided in the next chapter.

Note that the verb stem can also be reduplicated although this is not shown in the tree diagram in (2). Reduplicated stems will not be considered here but their discussion is reserved for chapters 5 and 6 which focus specifically on reduplication.

2.2 The Root.

The root, sometimes referred to as the radical¹, is the central morpheme to which affixes are attached. It is also the most stable morpheme in the sense that it does not normally lose material when phonological rules apply unlike affixes which may be reduced and sometimes even becoming $\emptyset$ morphemes. In Ndebele the verb root takes various shapes. While most of the roots are consonant initial there are others that commence with a vowel. These two broad categories of roots are discussed in the sub-sections 2.2.1 and 2.2.2.

2.2.1 Consonant-initial Roots

Most Ndebele verb roots are typically CVC- as in other Bantu languages. As pointed out in the introduction, from the Ndebele database of 5000 words used for this study 1984 are verbs. From these 1984 verbs 1432 roots can be identified. This figure is arrived at by counting each root once and ignoring its presence in additional suffixed forms which have become lexicalized. Each of the roots in cases where different roots have the same phonological shape is, of course, counted. Out of the 1432 roots 1346 (or 94%) are consonant initial and 1284 (or 89.7 %) are CVC-. Examples of CVC- roots are given in (5).

¹ See, for example, Guthrie 1962.

(5) CVC- roots².

thath-	H	'take'	[thaath-a]
phek-	TL	'cook'	[pheek-a]
khul-	H	'grow'	[khuul-a]

Although some Proto Bantu roots had long vowels, the vowel in the Ndebele verb root is always underlyingly short. It however may be lengthened if it forms part of the penultimate syllable in a phonological word as in the bracketed examples. Root vowel lengthening occurs in cases where the only suffix is a final vowel except immediate past tense -é which shifts vowel length to the final syllable as will be seen when tone is considered in Chapter 6. Thus in (1), though underlyingly short, penultimate -a- of **thath-a** 'take' is long on the surface (i.e. **thath-a** → **thaatha**). However, vowel length is not encoded in the standard Ndebele orthography as it is predictable.

There are also 37 (or 2.6%) longer CVCVC- roots whose final -VC- sequence is -Vf-, -Vmp-, -Vc-, -Vd-, -nd-, -in-, -un-³, -Vhl-, -Vdl-, -Vx-, -Vj-, -Vtsh-, -Vq-, Vnq or -Vng-, none of which are considered to be suffixes. In the vast majority of cases the final -VC- looks like a suffix such as applicative -el- or stative -ek- and the root in such cases is taken to be CVC-. More will be said about such cases when we deal with suffixes in 2.3.2 and 2.3.3. The 37 CVCVC- roots are provided in (6).

(6) CVCVC- roots.

a.	viyoc-	TL	'genuflect'	[viyooc-a]
	gongod-	H	'hammer'	[gongood-a]

² Malcolm (1966) identifies -VC- suffixes in some CVC- roots which leaves the root as -C-. (I am, of course ignoring final vowel -a which he includes in the suffix). For instance, in **thath-** 'take' (PB. táud-) and **lal-** 'sleep' (PB. dáád- or dáad-) he identifies the contactive -ath- and the 'stative' -al-, respectively. However, I treat these roots as CVC- following their identification as such in Proto Bantu.

³ In the words **dlephuna** 'scratch, tear', **hlephuna** 'break off a piece', **hluthuna** 'snatch' and **hlafula** 'chew' I treat -n- as a suffix as it can either be used in free variation with the verb forming suffix -l-, or it follows an -u- that can be identified as part of an ideophone from which the verb is built or both. The ideophones are **dlephu** 'expressing way of scratching or tearing very quickly', **hlephu** 'expressing way of breaking off a piece very quickly', **hluthu** 'expressing way of snatching' **hlafulu** 'expressing way of chewing very quickly'. More details about verbs derived from ideophones are provided in Chapter 5 in the context of palatalization.

halad-	H	'speak harshly'	[halaad-a]
klolod-	H	'deride, mock, jeer at'	[klolood-a]
pened-	H	'hold together with safety pin'	[pened-a]
gubud-	H	'turn upside down'	[gubuud-a]
bhukud-	H	'stab'	[bhukuud-a]
hlikihl-	H	'wipe'	[hlikiihl-a]
mpolomp-	H	'take snuff in mouth'	[mpoloomp-a]
nikin-	TL	'shake the head'	[nikiin-a]
cabang-	H	'think'	[cabaang-a]
qabang-	H	'resow to fill up gaps in lines of plants'	[qabaang-a]
gebeng-	H	'act lawlessly'	[gebeeng-a]
khanzing-	H	'roast'	[khanziing-a]
hlobong-	H	'have sexual intercourse'	[hloboong-a]
lolong-	H	'smooth, finish off, plaster'	[loloong-a]
nqolong-	H	'call out aloud'	[nqoloong-a]
bulung-	H	'shape round'	[buluung-a]
gomonq-	H	'slope'	[gomoonq-a]
nyikiny-	TL	'move, shake about'	[nyikiiny-a]
jibuq-	TL	'jump down from'	[jibuuq-a]
tshikitsh-	H	'dance'	[tshikiitsh-a]
qolotsh-	H	'frisk, skip about'	[qolootsh-a]
bhukutsh-	TL	'swim'	[bhukuutsh-a]
humutsh-	TL	'allure, entice, seduce'	[humuutsh-a]
xukux-	H	'work a tight thing loose'	[xukuux-a]
b. jikij-el- H/TL 'throw, hurl at' [jikij-eel-a]			
diling-an-	H/TL	'become full or round'	[diling-aan-a]
cubung-ul-	H/TL	'pick out carefully, analyze'	[cubung-uul-a]
c. cacad- H 'shell nuts' [cacaad-a]			
qoqod-	H	'knock'	[qoqood-a]
bhibhidl-	H	'fester'	[bhibhiidl-a]
bhubhudl-	H	'foam'	[bhubhuudl-a]
ngungun-	H	'mutter'	[ngunguun-a]
d. kuluf-el- H/TL 'screw, screw up' [kuluf-eel-a]			
sayin-	H	'sign'	[sayiin-a]
vakatsh-	TL	'visit'	[vakaatsh-a]

While in (6a.) the root is clearly CVCVC-, in (6b.) it is a bound morpheme that always co-occurs with a suffix. There are more details about such 'frozen' suffixes in 2.3.3. In (6c.), though the root is also CVCVC-, it must be noted that the first CV is reduplicated. The CVCVC- roots in (6d.) are found in loan words from English and Afrikaans. As in (5) vowels in the roots in (6) are also underlyingly short but the second one in a root may be lengthened under the same conditions given for vowel lengthening in CVC- roots. For instance, the second -o- which is part of the penultimate syllable in **qoqod-a** 'knock', the

second example in (6c.), is long on the surface since the only suffix is default final vowel -a. In **jikij-el-a** ‘throw, hurl at’ (first example in (6b.)), however, the lengthened vowel is that of the suffix **-el-** as it is the one in the penultimate syllable. As before, the standard orthography does not show any differences in vowel length.

From the database there are only two (0.1%) roots that are longer than CVCVC-. The two CVCVCVC- roots are given in (7).

(7) CVCVCVC- roots.

bhilikic-	H/TL	‘touch or hold with dirty hands’	[bhilikiic-a]
dlubulund-	H/TL	‘break free of control’	[dlubuluund-a]

As in the other examples above the vowels in these roots are underlyingly short but the third, if it eventually forms part of the penultimate syllable of the verb, may be lengthened as before.

Next to be considered are sub-minimal roots which in this study are treated as -C- roots. The database used has only 23 (or 1.6%) of these out of the 1432 roots. In Proto-Bantu reconstructions most of them are provided as -CV- roots (See, for example Guthrie (1967-71) and Meeussen (1969). With the exception of irregular **-thi** ‘say’, **-tsho**⁴ ‘say’ and defective verbs **-hle** ‘happen suddenly’, **-ze** ‘until’ and **-se**⁵ ‘then, already’ which can not stand on their own but are always used in conjunction with other verbs, all the other 17 sub-minimal roots synchronically take the vowel **-a** which functions like the default final vowel **-a** often suffixed to longer roots we have seen. Even those roots which were **-Ca-** in Proto-Bantu, for example, ***-pa-** ‘give’, do not have a stable **-a-** as it can be replaced by a suffix, for example subjunctive **-e**, perfective **-ile** or applicative **-el-**. This suggests that

⁴ Although default final vowel **-a** cannot be used in place of **-i** in **-thi** ‘say’ and **-o** in **-tsho** ‘say’, the two vowels can be replaced by other suffixes. For instance **-thi** becomes **-th-e** in the immediate past tense and **-tsho** is realized as **-tsh-ilo** in the past perfect tense. In the passive **-thi** and **-tsho** surface as **-th-iw-a** and **tsh-iw-o**, respectively. While **-thi** does not take causative **-is-** and applicative **-el-**, **tsho** can be both causativized and applicativized to become **tsh-is-o** and **tsh-ol-o** where in the latter vowels harmonize.

⁵ The defective verb stem **-se** ‘now, then, already’ is in fact a lexicalized subjunctive or perfective form derived from the sub-minimal stem **-sa** ‘dawn’

synchronically the vowel **-a-** in the sub-minimal **-Ca-** stems is not part of the root but is in fact default final vowel **-a** as root material is normally stable compared to suffixal material. A few examples also have **-CVC-** and **-VC-** correspondences in Proto-Bantu but the Proto-Bantu vowel (if present) does not surface. In (8) we see a list of the Ndebele **-C-** roots. Roots for regular verbs with **-C-** roots are provided in (8a.) while those for defective verbs are given in (8b.). There are also verbs whose roots can be treated as either **-C-** or **-VC-** and their roots are given in (8c.).

(8) **-C-** roots.

Ndebele			Proto-Bantu
a.	-ph-	H/TL 'give'	-pí-
	-b- ⁶	H 'become'	-bá-
	-f-	H/TL 'die'	-kú-
	-w-	H/TL 'fall'	-gu-
	-m-	H/TL 'stand'	-yím-/ -jím-/gi-am-
	-th-(i)	H 'say'	-ti
	-s-	H/TL 'dawn'	-kí-/ -ké
	-z-	H/TL 'come'	-yij-/ -jjj-
	-zw-	H/TL 'hear'	yigu/-jjg-
	-lw-	H/TL 'fight'	-du-
	-hlw-	H/TL 'become dark (at evening)'	yíd/-jíd-
	-dl-	H/TL 'eat'	-dí-
	-tsh-	H/TL 'become burnt / burn'	-pí-
	-tsh-(o)	H/TL 'assert, say'	
	-ny-	H/TL 'defecate'	-ñi-/ -ne
	-kh-	H/TL 'draw water, pluck'	-ik-/ -k(a)-
	-n-	H/TL 'rain'	
	-y-	H/TL 'go'	-gi-
b.	-hl-(e)	H 'happen suddenly'	
	-z-(e)	H 'until'	
	-s-(e)	H 'now, then, already'	-kí-/ -ké
c.	-(e)mb-	H/TL 'dig'	-jimb-
	-(e)th-	H/TL 'pour milk through a funnel, give a name, tell a story'	-yit-

⁶ Although **-b-** 'become' sounds odd with derivational suffixes such as applicative **-el-**, intensive **-isis-** and passive **-iw-**, inflectional suffixes such as immediate past tense **-é**, subjunctive **-e** and negative **-i** can undoubtedly be suffixed to it in place of final **-a**.

In the examples in (8) Proto-Bantu roots are provided for comparison with current forms. While in Guthrie's reconstructions **y** and **j** represent a palatal glide and a voiced palatal affricate, respectively, in Meeussen's forms it is not clear which of the two **j** stands for. This applies to other examples in this sub-section as well. Besides the fact that Ndebele might have dropped the vowel seen in Proto Bantu -CV- roots, fusion of consonant and vowel is also a possibility in many cases (eg. -du- (> -lu-/ -dw- > -lw-) > -lʷ- 'fight') and it would also support that the synchronic terminal -a is the same as the default final vowel suffixed to longer roots.

2.2.2 Vowel-Initial Roots

Vowel initial roots can be categorized like the consonant initial ones we have just seen above except that they are preceded by a vowel and that none longer than -VCVCVC- have been found. Synchronically, underlying vowels are also short in vowel initial roots but may be lengthened by rule as before if they end up in the penultimate syllable of the verb. There are a total of 86 (or 6%) vowel initial roots of which 59 can be considered to be -VCVC-. The figure 59 is 4.1% of the total number of verb roots in the database. Like sub-minimal roots, vowel initial roots also differ in shape from their Proto-Bantu correspondences. Those that can be traced to Proto-Bantu originally commenced with a palatal glide which has since been lost. Examples of vowel initial -VCVC- roots in (9) include some that have corresponding Proto Bantu forms.

(9) -VCVC- roots

Ndebele			Proto-Bantu
-ambatha	TL	'cover yourself with blanket, wear'	-jambad-
-eyam-	H/TL	'lean on/against'	-yégam-/ -jég-am-
-elaph-	TL	'cure'	-----
-elus-	TL	'herd'	-----
-engez-	TL	'increase, add'	-jong-id-
-ethuk-	TL	'be startled'	-jituk-

Synchronically, only very few CVC- verb roots⁷ (9/1432 or 0.6%) such as **yeka** ‘leave/stop’ and **yenga** ‘fool’ begin with a palatal glide which is also probably on its way out. In fact young Ndebele speakers often confuse these glide initial roots with the vowel initial ones when applying phonological rules. For example, **yekela** ‘leave alone, let go, stop doing something’, an applicativized form from **yeka**, is often treated as **-ekela**. Thus, **w-a-m-yekel-a** ‘he let him go free’ is **w-a-m-ekel-a** for many young people.

Note that in (9) root identification is based on synchronic status. While forms that are clearly suffixed have been left out it can also be assumed that the roots in (9) are suffixed as was the case with CVC- roots which had similar additional -VC- endings. Assuming that all Bantu verbs had CVC- roots as has been suggested in the literature, this would mean that all examples in (9) and similar forms now actually have -VC- roots as the initial glide was lost. There are, however, problems in that some of the reconstructed forms, ignoring the initial glide, show the root as -VCVC-. Two such example are ***(j)ithuk** for **-ethuk-** ‘be startled’ and ***(j)ambad-** for **-ambatha** ‘cover yourself’. To further complicate the problem, some reconstructions by different scholars also show inconsistencies. For example, **-eyam-** ‘lean against’ corresponds to Guthrie’s root ***-yégam-** and Meeussens’s root plus suffix ***-jég-am-**. In addition there are also roots where it seems like a coincidence that the final -VC- looks like a suffix. A complete list of these roots taken from the database is given in (10) where roots which differ only in their initial vowel are treated as different. These 11 roots constitute 0.8% of the total number of roots in the database.

(10) -VCVC- roots

a. Intransitive			
-anel-	TL	‘become enough’	
-enel-	TL	‘become enough’	
-enyel-	H/TL	‘be sprained’	
-emul-	H/TL	‘begin to (get pregnant)’	

⁷ Five of the nine yVC- roots can also be treated as yVCV- as the verb stems they are found in appear to be derived from CVCV ideophones by suffixing a verb forming consonant. However, it can also be argued that the verbs are derived by dropping the final vowel of the ideophone and then attaching a -VC- verb forming suffix. See Chapter 4 for verbs with yVC- roots and Chapter 5 for more details about verbs derived from ideophones.

-omul- H/TL ‘begin to (get pregnant)’

b. Transitive

-aluk-	TL	‘weave, knit’
-amuk-	TL	‘deprive, take away’
-emuk-	TL	‘deprive, take away’
-ethuk-	H	‘insult’
-elek-	TL	‘add on to’
-enek-	TL	‘air clothes, etc’

As can be seen, roots in (10a.) whose final -VC- resembles transitive applicative **-el-** and transitive reversible **-ul-** are in fact intransitive. The opposite can be seen in (10b.) where the roots are all transitive and yet they end with what looks like detransitivizing suffixes **-ek-** (stative) and **-uk-** (reversible). While there is a possibility that the suffixes lost their intransitive and transitive features in (10a.) and (10b.), one cannot easily rule out that the **-el-**, **-ul-**, **-ek-** and **-uk-** in these roots were never suffixes but were always part of the root just as there are CVC- roots which have these -VC- endings, for example, **phək-** ‘cook’ and **khul-** ‘grow’ we saw in (5). In cases where these -VC- endings are clear suffixes, though some are non-productive, the transitive and intransitive features are normally maintained. Given the problems just discussed, it will be assumed in this study that the forms in (10) are the only -VCVC- roots in the data base. All others included in the figure 59 above will be treated as -VC- roots as it seems impossible to distinguish -VCVC- roots (e.g. -VCuk) from -VC-VC- ones (e.g. -VC-uk-) in cases where -VCVC- roots have transitivity features that would be expected of them if they were -VC-VC-.

If the criterion used for the identification of -VCVC- roots is applied to longer vowel initial forms, only one (or 0.1%) -VCVCVC- root provided in (11) can be identified. Although the final -VC-, **-ek-** looks like the stative suffix it is probably a frozen transitive causative suffix from Proto-Bantu ***-ik-**.

(11) Verb with -VCVCVC- root.

-ebolek- TL ‘borrow’

The stative suffix **-ek-**, normally makes the verb intransitive even in cases where it is part of a lexicalized form, but in this case the root is transitive. As was noted in shorter forms above, the possibility that the suffix lost its intransitive feature seems remote. It is more likely that the **-ek-** in **-ebolek-** originates from Proto-Bantu causative **-ik-** especially as borrowing has some causal implication, roughly ‘cause to possess’ even if possession is temporarily. Treating **-ebolek-** as having a -VCVC- root therefore seems more reasonable than assuming that the whole stem is equivalent to a root. It is unfortunate that a corresponding Proto-Bantu form could not be found for **-ebol-ek**.

The next set of examples in (12) are less problematic ones. These are cases where the root is clearly -VC- although it might have commenced with a palatal glide historically.

(12) Verbs with -VC- roots.

Ndebele			Proto Bantu
-al-	H/TL	‘refuse, deny’	-káán-/káan- ?
-az-	TL	‘know / be able’	-jǐjǐ
-akh-	H/TL	‘build’	-jak-
-eb-	H/TL	‘steal’	-yǐb-/jǐb-
-enz-	H/TL	‘do, make’	-jeng-
-eth-	H/TL	‘name’	-yít-/jít-
-om-	H/TL	‘become dry’	-yúm-/júm-
-on-	H/TL	‘spoil, sin, damage’	-yún-/yón-ud-
-os-	H/TL	‘roast, burn’	-yóke-/joki-
-oth-	H/TL	‘warn oneself’	-yót-/jót-

There are 27 (or 1.9%) such roots out of the total of the 1432 roots. There are therefore a total of 75 (or 5.2%) -VC- roots if the 48 (59-11) which look like -VCVC- roots are added. Note that the root **-az-** ‘know / be able’ does not take default final vowel **-a** but **-i** is suffixed instead. However, when a default vowel is not required, **-i** is dropped just like default **-a** and **-az-** can take any suffix that other roots in its semantic class also take. Some examples are provided in (13).

(13) Default final vowel for **-az-** ‘know / be able’ is **-i**, not **-a**.

- a. **-az-i** ‘know, be able’

- al-a 'refuse'
 -enz-a 'do, make'
 -os-a 'roast'
- b. ba-a-az-i > baz-i 'they knew; they were able'
 ba-a-al-a > bal-a 'they refused'
 ba-a-enz-a > benz-a 'they did; they made'
 ba-a-os-a > bos-a 'they roasted'
- c. -az-ile 'knew'
 -al-ile 'refused'
 -enz-ile 'did, made'
 -os-ile 'roasted'
- d. -az-el-a 'know for'
 -al-el-a 'refuse for'
 -enz-el-a 'do for, make for'
 -os-el-a 'roast for'

As can be seen in (13)a., where no derivational or inflectional suffix is required, **-i** is suffixed to **-az-** (as in the PB form **-jjji**) and yet all other roots take default final vowel **-a**. In (13)b. the past tense is marked by the prefix **-a-** and again **-az-** takes **-i** while all other roots suffix default final vowel **-a**. The prefix **ba-** is Class 2 subject marker. In (13)c. where the perfective suffix **-ile** is used **-i** cannot be suffixed to **-az-** just as default final vowel **-a** is excluded from the other roots. The examples in (13)d. are more interesting as they show that once a suffix is included **-i** cannot be suffixed to a stem containing the root **-az-** even if that suffix ends with a consonant. As can be seen, all forms, including **-az-**, take default final vowel **-a** after the applicative suffix **-el-**. It is therefore clear that **-i**, if present, must not be preceded by a suffix but must always be attached to the root **-az-**.

Presented in (14) is a table summarizing the main facts provided in this sub-section.

(14) Distribution of Ndebele roots according to phonological shape.

ROOT	TOTAL	%
CVC-	1284	89.7
CVCVC-	37	2.6
CVCVCVC-	2	0.1
-C-	22	1.5
-VC-	75	5.2
-VCVC-	12	0.9
TOTAL	1432	100

The table shows how the roots taken from the Ndebele database are distributed according to their phonological structure. Both raw figures and percentages are provided for ease of comparison. Since the facts relating to the figures in the table have already been discussed, no further comment is necessary.

2.3 Affixes

After a close examination of the root we now turn to affixes. Ndebele has a wide range of prefixes and suffixes. While not much can be said about prefixes in this study, suffixes provide many interesting linguistic facts relevant to reduplication. Three sub-sections will, therefore, focus on suffixes while prefixes will all be dealt with in one sub-section. Prefixes will be discussed in 2.3.1, Productive Derivational Suffixes in 2.3.2, Unproductive Derivational Suffixes in 2.3.3, and Inflectional Suffixes in 2.3.4. Although productive derivational suffixes will be considered in this chapter, the discussion on many interesting issues about their combinations and ordering will be left for the next chapter.

2.3.1 Prefixes

Since the focus of the study is on the verb, prefixes of interest are those that do not accompany the creation of a new category of words such as nouns or adjectives when attached to the verb stem. The infinitive prefix **uku-** is the only exception as it has both nominal and verbal features. Prefixes considered here are, otherwise, all inflectional in nature as they also do not change the argument structure of the verb. However, they do contribute grammatical information such as ‘person’ (first, second or third), number (singular or plural), tense, mood and negation.

2.3.1.1 General Description of Prefixes

First to be considered are two class agreement prefixes formed from the VCV- noun class prefix by dropping the initial vowel (augment or pre-prefix) in non-nasal classes and by

retaining only the characteristic vowel of the class or by dropping it leaving behind only the nasal in nasal classes. These are the Subject Marker (SM) and the Object Marker (OM). While the SM brings about concordial agreement between the subject noun phrase (NP) and the verb in a sentence, the OM ensures that there is agreement between the object NP and the verb as illustrated in (15). The SM and the noun class prefix from which it comes are in bold while the OM and the noun class prefix from which it is formed are underlined.

(15) The SM and the OM in a sentence.

Izi -nja	zi -ya- <u>m</u> -thand-a	<u>um(u)</u> -fana.	'The dogs love him, the boy'.
dogs	they-are-him-love-(a)	the-boy.	
Umu -ntu	u -ya- <u>si</u> -bon-a	<u>isi</u> -lwane.	'The person sees it, the lion'
the-person	he-is-it-see-(a)	the-lion	

As can be seen, the SM and the OM are the prefixes through which class features of the subject NP and object NP, respectively, are copied on to the verb in a sentence. The table in (16) shows the shape of the third person Subject and Object Markers in different classes. Noun class prefixes from which the SM and the OM are derived are included together with their Proto-Bantu (PB) forms. Proto Bantu forms of the SM are also included in the table. Note that predictable surface variations have been left out but will be obvious after the discussion of morpheme structure conditions in 4.2. Also, unlike in some Bantu languages, there is no Class 12 and 13 in Ndebele. These are diminutive classes which are marked by the suffix **-ana** (or **-anyana**) in Ndebele. The PB prefixes for the 'missing' two classes are ***ka-** and ***tu-**, respectively. The table also does not include examples showing the use of the various types of subject and object markers but these will be provided in the next section dealing with the sequencing of prefixes.

(16) The Subject and Object Markers together with Noun Prefixes (all H tone)

NOUN CLASS	PREFIX		SUB. MARKER		OM
	PB	NDEB.	PB	NDEB.	NDEB.
1.	mu-	umu-	a-	u-, a-, e-	mu-
1a.		u-		u-, a-, e-	mu-
2.	ba-	aba-, abe-	ba-	ba-, be-	ba-
2a.		o-		ba-, be-	ba-
3.	mu-	umu-	gu-	u-	u-
4.	mi-	imi-	gi-	i-	i-
5.	di-j-	ili-	di-	li-	li-
6.	ma-	ama-	ga-	a-, e-	a-
7.	ki-	isi-	ki-	si-	si-
8.	bi-	izi-	bi-	zi-	zi-
9.	n-	iN-	ji-	i-	i-
10.	n-	iziN-	ji-	zi-	zi-
11.	du-	ulu-	du-	lu-	lu-
12.	ka-	---	---	---	---
13.	tu-	---	---	---	---
14.	bu-	ubu-	bu-	bu-	bu-
15.	ku-	uku-	ku-	ku-	ku-
16.	pa-	pha-	pa-	ku-	ku-
17.	ku-	ku-	ku-	ku-	ku-
18.	mu-	mu-	mu-	ku-	ku-

As can be seen from the table, the SM in Class 1 and 1a. has three variants and these are morphologically conditioned. In the subjunctive and potential moods the SM is realized as **a-**, and in the conditional and participial moods it surfaces as **e-**. The SM is **u-** elsewhere. In class 2 and 2a. the SM has two allomorphic forms. The allomorph **be-** is employed in the conditional and participial moods and **ba-** in all other morphological environments. Similarly, in Class 6, **e-** is used in the conditional and participial moods and **a-** elsewhere. Although there are these slight variations in shape, some generalizations can be made about the SM. In nasal classes (1, 3, 4, 6, 9) the SM is the characteristic vowel of the noun class prefix but with variant vowel **-a** or **-e** in cases already mentioned. Class 10 which appears to be a combination of class 8 and 9 (*izi* + *iN* > *iziN-*) is an exception as its SM is **zi-**. In non-nasal classes the CV 'prefix proper' is the SM, the initial vowel or pre-prefix having been dropped. Observe that in Classes 2 and 2a. **be-**, is a variant which can be said to be derived

from the variant noun class prefix **abe-**. The three locative classes (16, 17 and 18) employ an identical SM **ku-**.

The OM is identical to the SM in all classes except where the SM has allomorphs. In those exceptional cases the OM is only identical to the allomorph of the SM whose derivation from the noun class prefix is transparent. However, in class 1 the OM is not just the characteristic vowel of the class but the CV- prefix proper even though this is a nasal class.

There are also first and second person subject and object markers. Singular and plural forms of these are provided in (17). Examples in the next section will help show how the subject and object marker are used.

(17) First and Second Person Subject (all TL) and Object Markers (all H tone).

	SUBJECT MARKER		OBJECT MARKER	
	SINGULAR	PLURAL	SINGULAR	PLURAL
1 st PERSON	ngi-	si-	-ngi-	-si-
2 nd PERSON	u-	li-	-ku-	-li-

This table shows that the first and second person subject and object markers are also identical except in the singular second person where the SM is **u-** and the OM surfaces as -**ku-**.

A list of the rest of the prefixes of interest is given in (18). Names of prefixes are adopted from Doke (1931).

(18) Other Ndebele Prefixes

OTHER INFLECTIONAL PREFIXES			
uku-	H	Infinitive	
-a-	H	Remote Past Tense	
-sa-	H	Progressive	
se-	H	Exclusive	
-zi-	H	Reflexive	
be-	TL	Immediate Past Continuous Tense	
-ya-	TL	Present Continuous Tense	
-za-	TL	Future Tense	
-zaku-	TL	Immediate Future Tense	
-yaku-	TL	Remote (distant) Future Tense	
-zuku-	TL	Immediate Future Tense (Negative)	
-yuku-	TL	Remote (distant) Future Tense (Negative)	
-(k)a-	TL	Negative	
-ka-	TL	Negative Exclusive	
-nga-	TL	Negative	
(m)a-	TL	Dependent Imperative	
-nga-	TL	Potential	
-nge-	F	Potential (negative)	[F=Falling Tone]

As can be seen, most of these prefixes are -CV- although there are some that are -CVCV-, VCV- and -V-. Some of the prefixes have predictable surface variations which need no comment here as the variations will be obvious after considering morpheme structure conditions in 4.2. What remains in , then, is to see how all these prefixes are ordered when attached to the verb root.

2.3.1.2 The Sequencing of Prefixes

The sequencing of prefixes is not random but follows a defined pattern as illustrated with the affirmative indicative mood in (19) where the SM is in bold face and the OM is underlined.

(19) Prefix ordering in the Indicative Mood

- a. SM + Root-a
u-thath-a H 's/he takes **or** s/he is taking'
u-ph-a H/TL 's/he gives **or** s/he is giving'
- b. SM + OM + Root-a
u-m-thath-a 'he takes him/her **or** he is taking him/her'

u-mu-ph-a 'he gives him/her or he is giving him/her'

c. SM + TM + Root-a

w-a-thath-a	's/he took'
w-a-ph-a	's/he gave'
u-ya-thath-a	's/he takes'
u-ya-ph-a	's/he gives'
u-za-thath-a	's/he will take'
u-za-ph-a	's/he will give'
u-zaku-thath-a	's/he will take'
u-zaku-ph-a	's/he will give'
u-yaku-thath-a	's/he will take'
u-yaku-ph-a	's/he will give'

d. SM + TM + OM + Root-a

w-a-si-thath-a	'he took it'
w-a-si-ph-a	'he gave it'
u-ya-zi-thath-a	'he is taking them'
u-ya-zi-ph-a	'he is giving them'
u-za-lu-thath-a	'he will take it'
u-za-lu-ph-a	'he will give it'
u-zaku-ba-thath-a	'he will take them'
u-zaku-ba-ph-a	'he will give them'
u-yaku-ba-thath-a	'he will take them'
u-yaku-ba-ph-a	'he will give them'

When there are no other prefixes the SM immediately precedes the root as in (19a.) However, if the OM or a tense marker (TM) is present, the subject marker cannot immediately precede the root as that position is taken by these suffixes. This, we see in (19b.) where it is now the OM which immediately precedes the root and in (19c.) where the SM precedes the TM. In fact the OM always takes the position immediately preceding the root when present. Examples in (19d.) where the OM comes after both the SM and the TM illustrate this.

The reflexive prefix which is always **-zi-** in the first, second and third person is not included in the tables in (16) and (17) but can also be treated as an OM. In fact it is a special type of OM as it marks some relationship between an object and the verb. The object, however, is the same as the subject unlike in the case of the regular OM where the object is different from the subject. When used, the reflexive also immediately precedes the root just like the regular OM. Examples are given (20). Note that reflexive **-zi-** is identical to the class 8 and 10 OM.

(20) Reflexive **-zi-** immediately precedes the root.

w-a-<u>zi</u>-sik-a	H	's/he cut himself'
u-za-<u>zi</u>-ph-a	H/TL	's/he will giving herself/himself'

As can be see, **-zi-** not only immediately precedes the root but also comes after both the SM and TM.

The OM is normally preceded by other prefixes except in the imperative mood where it can be the only prefix employed. This applies to the reflexive as well. Some examples of the use of the OM and reflexive in the imperative mood are given in (21a.) and (21b.), respectively.

(21) OM and reflexive in the imperative mood

- a. OM + Root-e/eni(ni)

ba-thath-e	H	'take them'
ba-ph-e	H/TL	'give them'
ba-thath-e-ni	H	'take them'
ba-ph-e-ni(ni)	H/TL	'give them'
- b. Reflexive + Root-e/eni(ni)

zi-tshay-e	TL	'hit yourself'
zi-ph-e	H/TL	'give yourself'
zi-tshay-e-ni	TL	'hit yourselves'
zi-ph-e-ni(ni)	H/TL	'give yourselves'
- c. OM + Root-e/a in the First Person

ngi-tshay-a/e	TL	'hit me'
si-ph-a/e	H/TL	'give us'
ngi-tshay-ani(ni))/-eni(ni)	TL	'hit me'
si-ph-ani(ni))/-eni(ni)	H/TL	'give us'

When the OM or the reflexive is used in this mood the only inflectional suffixes that can be attached to the root are the singular imperative **-e** and plural imperative **-eni / -enini** except in the singular and plural 'First Person' where default final vowel **-a** and plural **-ani/-anini** can also be used as in (21c.). Since the reflexive behaves just like the regular SM it will need no special treatment in this study but the term Object Marker will be taken to include the reflexive unless otherwise stated. Also to be included under the term Object Marker for now is a 'semantically empty' prefix **si-** used in verbs with sub-minimal **-C-** roots and

which takes the same position as the OM in the verb. This prefix, which is not discussed here but will be considered in detail in Chapter 4, is restricted to the indicative, conditional and participial moods.

The prefix order just established in the indicative mood is SM-TM-OM-. However, this does not include the full range of possibilities in the indicative mood. In Nguni languages a verb, besides taking different tenses, can also be realized with three implications (simple, progressive and exclusive) and three typical aspects (indefinite, continuous and perfect). (See for example Doke 1954, 1965 and Malcolm 1966). It is therefore important to see what happens to the ordering of prefixes in these different tenses, implications and aspects if we are to provide a better picture about prefix sequencing. In his discussion of the indicative mood Doke (1954:72) rightly points out that it “shows the greatest number and variety of forms, including the fullest development of implications and aspect, and the fullest range of tenses”. The table in (22) illustrates the ordering of prefixes in different tenses and implications of the verb in the affirmative indicative mood as well as other moods. Aspect is considered together with tense. While indefinite aspect is left unmarked on the tense, continuous aspect is marked in brackets. The Perfect aspect needs not be considered as it is effected by means of a suffix and prefixes appear as they are in the indefinite aspect. Implication prefixes (IP), progressive **-sa-** and exclusive **se-** (or **-s-**) appear as they are. In some cases under the Exclusive Implication column there is a variant which takes care of instances when the SM is V rather than CV. Note that, for convenience, the SM is represented by S in the table and **R** stands for the root.

(22) Sequencing of prefixes in different moods in the affirmative.

	TENSE	SIMPLE IMPL.	PROGR. IMPL.	EXCL. IMPL.
I N	PRES.	S- R -a	S-sa- R -a	se-S- R -a ~ S-s-S- R -a
	PRES. CONT.	S-ya- R -a	-----	-----
	IMMED. PAST	S- R -e	S-sa- R -e	se-S- R -e ~ S-s-S- R -e

D I C A T I V E M O O D	IMMED. PAST (Cont.)	be-S-R-a	be-S-sa-R-a	be-se-S-R-a ~ S-b-S-s-S-R-a
	REM. PAST	S-a-R-a	-----	se-S-a-R-a
	REM. PAST (Cont.)	S-a-S-R-a	S-a-S-sa-R-a	S-a-(S)-se-S-R-a
	FUTURE	S-za-R-a	S-sa-za-R-a	se-S-za-R-a
	FUT. (Cont.)	S-za-be S-R-a	S-za-be S-sa-R-a	S-za-be se-S-R-a
	IMMED. FUT.	S-zaku-R-a	S-sa-zaku-R-a	se-S-zaku-R-a ~ S-s-S-zaku-R-a
	IMMED. FUT. (Cont.)	S-zaku-ba/e S-R-a	S-zaku-ba/e S-sa- R-a	S-zaku-ba/e se-S-R- ~ S-zaku-ba S-s-S-R-
	REM. FUT.	S-yaku-R-a	S-sa-yaku-R-a	se-S-yaku-R-a ~ S-s-S-yaku-R-a
	REM. FUT. (Cont.)	S-yaku-ba/e S-R-a	S-yaku-ba/e S-sa- R-a	S-yaku-ba se-S-R-a ~ S-yaku-ba S-s-S-R-a
	PRES.	S-R-a	S-sa-R-a	se-S-R-a ~ S-s-S-R-a
C O N D I T I O N A L M O O D	PRES. CONT.	-----	-----	-----
	IMM. PAST	S-R-e	S-sa-R-e	se-S-R-e ~ S-s-S-R-e
	IMM. PAST (Cont.)	be-S-R-a	be-S-sa-R-a	be-se-S-R-a ~ S-TM-S-s-S-R-a
	REM. PAST	S-a-R-a	-----	se-S-a-R-a
	REM. PAST (Cont.)	S-a-S-R-a	S-a-S-sa-R-a	S-a-se-S-R-a ~ S-a-S-s-S-R-a
	FUT.	S-za-R-a	S-sa-za-R-a	se-S-za-R-a ~ S-s-S-za-R-a
	FUT. (Cont.)	S-za-be S-R-a	S-za-be S-sa-R-a	S-za-be se-S-R-a ~ S-za-be S-s-S-R-a
	IMM. FUT.	S-zaku-R-a	S-sa-zaku-R-a	se-S-zaku-R-a ~ S-s-S-zaku-R-a
	IMM. FUT. (Cont.)	S-zaku-be S-R-a	S-zaku-be S-sa-R-a	S-zaku-be se-S-R-a ~ S-zaku-be S-s-S-R-a
	REM. FUT.	S-yaku-R-a	S-sa-yaku-R-a	se-S-yaku-R-a ~ S-s-S-yaku-R-a
P O T E	REM. FUT. (Cont.)	S-yaku-be S-R-a	S-yaku-be S-sa-R-a	S-yaku-be se-S-R-a ~ S-yaku-be S-s-S-R-a
	PRES.	S-nga-R-a	-----	se-S-nga-R-a ~ S-s-S-nga-R-a
	PRES. CONT.	-----	-----	-----
	IMM. PAST	-----	-----	-----
	IMM. PAST (Cont.)	be-S-nga-R-a	-----	be-se-S-nga-R-a ~ S-be-S-s-S-nga-R-a

N T I A L M O O D	REM. PAST	-----	-----	-----
	REM. PAST (Cont.)	S-a-S-nga- R -a	-----	S-a(S)-se-S-nga- R -a
	FUT.	-----	-----	-----
	FUT. (Cont.)	S-za-be S-nga- R -a	-----	S-za-be se-S-nga- R -a
	IMM. FUT.	-----	-----	-----
	IMM. FUT. (Cont.)	S-zaku-ba/e S-nga- R -a	-----	S-zaku-ba/e se-S-nga- R - ~ S-zaku-ba S-s-S-nga- R -a
	REM. FUT.	-----	-----	-----
	REM. FUT. (Cont.)	S-yaku-ba/e S-nga- R -a	-----	S-yaku-ba se-S-nga- R -a ~ S-yaku-ba S-s-S-nga- R -a
S U B J U N C T I V E M O O D	PRES.	S- R -e	-----	-----
	PRES. CONT.	-----	-----	-----
	IMM. PAST	S-a- R -a	-----	-----
	IMM. PAST (Cont.)	S- R -e	-----	-----
	REM. PAST	S-a- R -a	-----	-----
	REM. PAST (Cont.)	S- R -e	-----	-----
	FUT.	S- R -e	-----	-----
	FUT. (Cont.)	S- R -e	-----	-----
	IMM. FUT.	S- R -e	-----	-----
	IMM. FUT. (Cont.)	S- R -a/e	-----	-----
	REM. FUT.	S- R -e	-----	-----
	REM. FUT. (Cont.)	S- R -a/e	-----	-----
	P ^s	All Tenses	S- R -a	se-S- R -a ~ S-s-SM- R -a
	I M		uku- R -a	uku- R -a

Although **R** represents the root (the minimal stem), facts about prefix ordering also hold if the stem is longer than the root. The root is here preferred because suffixes that may be attached to it to create a longer stem are treated in the next section. Also, even if suffixes are included, prefixes are still attached to the root part of the stem. The OM is not included in the table as its non-changing position has already been established. The terminal vowel of

the verb, though a suffix, is included as it varies in different tenses. However, tone which also varies in different tenses is not encoded as it is given special treatment in Chapter 6.

As can be seen in (22), there are now other sequences in the indicative mood besides SM-TM-OM-. Where only an implication prefix (IP) is added as in the future tense with a progressive implication, the order becomes SM-IP-TM-OM-. However, there are some odd cases where the TM or IP occurs before the SM. It should be noted that Immediate Past Continuous Tense **be-** and Exclusive **se-** were not included in (19). The prefixes **be-** and **se-**, unlike other tense and implication markers, come before the SM (the PI position in the tree in (2)) because of contraction which results in one of the two co-referential subject markers being dropped in the newly created compound verb. The prefix order then becomes TM/IP-SM-IP-TM-OM-. To make this point clearer, let us consider first the prefix **be-** which appears to be a combination of the -C- root **-b-** ‘be, become’ and the immediate past tense suffix **-e**. A compound verb is created when the verb in which **-b-** is the root comes together with the following one sub-categorized for by **-e**. The coming together of the two verbs results in the SM being duplicated in the newly created verb as each of the two verbs brings with it its own SM. The SM preceding **be-** is dropped to avoid this duplication. On the surface, therefore, **be-** precedes the SM which is in fact the second one in the underlying structure. The compounding and the loss of the SM preceding **be-** is illustrated in (23).

(23) Immediate Past Continuous Tense **be-**.

a.	zibe zihamba	→ bezihamba	H	‘they were walking/moving/going’
	sibe sikhala	→ besikhala	H/TL	‘it was crying’
b.	ibe ihamba	→ ibihamba	H	‘it was walking’
	ube ekhala	→ ubekhala	H/TL	‘s/he was crying’
c.	lube lukuluma	→ belukuluma	H	‘it was biting you’
	abe embona	→ abembona	H/TL	‘they were seeing him/her’

⁸ PM and IM stand for Participial and Infinitive Mood, respectively.

In (23a.) the SM is CV and in (23b.) it is V. In (23c.) where the SMs are CV and V the OM is also included. Although the contracted form is generally preferred, both the long and contracted forms are currently in use. Parallel constructions in which **-b-** ‘be, become’ is also used exist in the future (cont.) and immediate future (cont.) but there is no compounding or loss of one of the subject markers. Some examples of the constructions are provided in (24).

(24) Future (cont.) and Immediate future (cont.)

- a. Future Tense (cont.)
 - (i) **lu-za-be lu-khala** ‘it will be crying’ ***lu-za-be-khala**
a-za-be e-baleka ‘they will be running away’
 - (ii) **si-za-be si-li-funda** ‘we will be leaning’
i-za-be i-bu-dla ‘it will be eating it’
- b. Immediate Future Tense (cont.)
 - (i) **lu-zoku-be/a lu-khala** ‘it will be crying’
a-zoku-be/a e-baleka ‘they will be running away’
 - (ii) **si-zoku-be/a si-li-funda** ‘we will be leaning’
i-zoku-be/a i-bu-dla ‘it will be eating it’

In both the future (cont.) tense ((24a.)) and the immediate future (cont.) tense ((24b.)) the TM comes after the SM of the first of the two verbs. The OM comes after the SM of the second of the two verbs. Note that in (23a.) **-e** is suffixed to the root **-b-** but in (24b.) the terminal vowel can also be **-a**. It can be assumed that **-e** employed in (24a.) and (24b.) is the shortened perfective ending from **-il-e** and that the optional **-a** in (24b.) is the default final vowel suffixed to verbs. It is, therefore, also clear from the examples in (24) that the TM comes after the SM but before the OM.

Although less obvious as uncontracted forms are no longer used, exclusive **se-**’s occurrence before the SM can also be explained in terms of loss of the first of two co-referential subject markers after compounding or grammaticalization of **se-**. Since the point has already been made, only a few examples in (25) will suffice.

(25) Exclusive se-

- | | | | |
|----|---|---|----------------------|
| a. | base behamba → se-be-hamba | H | 'they are now going' |
| | luse luhamba → se-lu-hamba | H | 'it is now going' |
| b. | ase ehamba → a-s-e-hamba ~ s-e-hamba | H | 'they are now going' |
| | ise ihamba → i-s-i-hamba ~ s-i-hamba | H | 'it is now going' |
| c. | b-a-se be-hamba | H | 'they then went' |
| | lw-a-se lu-hamba | H | 'it then went' |

While examples in (25a.) where the SM is CV- present nothing new as the facts are the same as those relating to examples in (23), examples in (25b.) where the SM is a vowel show that **se-**, indeed, comes after the SM. The first SM may, of course, be optionally dropped in the compound verb. The **-e-** of **se-** is also dropped to avoid an unacceptable VV sequence. Examples in (25c.) are in the past tense and are included to show that **se-** does exist as an independent stem since there is no compounding when the past tense is used with an exclusive implication.

The occurrence of two subject markers in the simple implication of the remote past (cont.) creating the order SM-TM-SM- also requires some explanation. The remote past with a continuous aspect appears to be a combination of two tenses, remote past tense and present tense. While the remote past is marked by **-a-** the present tense is marked by a $\emptyset$ morpheme. Each of these tense markers must be preceded by a SM so that the order becomes SM-TM-SM-TM-. Here, it seems, there is no loss of one of the SMs as no compounding is involved. In compounding one of the SMs can easily be dropped because part of the deficient verb is preserved. Dropping the SM when the present tense is already marked by $\emptyset$ morpheme would leave nothing marking this tense on the surface.

It is also necessary to see what happens in other moods besides the indicative. Let us consider the conditional mood which, like the indicative mood, occurs with all implications. As in other languages, the conditional mood in Ndebele is used when expressing the equivalent of 'if', 'when' or 'after' in English. Here are present tense examples of the mood in which the equivalent of 'if' is expressed.

(26) The Conditional Mood in the Present Tense

- a. Wozani nxa **li**-funa. 'Come if you want'
- b. Wozani nxa **li-sa**-fun-a. 'Come if you still want'
- c. Wozani nxa **se-li**-fun-a. 'Come if you now want to'

Examples in (26a.), (26b.) and (26c.) illustrate the use of the Conditional Mood with simple implication, progressive implication and exclusive implication, respectively. The ordering of suffixes in these examples presents nothing new. This ordering of prefixes can also be seen in (22) where sequences in other tenses are also provided.

As can be seen from (22), the affix sequences are those we have already seen with the Indicative Mood. They therefore need no further discussion. What is important, however, is to point out that the Conditional has a sub-mood, often referred to as the Contingent Mood. As Doke (1954) notes, the Contingent Mood in Nguni languages 'is indicated by the use of tenses of past-future sequence, implying unfulfilled intention,...'. It can be interpreted as 'we would have VERB, (but)...'. Ndebele examples of this sub-mood are provided in (27).

(27) The Contingent Mood

- a. Immediate Past with Future
si-be si-za-bhala → be-si-za-bhala TL 'we would have written ...'
lu-be lu-za-bona → be-lu-za-bona H/TL 'it would have seen ...'
- b. Remote Past with Future
s-a-si-za-bhala TL 'we would have written ...'
lw-a-lu-za-bona H/TL 'it would have seen ...'

While in (27a.) the Immediate past is used with the future tense, in (27b.) it is the remote past which is used with the future tense. Note that in both cases the future tense can be replaced by the immediate future *zaku/zoku* or the remote future *yaku/yoku* (or their contracted forms *-zo-* and *-ya-/yo-*). Observe that in (27a.) both the long form and the more commonly used contracted form are included. In (27b.) each example has two SMs and two TMs. This is identical to the SM-TM-SM-TM- sequence we saw with the Remote

past (cont.) in the Indicative Mood except that the second TM, the future tense, is not a $\emptyset$ morpheme this time.

Next to be considered is the potential mood which is marked by the formative **-nga-**. The potential mood expresses the ability to do something or the possibility for something to happen. It takes two implications, the simple ((28a.)) and the exclusive ((28b.)). Although the progressive implication ((28c.)) seems grammatical it sounds odd to use. In (28) we see that the modal prefix (MP) **-nga-**, just like a TM or IP, comes after the SM. A SM before exclusive **se-** is dropped as before (**sise singahamba** > **sesingahamba**).

(28) The Potential Mood

- a. Si-nga-hamba H 'We can go'
- b. Se-si-nga-hamba H 'We can now go'
- c. Si-sa-nga-hamba H 'We can still go' ?

To see how the MP is ordered with respect to the TM and IP it is necessary to consider the mood in other tenses. The table in (22) provides the rest of the tenses and also includes the present tense we have just looked at.

The immediate past (cont.), Remote past (cont.) and the Future tense (cont.) have the sequences TM-SM-MP-, TM-IP-SM-MP- and SM-TM-SM-MP- and IP-SM-MP- which we had not yet seen. Although these are new sequences the facts are those already known except that the MP must come after all other prefixes except the OM which is not included in the table. Also, where compounding is involved the MP must be preceded by its own SM just as the IM or TM. The default order in the Potential Mood appears to be SM-MP-OM- and other sequences occur when two verbs come together as was illustrated in the Indicative Mood. The Remote past (cont.) might appear to have an unexpected sequence of SM-TM-SM-MP- where there are two SMs, but recall that this is a tense where there are two tense markers underlyingly, remote past **-a-** and present tense **- $\emptyset$ -**. Each of these tense markers must be preceded by its own SM.

Another mood that needs to be considered is the Subjunctive. It is usually identified by the suffix **-e** although default final vowel **-a** is employed in some tenses. The subjunctive mood is usually used to “express a wish, desire, purpose....to express or urge action...after auxiliaries like buye, hle, mane, suke...in orders or narratives to express a sequence of actions, replacing ‘and’” and with **-bo-** (together with the short infinitive) to form an emphatic future subjunctive. (Einhorn and Mfeka 1992). In some cases a verb in the subjunctive mood cannot stand alone in a sentence or verb phrase but its occurrence is dependent on the presence of a preceding verb or deficient verb. However, when expressing a desire, wish or urging action the verb in the subjunctive mood need not follow another verb. Although the subjunctive occurs in most tenses particularly when it is used to express a sequence of actions or when it replaces the equivalent of English ‘and’, it only takes the simple implication. A few examples of the subjunctive in the present and remote past tenses are given in (29)

(29) The Subjunctive

a. The subjunctive in the present tense (Simple Implication)

Usale kuhle. ‘You remain well’

Uyafunda ukuze aphumelele. ‘He studies so that he succeeds’

Uvuka ageze, adle, ahambe esikolo. ‘He wakes up, eats and goes to school’

b. The subjunctive in the remote past tense (Simple Implication)

Wavuka wageza, wadla, wahamba esikolo.⁹ ‘He woke up, ate and went to school’

The ordering of prefixes in the subjunctive mood is also presented in (22). There is nothing new in ordering of prefixes as the sequences SM-OM- and SM-TM-OM- are the ones we expect given what we have already seen above.

The next mood to be considered is the Participial which ‘usually denotes that an action is happening simultaneously with another, and such action may be continuous’. (Malcolm 1966). A few examples in (30) should make this point clearer.

⁹ Note that the occurrence of the verbs **wageza**, **wadla** and **wahamba** is dependent on the presence of **wavuka** even though the affixes used in all the four verbs are identical.

(30) The Participial Mood.

- a. Zafika **zi**-khal-a. 'They arrived crying'
- b. Zafika **zi**-sa-khala 'They arrived while still crying'
- c. Zafika se-**zi**-khala 'They were then crying when they arrived'

All the examples in (30) are in the remote past tense but the mood occurs in all tenses as indicated in (22). The three examples, (30a.), (30b.) and (30c.) show the ordering of prefixes in the simple, progressive and exclusive implication, respectively. The ordering of prefixes in the participial mood varies only according to implication but not with regards to tense. The sequences SM-OM-, SM-IP-OM- and IP-SM-OM- seen in the table are those already familiar and need no further comment.

Before we turn to negative forms, let us also look at the Infinitive Mood which is identified by the prefix **uku**-. Besides the prefix **uku**- the infinitive can also take the OM whose position is always immediately before the root. The two examples in (31) should suffice in illustrating the use of the infinitive.

(31) The Infinitive Mood.

- Ngifuna **uku**-hamb-a. 'I want to go'
- Sifuna **uku**-m-bon-a. 'We want to see him/her'

As can be seen here and in (22), only the order MP-OM- is acceptable in all the tenses and implications. Note that the sequence MP-OM- is identical to the one we saw with the potential mood except that Potential Mood **-nga**- is always preceded by a SM.

The order of prefixes established so far is **SM-IP-TM-MP-OM**- although not all these prefixes can be used simultaneously. As just seen, for instance, the infinitive MP can not be preceded by any other prefix but does not violate the order as it cannot come after the OM and does not allow any other prefix to come after it. We now need to see the place of negative markers (N) in this order. A table that illustrates the sequencing of prefixes in the negative is provided in (32).

(32) Prefix Sequencing in the Negative.

	TENSE	SIMPLE IMPL.	PROGR. IMPL.	EXCL. IMPL.
INDICATIVE MOOD	PRES.	ka-S-R-i	ka-S-sa-R-i	ka-S-ka-R-i
	PRES. CONT.	ka-S-R-i	-----	-----
	IMMED. PAST	ka-S-R-anga	S-nga-sa-R-i	ka-S-ka-R-i
	IMMED. PAST (Cont.)	be-S-nga-R-i	be-S-nga-sa-R-i	be-S-nga-ka-R-i ~ S-b-S-nga-ka-R-i
	REM. PAST	ka-S-R-anga	-----	ka-S-ka-R-i
	REM. PAST (Cont.)	S-a-S-nga-R-i	S-a-S-nga-sa-R-i	S-a-S-nga-ka-R-i
	FUTURE	ka-S-zuku-R-a	ka-S-sa-zuku-R-a	ka-S-se-zuku-R-a
	FUT. (Cont.)	S-za-be S-nga-R-i	S-za-be S-nga-sa-R-i	S-za-be S-nga-ka-R-i
	IMMED. FUT.	ka-S-zuku-R-a	ka-S-sa-zuku-R-a	ka-S-se-zuku-R-a
	IMMED. FUT. (Cont.)	S-zaku-ba/e S-nga-R-i	S-zaku-ba/e S-nga-sa-R-i	S-zaku-ba/e S-nga-ka-R-i
	REM. FUT.	ka-S-yuku-R-a	ka-S-sa-yuku-R-a	ka-S-se-yuku-R-a
	REM. FUT. (Cont.)	S-yaku-ba S-nga-R-i	S-yaku-ba S-nga-sa-R-i	S-yaku-ba S-nga-ka-R-i
CONDITIONAL MOOD	PRES.	S-nga-R-i	S-nga-sa-R-i	S-nga-ka-R-i
	PRES. CONT.	-----	-----	-----
	IMM. PAST	S-nga-R-anga	S-nga-sa-R-i	S-nga-ka-R-i
	IMM. PAST (Cont.)	be-S-nga-R-i	be-S-nga-sa-R-i	be-S-nga-ka-R-i ~ S-b-S-nga-ka-R-i
	REM. PAST	S-nga-R-anga	S-nga-sa-R-anga	S-nga-ka-R-i
	REM. PAST (Cont.)	S-a-S-nga-R-i	S-a-S-nga-sa-R-i	S-a-S-nga-ka-R-i
	FUT.	S-nga-zuku-R-a	S-nga-sa-zuku-R-a	S-nga-ka-R-i
	FUT. (Cont.)	S-za-be S-nga-R-i	S-za-be S-nga-sa-R-i	S-za-be S-nga-ka-R-i
	IMM. FUT.	S-nga-zuku-R-a	S-nga-sa-zuku-R-a	S-nga-ka-R-i
	IMM. FUT. (Cont.)	S-zaku-be S-nga-R-i	S-zaku-be S-nga-sa-R-i	S-zaku-be S-nga-ka-R-i
	REM. FUT.	S-nga-yuku-R-a	S-nga-sa-yuku-R-a	S-nga-ka-R-i
	REM. FUT. (Cont.)	S-yaku-be S-nga-R-i	S-yaku-be S-nga-sa-R-i	S-yaku-be S-nga-ka-R-i
P	PRES.	S-nge-R-e	-----	(ka-)S-nge-R-e
	PRES. CONT.	-----	-----	-----
	IMM. PAST	-----	-----	-----
	IMM. PAST (Cont.)	be-S-nge-R-e	-----	be-S-nge-R-e ~ S-b-S-nge-R-e

O T T E N T I A L M O O D	REM. PAST	-----	-----	-----
	REM. PAST (Cont.)	S-a-S-nge- R-e	-----	S-a-S-nge- R-e
	FUT.	-----	-----	-----
	FUT. (Cont.)	S-za-be S-nge- R-e	-----	S-za-be se-S-nge- R-e
	IMM. FUT.	-----	-----	-----
	IMM. FUT. (Cont.)	S-zaku-ba/e S-nge- R-e	-----	S-zaku-ba/e S-nge- R-e
	REM. FUT.	-----	-----	-----
	REM. FUT. (Cont.)	S-yaku-ba/e S-nge- R-e	-----	S-yaku-ba S-nge- R-e
S U B J U N C T I V E M O O D	PRES.	S-nga- R-i	-----	-----
	PRES. CONT.	-----	-----	-----
	IMM. PAST	ka-S-a- R-a	-----	-----
	IMM. PAST (Cont.)	S-nga- R-i	-----	-----
	REM. PAST	ka-S-a- R-a	-----	-----
	REM. PAST (Cont.)	S-nga- R-i	-----	-----
	FUT.	S-nga- R-i	-----	-----
	FUT. (Cont.)	S-nga- R-i	-----	-----
	IMM. FUT.	S-nga- R-i	-----	-----
	IMM. FUT. (Cont.)	S-nga- R-i	-----	-----
	REM. FUT.	S-nga- R-i	-----	-----
	REM. FUT. (Cont.)	S-nga- R-i	-----	-----
	P	All Tenses	S-nga- R-i	S-nga-sa- R-i
	M			S-nga-ka- R-i
I M	All Tenses	uku-nga- R-i	uku-nga- R-i	uku-nga- R-i

As can be seen from the table, the negative takes various forms. The negative prefix **ka-** only occurs in the Indicative Mood and comes before all other prefixes including the SM. When used in the Present Continuous, Immediate Past (Exclusive), Remote Past (Exclusive) and in all implications of the Present Tense the verb must end with negative suffix **-i**. Note that exclusive **se-** is replaced with negative exclusive **-ka-** which means 'not yet'. However exclusive **-ka-**, unlike **se-** which takes the first or second position in the sequence of prefixes when used, must immediately precede the OM or root if the OM is absent. In most

case the order of prefixes after negative **ka-** is identical to the sequences observed in the affirmative. In the Immediate and Remote Past (Simple Implication) a verb which begins with negative **ka-** must terminate in negative **-anga**. The **ka...anga** negative is also used in the perfective aspect of the verb which is not included in the table. When negative **ka-** is used in all implications of the Future, Immediate Future and Remote Future tenses the verb must end in default final vowel **-a**. Examples of the use of negative **ka-** with other prefixes are given in (33)

(33) Ordering of prefixes when negative **ka-** is included.

- a. **ka...i**
 - ka-si-hamb-i** 'we are not going' [Pres.(Simp.) and Pres. Cont.]
 - ka-si-sa-hamb-i** 'we are no longer going' [Pres. Prog.]
 - ka-si-ka-hamb-i** 'we have not yet gone' [Pres.(excl.), Imm. Past (Excl.) and Rem.Past Excl.]
- b. **ka...anga**
 - ka-si-hamb-anga** 'we did not go' [Imm. Past (Simp.), Rem. Past.(Simple) and Perfective (negative of si-hamb-ile)]
- c. **ka...a**
 - ka-si-zuku/yuku-hamb-a** 'we will not go' Fut.(Simp.) , Imm. Fut.(Simp.) & Rem. Fut.(Simp.)
 - ka-si-sa-zuku/yuku-hamb-a** 'we are no longer going' Fut.(Prog..) , Imm. Fut. (Prog..) & Rem. Fut.(Prog.)
 - ka-si-se-zuku/yuku-hamb-a** 'we will no longer go' Fut.(Excl.) , Imm Fut.(Excl..) & Rem. Fut.(Excl.)

All the examples in (33) can also take the OM which must immediately precede the root. Now a complete default order of prefixes can be established although it will not take into account other forms of the negative. Since the default order in the affirmative was SM-IP-TM-MP-OM- all we need to add now is the negative which gives us the order **N- SM-IP-TM-MP-OM-**. This makes negative **(k)a-** the only prefix that truly belongs to the PI position in the tree diagram in (2). All other prefixes that come after the SM belong to the PS position although they may appear in the PI position on the surface. Recall that prefixes such as **be-** and **se-** appeared to belong to the PI position due to loss of a preceding SM as a result of compounding.

Although **ka...i/anga/a** occurs with most tenses and implications in the indicative mood, the negative form which is employed in most moods, tenses and implications is marked by the prefix **-nga-** and the suffix **-i**. The position of **-nga-** in the sequence of prefixes can be illustrated with examples from the Indicative Mood ((34a.)) and Conditional Mood ((34b.)), the tenses being Immediate Past (Cont.) and Future, respectively. In other moods where **-nga...i** is used the prefix ordering facts are the same.

(34). Negative **-nga...i**

- | | | |
|----|------------------------------|-------------------------------|
| a. | be-si-nga-hamb-i | 'we were not going' |
| | be-si-nga-sa-hamb-i | 'we were no longer going' |
| | be-si-nga-ka-hamb-i | 'we had not yet gone' |
| b. | si-nga-zuku-hamb-a | '(if) we are not going' |
| | si-nga-sa-zuku-hamb-a | '(if) we are no longer going' |
| | si-nga-ka-hamb-i | '(if) we have not yet gone' |

As seen in (34), negative **-nga-** comes after the SM but must precede the TM, IP (**-sa-** or **-ka-**) and of course the OM which is not included in the examples as its position in the verb is known. This establishes the order **SM-N-IP-TM-(MP)-OM-**. The sequence may of course be slightly changed in cases of compounding, for example, when Immediate Past (cont.) **be-** is used as in (34a.) where the order is **TM-SM-N-IP-TM-OM-**.

Another form of the negative has the prefix **-nga** and suffix **-anga** and is used in the Conditional Mood. It occurs in the simple implication of the Immediate Past and Remote Past tenses and the progressive implication of the Remote Past. Here are some examples.

(35) Negative **-nga...anga**.

- | | | |
|----|----------------------------|--------------------------|
| a. | si-nga-hamb-anga | '(if) we had not gone' |
| b. | si-nga-sa-hamb-anga | '(if) we no longer went' |

The prefix sequences in these examples are **SM-N-** and **SM-N-IP-** which are consistent with the order **SM-N-IP-TM-(MP)-OM-**.

In the Immediate and Remote Future tenses (Simple and Progressive Implication) of the Conditional Mood where negative **-nga-** is used default final vowel **-a** is suffixed to the verb. Here are some examples.

(36) Negative **-nga...a**

- a. **si-nga-zuku-hamb-a** '(if) we will not go/not be going'
- si-nga-sa-zuku-hamb-a** '(if) we will no longer go'
- b. **si-nga-yuku-hamb-a** '(if) we will not go/not be going'
- si-nga-sa-yuku-hamb-a** '(if) we will no longer go'

Here again, prefix sequences **SM-N-TM-** and **SM-N-IP-TM-** are those that do not violate the order **SM-N-IP-TM-(MP)-OM-**.

The negative in the Potential Mood is marked by prefix **nge-** and the final vowel of the verb is subjunctive **-e**. The prefix **-nge-** is a contracted form of the deficient verb **ngeke** 'cannot'. Examples in (37) which illustrate the ordering of prefixes in the Potential Mood also show the underlying structure from which **-nge-** and other prefixes are derived. The examples are in the Present, Immediate Past and Remote Past tenses. Also, all of them have a simple implication although other implications and tenses have the same forms.

(37) Negative **-nge-...e** in the Potential Mood

- a. **si-ngeke si-hamb-e** → **si-nge-hamb-e** 'we cannot go'
- b. **si-be si-ngeke si-hamb-e** → **be-si-nge-hamb-e** 'we could not have gone'
- c. **si-a si-∅-ngeke si-hamb-e** → **s-a-si-nge-hamb-e** 'we could not go'

As can be seen, each of the verbs or tenses has its own SM in the underlying structure but one of these co-referential prefixes does not surface as a result of compounding. It is also clear from these examples that negative **-nge-** comes after all other prefixes except the OM which, if present, will immediately precede the root. The sequences **SM-N-**, **TM-SM-N-** and **SM-TM-SM-N-** also present nothing new particularly when the underlying structures are

taken into account. The default order when negative **-nge-** is used is **SM-N-OM-** and other variations are a result of compounding or use of two tenses as we have seen.

Prefixes sequence seen in this sub-section show that default orders are **N-SM-IP-TM-MP-OM** and **SM-N-IP-TM-MP-OM**, the first being used with negative **ka-** and the second with negative **-nga-**. Other sequences are only surface modifications but these two default orders are not violate in the underlying structure.

2.3.2 Productive Derivational Suffixes

Productive derivational suffixes are affixes often referred to as extensions in the Bantu literature. In Ndebele most of them are **-VC-** except intensive **-isis-** which has a reduplicated **-VC-** and allomorphs of the passive and stative whose shapes are **-C-** and **-VCVC-**, respectively. While in some Bantu languages such as Shona and Ciyao the vowel of a **-VC-** suffix harmonizes with the preceding one in the root, this does not occur in Ndebele as the vowel always maintains the same phonological shape. A list of the Ndebele derivational suffixes is given in (38).

(38) Productive Derivational Suffixes.

DERIVATIONAL SUFFIXES	
-w- ~ -iw-	Passive (PASS)
-ek- ~ -akal-	Stative (STAT)
-el-	Applicative (APP)
-an-	Reciprocal (REC)
-is-	Causative (CAUS)
-isis-	Intensive (INT)

In general, each verbal derivational suffix introduces a new meaning to the verb. While some suffixes alter the argument structure of the base others do not. Guthrie (1962:94-97) observed that an extended verb in Bantu may take an extra object, have its objects reduced by one or retain the same number of objects depending on the suffix employed. Thus Bantu derivational suffixes fall into three categories which are determined by these properties.

Ndebele is no exception as it has suffixes which add a new argument, take away an argument and those that do not change the argument structure.

Zero or more of the extensions in (38) may be suffixed to the root or to the extended root which also includes non-productive suffixes. In other words the suffixes are attached to the minimal D-Stem (Root) or to the D-Stem represented by R' in (2). Before looking at what happens when two or more suffixes are combined in the next chapter it is important to explain briefly the function of each derivational suffix.

2.3.2.1 Causative /-is-/

Let us consider first the causative suffix. The most basic interpretation of CAUS /-is-/ is 'cause to' or 'make (do something)' although the suffix may also be associated with the meaning equivalent to 'help (do something)' in English. When /-is-/ is suffixed to a verb a 'Causer' argument is introduced which normally takes the subject position in an active sentence. The original Agent (or Experiencer etc.) subject of the uncausativized verb is then moved to an object position closest to the verb as illustrated in (39). Note that this word order is obligatory. Even objects cannot switch positions¹⁰.

- (39) Causative /-is-/ introduces a 'Causer' argument.
- | | | | | |
|----|-------------|-----------|----------|---|
| a. | Inkazana | isik-a | inyama. | 'The girl is cutting the meat' |
| | AGENT | | PATIENT | |
| | Umama | usik-is-a | inkazana | inyama. 'Mother is making the girl cut the meat' |
| | CAUSER | | AGENT | PATIENT |
| b. | Umfana | ufak-a | ibhokisi | endlini. 'The boy is putting the box in the house' |
| | AGENT | | PATIENT | LOCATION |
| | Ubaba | ufak-is-a | umfana | ibhokisi endlini. 'Father is making the boy put the box |
| | CAUSER | | AGENT | PATIENT LOC. in the house' |
| c. | Umntwana | uyagul-a | | 'The child is sick' |
| | EXPERIENCER | | | |

¹⁰ I treat a locative adverb such as endlini 'in the house' as a locative object particularly when it is one of the arguments of the verb as in (39).

Ingcekeza igulis-is-a umntwana	'The dirt is making the child sick'
CAUSER	EXPERIENCER

Note that a Causer argument can even be introduced when /-is-/ is suffixed to a ditransitive verb as in (39b.) or to an intransitive verb as in (39c.). The causativization rule can be represented by the following frame.

(40) Causativization Rule.

NP ₁	VERB-is-	NP ₂	(NP ₃)	(NP ₄ / PP}
SUBJ.		OBJ ₁	(OBJ ₂)	(OBJ ₃)
CAUSER		AGENT, EXP., etc.	(PATIENT)	(THEME, LOC.)

When Causative /-is-/ is suffixed to a verb that verb is then sub-categorized as requiring two, three or even four noun phrases (NPs). In place of a fourth NP there could also be a prepositional phrase (PP). The syntax requires that the first NP be a subject, the second a direct object and the 'optional' third and fourth NPs or PP be indirect objects. To be exact, the third and fourth NPs (and PP) are not really optional but their presence is determined by whether the unsuffixed verb would be intransitive, transitive or ditransitive. If it would be intransitive then NP₃ and NP₄ are not required. However, if the verb would be transitive then NP₃ is obligatory and if it would be ditransitive both NP₃ and NP₄ are necessary. The semantics require that NP₁ be a causer, NP₂ an agent (or experiencer, etc.), NP₃ a patient and NP₄/PP a theme or location.

2.3.2.2 Applicative /-el-/

Like CAUS /-is-/, APP /-el-/ is also a transitivity morpheme which can be suffixed to both transitive and intransitive verbs. APP /-el-/ does not have a consistent meaning but introduces a new argument whenever it is suffixed to a verb. The type of argument or the meaning varies depending on the semantic class of the verb as the three examples in (41) show.

(41) Meaning or type of argument varies depending on the semantic class of the verb.

- a. sik-el-a H 'cut for (Benefactive or Reason); cut at / in / on (Location)'
- b. gijim-el-a TL 'run for (Benefactive or Reason); run to / into (Goal), run at / in / on (Location)'
- c. thand-el-a H/TL 'like for (Reason); like at / in (Location)'

The most salient meaning is the benefactive one such as the one expressed by 'for' or 'on behalf of' in English although not all verbs can have this semantic interpretation, for example verbs of feeling and experiencer verbs ((41c.)). With verbs of motion ((41b.)) /-el-/ may also express goal¹¹ ('to', 'into') or source ('from'). While a benefactive interpretation is usually the most obvious one for most verbs, it seems Reason ('for') is the interpretation that can be associated with virtually all verbs. For most verbs APP /-el-/ can also introduce a Locative argument which expresses the equivalent of English 'at' / 'in' / 'on'. Due to the many variations in the use of the applicative no formal rule will be provided in this brief discussion.

2.3.2.3 Reciprocal /-an-/

Next to be considered is reciprocal /-an-/ suffixed to transitive verbs. The meaning it carried is that of reciprocity of action equivalent to the one expressed by 'each other' or 'one another' in English. REC /-an-/ subcategorizes for one or two arguments, the Patient or both the Patient and Agent. When it is suffixed to a transitive verb with only an Agent due to the presence of present continuous tense prefix -ya- it introduces a Patient as in (42a.). However, when it is suffixed to a clearly transitive verb without -ya- and which has both an Agent and Patient, it comes with these two same roles although it maps them in a reversed order as in (42b.). Note that the presence of the present continuous tense prefix -ya-,

¹¹ For some verbs what appears like the goal ('to') can in fact be interpreted as benefactive with the meaning 'intended for' as exemplified by *bhal-el-a incwadi* 'write a letter to' / 'write a letter intended for'. (See Hawkinson and Hyman 1974 for a detailed discussion of this issue but focusing on Shona).

particularly in the absence of an OM, makes a transitive verb behave as if it were intransitive as it cannot take an object¹².

(42) Reciprocal /-an-/ in two types of transitive verbs.

a. Transitive verb without an object

(i) Abafana bayasika 'Boys cut / Boys are cutting'
AGENT

(ii) Aba-fana bayasikana. 'Boys are cutting each other'
AGENT
PATIENT

b. Transitive verb with an object

(i) Umfana usika inkazana 'The boy is cutting the girl'
AGENT PATIENT

(ii) Umfana usikana le-nkazana 'The boy and the girl are cutting
[la-inkazana] each other'
AGENT PATIENT [Lit. 'The boy is cutting
PATIENT AGENT each other with the girl' (Obl. la=with)]

or

Umfana le-nkazana bayasikana¹³ 'The boy and the girl are cutting
AGENT PATIENT each other'
PATIENT AGENT

¹² On the other hand, the absence of -ya- in intransitive verbs makes them appear transitive since they require an object as in the following examples.

- a. umntwana uyagula 'the child is sick'
umntwana ugula indingindi 'the child is suffering from measles'
- b. umntwana uyakhala 'the child is crying'
umntwana ukhala inyembezi 'the child crying tears'.

¹³ The subject marker ba- is used because the two nouns umfana and inkazana (belonging to class 1 and class 9, respectively) both refer to human beings. For non-humans or for human versus non-human gender conflict is resolved by using the class 15 subject marker ku-, for example,

Umuntu lenja lofudu kuyahamba 'A person, a dog and a tortoise are going'.

Unlike in some Bantu languages (e.g. ChiChewa) where the first sentence structure in (42)b.(ii) is only appropriate in cases where there is a gender conflict, the structure is acceptable in Ndebele even when there is no gender conflict, for example,

Abafazi basikana labafana 'Women and boys are cutting each other'
CI 2 CI 2 [Lit. Women are cutting each other with the boys]

For details relating to gender conflict in some Bantu languages see, for example, Hawkinson and Hyman 1974 and Mchombo and Ngalande 1980.

The reciprocal rule, like the causativization rule, can also be presented as a sub-categorization frame. For Chichewa Mchombo and Ngalande (1980:575) propose that when /-an-/ is suffixed “the derived verb is sub-categorized as requiring the frame NP____(PP)”. The category PP is optional when the subject NP is in the plural and hence the bracketing. The same sub-categorization frame works for Ndebele but needs to be constrained as it over generates. Applicativized verbs, for instance, could also have the same frame. My proposal for Ndebele includes both syntactic and semantic information in addition to the given frame. The rule is presented in (43)

- ¹⁴ If the base also has a causative suffix the ‘Agent’ and ‘Patient’ are fused together in each of the two objects as illustrated below.

- Note that if /-is-/ is interpreted as 'help' sentence (a) would mean 'the man is helping the boy cut the girl' and (b) would mean 'the man and the girl are helping each other cut the boy'.

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From the frame, we see that a reciprocalized verb requires a subject NP and may or may not take an oblique phrase depending on the facts already given above. The subject must be both an agent and a patient. If there is a PP it must also be both an agent and a patient. Building in these syntactic and semantic roles eliminated over generation as applicativized verb, for example, cannot be sub-categorized this way.

Note that there are several other approaches which have been considered in the study of reciprocals and these are discussed in detail by Mchombo (in Press)¹⁶. Perhaps the most obvious one is a transformational grammar approach in which /-an-/ does not subcategorize for any argument but brings together arguments from two underlying sentence structures to create one surface structure sentence in which the Agent and Patient are fused together¹⁷. However, this approach and others will not be pursued in this here.

2.3.2.4 Intensive /-isis-/

INTENSIVE /-isis-/ expresses the highest degree of whatever the verb implies such as ‘very much’ or ‘(very) well’ or ‘really [VERB]’. An example is given in (44).

(44) Verbs with intensive -isis-.

sik-isis-a	H	‘cut well / really cut’
boph-isis-a	H	‘tie well / really tie’
hlal-isis-a	TL	‘sit well / really sit / sit or stay for a very long time’
khal-isis-a	H/TL	‘cry a lot / really cry’
hlel-isis-a	TL	‘laugh a lot / really laugh’

As (43) shows, a verb such as **sik-isis-a** means ‘cut well’ but can also be interpreted as ‘really cut’. Even in a non-volitional verb such as **khal-isis-a** ‘cry a lot / really cry’ the highest degree of what the verb implied (crying) is expressed. The intensive is neutral in the

¹⁶ See also Mchombo (1991) where reciprocalization is treated as a lexical process which alters the argument structure of the predicate.

¹⁷ See for example Stockwell et al. (1973:402).

sense that it is neither a transitivizing or detransitivizing morpheme. In other words it does not add or take away any argument when it is suffixed to a verb.

2.3.2.5 Stative /-ek-/ ~ /-akal-/

Stative /-ek-/ (also referred to as the Neuter, Middle or Quasi-passive), as Doke (1931:130) points out for Zulu, a language closely related to Ndebele, has the force of the English suffix **-able** or **-ble** (and in other contexts expresses the idea of ‘get or ‘become’ as opposed to passive ‘be’) and “indicates an intransitive state or condition without any special reference to an agent determining that condition”. In other words, there is no implied agent or suppressed argument when /-ek-/ is used as (45) illustrates. Although detransitivizing, /-ek-/ may be taken to be a ‘fake’ neutral suffix as it behaves like /-isis-/ on the surface since it is not obvious that it takes away an argument and as is it also never adds any new argument to the verb.

(45) Stative /-ek-/ is detransitivizing.

Umama usik-a inyama.	‘Mother is cutting the meat’
Inyama iyasik- ek -a.	‘The meat is “cuttable”; the meat gets cut’
Umfana uvula iminyango.	‘The boy is opening the doors’
Iminyango iyavul- ek -a	‘The doors are “openable”, the doors get opened / open on their own’

Not that **-ek-** also has the meaning ‘get(s) **Verb-ed**’ or implies that the action of the verb happens on its own. Even with these senses no external agent or suppressed argument is implied.

A limited range of verbs also takes the variant /-akal-/. These appear to be a subset of those with CVC- roots¹⁸. Although /-ek-/ and /-akal-/ generally mean one and the same thing there sometimes seem to be a subtle difference in interpretation. While for /-ek-/ the salient meaning is normally ‘-able’ or ‘-ble’ , for /-akal-/ the most obvious immediate

interpretation is usually ‘become’ or ‘be’. Some examples are provided in (46). Note that the verb root **sik-** ‘cut’ which is used as the main example in this sub-section does not take /-akal-/.

(46) Verbs taking both /-ek-/ and /-akal-/.

- | | | | |
|----|-----------------------|------|--|
| a | bon-ek-a | H/TL | ‘be possible to be seen (be ‘seeable’); be/become visible’ |
| | thole-ek-a | H | ‘be possible to be found (be ‘foundable’); be found’ |
| b | bon-akal-a | H/TL | ‘be/become visible; be possible to be seen’ |
| | thol-akal-a | H | ‘be found; be possible to be found’ |
| c. | swel-ek-a / swelakala | H | ‘be required/needed/wanted; be/become necessary’ |
| | fun-ek-a / funakala | H/TL | ‘be required/needed/wanted; be/become necessary’ |

In (46)a. and (46)b. the salient meaning of the verb appears first. Inherent semantics of the two examples in (46)c. make it odd to have the usual ‘-able/-ble’ meaning associated with **-ek-**. Thus both **-ek-** and **-akal-** are normally interpreted as ‘be/become’ when suffixed to **swel-** ‘require/need/want’ or **fun-** ‘require/need/want’.

Verbs that take /-akal-/ also seem to be those that are normally used with the semantic interpretation of ‘be/become(s) **Verb-ed**’ rather than ‘get(s) **Verb-ed**’. While verbs without /-akal-/ may imply that the action of the verb happens on its own with or without any external agent, in verbs with /-akal-/ the action of the verb may happen on its own but when we imagine there being an agent that agent would only be external. For instance, the meat can get cut when someone ‘breaks’ it or when it ‘breaks’ on its own but it would sound odd to say someone gets seen when he sees herself/himself. This is the difference we see between **sik-ek-a** in (45) and **bon-ek-a / bon-akal-a** in (46). In short, the action that happens on its own is either intrinsic or extrinsic in verbs that do not suffix /-akal-/ but only extrinsic in verbs that take /-akal-/.

¹⁸ It is not clear why /-akal-/ is restricted to this subset. If the reason is phonological then the answer is probably in historical linguistics. It is also possible that the verbs form a semantic class as suggested below although more work still needs to be done to establish exactly what the class is.

2.3.2.6 Passive /-w-/ ~ /-iw-/.

Last to be considered is Passive /-w-/ which expresses a meaning equivalent to English ‘be’. This is a detransitivizing morpheme and takes away an argument when suffixed to a verb. In fact, as Harford (1993:102) notes for Chishona, the passive requires the suppression of the highest thematic role in a lexical form. The suppressed thematic role is recoverable and may surface as an optional oblique phrase unlike in the case of STAT /-ek-/ where the lost argument is never implied after suffixation. Some Ndebele examples are provided in (47) where active sentences are given in (47a.) and their corresponding passive forms in (47b.).

(47) Passive /-w-/ takes away an argument.

- | | | | |
|----|------|--|--|
| a. | (i) | Umama usika inyama.
AGENT PATIENT | ‘Mother is cutting the meat’ |
| | (ii) | Inkazana ipheka ukudla.
AGENT PATIENT | ‘The girl is cooking the food’ |
| b. | (i) | Inyama i-ya-sik-w-a.
PATIENT
or
Inyama i-sik-w-a ng-umama.
PATIENT by – AGENT | ‘The meat is being cut’

‘The meat is being cut by mother’ |
| | (ii) | ukudla ku-ya-phek-w-a.
PATIENT
or
ukudla kuphek-w-a yi-nkazana
PATIENT by – AGENT | ‘The food is being cooked’

‘The food is being cooked by the girl’ |

The facts just mentioned apply to both [-w-] and the variant form [-iw-]. The difference between the two morphs is mainly phonological. [-iw-] is generally suffixed to short -C- and -VC- stems while [-w-] is taken by longer ones. However, a few longer stems with a final bilabial may take [-iw-] as in (48).

(48) Passive -iw- in stems longer than -C-.

- | | | |
|---------------|---|--------------|
| -khokhob-iw-a | H | ‘be stooped’ |
| -holob-iw-a | H | ‘be boiled’ |

In most cases of this nature the bilabial is palatalized and /-w-/ is used instead.

2.3.3 Unproductive Derivational Suffixes

Ndebele has many non-productive suffixes which are, however, still productive in some Bantu languages such as Bemba and Ciyao to some extent (See Guthrie 1962 and Ngunga 1997). Productive suffixes cannot be attached to roots that take these suffixes unless the non-productive suffixes are present and come immediately after the root. In other words, productive suffixes cannot precede unproductive ones and roots that co-occur with non-productive suffixes are not available to productive suffixes except in the presence of the unproductive suffixes. Consider the examples in (49) where the non-productive suffixes are transitive reversive **-ul-** and intransitive reversive **-uk-**, and productive suffixes are CAUS **-is-** and APP **-el-**.

(49) Non-Productive suffixes

- a. *genq-a
- b. genq-ul-a H 'overturn'
 genq-uk-a H 'get overturned'
- c. genq-ul-el-a H 'overturn for'
 genq-uk-is-a H 'cause to overturn'
- d. *genq-el-(ul)-a
 *genq-is-(uk)-a

The example in (49a.) is unacceptable because the root **genq-** is a bound morpheme which must always co-occur with transitive reversive **-ul-** or intransitive reversive **-uk-**. Forms that have these two non-productive suffixes in (49b.) are acceptable and can even take productive suffixes as in (49c.). However when productive suffixes are attached to **genq-** unacceptable forms are created as can be seen in (49d.) Even adding the non-productive suffixes after the productive ones does not improve the unacceptable forms. A list of non-productive derivational suffixes with names adopted from Doke (1931) is given in (50).

(50) Non-Productive suffixes (all TL)

NON-PRODUCTIVE SUFFIXES			
Suffixes Forming Derived Verbs From verbs:			
	SUFFIX	EXAMPLE	
1. Dispersive	-alal-	camb-alal-a	'lie down stretched out'
2. Stative II	-am-	qak-am-a	'be raise, be high'
3. Contactive	-ath-	fumb-ath-a	'clench the hand'
4. Perfective	-el-el-	gciz-el-el-a	'emphasize'
5. Persistent	-ezel-	band-ezel-a	'press against'
6. Transitive Reversive (short)	-ul-	genq-ul-a	'overturn'
7. Transitive Reversive (long)	-ulul-	thuk-ulul-a	'untie, undo'
8. Intransitive Reversive (short)	-uk-	genq-uk-a	'get overturned'
9. Intransitive Reversive (long)	-uluk-	thuk-uluk-a	'come untied'
10. Miscellaneous a.	-ay-	tshum-ay-el-a	'preach'
b.	-m-	suku-m-a	'stand'
c.	-nz-	sebe-nz-a	'work'
Suffixes Forming Derived Verbs From Noun and Adjective roots			
11.	-ph-	i-tila tila-ph-a	'lazy person' 'be lazy'
Suffixes Forming Derived Verbs From Ideophones and other Stems			
12. Intransitive:	-k-	dabu dubu-k-a	'sound of getting torn' 'get torn'
13. Transitive:	-l-	dazu dazu-l-a	'sound of something splitting apart' 'split down'
14. Causative	-z-	bhadla bhadla-z-a	'way of saying without finesse' 'say without finesse'
15. do.	-s-	gagas-a	'stammer'
and others: (suffixes to radicals)	-b-	khokhob-a	'stoop'
	-bh-	gubh-a	'hollow out'
	-l-	dubul-a	'shoot a gun'
	-th-	phepheth-a	'blow'
		nyiki	'way of shaking about'
	-ny-	nyiki-ny-a	'shake about'
	-z-	zunguz-a	'sway'

Later it will be argued, following O'Bryan (1974), that **-bal-**, **-bez-**, **-bul-** are also suffixes although the table above assumes that **-b-**, **-ul-**, **-l-**, **-z-** takes care of them. When only those suffixes in the table are considered, **-bul-** can be treated as a combination of **-b-** and **-ul-**. In **-bal-** and **-bez-** the initial **-CV-** can be treated as part of an ideophone root and **-l-** and **-z-**

as suffixes. More will be said about these -bCV- suffixes in Chapter 5 when palatalization is discussed.

Note that productive derivational suffixes are also used like frozen non-productive suffixes when suffixed to some roots but they are not included in (49). Here are some examples.

(51) Frozen Productive Derivational Suffixes

- a. *hlang-a
*kwej-a
- b. hlang-an-a TL 'meet'
 kwej-is-a H 'pass the time with idle chatter'
- c. hlang-an-el-a TL 'meet for/at'
 kwej-is-el-a H 'pass the time with idle chatter for/at'
- d. *hlang-el-(an)-a
 *kwej-el-(is)-a

In (51a.) we see that when default final vowel -a is suffixed to the roots **hlang-** and **kwej-** nonsense verbs result. This is due to the fact that **hlang-** and **kwej-** must always co-occur with REC -an- and CAUS -is-, respectively, as in (51b.) where default final vowel -a is also suffixed. These acceptable verbs can then take other productive suffixes as illustrated in (51c.) with APP -el-. However, -el- (or any other productive suffix) cannot come before 'frozen' -an- or -is-. This we see in (51d.) where it is also shown that using -el- (or any other productive suffix) without the frozen suffixes is also unacceptable.

As has been seen, non-productive or 'frozen' suffixes cannot be separated from the root. In fact they are normally treated as part of the root in phonological processes. Thus verbs in which the stem has a non-productive or 'frozen' suffix such as those in (49b.), (49c.), (51b.) and (51c.) can be treated like verbs whose roots are CVCVC-. It seems reasonable therefore to treat non-productive suffixes as part of the D-Stem in the verb structure but at the R' level since they behave as if they are part of the root.

2.3.4 Inflectional Suffixes

There are a number of Ndebele suffixes which can be classified as inflectional. These are non-derivational suffixes which do not alter the meaning or argument structure of the verb but which mark number, tense, aspect, mood and negation. In fact we saw most of these while discussing inflectional prefixes in 2.2. The prefixes they co-occur with need not be discussed again here. A list of the inflectional suffixes is provided in (52).

(52) Inflectional Suffixes (all TL except Immediate past tense -é).

INFLECTIONAL SUFFIXES	
-é	Immediate past
-il-e	Perfective (Past & Present)
-i	Negative
-anga	Negative
-e	Subjunctive
-e	Imperative
-ani/-eni	Plural (imperative)
-anini/-enini	Plural (imperative)
-a	Final Vowel (Default)

Generally the FV or IS position can be taken only by one of these suffixes in a given verb. Default final vowel **-a** can also be classified together with these suffixes as it shares the same final position with them. It will, however, be later shown in Chapter 4 and Chapter 7 how **-a** differs from inflectional suffixes. Some suffixes, particularly Perfective **-ile**, Negative **-anga** and Plural imperative **-anini/-enini** (usually contracted to **-ani/-eni**) are sometimes treated as combinations of two suffixes. For instance, **-ile** (Proto Bantu **-id-e**) is considered to be a combination of **-il-** and **-e**. (See, for example, Hyman 1995 and Bastin 1983). The negative morpheme is sometimes taken to be **-nga** rather than **-anga**, implying that **-nga** is suffixed after default final vowel **-a**. (See for example Doke 1931). The suffix could also be identified as **-ang-** plus default final vowel **-a** considering that most suffixes are **-VC-**. The suffix **-enini/-eni** is also sometimes split into singular imperative **-e** plus and plural imperative **-nini/-ni**. (See for example Doke 1931). However, with the exception of **-ile** which will be looked at closely when imbrication is discussed in Chapter 5, these

suffixes need not be split as each of them normally functions as a unit although derived from two suffixes.

2.4 Summary

In this chapter we have seen that the structure of the Ndebele verb which is also identifiable in other Bantu languages is **PI-SM-PS-OM-Root-Fr.Suffs-Ext.-FV** or **FS**. In the default order the prefix sequence is more specifically **N-SM-IP-TM-MP-OM** or **SM-N-IP-TM-MP-OM**, the first order being used with negative **ka-** and the second with negative **-nga-**. However, these sequences may be violated on the surface due mainly to compounding and subsequent reductions. The OM was shown to be privileged in the sense that it always immediately precedes the root when present, no prefix being allowed between it and the root. We also saw that the root takes various shapes although most verbs are CVC-. Non-productive or 'frozen' suffixes were shown to deserve a special position in the verb as they always occur immediately after the root when present¹⁹. Although the ordering of derivational suffixes was not discussed important information about their function was provided. It was shown that the suffixes carry different meanings and perhaps the most important point established was what each suffix does to the argument structure of the verb. While the CAUS, APP and REC introduce new arguments to the verb the PASS actually suppresses an argument. The REC may also seem to be neutral due to argument binding. The INT and STAT behave like neutral suffixes. While the INT which is truly neither adds nor removes an argument, the stative does take away an argument but behaves as if it does not since the lost argument is neither implied nor recoverable. Inflectional suffixes were also considered in this chapter and it was shown that they take the final morpheme slot in the verb and that they are mutually exclusive as only one of the suffixes can be used at a time in a given verb.

¹⁹ There is an exception, 'frozen' passive **-w-** which can be preceded by causative **-is-**. This will, however be discussed in the next chapter.

CHAPTER 3 COMBINATIONS AND SEQUENCES OF PRODUCTIVE DERIVATIONAL SUFFIXES

3.0 Introduction

In the last chapter we saw how various morphemes are organized in the verb. Although we discussed the function of productive derivational suffixes and also observed that they normally come immediately after the root or after non-productive derivational suffixes but before inflectional ones, we did not discuss how they combine or how they are sequenced when more than one is used. This chapter is devoted specifically to addressing these two issues. Combinatorial problems and morphotactic constraints in suffix ordering are given special attention. While examining the role of morphological operations in suffix ordering the chapter also shows how morphology interacts with other aspects of the grammar such as syntax and semantics in deriving acceptable surface forms. It has been noted in previous works on affix ordering in Bantu (e.g. Hyman and Mchombo 1992; Ngunga 1997) that in many languages with complex morphologies a combination of two or more affixes may be subject to morphological, syntactic and semantic restrictions. Zimbabwean Ndebele, like many other Bantu languages, is one of the languages in which the sequencing of derivational verbal suffixes such as those we saw in 2.3.2 and presented here as (1) is not free but must comply with such restrictions.

(1) Productive Derivational Suffixes.

DERIVATIONAL SUFFIXES (Exts.)	
-w- ~ -iw-	Passive (PASS/P)
-ek- ~ -akal-	Stative (STAT/S)
-el-	Applicative (APP/A)
-an-	Reciprocal (REC/R)
-is-	Causative (CAUS/C)
-isis-	Intensive (INT/I)

As seen in the preceding chapter, the addition of affixes potentially affects the valence and meaning of a verb base. When the affixes in (1) are suffixed to a verb root such as **sik-** 'cut' in (2) verbs with different syntactic and semantic properties are derived.

(2) Derivation of new verbs through suffixation.

sik-	'cut'
sik-is-	'cause to cut'
sik-el-	'cut for/at'
sik-an-	'cut each other'
sik-isis-	'cut well'
sik-ek-	'be (become) cut' or 'be possible to be cut'
sik-w-	'be cut'

A combination of two or more of the suffixes may or may not be acceptable. When acceptable the suffixes may appear in different sequences or may be restricted in terms of the order in which they occur. Why some suffixes combine freely and yet others are restricted or even fail to combine in either order is a major concern of this study. Although Hyman and Mchombo (1992) provide detailed and convincing explanations for the restrictions in Chichewa, the sequencing restrictions are not completely identical with those of Ndebele as there are areas where restrictions on Chichewa do not hold in Ndebele and vice-versa. While focusing on Ndebele, this study attempts to establish what exactly can be attributed to morphology in the sequencing constraints and also to identify constraints that are due to syntax, semantics and perhaps the nature of lexicon itself. Cases which would seem to be exceptions to the suffix ordering restrictions are also considered. Suffixes dealt with in this chapter are only those given in (1).

The rest of the chapter is organized as follows. Section 3.1 distinguishes combinations of two suffixes that are acceptable from those that are disallowed and discusses in detail the nature of restrictions imposed on unacceptable combinations. Combinations of three or more suffixes are dealt with in Section 3.2. Section 3.3 focuses on some 'frozen' suffixes, Section 3.4 on cases involving sub-minimal roots and Section 3.5 is the summary.

3.1 Possible and Disallowed Sequences of Two Suffixes

In this section we look at combinations of only two suffixes. Let us consider first possible combinations in 3.1.1 before we move on to disallowed sequences in 3.1.2.

3.1.1 Possible combinations of two suffixes.

If a combination of two given suffixes is acceptable the suffixes may occur in either order or one sequence may be acceptable but not the reversed order. In 3.1.1.1 we consider the former and in 3.1.1.2 the latter.

3.1.1.1 Suffixes occurring in both orders.

When two suffixes are combined, for example Reciprocal /-an-/ and Causative /-is-/ as in (3), different orders of the two suffixes may result in a corresponding difference in meaning¹. While there is a causativized Reciprocal in (3a.), (3b.) shows that a reciprocalized Causative is also acceptable and has a different meaning.

- (3) a. sik-an-is- ‘cause to cut each other’

VERB REC CAUS
[[[sik] an] is]
[X cause [Y_i cut e.o._i]

- b. sik-is-an- ‘cause each other to cut’ (also, ‘cause to cut each other’)

VERB CAUS REC
[[[sik] is] an]
[X_i cause [e.o._i cut Y]

Although the most salient meaning in each case appears to be compositional it is important to note that while **sik-an-is-** always means ‘cause to cut each other’ **sik-is-an-** may mean ‘cause each other to cut’ or ‘cause to cut each other’. This can be viewed as “asymmetric compositionality”.

¹ See also Guthrie (1962) and Hyman and Mchombo (1992).

In (4) we observe a similar pattern with Intensive /-isis-/ and Applicative /-el-/. While **sik-isis-el-**, the applicativized intensive in (4a.), means ‘cut well at/for (reason)’, **sik-el-isis-**, the intensivized applicative in (4b.) whose compositional meaning is ‘cut for/at well’ may also mean ‘cut well at/for (reason)’. The difference in compositional meaning can be made clearer by including ‘him’ and ‘something’ so that (4a.) becomes ‘I cut him well at/for ...’ while (4b.) becomes ‘I cut something at .../ for him well’.

(4) a. **sik-isis-el-** ‘cut well at/for (reason)’

VERB INT APP
[[[sik] isis] el]

b. **sik-el-isis-** ‘cut for/at well’ (also, ‘cut well at/for (reason)’)

VERB APP INT
[[[sik] el] isis]

Although the meaning in (3a.) and (4a.) is clearly compositional as indicated by the bracketing, cases with two possible interpretation ((3b.) and (4b.)), show that meaning does not necessarily have to be compositional. In (3b.) and (4b.) there is evidence for compositionality or compliance with “scope” when the semantic interpretation is different from the one for (3a) or (4a.). When the meaning is identical to that given in (3a.) and (4a.) we can assume that the surface forms result from the application of a rule which switches the order of the suffixes as illustrated in (5).

(5) a. **sik-is-an-** ‘cause to cut each other’

VERB REC CAUS > VERB CAUS REC
[[[sik] an] is] [[[sik] is] an]

b. **sik-el-isis-** ‘cut well at/ for (reason)’

VERB INT APP > VERB APP INT
[[[sik] isis] el] [[[sik] el] isis]

A question which arises is why we cannot get two possible interpretations in (3a.) and (4a.) In other words why is compositional CAUS-REC or APP-INT only spelt out in one way

and yet, on the other hand, REC-CAUS or INT-APP can be realized with two acceptable morphosyntactic structures? Examples in (3) and (4) seem to suggest that while compositionality or scope plays an important role in the ordering of suffixes something else must also be at play. I assume the simple interpretation that the orders in (3a.) and (4a.) are morphotactically marked although they respect compositionality. On the other hand, I consider a sequence which takes both the compositional and non-compositional meaning to be the default morphotactical order. In fact I argue that an acceptable sequence of suffixes which conflicts with the unmarked morphosyntactic order can also be realized with a sequence which complies with the unmarked order on the surface. From (3) and (4) we establish the morphosyntactic ranking of suffixes in (6a.) and (6b.) where the suffix before the sign > is ranked higher than the one which follows.

- (6) a. CAUS > REC
 b. APP > INT

Other suffixes which occur in either order are the REC and INT but the facts are slightly different from what we have just noted about examples in (3) and (4). As can be seen in (7) it is possible to have both an intensivized reciprocal and a reciprocalized intensive but the meaning comes out the same.

- (7) a. sik-an-isis- 'cut each other well' (= INT-REC)
 VERB REC INT
 [[[sik] an] isis]
 b. sik-isis-an- 'cut well, each other' (= REC-INT)
 VERB INT REC
 [[[sik] isis] an]

Perhaps to a linguist there might be a very subtle difference in terms of semantics between 'cut each other well' and 'cut well, each other' but in actual language usage the two are interpreted as one and the same meaning. In other words **-an-isis-** and **-isis-an-** are used

interchangeably. The two suffixes, REC **-an-** and INT **-isis-** can, therefore, be ranked equally so that the unmarked morphosyntactic orders in (6) can now be presented as in (8).

- (8) a. CAUS > REC, INT
 b. APP > INT, REC

In (9) we also see that a stativized intensive and an intensivized stative are both acceptable. Although the two sequences appear different in terms of compositionality or scope they are also used interchangeable. In other words **-isis-ek-** and **-ek-isis-** mean one and the same thing to the speakers of the language.

- (9) a. sik-isis-ek- 'be well cut / be possible to be well cut' (= STAT-INT)

VERB INT STAT
 [[[sik] isis] ek]

- b. sik-ek-isis- 'be cut well / be possible to be cut well' (= INT-STAT)

VERB STAT INT
 [[[sik] ek] isis]

There is clearly no obvious default order in (9) just as in (7). The possibility of an unmarked morphotactic order is overridden by semantics. Since **-an-isis-** in (7) is treated as **-isis-an-** and vice-versa there is no way of distinguishing the default order from the marked one which is strictly compositional. The same applies to **-isis-ek-** versus **-ek-isis-** in (9). This means that that the compositional order of suffixes in (7) and (9) can also be viewed as non-compositional whereby the compositional sequence appears reversed on the surface as illustrated in (10).

- (10) a. sik-isis-an- 'cut each other well'

VERB REC INT ⇒ VERB INT REC
 [[[sik] an] isis] [[[sik] isis] an]

- b. sik-an-isis- 'cut well each other'

VERB INT REC ⇒ VERB REC INT
 [[[sik] isis] an] [[[sik] an] isis]

- c. sik-ek-isis- 'be well cut / be possible to be well cut'

VERB INT STAT $\Rightarrow$ VERB STAT INT
 [[[sik] isis] ek] [[[sik] ek] isis]

- d. sik-isis-ek- 'be cut well / be possible to be cut well'

VERB STAT INT $\Rightarrow$ VERB INT STAT
 [[[sik] ek] isis] [[[sik] isis] ek]

Given that no marked or unmarked order is apparent when the intensive and stative are combined it can be assumed that the two suffixes are equally ranked. The new unmarked hierarchy is given (11) where the three suffixes INT, REC, STAT are ranked equally and below both the CAUS and APP.

- (11) a. CAUS > INT, REC, STAT
 b. APP > INT, REC, STAT

The last set of suffixes to be considered in this subsection involves REC /-an-/ and PASS /-w-/. These suffixes occur in either order only in a special construction². Normally two 'detransitivizing' suffixes such as these do not occur in succession as in (12a.). Also, the PASS normally comes last in any acceptable sequence of suffixes where it is used because besides being a detransitivizing morpheme, it suppresses an argument when suffixed to a verb as was pointed out in the previous chapter. Passive /-w-/ comes before /-an-/ only if there is a locative or semantically empty subject (usually expressed by 'there' and 'it' in English) as illustrated in (12b.).

- (12) Order possible in a specific construction

- a. REC-PASS sik-an-w-
 PASS-REC sik-w-an-
- b. Phandle kwasik-w-an-a / kwasik-an-w-a. 'Outside (there) was stabbing of each other'
 Kw-a-sik-w-an-a / Kw-a-sik-an-w-a. 'There was stabbing of each other'

² Note that for this construction a generic Class 17 concord (Locative Subject Marker) ku- is used. (/a- is the past tense morpheme.

- c. VERB PASS REC
[[[sik] w] an]
- d. VERB PASS REC $\Rightarrow$ VERB REC PASS
[[[sik] w] an] [[[sik] an] w]

In this construction the morphological spellout is a marked order, PASS-REC in (12c.). This is made clear by the fact that while **kwa-sik-w-a** ‘it was cut’ (with semantically empty ‘it’) is acceptable, ***kwa-sik-an-a** is ill-formed. As expected the default morphosyntactic sequence REC-PASS illustrated in (12d.) is also acceptable and has the same meaning as PASS-REC. Since the passive is clearly ranked below the reciprocal here it can be assumed that it is also ranked below the intensive and the stative which have the same ranking as the reciprocal. This gives us the following hierarchy.

- (13) a. CAUS > INT, REC, STAT > PASS
b. APP > INT, REC, STAT > PASS

Note that up to this point we still have not established the ranking of the CAUS and the APP with respect to each other. This should be resolved in the next sub-section.

3.1.1.2 Suffixes Combining In One Way But Not The Reversed Order.

As already alluded to, some suffixes combine in only one way but not the other. A complete range of pairs of such suffixes is given in (14).

(14) Suffixes Combining In One Way But Not The Reversed Order

- | | | | |
|----|--|--|---|
| a. | CAUS-APP
*APP-CAUS | sik-is-el-
*sik-el-is- | ‘cause to cut for/at’
‘cause for/at to cut’ |
| b. | CAUS-PASS
*PASS-CAUS | sik-is-w-
*sik-w-is | ‘be caused to cut’
‘cause to be cut’ (use CAUS-PASS) |
| c. | CAUS-STAT
*STAT-CAUS
*CAUS-STAT
STAT-CAUS | sik-is-ek-
*sik-ek-is-
*bon-is-akal-
bon-akal-is- | ‘be possible to be caused to cut’
‘make possible to (be) cut’
‘be possible to be caused to see’
‘make visible; make possible to be seen’ |

d.	APP-STAT *STAT-APP *APP-STAT STAT-APP	sik-el-ek- *sik-ek-el- bon-el-ekal- bon-akal-el-	'be possible to be cut for' 'be possible to be cut for' 'be possible to be cut for' 'be be seen at/(for)'
e.	APP-REC *REC-APP	sik-el-an- *sik-an-el-	'cut for each other' 'cut each other for/at'
f.	APP-PASS PASS-APP	sik-el-w- *sik-w-el-	'be cut for/at' 'be cut for/at'
g.	INT-PASS *PASS-INT	sik-isis-w- *sik-w-isis-	'be cut well' 'be cut well' (use INT-PASS)

In (14a.) we see that an applicativized causative is acceptable but not a causativized applicative. Independent of scope CAUS /-is-/ must be spelt out before APP /-el-/. This suggests that the default morphosyntactic sequence is in fact **-is-el-** shown in (15a.) and the incorrect spell out of causativized applicative as **-el-is-** is blocked as illustrated in (15b.).

(15) a. [for W [X cause [Y cut Z]]]

VERB CAUS APP
[[[sik] is] el]

b. [X cause [for W [Y cut Z]]]

VERB APP CAUS
*[[[sik] el] is]

It is now becomes possible to bring together (13a.) and (13b.) so that our new unmarked order appears as in (16).

(16) CAUS > APP > INT, REC, STAT > PASS

(14b.) provides similar facts to those about (14a.) but involves the causative and passive suffixes. As illustrated in (17), CAUS /-is-/ must be spelled out before PASS /-w-/ independent of scope.

(17) a. CAUS-PASS sik-is-w- 'be caused to cut'

[passive [X cause [Y cut Z]]]

VERB CAUS PASS
 [[[sik] is] w]

- b. *PASS-CAUS *sik-w-is ‘cause to be cut’ (use CAUS-PASS)

[X cause [passive [Y cut Z]]]

VERB PASS CAUS
 * [[[sik] w] is]

While a passivized causative ((17a.)) has the compositional sequence **-is-w-**, a causativized passive ((17b.)) is never realized with the compositional sequence **-w-is-** but always surfaces as **-is-w-**. The default order is therefore **-is-w-** and this is consistent with the unmarked order we have just proposed in (16).

In (14c.) we see CAUS /-is-/ again coming before another suffix independent of scope. In this instance stativized causative spells out directly as shown in (18a.) and (18c.) but the incorrect spellout of a causativized stative is blocked as seen in (18b.) and (18d.). Here again the default order **-is-ek-** does not conflict with the unmarked morphosyntactic order in (16) but further supports the argument for such a hierarchy.

- (18) a. CAUS-STAT sik-is-ek- ‘be possible to be caused to cut’

[stative [X cause [Y cut Z]]]

VERB CAUS stative
 [[[sik] is] ek]

- b. *STAT-CAUS *sik-ek-is- ‘make possible to (be) cut’

[X cause [stative [Y cut Z]]]

VERB STAT CAUS
 * [[[sik] ek] is]

- c. CAUS-STAT bon-is-ek- ‘be possible to be shown or caused to see’

[stative [X cause [Y cut Z]]]

VERB CAUS stative
 [[[bon] is] ek]

- d. *STAT-CAUS *bon-ek-is- ‘make visible / cause to be seen / make possible to be seen’

[X cause [stative [Y cut Z]]]

VERB STAT CAUS
*[[[bon] ek] is]

- e. *CAUS-STAT bon-is-akal- 'be possible to be shown or caused to see'

VERB CAUS STAT
*[[[bon] is] akal]

- f. STAT-CAUS bon -akal-is- 'make visible / cause to be seen'

VERB STAT CAUS
[[[bon] akal] is]

However, if the allomorph **-akal-** replaced **-ek-**, CAUS-STAT spellout is unacceptable but STAT-CAUS is well formed as seen in (18e.) and (18f.), respectively. Note that the meaning expressed by the order **-akal-is-** in (18f.) can also be taken by default order **-is-ek-** in (18c.).

From the facts in (17) and (18) it is clear that when both a transitivity suffix and a detransitivizing suffix (/is-/ and /w-/ or /ek-/ , respectively) is used the conflict which arises is resolved morphotactically by spelling out the transitivity suffix first regardless of scope unless a variant form of the suffix is used.

Another set of suffixes involving a transitivity suffix and a detransitivizing suffix which combine in one way but not the reversed order is that in (14d.). While a stativized applicative surfaces with the compositional sequence **-el-ek-** ((19a.) and (19c.)), an applicativized stative cannot be spelt out as **-ek-el-** ((19b.) and (19d.)), a sequence which violates the default order in (16). The unmarked sequence in which transitivity /el-/ occurs before detransitivizing /ek-/ is used instead of **-ek-el-**.

- (19) a. APP-STAT sik-el-ek- 'be possible to be cut for/at'

VERB APP STAT
[[[sik] el] ek]

- b. *STAT-APP *sik-ek-el- 'be possible to be cut for/at'

VERB STAT APP
*[[[sik] ek] el]

c. APP-STAT bon-el-ek- ‘be (possible to be) seen for/at’

VERB APP STAT
[[[bon] el] ek]

d. *STAT-APP *bon-ek-el- ‘be (possible to be) seen for/at’

VERB STAT APP
*[[[bon] ek] el]

e. *APP-STAT bon-el-akal- ‘be seen at/(for)’

VERB APP STAT
*[[[bon] el] akal]

f. STAT-APP bon -akal-el- ‘be seen at/(for)’

VERB STAT APP
[[[bon] akal] el]

However, when the stative allomorph /-akal-/ is used in place of /-ek-/ we get the opposite again as in (18). As can be seen, a stativized applicative is disallowed in (19e.) while an applicativized stative in (19f.) is acceptable. While the order APP-STAT is consistent with what we expect from the default order in (16), STAT-APP is only possible when the more restricted stative morph /-akal-/ is used. In fact the **-akal-** is always attached to the root and no suffix can precede it. Note the difference in meaning when the two stative suffixes are used. When /-akal-/ is used, the argument introduced by APP /-el-/ is usually ‘Locative’ but ‘Reason’ may also make sense. A ‘Benefactive’ argument sounds odd with **-akal-el-** but is clearly acceptable when the order is **-el-ek-**. The meaning of **-akal-el-** can also be taken by the unmarked order **-el-ek-**.

(14e.) shows that a reciprocalized applicative is well-formed but not applicativized reciprocal. As seen in (20a.) a reciprocalized applicative correctly spells out as **-el-an-** but the compositional sequence **-an-el-** in (20b.) is ill-formed for an applicativized reciprocal.

(20) a. APP-REC sik-el-an- ‘cut for each other’

VERB APP REC
[[[sik] el] an]

- b. REC-APP *sik-an-el- ‘cut each other for/at’

VERB REC APP
*[[[sik] an] el]

The applicativized reciprocal can surface as **-el-an-**, in fact the unmarked order consistent with (16).

(14f.) also shows that a passivized applicative is acceptable but not an applicativized passive. As can be seen in (21a.) a passivized applicative spells out directly as **-el-w-** but the incorrect **-w-el-** spell out of an applicativized passive is blocked.

- (21) a. APP-PASS sik-el-w- ‘be cut for/at’

VERB APP PASS
[[[sik] el] w]

- b. PASS-APP *sik-w-el- ‘be cut for/at’

VERB PASS APP
*[[[sik] w] el]

For the applicativized passive the default order in which transitivity **/-el-/** comes before detransitivizing **/-w-/** is used. Note that the default order here is also the one which is consistent with the template in (16).

The last set of affixes to be considered in this sub-section involves ‘neutral’ intensive **/-isis-/** and detransitivizing passive **/-w-/**. (14g.) shows that a passivized intensive is acceptable but not an intensivized passive. As (22a.) illustrates the spell out of a passivized intensive is compositional but for the intensivized passive ((22b.)) the compositional order cannot surface. The compositional sequence **-w-isis-** can only be spelled out as default **-isis-w-** where the neutral suffix comes before the detransitivizing one.

- (22) a. INT-PASS sik-isis-w- ‘be well cut’

VERB INT PASS
[[[sik] isis] w]

- b. *PASS-INT *sik-w-isis- ‘be cut well’ (use INT-PASS)

VERB PASS INT
*[[[sik] w] isis]

Considering what we observed above we see that in the unmarked order detransitivizing **-w-** generally comes after both transitivity and neutral suffixes. In fact (14) also reflects this.

3.1.2 Disallowed combinations of suffixes.

We have seen that some sequences may be allowed while their reversed order is disallowed at least on the surface. Disallowed combinations may also involve different suffixes which fail to combine in either order or identical suffixes used in succession. Let us consider each in turn.

3.1.2.1 Suffixes failing to combine in either order

Several different suffixes fail to combine in either order and these are given in (23).

(23) Suffixes that fail to combine in either order

- | | | | |
|----|------------|-----------------------|---------------------------------|
| a. | *PASS-STAT | *sik-w-ek- | ‘be possible to have been cut’ |
| | *STAT-PASS | *sik-ek-(i)w- | ‘be possible to have been cut’ |
| | | *bon-ek-(i)w- | ‘be possible to have been seen’ |
| | | (kwa)-bon-akal-(i)w- | ‘(it) was seen’ |
| | | *(kwa)-bon-(i)w-akal- | ‘(it) was seen’ |
| b. | *REC-STAT | *sik-an-ek- | ‘be possible to cut each other’ |
| | *STAT-REC | *sik-ek-an- | ‘be possible to cut each other’ |
| c. | *CAUS-INT | *sik-is-isis- | ‘cause to cut well’ |
| | *INT-CAUS | *sik-isis-is | ‘cause well to cut’ |

The passive and stative **/-ek-/** in (23a.) fail to combine because the verb sik- can only be detransitivized once. Recall that in the preceding chapter we noted that both PASSIVE **/-w-/** and the STATIVE **/-ek-/** are detransitivizing morphemes although on the surface **/-ek-/** appears to be neutral. Note, however, that the stative allomorph **-akal-** which must always be attached to the root can be followed by passive **-(i)w-** in the special construction that has a locative or ‘semantically empty’ subject. In (23b.) the reciprocal and stative cannot combine

for a similar reason. It must be noted that the reciprocal behaves like a detransitivizing morpheme due to the fact that it leads to argument binding³. In (23c.) it can be assumed that 'CAUS plus INT' and 'INT plus CAUS' are both ill-formed due to the **Repeated Morph Constraint** (RMC) which prohibits two morphosyntactic features from being spelled out by the same morph⁴. The intensive morph [-isis-] (which appears to be a result of reduplicating the causative morph [-is-]) cannot be adjacent to an almost identical Causative morph [-is-] regardless of the order in which they come. In fact using **-isis-** and **-is-** in either order sound as if only the intensive meaning is being emphasized.

3.1.2.2 Failure of Identical Suffixes to Combine

Having assumed that the RMC disallows the CAUS-INT and INT-CAUS combinations it is important to see what happens with sequences of completely identical suffixes. Sequences such as PASS-PASS **-w-w-** and STAT-STAT **-ek-ek-** in (24a.) and (24b.) are obviously disallowed since we have already seen that a verb cannot be detransitivized twice except in the special case of **-w-an-** where the subject subcategorized for by the verb in which the two suffixes occur is 'semantically empty'.

(24) Combination of Identical Suffixes

- a. *PASS-PASS sik-w-w-
- b. *STAT-STAT sik-ek-ek-
- c. *INT-INT sik-isis-isis-
- d. *REC-REC sik-an-an-
- e. *CAUS-CAUS sik-is-is- 'cause to cause to cut'

Other sequences such as INT-INT **-isis-isis-** and REC-REC **-an-an-** in (24c.) and (24d), respectively, are also disallowed as they do not make sense in terms of semantics. Since the

³ In fact the reciprocal has sometimes been treated as a detransitivizing morpheme. (See for example Dembetembe 1987).

⁴ See Menn and McWinney 1984 and also Hyman and Mchombo 1992.

intensive means ‘well’, ‘really’ or ‘very much’ this highest degree associated with /-isis-/ cannot be expressed twice. It would also be meaningless to express twice reciprocity brought by /-an-/ ‘each other / one another’. Moreover, it has already been pointed out above that /-an-/ may also behave like a detransitivizing morpheme, making it impossible for two of them to combine. Although CAUS-CAUS **-is-is-** in (24e.) would have the logical meaning ‘cause to cause’ it is also unacceptable. This might be due to the fact that it would be difficult for the brain to process such meaning. In all these disallowed cases we can assume the simplest view that the RMC is responsible in spite of there being other possible explanations.

The best test appears to be APP-APP **-el-el-** since in terms of compositionality and scope it would otherwise be possible to have two APPLICATIVE suffixes. Consider, for example, the fact that the APPLICATIVE can introduce a Benefactive or Locative argument to a verb as in (25b.) and (25c.), respectively. One would expect two APP suffixes if both arguments are to be spelt out on the same verb. However, this is not the case as the spelling out of two APP suffixes on the same verb is ill-formed ((25d.)).

(25) RMC rules out the sequence **-el-el-** (APP-APP).

- (a) Umama u-sik-a isinkwa. < transitive verb >
‘Mother is cutting some bread’
- (b) Umama u-sik-el-a umntwana isinkwa. < trans. verb + NP object (Benefactive) >
‘Mother is cutting the child some bread’
- (c) Umama u-sik-el-a isinkwa etafuleni. < transitive verb + Locative object >
‘Mother is cutting some bread on the table’
- (d) *Umama u-sik-el-el-a umntwana isinkwa etafuleni. < trans. verb + NP Obj. +
Loc. obj. >
‘Mother is cutting the child some bread on the table’
- (e) Umama u-sik-el-a umntwana isinkwa (etafuleni).
< transitive verb + NP Obj. + NP. obj. >
‘Mother is cutting the child some bread (on the table)’
- (f) Umama u-sik-a isinkwa (etafuleni). < transitive verb >
‘Mother is cutting some bread (on the table)’

As seen in (25e.) only one APPLICATIVE suffix is required and the locative occurs as an optional adjunct. Note that even when there is no applicative suffix as in (25f.) a locative can still be brought in as an optional adjunct. However, in (25c.) the locative is not optional as it is the argument introduced by the applicative.

The fact that two applicative suffixes cannot be used to introduce two new arguments to the verb appears to be a problem for Baker's (1985a.,b.) Mirror Principle. According to Baker, affix order in morphologically complex forms is not randomly related to the sequence of operations needed to get from the syntax of the base form to that of the surface form, but the order of affixes 'mirrors' that of the operations. The order of morphological operations reflected in affixation is always identical to that of syntactic operations. However, this is not what we see with the Ndebele applicative /-el-/ since only one affix is required even when there are two syntactic operations.

3.1.3 Summary

In this section we have discussed both permissible and disallowed sequences of two suffixes. A summary of the acceptable and unacceptable suffix combinations discussed above is provided in (26) in the form of a table. The first suffix in the sequence is given on the vertical axis and the second on the horizontal axis. Unacceptable combinations are starred and, in addition, those ruled out by the RMC are also marked *RMC.

(26) Acceptable and Unacceptable Suffix Combinations.

		2 nd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
S U F F I X	C	*RMC	✓	✓	✓	*RMC	✓
	A	*	*RMC	✓	✓	✓	✓
	R	✓	*	*RMC	✓	✓	*
	P	*	*	(✓)	*RMC	*	*
	I	*RMC	✓	✓	✓	*RMC	✓
	S	(✓)	(✓)	*	(✓)	✓	*RMC

The default morphosyntactic order established earlier in (16) is repeated here as (27) but now incorporating STAT /-akal-/. We ignore PASS -iw- for now as more still needs to be said about this suffix.. In the default or unmarked order the STAT suffix /-akal-/ is ranked highest and must normally be closest to the root and PASS /-w-/ which is ranked lowest must come after all other derivational suffixes.

- (27) -akal- > -is-, -iw > -el- > -an-, -isis-, -ek- > -w-
 STAT CAUS, PASS > APP > REC, INT, STAT > PASS

It has been argued that an acceptable sequence of suffixes which conflicts with the unmarked order in (27) can also be realized with a sequence which complies with the unmarked order on the surface. A sequence of suffixes consistent with the default order in (27) usually takes both a compositional and non-compositional meaning. In some cases a sequence which conflicts with (27) is disallowed on the surface while the one consistent with it is acceptable. We also saw that there are some suffixes which fail to combine in either order due to different morphotactical constraints such as the RMC and the fact that a verb cannot be detransitivized twice.

3.2 Possible combinations of three or more suffixes

In most cases the ordering of three or more suffixes is predictable from the facts given above. (27) can also be used as a guideline in predicting which sequences will be acceptable and which ones are likely to be disallowed. However, there are some cases which deserve comment and these are discussed in this section.

3.2.1 Causative + Two more suffixes

Let us consider first cases where the causative is followed by two other suffixes. These are presented in (28) where the vertical axis of the table shows the second suffix in the sequence and the horizontal axis provides the third. Sequences beginning with CAUS-

CAUS **-is-is-** and CAUS-INT **-is-isis-** are not included in the table as they all violate the RMC. Other cases ruled out by the RMC before even considering other constraints are included and are marked ‘*RMC’. As already pointed out cases which involve two permissible or disallowed adjacent suffixes discussed in the previous section need not be commented on here as the same facts still hold.

(28) Causative + Two more suffixes.

C +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
2 nd S U F F.	A	*	*RMC	√	√	√	√
	R	?	√	*RMC	√	√	*
	P	*	*	(√)	*RMC	*	*
	S	*	*	*	*	√	*RMC

The only suffix order that deserves comment in (28) is CAUS-REC-CAUS **-is-an-is-** which has a question mark in the table. In (29) **-is-an-is-** is suffixed to the verb root **sik-** ‘cut’.

(29) ?CRC sik-is-an-is- ‘cause to cut each other’ [expressed by RC (and, of course, CR)]
 *‘cause to (cause to cut each other)’
 *‘cause that X cause to cut each other’

Suffixing **-is-an-is-** to **sik-** sounds odd because the resultant meaning ‘cause to cut each other’ is normally expressed by the shorter REC-CAUS **-an-is-** and, of course, the default sequence CAUS-REC **-is-an-**. The verb **sik-is-an-is-** cannot be interpreted as ‘cause to (cause to cut each other)’ or ‘cause that X cause to cut each other’.

3.2.2 Applicative + Two more suffixes

Next, we look at the applicative also followed by two other suffixes. The table in (30) provides all the possibilities except cases which begin with the sequence APP-APP **-el-el-** as all of them obviously violate the RMC. Other cases which violate the RMC (and possibly

other constraints) are shown in the table and need no further comment. Here again cases which involve two permissible or disallowed adjacent suffixes discussed in the previous section are not commented on as the facts are already known. Note that ‘S’ here stands only for /-ek-/ as a sequence with /-akal-/ will always be ruled out if /-akal-/ is not immediately preceded by the root.

(30) Applicative + Two more suffixes.

A +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S (-ek-)
S U F F. F.	2 nd C	*RMC	*	*	*	*RMC	*
	R	?	✓	*RMC	✓	✓	*
	P	*	*	✓	*RMC	*	*
	I	*RMC	?	✓	✓	*RMC	✓
	S	*	*	*	*	✓	*RMC

Only two cases with question marks need to be considered. These are APP-INT-APP **-el-isis-el-** and APP-REC-CAUS **-el-an-is-** which are also provided as suffixes to the verb **sik-** ‘cut’ in (31).

- (31) a. ?AIA sik-el-isis-el- ‘cut well at/ for(Reason)’ [expressed by AI and IA]
b. ?ARC sik-el-an-is- ‘cause to cut for each other’ [expressed by CAR]

The sequence **-el-isis-el-** in (31a.) sounds odd because there are alternative shorter forms APP-INT and INT-APP which are preferred. When using the shorter sequences the second argument normally associated with the applicative (Locative or Reason) is brought in as an adjunct. In (31b.) **-el-an-is-** sounds odd because the applicative comes before the causative thereby violating the default morphosyntactic order. The fact that there is the reciprocal in between does not solve the problem as the constraint against **-el-is-** still applies .

3.2.3 Reciprocal + Two more suffixes

The reciprocal followed by two suffixes has more interesting facts. The table in (32) provides acceptable and disallowed combinations where the reciprocal is the first prefix in the sequence of three. It excludes sequences commencing in REC-REC **-an-an-** as they all violate the RMC but includes other sequence which violate the same constraint. Also included are sequence which are obviously acceptable or disallowed from the facts about two adjacent suffixes given in the previous section. All these need not be discussed.

(32) Reciprocal + Two more suffixes.

R +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S (-ek-)
2 nd S U F F.	C	*RMC	✓	✓	✓	*RMC	✓
	A	*	*RMC	✓	?	?	?
	P	*	*	*	*RMC	*	*
	I	*RMC	✓	✓	✓	*RMC	✓
	S	*	*	*	*	*	*RMC

The table also includes five combinations whose facts are not obvious from what was discussed above and these are the ones which require some explanation. The first to be considered is REC-APP-REC **-an-el-an-** which is presented again in (33) but now suffixed to the verb **sik-**.

(33) RAR sik-an-el-an- 'cut each other for/at'

Here we see that REC-APP-REC **-an-el-an-** is acceptable and has the compositional meaning we expected to go along with disallowed REC-APP **-an-el-** in the previous section. It appears the REC morpheme is represented by two morphs with APP [-el-] in between as illustrated in (34). The combination **-an-el-an-** also shows that the RMC does not apply to the reciprocal if the two morphs are separated by the applicative.

- (34) sik-an-el-an- 'cut each other for/at'

VERB REC APP REC
 [[[[sik] an] el] an] [morphs]

Perhaps the doubling of **-an-** is a way of repairing the marked structure **-an-el-** (REC-APP) which does not comply with the unmarked order in (27). For a similar problem in Chichewa, Hyman and Mchombo (1992: 7-8) propose that “the reciprocal feature percolates outwards as a feature of the whole base” so that it is this feature (rather than the internal morph [-an-]) which conflicts with the outside applicative. They also propose that the applicative and reciprocal spellout rules apply cyclically and provide a detailed account of this⁵. A problem with this view, however, is that the sequence **-an-is-** (REC-CAUS), for instance, which potentially has the same problem is acceptable without any doubling of the morph [-an-]. As Hyman and Mchombo rightly point out, the problem is restricted to the applicative. Why /-is-/ should be transparent to this doubling problem if we assume that the reciprocal feature percolates remains elusive. We can assume that there is something special about /-el-/ or /-an-/.

It is interesting to note that if another suffix, particularly CAUS /-is-/ or INT /-isis-/ (which is permitted before -el-), separates /-an-/ and /-el-/ then no doubling of [-an-] occurs. This we see in (35a.). If [-an-] is doubled with **-is-el-** or **-isis-el-** in between the second [-an-] is interpreted as different from the first. In other words the second [-an-] reciprocalizes the verb for the second time as seen in (35b.). However, if [-an-] immediately precedes [-el-] as in (35c.) doubling of the reciprocal morph is necessary.

- (35) a. sik-an-is-el- 'cause to cut each other for'
 sik-an-isis-el- 'cut each other well for'
- b. sik-an-is-el-an- 'cause to cut each other for each other'
 sik-an-isis-el-an- 'cut each other well for each other'
- c. sik-is-an-el-an- 'cause each other to cut for/at'
 sik-isis-an-el-an- 'cut well each other for/at'

Note that the meaning of **sik-an-is-el-** and **sik-an-isis-el-** in (35a.) can also be taken by **sik-is-el-an-** and **sik-el-an-isis-**, respectively, which observes the default order in (27). Similarly, the meaning of **sik-is-an-el-an-** and **sik-isis-an-el-an-** in (35c.) can also be taken by unmarked **sik-is-el-an-** and **sik-el-an-isis-**, respectively. However, there is no other way of conveying the meaning of **sik-an-is-el-an-** and **sik-an-isis-el-an-** in (35b.) because **sik-is-el-an-(an)-** and **sik-el-an-(an)-isis-** which comply with the order in (27) are ill-formed. In this case the problem is the **-an-an-** sequence which can be assumed to be ruled out by the RMC.

Going back to the table in (32) we see that there are three combinations with question marks. These are REC-APP-INT **-an-el-isis-**, REC-APP-PASS **-an-el-w-** and REC-APP-STAT **-an-el-ek-** which we now suffix to the verb root **sik-** in (36).

- (36) a. ?RAI **sik-an-el-isis-** ‘cut each other well for/at’ [missing -an-]
 b. ?RAP **sik-an-el-w-** ‘be cut for each other at/for’ [sp. constr.]
 [missing -an-]
 c. ?RAS **sik-an-el-ek-** ‘be possible to cut each other for/at’ ?
 [missing -an-]

The three sequences **-an-el-isis-**, **-an-el-w-** and **-an-el-ek-** sound odd due to the fact that there is no doubling of [-an-] and yet the reciprocal immediately precedes APP /-el-/ in each case. The verbs **sik-an-el-isis-** ((36a.)) and **sik-an-el-w-** ((36b.)) sound better when there is doubling of [-an-] so that they become **sik-an-el-an-isis-** / **sik-an-el-isis-an-** and **sik-an-el-an-w-** / **sik-an-el-w-an-**, respectively. Doubling of [-an-] would not entirely solve the problem in (36c.) since the combination **-an-ek-** or **-ek-an-** would still be ill-formed.

The last combination deserving comment in this sub-section is REC-PASS-REC **-an-w-an-** which is here suffixed to **sik-**.

- (37) *RPR **sik-an-w-an-**

⁵ Also provided is an alternative ‘prosodic circumscription’ account which I do not present here.

In (37) the doubling of REC -an- makes no sense in terms of scope and is also unnecessary as both **-an-w-** and **-w-an-** are acceptable.

3.2.4 Intensive + Two more suffixes

The intensive can also be followed by two more suffixes and most of the possibilities are given in (38). Combinations that have been left out in the table are those beginning with the sequences INT-INT **-isis-isis-** and INT-CAUS **-isis-is-** which obviously violate the RMC. Other sequences which violate the constraint are included and are marked as in other tables above. Since the facts are already known there is no need to comment on all cases ruled out by the RMC. It is also not necessary again here to comment on permissible and disallowed sequences whose facts are obvious from the discussion on combinations of two suffixes in the previous section.

(38) Intensive + Two more suffixes.

I +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
2 nd S U F F.	A	*	*RMC	✓	✓	*	✓
	R	?	✓	*RMC	✓	*	*
	P	*	*	(✓)	*RMC	*	*
	S	*	*	*	*	*	*RMC

Three combinations INT-REC-CAUS **isis-an-is-**, INT-REC-INT **isis-an-isis** and INT-STAT-INT **isis-ek-isis**, however, need to be accounted for. (39) shows what happens when the first, **isis-an-is**, is suffixed to our example **sik-**.

(39) ?IRC **sik-isis-an-is-** 'cause to cut well each other'

As can be seen, **sik-isis-an-is-** could mean 'cause to cut well each other' but sounds odd probably because CAUS /-is-/ must be closest to the root in the unmarked order. In fact, although **sik-isis-an-is-** sounds morphotactically possible it is better expressed by **sik-is-**

an-isis- which complies with the default order in (27) and has the compositional meaning ‘cause to cut each other well’. Thus, while ‘cause to cut each other well’ is spelt out directly as in (40)a., ‘cause to cut well each other’ appears to involve a change in the order of suffixes as illustrated in (40)b.

- (40) a. sik-isis-an-is- ‘cause to cut each other well’

VERB CAUS REC INT
 [[[sik] is] an] isis]

- b. sik-isis-an-is- ‘cause to cut well each other’

VERB INT REC CAUS ⇒ VERB CAUS REC INT
 [[[sik] isis] an] is] [[[sik] is] an] isis]

The other two orders **-isis-an-isis-** and **isis-ek-isis-** suffixed to **sik-** in (41) could perhaps be predicted from facts already known about the order **-isis-isis-**. What is important here is to show that even if another suffix intervenes, a combination with two intensive suffixes is still ill-formed.

- (41) Combination with two intensive suffixes.

- a. *IRI sik-isis-an-isis- ‘really cut each other well’
 [intensive always occurs once]
 b. *ISI sik-isis-ek-isis- ‘be really possible to cut well’
 [intensive always occurs once]

Even though the four sequences **-isis-an-**, **-an-isis-**, **-isis-ek-** and **-ek-isis-** are all acceptable, **-isis-an-isis-** in (41a.) and **-isis-ek-isis-** in (41b.) are disallowed for semantic reasons noted above, in particular, the fact that INT /-isis-/ cannot be used more than once in a single verb as it expresses the highest degree of what the verb implies. In fact, although some attempt has been made to provide glosses in (41), using the intensive more than once does not seem to make any sense in terms of scope.

3.2.5 Stative + Two more suffixes

In (42a.) where combinations beginning with STAT-STAT **-ek-ek-** which all violate the RMC have been left out, STAT /-ek-/ cannot be followed by two suffixes.

(42) a. Stative /-ek-/ + Two more suffixes

S /-ek/ +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
2 nd S U F F.	C	*RMC	*	*	*	*RMC	*
	A	*	*RMC	*	*	*	*
	R	*	*	*RMC	*	*	*
	P	*	*	*	*RMC	*	*
	I	*RMC	*	*	*	*RMC	?

b. Stative /-akal-/ + Two more suffixes

S /-akal-/ +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S (-ek-)
2 nd S U F F.	C	*RMC	✓	✓	✓	*RMC	✓
	A	*	*RMC	?	✓	✓	✓
	R	*	*	*RMC	*	*	*
	P	*	*	*	*RMC	*	*
	I	*RMC	✓	✓	✓	*RMC	✓

Since INT /-isis-/ can come after STAT /-ek-/ one would expect adding to **-ek-isis-** a suffix which is normally permitted immediately after /-isis-/ to result in a well formed combination. However, as seen in (43) where the possible affixes are suffixed to **sik-ek-isis-** 'be (possible to be) cut well', the resultant verbs are unacceptable.

- (43) a. *SIP sik-ek-isis-w- *SP
 b. *SIR sik-ek-isis-an- *SR
 c. ?SIS sik-ek-isis-ek- [same as sik-ek-isis-]

The problem is that the verb is being detransitivized twice in each case without being transitivized since /-isis-/ is neutral. Intervening /-isis-/ does not solve the **-ek-w-** problem in (43a.), the **-ek-an-** restriction in (43b.) and the ***-ek-ek-** constraint (in fact, the RMC) in

(43c.). Although (43c.) sounds as if it could be possible, it appears the meaning would be that of the preferred shorter form **sik-ek-isis-**.

Unlike in (42a), there are many possible combinations in (42b.) where sequences beginning with **-akal-akal-** have been left out as they violate the RMC. Most of the disallowed sequences are those which violate the RMC or are cases where **-akal-**, an intransitive suffix, is followed locally by another intransitive suffix, REC **-an-** or PASS **-w-** or even STAT **-ek-**, or are instances where any two of these intransitive suffixes are adjacent. The sequence **-akal- +transitive suffix + intransitive suffix** may be acceptable, for example, **-akal-is-w-** as the verb is transitivized before being detransitivized. Interestingly, **-akal-isis-ek-** is also well formed although INT **-isis-** is neutral. The sequence **-akal-el-is-** is ruled out by the fact that APP-CAUS **-el-is-** is ill-formed. Note that **-akal-** is not included in the table's third suffix position as it must always be attached to the root. Any form that has **-akal-** in that position would be unacceptable.

3.2.6 Passive + Two more suffixes

Adding two more suffixes after PASS **/-w-/** is dispreferred. A whole range of possible combination which excludes only sequences beginning in PASS-PASS **-w-w-** which are ill-formed due to the RMC is given in the table in (44). However other sequences which are also ruled out by the RMC are included as in the tables already seen above.

(44) Passive + Two more suffixes

P +		3 rd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
2 nd S U F F.	C	*RMC	*	*	*	*RMC	*
	A	*	*RMC	*	*	*	*
	R	*	(?)	*RMC	*	(√)	*
	I	*RMC	*	*	*	*RMC	*
	S	*	*	*	*	*	*RMC

For most sequences beginning with PASS /-w-/ it can be easily predicted whether they are permissible or disallowed from what we already know about combinations of two adjacent suffixes. As was shown in the previous section, /-w-/ can only occur before REC /-an-/ and only in the special construction already discussed. Combinations that are of interest here then are only those beginning with PASS-REC **-w-an-** and which involve suffixes allowed after REC /-an-/. In (45) we see what happens when the sequences in question are suffixed to our example **sik-**.

- (45) a. PRI kwa-sik-w-an-isis- ‘the was cutting of each other well’
 b. ?PRA kwa-sik-w-an-el- ‘there was cutting of each other at/for (reason)’
 [missing /-an-/]
 c. *PRC kwa-sik-w-an-is- ‘there was making to cut each other’
 d. *PRP kwa-sik-w-an-w-

The PASS-REC-INT **-w-an-isis-** in (45a.) is acceptable because both PASS-REC **-w-an-** and REC-INT **-an-isis-** are well-formed. Although **-w-isis-** is disallowed the fact that there is REC /-an-/ in-between makes it acceptable. Note that the unmarked order **-an-isis-w-** can also be used with the same meaning as **-w-an-isis-**. The combination PASS-REC-APP **-w-an-el-** in (45b.) sounds odd because of the sequence **-an-el-** which requires the doubling of /-an-/. Thus, otherwise **kwa-sik-w-an-el-an-** ‘there was cutting of each other at/for (reason)’ is acceptable. In this case as well the default sequence **-el-an-w-** can bring the same meaning. While both PASS-REC **-w-an-** and REC-CAUS **-an-is-** are acceptable, (45c.) shows that the sequence PASS-REC-CAUS **-w-an-is-** is disallowed. This suggests that the order PASS-CAUS **-w-is-** is ill-formed whether or not there is another suffix in-between. The meaning is best expressed by the unmarked order **-is-an-w-**. In (45d.) we see that PASS-REC-PASS **-w-an-w-** is ill-formed in spite of the fact the PASS-REC **-w-an-** and REC-PASS **-an-w-** are compatible. This appears to be due to the fact that **-w-w-** is disallowed by the RMC. The fact that there is another suffix in between does not solve the problem. Also, it appears the verb is being detransitivized more than once.

While the use of more than three suffixes is not very common and often creates odd verbs it is possible as examples in (46) show. Here I use the longest possible sequence following generalizations made above and without repeating any of the suffixes.

- The suffix order in (46a.) is consistent with the unmarked sequence in (27) but not the one in (46b.) The same generalizations made earlier about the range of semantic interpretations open to a marked versus an unmarked order apply to (46). As can be seen, the order in (46a.) which can be compositional or non-compositional complies with the unmarked order in (27) and has a wider range of semantic interpretations than that in (46b.) which observes ‘scope’ while violating the default order in (27).

(47) a. *RARC sik-an-el-an-is- 'cause to cut each other at/for (reason)'
(use CRAR or unmarked CAR)

b. *RARA sik-an-el-an-el- 'cut each other for...at'

c. RARI sik-an-el-an-isis- 'cut each other at/for (reason).... well'

d. *RARS sik-an-el-an-ek- 'be possible to be cut for each other'

e. RARP (kwa-)sik-an-el-an-w- '(there was) cutting of each other for/at'

The sequence **-an-el-an-is-** in (47a.) is ill-formed because CAUS /-is-/ is supposed to come before APP /-el-/. As we saw before, **-el-is-** is disallowed even if there is another suffix separating /-el-/ and /-is-/. The compositional meaning ‘cause to cut each other at/for (reason)’ which could result from **-an-el-an-is-** can in fact be expressed non-compositionally by CAUS-REC-APP-REC **-is-an-el-an-** or even by the unmarked shorter sequence CAUS-APP-REC **-is-el-an-**. In (47b.) the problem is that two applicative suffixes have been used and yet only one is normally required. In other words the meaning ‘cut each other for... at’ can be expressed by **sik-an-el-an-** even though another /-el-/ appears to be necessary in terms of scope. The unmarked order **-el-an-** can also replace **-an-el-an-** without any change in meaning. Observe also that even if the second /-el-/ were allowed the sequence would still be ill-formed as final **-an-el-** would also require the doubling of /-an-/. The sequence **an-el-an-isis-** in (47c.) is well-formed because INT /-isis-/ can follow both REC /-an-/ and APP /-el-/. Note here too that the unmarked order **-el-an-isis-** can also express the same meaning as **an-el-an-isis-** even if it is inconsistent with scope. Use of the disallowed sequence **-an-ek-** makes **an-el-an-ek** in (47d.) unacceptable. The order **-an-el-an-w-** in (47e.) is acceptable because it is consistent with what we have already seen above, specifically, that PASS /-w-/ can come after both REC /-an-/ and APP /-el-/. As expected the default order **-el-an-w-** can be used in place of **-an-el-an-w-** and with the same meaning. Observe also that the sequence **-an-el-an-** can be broken up by PASS /-w-/ as in (48a).

(48)a. RAPR (kwa-)sik-an-el-w-an- ‘(there was) cutting of each other for/at’

b. RCAPR (kwa-)sik-an-is-el-w-an- ‘(there was) cutting of each other for/at’

In spite of having an **-an-el-** sequence the order **-an-el-w-an-** is acceptable because there is still the doubling of /-an-/ even if the second one is at a distance. The doubling at a distance is also acceptable when there is also CAUS **-is-** in addition to **-el-w-** between the two reciprocal morphs as (48b.) illustrates.

It is also possible to have PASS /-w-/ as the first suffix in the sequence when combined with **-an-el-an-** as in (49).

- (49) PRAR (kwa-)sik-w-an-el-an- ‘(there was) cutting of each other for/at’

Here PASS /-w-/ is allowed before APP /-el-/ because there is REC /-an-/ which separates the two suffixes.

Other example where PASS /-w-/ occurs as the first suffix in the sequence are given in (50).

- (50)a. ?PRAI (kwa-)sik-w-an-el-isis- ‘(there was) cutting of each other for/at...well’
 b. PRAIR (kwa)sik-w-an-el-isis-an- ‘(there was) cutting of each other for/at...well’
 c. PRARI (kwa)sik-w-an-el-an-isis- ‘(there was) cutting of each other for/at...well’
 d. ARIP sik-el-an-isis-w- ‘(there was) cutting of each other for/at...well’
 e. AIRP sik-el-isis-an-w- ‘(there was) cutting of each other for/at...well’

In (50a.), the order **-w-an-el-isis-** sounds odd but once we add another /-an-/ as in (50b.) the acceptability of the sequence is no longer questionable. The combination PASS-REC-APP-INT-REC **-w-an-el-isis-an-** in (50b.) is in fact another example of a broken up **-an-el-an-** sequence. The sequence PASS-REC-APP-REC-INT **-w-an-el-an-isis-** with unbroken **-an-el-an-** in (50c.) is also acceptable with the same meaning as **-w-an-el-isis-an-** and, of course, the default order APP-REC-INT-PASS **-el-an-isis-w-** in (50d.) or APP-INT-REC-PASS in (50e.).

The last set of examples in this sub-section involves adding PASS /-w-/ to sequences which begin with CAUS-REC-APP- **-is-an-el-** and INT-REC-APP- **-isis-an-el-**. Since **-an-el-** is ill-formed doubling occurs and the second /-an-/ may be before /-w-/ as seen in (51a.) or after as in (51b.)

- (51) a. CRARP sik-is-an-el-an-w ‘be made to cut for each other’
 IRARP sik-isis-an-el-an-w ‘be cut well for each other’
 b. CRAPR sik-is-an-el-w-an ‘be made to cut for each other’

IRAPR sik-isis-an-el-w-an ‘be cut well for each other’

Note that CAUS /-is-/ is usually used to mean ‘help (do something)’ in these long sequences although the ‘cause to’ sense is given above.

3.2.8 Summary

This section has shown that acceptable and disallowed sequences of three or more suffixes are generally predictable from facts given in the previous section about combinations of two suffixes although there are some exceptions. The exceptions we have just seen are that some restrictions fall out once another suffix (in particular, REC /-an-/) separates an unacceptable sequence such as ***-w-isis-** and ***-w-el-**. Also, INT /-isis-/ can be used only once in a sequence of suffixes even if there is no violation of any constraint on the ordering of two suffixes. We also observed that disallowed ***REC-APP -an-el-** is correctly spelt out as REC-APP-REC **-an-el-an-** and that the doubling of /-an-/ can be non-local as the sequence **-an-el-an-** can also be split by a suffix such as PASS /-w-/ and INT /-isis-/. It was also shown that the RMC does not apply to the combination **-an-el-an-** where the two reciprocal morphs are separated by the applicative or the applicative together with another suffix.

3.3 Frozen Extensions

It has been shown in the two preceding sections that the Repeated Morph Constraint (RMC) makes it impossible to spell out the same morph twice in a single verb particularly in cases where the two morphs would be adjacent to each other. Ndebele introduces another dimension to the issue of the RMC when frozen suffixes are considered.

Before discussing the RMC in the context of frozen suffixes it must be pointed out that cases involving the frozen intensive are left out below. Only one word **qed-isis-a** ‘understand’ ending with frozen INT /-isis-/ was found in the database. In this word the RMC cannot be violated as /-isis-/ cannot be followed by another intensive suffix. The

causativized form **qed-isis-is-a** ‘make understand’ is also odd and ambiguous as it can be re-analyzed as **qed-is-isis-a**. Also, it is not clear in **qed-isis-a** that the frozen suffix is really /-isis-/ rather than two causative suffixes /-is-is-/ since both **qeda** ‘finish’ and **qed-is-a** ‘finish the little that remains’ are attested.

A verb whose Dstems ends with a frozen reciprocal is intransitive and cannot take another reciprocal suffix since /-an-/ behaves like a detransitivizing morpheme. In other words a verb which is already intransitive need not be detransitivized again. Discussion on the RMC, therefore, needs not include /-an-/. However, we will need to see what happens when APP /-el-/ is suffixed to a verb whose Dstem ends with a frozen reciprocal since the order **-an-el-** is disallowed in regular verbs unless there is doubling of the reciprocal morph /-an-/.

3.3.1 Frozen Applicative and Causative

There are many verbs with frozen suffixes which look like the applicative and the causative⁶. An interesting point to note is that such verbs can be applicativized or causativized in violation of the RMC. Let us consider for instance the verbs in (52) where no related CVCa forms are available.

⁶ I do not discuss verbs whose roots seem to have frozen causative **-j-** but treat them like those with regular roots. For instance, roots ending in **-z-** below are treated as different from their corresponding forms ending in **-l-** or **-k-** and all of them are causativized in the same way using the productive suffix **-is-**.

khwel-a		‘climb’	khwel-is-a	‘cause to climb’
khwel-j-a	→ khwez-a	‘raise’	khwez-is-a	‘make raise’
limal-a		‘get injured’	limal-is-a	‘cause to get injured’
limal-j-a	→ limaz-a	‘injure’	limaz-is-a	‘cause to be injured’
dilik-a		‘get destroy’	dilik-is-a	‘cause to get destroyed’
dilik-j-a	→ diliz-a	‘destroy’	diliz-is-a	‘make destroy’
phohlok-a		‘get broken’	phohlok-is-a	‘cause to get broken’
phohlok-j-a	→ phohloz-a	‘break’	phohloz-is-a	‘make break’

- (52) a. *sab-a
 sab-el-a 'answer to a call' sab-el-el-a 'answer to a call for/at'
 *bing-a
 *bing-el-a
 bing-elel-a 'greet' bing-elel-el-a 'greet for/at'
- b. *khol-a
 khol-is-a 'enjoy' khol-is-is-a 'make enjoy'
 khol-is-isis-a 'enjoy a lot'
- *kham-a
 kham-is-a 'be open' kham-is-is-a 'cause to be open'
 kham-is-isis-a 'be really/wide open'

As can be seen in (52a.) verbs ending in what seems like APP /-el-/ or even double applicative /-elel-/ are applicativized just like verbs whose bases do not end in /-el-/. Similarly in (52b.) verbs with bases ending in frozen /-is-/ are also causativized and even intensivized. One may conclude that the RMC is violated in these examples because the /-el-/ or /-is-/ is in fact part of the root since there are no related CVCa verbs. However, examples in (53) further complicate the issue.

- (53)a. land-a 'fetch'
 land-el-a 'follow/pursue' land-el-el-a 'follow/pursue for'
 land-elel-a 'be persistent in following' land-elel-el-a 'follow persistently for'
 landel-is-a 'send after' land-el-is-is-a 'make send after'
 ? land-el-is-isis-a 'really send after'
 landelis-el-a 'send after' land-el-is-el-el-a 'send after for'
- b. val-a 'close/shut'
 val-el-a 'shut in/out, exclude' val-el-el-a 'shut in/out for/at'
 val-el-is-a 'say good-bye to' val-el-is-is-a 'cause to say good-bye'
 val-el-is-isis-a 'really say good-bye'

In (53) verb bases ending in /-el-/ or /-is-/ have related CVCa verbs from which they are derived. Again here the RMC is violated as applicativization and causativization occur. It is clear therefore that once a verb ending in APP /-el-/ or CAUS /-is-/ becomes lexicalized the RMC no longer applies. The /-el-/ or /-is-/ is treated as part of the root after lexicalization and hence the RMC has no access to the original morpheme boundary.

3.3.2 Frozen Passive

The only morpheme boundaries that are accessible even after lexicalization are those involving PASS /-w-/. However, the PASS does not violate the RMC but permits the CAUS, APP and INT to come between it and the root thereby observing the morphosyntactic hierarchy in (27). This is illustrated in (54). (Note that the REC can also come before /-w-/ in cases where there is a locative or empty subject).

- (54)
- | | | | |
|-----------|-----------|----------------|-------------------------------|
| *khol-a | | | |
| khol-w-a | ‘believe’ | khol-is-w-a | ‘be made to believe’ |
| | | khol-el-w-a | ‘be believed for (Reason)’ |
| | | khol-isis-w-a | ‘be really/strongly believed’ |
| | | | |
| *khohl-a | | | |
| khohl-w-a | ‘forget’ | khohl-is-w-a | ‘be made to forget’ |
| | | khohl-el-w-a | ‘be forgotten for (Reason)’ |
| | | khohl-isis-w-a | ‘be really forgotten’ |

It is not very clear why in cases involving PASS /-w-/ the morphosyntactic hierarchy is never violated even after lexicalization and yet in cases involving APP /-el-/ such as those in (53) there is nothing which stops CAUS /-is-/ from being spelt out after /-el-/. The CAUS is clearly not sensitive to original morpheme boundaries in lexicalized forms as what appears like APP-CAUS is acceptable. Perhaps the answer is in phonology. While Consonant plus [w] (Cw) may occur as the first or last syllable of a word, it is disallowed word internally except in cases where it is a copy of the initial syllable. In other words CVCwVC- is not permitted. The problem could also be due to the -C- shape of the PASS morph used. Other suffixes such as the APP and CAUS have a -VC- shape.

3.3.3 Frozen Stative

Even STAT /-ek-/, a detransitivizing morpheme like PASS -w-, does not permit another suffix between it and the root after lexicalization. Instead high ranked suffixes such as CAUS /-is-/ and APP /-el-/ are allowed to follow thereby showing non-compliance with the unmarked order. This is illustrated in (55).

- (55)
- | | | |
|----|------------------------|-------------------------------------|
| a. | qhub-a | ‘progress’ |
| | qhub-ek-a | ‘continue’ |
| | qhub-ek- ek -a | ‘be possible to continue’ |
| | qhub-ek-is-a | ‘cause to continue’ |
| | qhub-ek-el-a | ‘continue for (Reason)’ |
| | kwa-qhutsh-ek-w-a | ‘it was continued’ |
| b. | duba | ‘trouble’ |
| | dub-ek-a | ‘become troubled’ |
| | ?dub-ek- ek -a | ‘be possible to become troubled’ |
| | dub-ek-is-a | ‘cause to become troubled’ |
| | dub-ek-el-a | ‘become troubled for/at’ |
| | kwa-dutsh-ek-w-a | ‘it was suffered’ |
| c. | *bala | |
| | bal-ek-a | ‘run away/ flee’ |
| | bal-ek- ek -a | ‘be possible to run away’ |
| | bal-ek-is-a | ‘cause to run away’ |
| | bal-ek-el-a | ‘run away to / from / for (Reason)’ |
| | kwa-bal-ek-w- a | ‘it was fled’ |
| d. | *nqina | |
| | nqin-ek-a | ‘be worried’ |
| | ?nqin-ek- ek -a | ‘be possible to be worried’ |
| | nqin-ek-is-a | ‘cause to be worried’ |
| | nqin-ek-el-a | ‘be worried about / for’ |
| | kwa-nqin-ek-w-a | ‘there was worrying’ |

In (55) we also see that STAT /-ek-/ can come after an identical ‘frozen’ suffix of a lexicalized form when there is a corresponding CVCa verb as in (55a.) or when there is none as in (55c.). This further shows that the RMC does not hold in such lexicalized forms. In (55b.) and (55d.) the sequence **-ek-ek-**, though well-formed in terms of ‘scope’ appears questionable. The meaning introduced by the second /-ek-/ is already present in the lexicalized verb in (55b.) and is not usually expressed in (55d.) perhaps due to the verb’s inherent semantics. Note also that verbs ending in /-ek-/ such as those in (55) are generally intransitive but suffixing a detransitivizing morpheme /-ek-/ seems possible in some cases as we have seen, something not possible if the final suffix of the verb is a productive /-ek-/. Suffixing intransitive PASS /-w-/ is only possible in the special construction discussed in the preceding sections.

3.3.4 Frozen Reciprocal

As already alluded to above, in cases involving a frozen reciprocal our main interest is to see what happens to the sequence **-an-el-** since it was disallowed in regular verbs except with the doubling of the reciprocal morph. In (56) we see that both **-an-el-** and **-an-el-an-** are acceptable. A surprisingly transitive word such as **fuman-a**⁷ ‘find’ and whose semantics is not inherently ‘reciprocity of action’ can even allow /-an-/ to be followed by an identical suffix thereby making it appear as if the RMC is being violated.

(56) Sequence **an-el-** in Frozen Reciprocal

- | | | |
|----|------------------|--|
| a. | xab-a | ‘roast’ |
| | xab-an-a | ‘quarrel’ |
| | xab-an-el-a | ‘quarrel for/at’ |
| | xab-an-el-an-a | ‘quarrel (between themselves) for/at’ |
| b. | buth-a | ‘collect, gather’ |
| | buth-an-a | ‘assemble’ |
| | buth-an-el-a | ‘assemble for/at’ |
| | buth-an-el-an-a | ‘assemble for/at’ |
| c. | *hlang-a | |
| | hlang-an-a | ‘meet’ |
| | hlang-an-el-a | ‘meet for/at’ |
| | hlang-an-el-an-a | ‘meet for/at’ |
| d. | *fum-a | |
| | fum-an-a | ‘find’ |
| | fum-an-an-a | ‘find each other’ |
| | fum-an-el-a | ‘find for/at’ |
| | fum-an-el-an-a | ‘find for each other/find each other at’ |

The frozen **-an-** is in fact treated as part of the root so that **-el-** or **-an-** is the first suffix after the root. As we saw in the previous section, **Root-el-**, **Root-an-** and **Root-el-an-** are all well-formed. Note that there is a related CVCa verb in (56a.) and (56b.) but not in (56c.) and (56d.).

⁷ It is possible that **-an-** in **fuman-a** ‘find’ is part of the root and not a reciprocal suffix. Reciprocal **-an-** would normally make the verb intransitive. cf. **-gigan-** ‘find’ (PB)

3.3.5 Summary

In this section we have seen that once lexicalization occurs a frozen suffix such as CAUS /-is-/, APP /-el-/, STAT /-ek-/ and REC /-an-/ is then treated as part of the root. This makes it possible for two identical suffixes to follow each other as the boundary between the root and the frozen suffix is no longer accessible. Thus **-is-is-**, **-el-el-**, **-ek-ek-** and **-an-an-** occur only if the first suffix in the sequence is a frozen one. The RMC does not apply in such cases. The only exceptions are cases involving the frozen PASS /-w-/. Frozen /-w-/ permits the CAUS, APP and INT to come between it and the root thereby complying with the unmarked order in (27). The sequence **-w-w-** never occurs but is always ruled out by the RMC and the constraint which forbids detransitivizing a verb more than once. It has also been shown that the disallowed sequence **-an-el-** is acceptable when /-an-/ is a frozen suffix.

3.4 Suffixes Ordering Reconsidered With Sub-minimal Roots.

Finally, we need to see if the generalization made above about the sequencing of suffixes also hold in cases involving sub-minimal roots. In place of our CVC- root **sik-** ‘cut’ we now use a -C- root **-dl-** ‘eat’ as an example. As seen in (57) all the suffixes in question can still be used with **-dl-** except that for the passive the variant /-iw-/ now replaces /-w-/.

- (57)
- | | |
|------------------|--|
| -dl- | ‘eat’ |
| -dl-is- | ‘cause to eat / feed’ |
| -dl-el- | ‘eat for/at’ |
| -dl-an- | ‘eat each other’ |
| -dl-isis- | ‘eat well’ |
| -dl-ek- | ‘be edible / be eaten away / wear off / be eroded’ |
| -dl-iw- | ‘be eaten’ |

It is important to note here that while suffixes such as CAUS /-is-/ and STAT /-ek-/ are productive like others they are also used as frozen suffixes for some senses of the verb. With a frozen causative **-dl-is-** means ‘feed’ in addition to ‘cause to eat’ and with a frozen

stative **dl-ek-** means ‘be eaten away / wear off / be eroded’ besides ‘be edible’. The reciprocal should also not be confused with an identical suffix, stabilizer /-an-/ used in the imperative to satisfy minimality conditions which require the verb to be at least CVCV at the word level.

To see if restrictions on the ordering of two suffixes noted above still hold let us compare the two tables in (58) where the vertical axis in each case shows the first suffix in the sequence and the horizontal axis the second.

(58)a. CVC- Root + Two Suffixes

CVC +		2 nd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
S U F F I X	I st C	*RMC	✓	✓	✓	*RMC	✓
	A	*	*RMC	✓	✓	✓	✓
	R	✓	*	*RMC	✓	✓	*
	P	*	*	✓	*RMC	*	*
	I	*RMC	✓	✓	✓	*RMC	✓
	S	*	*	*	*	✓	*RMC

b. -C- Root + Two Suffixes

C Root +		2 nd SUFFIX IN THE SEQUENCE					
		C	A	R	P	I	S
S U F F I X	I st C	✓	✓	✓	✓	✓	✓
	A	✓	?	✓	✓	✓	✓
	R	✓	?	*RMC	(✓)	✓	*
	P	*	*	(✓)	*RMC	*	*
	I	✓	✓	✓	✓	*RMC	✓
	S	✓	✓	*	*	✓	*RMC

Comparing (58a.) (which is in fact (26) repeated) with (58b.) it can be seen that most of the facts noted above are still valid as most corresponding boxes in the tables are identical. However, some suffixes which combined in one way but not the reversed order previously

can now combine in either order as table (58b.) shows. These are the ones which deserve special comment. The next sub-section focuses specifically on them.

3.4.1 Suffixes combining in one way but not the reversed order reconsidered with sub-minimal roots.

In section 3 the causative and the passive were shown to be one of the pairs of suffixes which combine in one way but not the reversed order. The order CAUS-PASS **-is-w-** was shown to be well formed when suffixed to **sik-** while the reversed sequence PASS-CAUS **-w-is-** was disallowed. In (59) where **-dl-** is used in place of **sik-** we see that the same facts still hold.

- (59) a. CAUS-PASS dl-is-w- ‘be made to eat / be feed’
 b. *PASS-CAUS *dl-(i)w-is- ‘cause to be eaten’
 ?dl-iw-is-w- ‘cause to be eaten’
 ?dl-iw-is-iw-

Although PASS-CAUS is still disallowed spelling out the PASS again after the CAUS as in (59b.) makes it sound slightly better.

Another set of suffixes combining one way but not the reversed order when suffixed to **sik-** involved the intensive and the passive. In (60)a. we see that **-isis-w-** is still acceptable even when suffixed to a sub-minimal root. (60)b. shows that **-iw-isis-** is disallowed as was **-w-isis-** after **sik-**.

- (60) a. INT-PASS dl-isis-w- ‘be well eaten’
 b. PASS-INT *dl-iw-isis- ‘be eaten well’
 *dl-iw-isis-iw-
 dl-iw-isis-w-

Although **-iw-isis-** is unacceptable doubling the PASS as further illustrated in (60b.) creates an acceptable form. This is consistent with what we saw earlier that the PASS has to spelt out last as it takes away an argument. ‘Scope’ here appears to be overridden by the

unmarked morphosyntactic order since there is no need to double the PASS in terms of ‘scope’. Note that the two PASS morphs must be different for doubling to be accepted. Once the morph [iw] is used it is possible to spell out the PASS again using a different morph [w]. This seems to apply even to two longer forms whose roots end with a bilabial where it appears possible to suffix /-iw-/ to the verbs which are not usually passivized. Examples are given in (61).

(61)	Verb	Gloss	INTENSIVIZED PASSIVE
	hlahlub-a	‘devine’	hlahlub-iw-isis-w-a
	holob-a	‘boil’	holob-iw-isis-w-a

Doubling the morph [w] is not possible, neither is a **-w-isis-iw-** spell out. Just like the causative morph [-is-], passive [-iw-] must be closest to the root in the absence of stative **-akal-**. As such the two can be ranked equally in the morphosyntactic hierarchy. This means that one passive morph is ranked second while the other is ranked last. At this point we can therefore modify (27) so that a complete ranking of all the suffixes in question can be presented as in (62).

(62)	-akal- > -is- , -iw- > -el- > -an- , -isis-, -ek- > -w-
	STAT > CAUS , PASS > APP > REC, INT , STAT > PASS

In section 3 we also saw that the sequence **-is-ek-** can be suffixed to **sik-** but not the reversed order **-ek-is-**. As shown in (63) STAT-CAUS sounds better with a sub-minimal form such as **-dl-** ‘eat’ but is still questionable probably because the unmarked order is violated. Doubling /-ek-/ also sounds just as odd as the verb is being detransitivized twice.

(63)	a.	CAUS-STAT	dl-is-ek-	‘be possible to be made to eat or to be feed’
	b.	?STAT-CAUS	?dl-ek-is- ?dl-ek-is-ek-	‘make possible to be eaten’

As was pointed out above and as also illustrated in (64)a., when **dl-ek-** is treated as a lexicalized form it has the meaning ‘be eroded’. Creating an **-ek-is-** sequence by suffixing

/-is-/ to **dl-ek-** is acceptable as (64)b. shows. Also, suffixing **-is-ek-** to lexicalized **dl-ek-** as in (64)c. is also permitted in spite of there being two detransitivizing morphemes.

- (64) a. STAT dl-ek- ‘be eroded’
 b. STAT-CAUS dl-ek-is- ‘cause to be eroded’ (different meaning)
 c. STAT-CAUS-STAT dl-ek-is-ek- ‘make possible to be eroded’

It is therefore clear in (64) that the /-ek-/ attached to the root **-dl-** is treated a part of the root just like ‘frozen’ suffixes we have already seen and is therefore not subject to suffix ordering restrictions when other suffixes come after it.

We also noted that CAUS-APP **-is-el-** is acceptable when suffixed to **sik-** ‘cut’ but not APP-CAUS **-el-is-**. (65)a shows that **-is-el-** is still a good sequence even when suffixed to a sub-minimal root **-dl-** ‘eat’. In (65)b. where the verb root is also **-dl-** we see that there is now no problem when a causative comes after an applicative although the argument introduced by the APP /-el-/ can only be Location. Other possible arguments can only be introduced when /-el-/ is spelt out again after CAUS /-is-/.

- (65) a. CAUS-APP dl-is-el- ‘feed (or make eat) for/at’
 b. APP-CAUS dl-el-is- ‘make eat at’ (only Location)
 dl-el-is-el- ‘make eat for/at (but not feeding)’

The acceptability of APP-CAUS can be due to the fact that /-el-/ is treated like a non-productive suffix in the verb, that is, C-VC- is taken to be CVC-. It is not clear whether a subminimality condition which requires a verb to be at least CVCV at word level also plays a role. As expected a form which observes the morphosyntactic order in (69) by spelling out APP /-el-/ after CAUS /-is-/ is still accepted. In fact the meanings associated with **-el-is-** and **-el-is-el-** can also be taken by **-is-el-**.

The order APP-STAT in (66a.) is acceptable after **-dl-** just as it was after **sik-**.

- (66) a. APP-STAT dl-el-ek- ‘be possible to eat (or be eaten) for/at’

- b. STAT-APP dl-ek-el- ‘be possible to be eaten at’ (Loc)
 *dl-ek-el-ek-

In (66b.), STAT-APP is fine after **-dl-** and yet the same sequence was disallowed after **sik-**. However, the argument introduced by the APP can only be Location. Other arguments cannot be brought in by doubling the APP since this would violate the RMC. The STATIVE also cannot be doubled as the verb cannot be detransitivized twice. Here again, as expected, the meaning of **-ek-el-** can also be expressed by the unmarked sequence **-el-ek-**.

The last combination of suffixes to be considered in this sub-section involves the applicative and the passive. The sequence APP-PASS **-el-w-** which was shown to be well-formed after **sik-** is still allowed after **-dl-** as seen in (67a.).

- (67) a. APP-PASS dl-el-w- ‘be eaten for/at’
 b. PASS-APP *dl-iw-el- ‘be eaten for/at’
 dl-iw-el-w-

PASS-APP **-iw-el-** in (67b.) is accepted only if the PASS is doubled. Again here the two PASS morphs have different shapes and the meaning associated with **-iw-el-w-** can also be expressed by default **-el-w-**.

3.4.2 Non-Local Doubling

We have just seen that the stative can only be doubled if the first morph is non-productive and that passive and applicative morphs, on the other hand, can be doubled even where no lexicalization is involved just like reciprocal [-an-]. It is therefore interesting to see what happens in cases of non-local doubling involving the passive and applicative since we saw that long distance doubling is acceptable with the reciprocal. Let us consider first the non-local doubling of the passive before we turn to non-local doubling of the applicative.

3.4.2.1 Non-Local Doubling of the Passive

As we have already seen above one instance where the passive is doubled is in the sequence **-iw-isis-w-**. It is interesting to see what happens when a suffix such as APP /-el-/ which can come before or after INT /-isis-/ is brought in. As seen in (68a.) and (68b.) both **-iw-isis-el-w-** and **-iw-el-isis-w-** are well-formed. It should not be surprising that the two suffix sequences are acceptable given that both **-iw-isis-** and **-isis-w-** are permitted. Doubling is necessary because although the passive comes early in terms of compositionality or scope there is a morphosyntactic constraint which require that it comes last as was pointed out earlier. The morph [-iw-] attached to the root is not accompanied by [-w-] only when no other suffix follows.

- (68) a. dl-iw-isis-el-w- 'be eaten well at'
b. dl-iw-el-isis-w- 'be eaten well at'
c. dl-isis-el-w- 'be well eaten at'
d. dl-el-isis-w- 'be eaten well at/for'

The meaning of the marked sequences **-iw-isis-el-w-** and **-iw-el-isis-w-** can also be expressed by the shorter sequence **-isis-el-w-** in (68c.) since to the speakers 'be eaten well at' and 'be well eaten at' mean one and the same thing. (68d.) further confirms the prediction that a default order will also take the meaning of a marked order.

Like the applicative, the stative can also come before or after the intensive. However, the sequences **-iw-isis-ek-w-** and **-iw-ek-isis-w-** are both ill-formed as shown in (69).

- (69) a. *dl-iw-isis-ek-w-
b. *dl-iw-ek-isis-w-

The problem is that both **-ek-w-** in (69a.) and **-iw-ek-** in (69b.) are ill-formed as they are sequence of two detransitivizing morphemes.

Another combination where it seems the passive must be doubled involves the causative. However, as we noted in the preceding sub-section **-iw-is-w-** sounds odd. We now have to see if introducing another suffix before or after **/-is-/** makes it better or even acceptable. A reasonable suffix to bring in is APP **/-el-/** since we have seen that in sub-minimal roots both **-is-el-** and **-el-is-** are permitted. As seen in (70a.) and (70b.) the sequences **-iw-is-el-w-** and **-iw-el-is-w-** are both disallowed although the former sounds better. The unacceptability of the two sequences appears to be due to the fact that the combination **-iw-is-** is ill-formed even when there is another suffix separating the passive and the causative. Also, the example in (70b.) could be ruled out by the ill-formed **-is-el-** sequence if we assume that **/-iw-/** satisfies the CVC- stem minimality condition required at word level and that other suffixes which follow must observe the ordering restrictions applicable to CVC- roots. In fact, although the sequence **-el-is-** is well-formed when suffixed to a sub-minimal root, it is only acceptable when it immediately follows the root, not when there is another suffix in-between.

- (70) a. ?dl-iw-is-el-w- 'be made to eat at' (*for)
 b. *dl-iw-el-is-w- 'be made to eat at'
 c. dl-el-is-w- 'be made to eat at'
 d. dl-is-el-w- 'be made to eat for/at'

Although the suffix sequences in (70a.) and (70b) are closer to their compositional order, they are disfavored also because their meanings can be expressed by the more regular and shorter sequence in (70c.) As expected the default order **-is-el-w-** in (70d.) can express the same meaning and has a wider range of semantic interpretations than the marked order **-el-is-w-** in (70c.).

3.4.2.2 Non-Local Doubling of the Applicative

For the applicative doubling was seen in the sequence **-el-is-el-**. To see if non-local doubling is acceptable with the applicative REC **/-an-/** which is allowed before and after CAUS **/-is-/** in a sequence of two suffixes can be introduced. The examples in (71a.) and (71b.) show that the new sequences **-el-is-an-el-** and **-el-an-is-el-** are both unacceptable. This is due to the fact that the second morph **/-el-/** occurs after REC **/-an-/** which has not been doubled.

- (71) a. ***dl-el-is-an-el-** 'make each other eat at'
b. ***dl-el-an-is-el-** 'make eat each other at'
c. **dl-el-is-an-el-an-** 'make each other eat at'
d. **dl-el-an-is-el-an** 'make eat each other at'
'make eat each other for each other'
e. **dl-el-is-an-** 'make each other eat at'
f. ***dl-el-an-is-** 'make eat each other at'
g. **dl-is-an-el-an-** 'make each other eat at'
'make eat each other at'
h. **dl-is-el-an-** 'make each other eat for/at' or
'make eat each other at'

Doubling **/-an-/** as in (71c.) and (71d.) creates acceptable sequences **-el-is-an-el-an-** and **-el-an-is-el-an-** but these are less preferred as there are shorter sequences with the same meaning. Note that (71d.) usually attracts the meaning 'make eat each other for each other' where there are two reciprocal morphemes rather than one with two morphs. This is probably due to the fact the first reciprocal morph does not immediately precede the second **/-el-/** as there is **/-is-/** in-between. For **-el-is-an-el-an-** the shorter sequence **-el-is-an-** in (71e.) is generally preferred but for **-el-an-is-el-an-** the order **-el-an-is-** in (71f.) is disallowed despite the fact that **-el-an-**, **-el-is-** and **-an-is-** are all well-formed sequences when suffixed to sub-minimal roots. Again here we see that the marked order **-el-is-** is not tolerated in sub-minimal roots unless it immediately follows the root with no suffix

separating /-el-/ and /-is-/. If another suffix separates the two then /-el-/ must be doubled as in (71d.). However, it is not clear why **-el-** is doubled in (71c.). Generally, if /-is-/ is moved further away from the second suffix position the sequence becomes unacceptable and suffix ordering constraints relevant to longer CVC- roots apply. Doubling of /-el-/ can be avoided by moving /-is-/ to a position closest to the root as in (71g.) or better still by using the unmarked sequence **-is-el-an-** as in (71h.).

Another combination which seems possible in the non-local doubling of /-el-/ is **-el-is-ek-el-** since both **-is-ek-** and **-ek-el-** are permitted when suffixed to sub-minimal roots. However, as seen in (72a.), this combination is disallowed. This seems to be due to the fact that the shorter sequence **-el-is-ek-** in (72c.) can take the same meaning as **-el-is-ek-el-**.

- (72)
- | | | |
|----|-------------------------|------------------------------------|
| a. | *dl-el-is-ek-el- | ‘be possible to be made to eat at’ |
| b. | *dl-el-ek-is-el- | ‘make possible to eat at/for’ |
| c. | dl-el-is-ek- | ‘be possible to be made to eat at’ |

Re-positioning /-ek-/ as in (72b.) is also unacceptable since the order **-el-ek-is-el-** violates the constraint ***-ek-is-**. Also here, the sequence **-el-is-** is not immediately preceded by the root as /-is-/ follows /-ek-/.

Finally, we need to consider the possibility of inserting the passive suffix /-w-/ or its variant /-iw-/ before or after the causative. We see in (73a.) and (73b.) that this creates ill-formed suffix sequences.

- (73)
- | | | |
|----|-----------------------------|-------------------------|
| a. | *dl-el-(i)w-is-el- | ‘be made to eat at’ |
| b. | *dl-el-is-(i)w-el- | ‘be made to eat at’ |
| c. | *dl-el-(i)w-is-el-w- | ‘be made to eat at’ |
| d. | *dl-el-is-(i)w-el-w- | ‘be made to eat at’ |
| e. | dl-el-is-w- | ‘be made to eat at’ |
| f. | dl-is-el-w- | ‘be made to eat for/at’ |

Although the problem appears to be the non-doubling of the passive when logically spelt out before **-is-el-** or **/-el-/**, introducing another passive morph after **/-el-/** is not the solution as seen in (73c.) and (73d.). In fact the meaning associated with and **-el-(i)w-is-el-** ((73a.)) and **-el-is-(i)w-el-** ((73b.)) is better expressed by the shorter sequence **-el-is-w-** in (72)e. The unmarked order **-is-el-w-** in (73f.) can also be used with the same meaning as expected.

3.4.3 Summary

This section has shown that suffixes which were earlier attached to a CVC- root **sik-** ‘cut’ can also be suffixed to a sub-minimal root **-dl-** ‘eat’ except that for the passive the variant **/-iw-/** is used in place of **/-w-/**. Although most of the facts about the ordering of two suffixes when preceded by a CVC- root are also valid in cases involving sub-minimal roots it was noted that some suffixes which combined in one way but not the reversed order previously now combine in either order when attached to a sub-minimal C- root. For instance the previously ill-formed sequences **-el-is-**, **-ek-el-** were shown to be acceptable when suffixed to a sub-minimal root provided they immediately follow the root with no other intervening suffix. Other previously disallowed sequences such as **-iw-isis-** and **-iw-el-** were shown to be permissible only if there is doubling the passive morph. Non-local doubling of both the passive and the applicative was shown to be possible although less preferred for the applicative.

3.5 Summary

The discussion in this chapter has shown that the ordering of derivational suffixes in Ndebele is determined by two competing constraints, one requiring suffixes to be spelled out compositionally and the other demanding that they follow a default morphological template. (See also Hyman (in Press)). It has been argued that there is an unmarked

morphosyntactic order ((62)) which in many cases determines whether or not a given combination of suffixes will be acceptable and also the range of semantic interpretations the combination will have. It has been demonstrated that the unmarked order is the deciding factor in most cases where the suffixes appear not to be spelt out in their compositional order and in cases where a sequence is acceptable but not its reversed order.

In fact the unmarked morphosyntactic order in (62) shows a close relationship with the thematic hierarchy in the ranking of arguments. The thematic hierarchy (see for example, Bresnan and Kanerva 1989, Bresnan and Moshi 1993, Alsina and Mchombo 1993, Harford 1993, Hyman and Mchombo 1992 and others) is based on the hypothesis that thematic roles in any argument structure can be ranked according to their prominence. The relative prominence is semantically determined. The most prominent roles are those of the more causally active or topical participants in events. The usually assumed thematic hierarchy is given in (74).

(74) Agent > Beneficiary > Goal / Experiencer > instrumental > Patient/Theme > Location

In this hierarchy the Agent is ranked highest and Location lowest. If there is a Causer, it is ranked highest and above the Agent.

We saw that in Ndebele transitivity morphemes /-is-/ and /-el-/ which introduce new arguments to the verb generally have to be closest to the root and in this order, reflecting the syntactic hierarchy in the ranking of arguments. The Causer associated with the CAUS is ranked above the Benefactive/ Goal / Theme / Reason / Location argument associated with the APP. Reciprocal /-an-/ , intensive /-isis-/ and stative /-ek-/ follow /-is-/ and /-el-/. As was pointed out above REC /-an-/ may or may not introduce new arguments to the verb. If it does the arguments (Agent and Patient) are not independent but are bound to those that the verb already has and if it does not, it moves an argument (Patient) to a different location where it fuses it with another (Agent). As such /-an-/ behaves like a neutral morpheme and hence its ranking with /-isis-/ which is truly neutral as it neither introduces nor takes away

an argument. Stative /-ek-/ which is ranked at the same level with /-an-/ and /-isis-/ is a ‘fake’ neutral suffix. It takes away an argument when suffixed to a verb but behaves like a neutral suffix as the lost argument is not recoverable. STAT /-ek-/ can be compared to the lowest ranked PASS /-w-/ which clearly takes away an argument that can be recovered as it is always implied. Note that, although the three suffixes /-an-/ , /-isis-/ and /-ek-/ are equally ranked /-an-/ and /-ek-/ cannot combine as they both behave like detransitivizing morpheme. However, **-an-isis-**, **-isis-an-**, **-isis-ek-** and **-ek-isis-** are all acceptable. Leaving out restricted STAT /-akal-/ and PASS /-iw-/ which is normally not followed by another suffix unless /-w-/ is used as well, the unmarked order of Ndebele suffixes is therefore roughly as follows.

- (75) ARGUMENT + ARGUMENT 0 ARGUMENT -
 -is- > -el- > -an- , -isis-, -ek- > -w-
 CAUS > APP > REC , INT , STAT > PASS

Note that the classification of /-an-/ and /-ek-/ as ARGUMENT +, ARGUMENT 0 and ARGUMENT - is not categorical for the reasons just mentioned. It is also important to point out that /-an-/ leans towards Argument + even if sometimes intransitive because it actually does not take away an argument. However, /-ek-/ does although it behaves as if it does not and hence its closeness to Argument -. Recall also that in cases involving CVC-roots /-an-/ can come before clearly transitive suffixes, /-is-/ and /-el-/ , but not /-ek-/ as ARGUMENT - suffixes are excuded before those which are ARGUMENT +.

When two or more suffixes are combined, it has been shown that a marked order which only conforms to compositionality or ‘scope’ will be restricted in terms of semantic interpretation whereas a sequence which observes the unmarked order in (62) will be open to a wider range of semantic interpretations as it can represent two different underlying compositional structures. In general, a marked sequence is tolerated if the suffix which come before another does not take away an argument and is not detransitivizing. In other

words, transitivity suffixes can only follow other transitivity suffixes and neutral ones but not detransitivizing ones which take away arguments.

Finally, some constraints appeared not to apply equally to all cases. For instance, the role of the RMC was shown to be restricted to sequences of productive suffixes as a non-productive suffix can be followed by an identical productive one. It was also demonstrated that some constraint which apply to CVC- roots do not hold in cases involving sub-minimal C- roots, for example, ***-el-is-** and **-ek-el**. Problems associated with some disallowed sequences were resolved by doubling one of the morphs. For example, the disallowed compositional sequence ***-an-el-** spells out as **-an-el-an-**. While some constraints such as ***-w-isis-** hold only locally others like ***-el-is-** were shown to hold even at a distance in cases involving CVC-roots. We saw that the order ***-w-isis-** is permitted if **/-an-/** comes in-between **/-w-/** and **/-isis-/** but ***-el-is-** could not be accepted even with another suffix separating **/-el-/** and **/-is-/**.

Facts about the ordering of Ndebele suffixes suggest that Barker's (1985) Mirror principle needs to be modified, at least, as syntactic operations are not always mirrored in the morphology. As has been seen, different morphotactical constraints play a role in the ordering of suffixes. Compositional suffix sequences are dispreferred in many cases in favor of non-compositional ones which comply with the unmarked morphosyntactic order discussed above.

CHAPTER 4: MORPHO-PHONOLOGY.

4.0 Introduction

In Chapter 2 we discussed the structure of the Ndebele verb but did not look closely at some important restrictions and tone patterns. This chapter looks at word and morpheme structure conditions (including root structure conditions) while discussion of tone is reserved for Chapter 6. For morpheme structure conditions both internal and external restrictions will be discussed. Word structure conditions are considered in 4.1, External morpheme structure conditions in 4.2, Truncation and imbrication which touch on both external and internal morpheme structure conditions in 4.3, and internal morpheme structure conditions, in particular Root structure conditions in 4.3. Section 4.4 is the summary.

4.1 Word Structure Conditions.

In many languages there are phonological and/or morphological conditions imposed on the verb at stem and word level. For example, in Chichewa and Kinande, the verb consists in at least two syllables although the stem can be monosyllabic (see Kanerva 1989, Mutaka & Hyman 1990). Myers (1987) has also shown that in Shona the bi-syllabic condition holds not only for verbs but also for words in other parts of speech¹. Sometimes minimality conditions are imposed for specific processes, for example, in Cibemba the stem must be longer than one syllable for 'imbrication' to occur. (See Hyman 1995). It is necessary in this study to see if similar prosodic conditions are imposed on the Ndebele verb as this will

¹ For works on 'minimality' see also Cole 1990, Hyman (1992), Hyman and Katamba 1990, Itô (1990), Lombardi & McCarthy 1990, McCarthy and Prince 1986, 1990, McNally 1990, Spring 1990, Downing 1996 and others.

have a bearing on the discussion of reduplication. It is also important to see if there are any morphological restrictions.

We saw in Chapter 2 that roots and derivational suffixes end in consonants. Since Ndebele does not permit closed syllables a word, therefore, cannot just be a D-Stem but must end in an inflectional suffix or default final vowel (FV) **-a**. The final consonant of the root which would, otherwise, be the coda is never deleted but suffixation is preferred instead. However, suffixing any affix other than **-a** requires the presence of at least one prefix. This means that the verb must be at least a Minimal Default Stem (Root-a) at word level although it can also take prefixes. In (1) we see that singular imperative verbs with CVC- roots meet this requirement when they suffix default final vowel **-a** which makes the word two syllables long.

(1) Verbs with CVC- Roots in the Singular Imperative

siz-a	‘help’
phek-a	‘cook’
thath-a	‘take’
hamb-a	‘go / walk’
bon-a	‘see’
khul-a	‘grow’
guq-a	‘kneel’

In fact all examples in this sub-section are in the imperative as this mood is the only one which generally requires only one affix in the singular, default final vowel **-a**. Facts relevant to verbs in the other moods which normally take more than one derivational and/or inflectional affix are given in the next sub-section which deals with morpheme structure conditions.

Longer singular imperative verbs with three or four syllables in (2) are also well formed as they satisfy the Minimal Default Stem condition in a similar manner to those in (1) by suffixing default FV **-a** to the root.

(2) Singular Imperative Verbs With Consonant Initial Roots Longer Than CVC- (including non-productive suffixes).

- a. hlikihl-a 'wipe'
gomonq-a 'slope'
- b. genq**uk**-a 'overturn intr.'
geng**ul**-a 'overturn tr.'
- c. bhilikic-a 'touch or hold with dirty hands'
dlubulund-a 'break free of control'

While roots in (2a.) are the regular CVCVC- ones, those in (2b.) include 'frozen' reversive suffixes **-uk-** and **-ul-**. Roots in (2c.) have the shape CVCVCVC-. Although **-ik-** in **bhilikic-a** and **-bul-** in **dlubulund-a** look like possible suffixes I do not treat them as such as they are followed by the sequences **-ic-** and **-und-**, respectively, which do not look like suffixes. The fact that **-ik-** and **-bul-** look like possible suffixes appears to be coincidental.

Verbs with consonant initial roots shorter than CVC- provide additional facts. Examples with C-roots in (3) show that besides the morphological requirement that the verb be at least a Root-a Minimal Default Stem there is also a prosodic minimality condition imposed on the Ndebele verb. (A full list of verbs with -C- roots was given in Chapter 2, (8)).

(3) Verbs with C- roots

- a. *dl-a
*ph-a
*m-a
*lw-a
*zw-a
*kh-a
- b. dl-an-a 'eat'
ph-an-a 'give'
m-an-a 'stand / wait'
lw-an-a 'fight'
zw-an-a 'taste'
kh-an-a 'draw water'
- c. yi-dl-a 'eat'

yi-ph-a	‘give’
yi-m-a	‘stand / wait’
yi-lw-a	‘fight’
yi-zw-a	‘taste’
kh-an-a	‘draw water’

Attaching default final vowel **-a** to a C- root as in (3a.) creates an acceptable mono-syllabic Minimal Default Stem which is, however, not a well-formed word. As can be seen in (3b.) and (3c.), adding an extra semantically ‘empty’ syllable, often referred to as a “stabilizer” in Bantu literature, to the stem makes it acceptable at word level. While in (3b.) suffixing stabilizer **-an-** adds the required syllable to the stem, in (3c.) bi-syllabicity is achieved by prefixing another stabilizer, the semantically empty default syllable **yi-**. Although the forms in (3b.) are the generally preferred ones in the imperative mood, those in (3c.) can also be used with the same meaning. Note that the stabilizers **-an-** and **yi-**, unlike default vowel **-a** which can be used in different moods and tenses, are only used in the imperative. Later in Chapter 7 we will see that there is also a default suffix **-yi** restricted to reduplicants. I treat these two **yi** syllables as different since **dl-a-yi**, for example, is unacceptable as a word although it can be a well formed reduplicant.

It is also important to see whether the same facts hold in cases involving vowel initial roots. Given that vowel initial roots will always have at least two syllables once a suffix is added one would not expect any new facts from them. However, as (4) shows an onset is always required for the initial V syllable in the imperative mood. (Note that in other moods, as already pointed out, a prefix always precedes the root, and these are cases discussed in the next section).

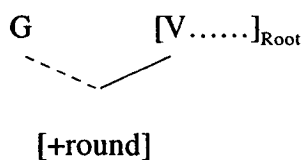
(4) Verbs with Vowel Initial Roots in the Imperative Mood (singular (sg.) and plural (pl.)).

- | | | |
|----|---------|------------------|
| a. | y-eq-a | ‘jump sg.’ |
| | y-akh-a | ‘build sg.’ |
| b. | w-os-a | ‘roast sg.’ |
| | w-on-a | ‘spoil, sin sg.’ |

- | | | |
|----|-------------------|---------------|
| c. | y-elus-a | 'herd' sg. |
| | y-ebolek-a | 'borrow sg.' |
| d. | y-eq-a-ni(ni) | 'jump pl.' |
| | w-os-a-ni(ni) | 'roast pl.' |
| | y-elus-a-ni(ni) | 'herd pl. ' |
| | y-ebolek-a-ni(ni) | 'borrow pl. ' |

In (4a.) we see that if the initial vowel of the root is unrounded the glide [y] is used as an onset. (4b.) shows that glide [w] is prefixed when the root begins with round vowel [o]. Thus, the initial vowel of the root spreads its roundness feature to the inserted glide (G) which serves as an onset as illustrated in (5). As will be seen in the next section, the spreading of the roundness feature does not affect consonants from prefixes most of which are non-glides. If we assume that the glide [y] in yi- ((3c.)) is the same as the one in (4), then this would suggest that [i] is the default vowel in Ndebele. In (3c.) [i] could then be seen as bringing in the required extra-syllable while [y] satisfies the onset requirement. In fact in some languages such as Shona -C- roots prefix i- in the imperative. There are, however, some complications with this approach as will be seen in the next section when we discusses cases involving V prefixes.

(5) An initial vowel of the root spreads its roundness features to the preceding glide.



The feature [+round] spreads to the left but [-round] is assigned by default as it is the elsewhere case. An onset is required even if the root is longer than -VC- or the verb is in the plural as illustrated in (4c.) and (4d.), respectively. The onset condition applies only to the

root morpheme as more examples in this chapter will reveal. The root itself can be -VC-, -VCVC- or even longer.

From the examples in this subsection, it is clear that verbs in the singular imperative mood must suffix default final vowel **-a** when no other affix is attached to the root as codas are not permitted. However, a question which arises is why specifically **-a** is suffixed and not any other vowel given that [a] is not necessarily the default epenthetic vowel in Ndebele. The position taken here is that the default final vowel **-a** which is neither derivational nor inflectional is licensed morphologically as it has the feature [+verbal] while other vowels are ruled out because they either lack this feature or they have conflicting tense, aspect, mood, negation and polarity features. (See also Hyman, Inkelas and Sibanda 1999).

Verbs with -C- roots and those with vowel initial roots further need to satisfy the bi-syllabic minimality condition and the onset requirement, respectively. While the introduction of a glide to serve as an onset is not unusual as it occurs in many languages, the prefixing of **yi-** and suffixing of **-an-** other than any other affixes to stems with sub-minimal -C- roots deserves some explanation. Like default final vowel **-a**, **yi-** and **-an-** are neither derivational nor inflectional and only have the morphological feature [+verbal]². They are only brought in when the verb stem is less than two syllables and are never used in cases where the verb is bi-syllabic or longer. In other words when the requirement that a verb be at least two syllables has already been met adding any material that will create an extra-syllable is prohibited. When the verb stem is monosyllabic **yi-** and **-an-** are acceptable because they bring in the second necessary syllable whose feature [+verbal] does not conflict with tense, aspect, mood, negation and polarity features. Any other affix would either have features that conflict with these or lack the feature [+verbal]. For instance, inflectional suffixes such as

² They can also be treated as having the following sub-categorization frames: **-a** / []_{verb stem}; **yi-** / _{verb stem} [] and **-an-** / [C__a]_{verb stem}.

subjunctive **-e**, immediate past tense **-e** and negative **-i** would have additional requirements besides the feature [+verbal].

In short, this sub-section has shown that there are both phonological and morphological conditions imposed on the Ndebele verb at word level. A summary of the main points is given in (6)

(6) Main points.

- a. At word level a verb must be at least a Minimal Default Stem (Root +a).
- b. At word level a verb must be at least two syllables long.
- c. At word level the verb's vowel initial root must have an onset in the imperative mood.

We now turn to external morpheme structure conditions.

4.2 External Morpheme Structure Conditions.

This section focuses on processes that result from the phonological shape of morphemes and the way they are concatenated. In other words, what happens at morpheme boundary will be of great interest. Some of the main problems were alluded to in the previous sub-section, namely, the non-acceptability of codas and the requirement that a vowel initial root begin with an onset in the imperative mood. However, root structure conditions will be considered separately in the section 4.4. We begin this section by looking at general properties of affixation in 4.2.1 followed in 4.2.2 by those in which the semantically 'empty' syllable **-si-** is used. Cases involving CV- and VCV- prefixes are discussed in 4.2.3 and the ghost vowel [i] is considered in 4.2.4. Finally, a summary is given in 4.2.5.

4.2.1 General properties of affixation.

We saw in 4.1 that when no inflectional affix is required unacceptable codas are avoided by suffixing default final vowel **-a** to the root. It was also shown that glides [y] and [w] are prefixed to vowel initial roots in the imperative mood where no prefix morpheme is required. More still needs to be said about how the coda and onset problems are resolved particularly when other affixes are involved.

Codas also have to be avoided when derivational suffixes are attached to the root but with no inflectional suffixes included. As was seen in 2.3.2 and 2.3.3, productive and non-productive derivational suffixes always end with consonants and without epenthesizing a vowel final syllables of stems with these suffixes would be closed. To resolve the coda problem, default final vowel **-a** is again suffixed as in the case of unsuffixed roots. Here are some examples.

(7) Default final vowel **-a** is suffixed to avoid unacceptable codas.

- | | | | | |
|----|----------------|---|-----------------|---------------------|
| a. | phek-is- | → | phek-is-a | ‘cause to cook’ |
| | hlikihl-is- | → | hlikihl-is-a | ‘cause to wipe’ |
| b. | phek-is-el- | → | phek-is-el-a | ‘cause to cook for’ |
| | hlikihl-is-el- | → | hlikihl-is-el-a | ‘cause to wipe for’ |

In (7a.) CAUS **-is-** comes after the root and in (7b.) APP **-el-** comes after CAUS **-is-** which is itself preceded by the root. In both cases the final consonant has to be followed by **-a** in the absence of an inflectional suffix. Inflectional suffixes themselves are not associated with the coda problem we have seen as they are either vowels or end with vowels, for example, immediate past tense **-e** and perfective **-ile**. In affirmative cases such as those in (7) where tense, mood and implication are not marked by suffixes **-a** appears to be brought in to ensure that the final syllable is not a closed one. This suffixation of **-a** also automatically

creates Default-Stems (i.e. unmarked I-Stems) as we saw in the previous section although in (7) the stems are longer than the minimal ones.

While the examples considered so far in this chapter may lead to the conclusion that a verb always requires an onset it is in fact not accurate. Examples in (8) make it clear that the onset requirement is only for a syllable that constitutes part of the root.

- (8). Consonant initial roots preceded by V subject and object markers do not require an onset.
- | | | |
|----|--------------|-----------------------------|
| a. | ba-phek-a | ‘they are cooking...(cl 2)’ |
| | ba-hlikihl-a | ‘they are wiping ...(cl 2)’ |
| b. | u-phek-a | ‘s/he are cooking...(cl 1)’ |
| | u-hlikihl-a | ‘s/he are wiping...(cl 1)’ |
| c. | ba-dl-a | ‘they are eating ...(cl 2)’ |
| | ba-ph-a | ‘they are giving ...(cl 2)’ |
| d. | i-dl-a | ‘it is eating ...(cl 9)’ |
| | i-ph-a | ‘it is giving ...(cl 9)’ |
| e. | si-phek-e | ‘cook it (cl 7)’ |
| | si-hlikihl-e | ‘wipe it (cl 7)’ |
| f. | i-phek-e | ‘cook it (cl 7)’ |
| | i-hlikihl-e | ‘wipe it (cl 7)’ |
| g. | zi-dl-e | ‘eat them (cl 10)’ |
| | zi-ph-e | ‘give them (cl 10)’ |
| h. | a-dl-e | ‘eat them (cl 6)’ |
| | a-ph-e | ‘give them (cl 6)’ |

In (8a.) through (8d.) the prefix is the subject marker and in the rest of the examples in (8) the root or stem is preceded by an object marker. In (8a.), (8c.), (8e.) and (8g.) where the prefix is CV- there is clearly no problem as the consonant of that prefix provides an onset. Examples in (8b.), (8d.), (8f.) and (8h.) where the prefix is just a vowel make it clear that no onset is required if the stem is consonant-initial. Perhaps the most interesting examples here are those in (8f.) and (8h.) which are in the imperative mood just like those we saw in the

preceding sub-section but differing in that the vowel is this time not part of the root but an object marker. The fact that no onset is required in (8f.) and (8h.) and yet it was required in (4) shows that phonology is sensitive to morpheme differences as the onset requirement applies selectively. In a derivational approach a rule which inserts an onset in (4) would therefore be lexical as it has access to the lexicon, thereby being able to determine which morpheme it is dealing with. Some post lexical rules will be seen in Chapter 6 when we deal with tone. (For details on lexical phonology and lexical rules, see Kiparsky 1982; 1985; Mohanan 1986, and others).

There are other cases where prefixes appear to provide onsets to roots but a closer look will show that these V and CV prefixes surface as Cs in order to avoid the creation of ill-formed VV sequences. Introducing a consonant to break up the ill-formed VV sequence is unacceptable. Even a glide is never inserted between the two vowels in Ndebele but an underlying VV sequence is resolved in one of the following three ways.

There can be glide formation whereby the first vowel in the sequence glides (i.e. $V \rightarrow G/__V$). When a high vowel prefix **i-** or **u-** immediately precedes a vowel initial root as in (9a.) and (9b.) for instance, the high vowel glides so that on the surface **i-** occurs as **y-** and **u-** as **w-**. Vowel initial roots normally commence with [-high] vowels. Glide insertion that leads to VV sequences being realized as VGV on the surface is disallowed as no segment can intervene between two adjacent morphs as already pointed out. While in (9a.) the prefix is the class 10 SM **i-**, in (9b.) a class 1 SM **u-** is used.

(9) Glide formation: **i** → **y**; **u** → **w**

a.	i-elaph-a	→ y-elaph-a	'it is treating.../ it treats ...'	*i-y-elaph-a
	i-akh-a	→ y-akh-a	'it is building .../ it builds ...'	*i-y-akh-a
b.	u-elaph-a	→ w-elaph-a	's/he is treating.../ s/he treats ...'	*u-y-elaph-a
	u-akh-a	→ w-akh-a	's/he is building.../ s/he builds...'	*u-y-akh-a
c.	a-elaph-a	→ elapha	'they are treating .../ they treat...'	*a-y-elaph-a

a-akh-a	→ akha	‘they are building .../ they build...’	*a-y-akh-a
d. (w)a-elaph-e	→ (w)elaphe	‘treat them’	*(w)a-y-elaph-e
(w)a-akh-e	→ (w)akhe	‘build them’	*(w)a-y-akhe

In (9c.) and (9d.) where the prefix is the class 6 SM **a-** and the class 6 OM **-(w)a-**, respectively, no vowel gliding occurs but vowel deletion and coalescence that will be discussed below apply. Here also, glide insertion resulting in the creation of VGV sequences is not an acceptable solution. Note that the examples in (9d.) are in the imperative mood and that even if the OM is taken to be a [-high] vowel **-a-** rather than **-wa-** no gliding occurs. It can, therefore, be concluded that in the imperative the kind of glide insertion we saw in (4) occurs only if there is no morpheme preceding the vowel initial root. In other words the constraint requiring every V of a stem to have an onset can be violated if there is a preceding affix. If present, an onset glide would act as an intervening segment between the prefix and the root. As already pointed out, such intervention is unacceptable³.

Even if there are two **-V-** prefixes as in (10) where the SM in each example is followed by remote past tense **-a-** high vowels still glide and glide insertion is still disallowed even between two vowel morphs. This is valid also in cases involving consonant initial roots as (10c.) shows. Depending on the SMs used, some of the examples in (10) resemble those in the imperative mood we saw in (4) but differ in terms of tone which we will consider in the Chapter 6.

(10) Glide formation when there are two prefixes (*-V-G-V-(G)-Root)

a.(i)	u-a-elaph-a	→ w-elaph-a	‘he treated/cured’
(ii)	u-a-akh-a	→ w-akh-a	‘he built’

³ Note that in (9)a-c. the unacceptable asterisked forms can be well-formed if the inserted glide is from another morph such as present continuous tense **-ya-** and the class 9 object marker **-yi-** as in the following examples.

i-ya-elaph-a	→ i-y-elaph-a	‘it is treating/it treats’
i-yi-elaph-a	→ i-y-elaph-a	‘it is treats it (cl 9)’

(iii)	u-a-ona	→	w-ona	'he sinned/spoiled'
b.(i)	i-a-elaph-a	→	y-elaph-a	'it treated/cured'
(ii)	i-a-akh-a	→	y-akh-a	'it built'
(iii)	i-a-ona	→	y-ona	'it sinned/spoiled'
c.(i)	i-a-thath-a	→	y-a-thath-a	'it took'
(ii)	i-a-hlikihl-a	→	y-a-hlikihl-a	'it wiped'
(iii)	u-a-dl-a	→	w-a-dl-a	'he ate'

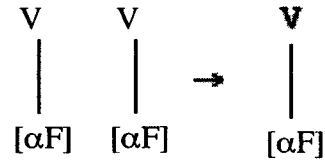
Note that in verbs whose roots commence with vowels [e] or [o] the tense marker **-a-** is deleted on the surface (although its high tone is preserved as will be seen in the next chapter). The deletion of the TM rather than the initial vowel of the root to avoid hiatus can be attributed to a constraint favoring preservation of material from the root rather than from affixes⁴ although the process can also be treated as deletion of [a] before another vowel (i.e. **a** → $\emptyset$ / __V). The constraint favoring preservation of material from the root is not violated in cases we have seen so far. Where the initial vowel of the root is **-a-** this vowel coalesces with the preceding **-a-** of the remote past tense following the normal coalescence processes of the language given in (11a.) (See also, Doke 1997, Malcom 1966 and others). Coalescences can be split into two rather than three processes as illustrated in (11b.). (11b.)(i) shows that two identical vowels yield a monomoraic vowel with the same features, and (11b.)(ii) illustrates that a [+low] vowel immediately followed by [+high] results in a monomoraic mid vowel.

(11) Coalescence Rules

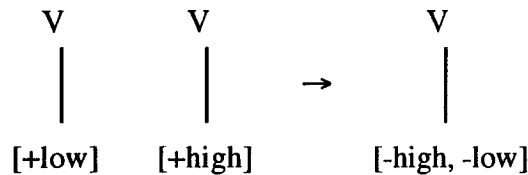
- a. (i) **a + a** → **a**
- (ii) **a + i** → **e**
- (iii) **a + u** → **o**

⁴ In Optimality Theory terms the TM is deleted as a result of ranking Max Root above Max Affix.

b. (i) Coalescence 1 (Coal.1) : $a + a \rightarrow a$



(ii) Coalescence 2 (Coal.2) : $a + i \rightarrow e$ and $a + u \rightarrow o$

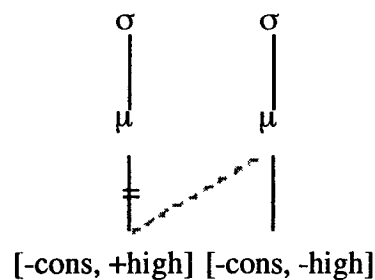


The vowel that results from coalescence takes only non-conflicting features from the two vowels which combine, [a] being treated as unspecified for roundness or backness. Thus, in (11a.)(i) both features, [+low] and [-high], are retained as the vowels are identical. The features [-round] and [+back] are assigned by default as the language has only one [+low] vowel which always takes those features. In (11a.)(ii) where [+low] and [+high] cannot co-occur the surviving non-conflicting features are [-high], [-low], [-round] and [-back]. The surviving features in (11a.)(iii) where [+low] and [+high] conflict are [-high], [-low], [+back] and [+round]. Backness in (11a.)(ii) and (11a.)(iii) could also be supplied by default since the main contrast in the derived vowels is in roundness. As we saw in (5) the feature [round] is the active one, not [back]. In cases where [a] is followed by a mid vowel coalescence fails because realization of any of the two vowels is possible. The feature [+low] of **a** does not conflict with [-high] of **e** or **o**, neither does the feature [-low] of **e** or **o** conflict with [-high] of **a**. A compromise is also not possible since phonologically the language has no vowel between **a** and **e** or between **a** and **o**. Also, when the vowels combine the backness and roundness features of **e** and **o** could lead to the creation of new vowels

which are not part of the vowel inventory of Ndebele. Thus deletion of the first vowel in the sequence (usually a vowel which is not part of the root) becomes the solution. Note that the result is different when the order of the two vowels that coalesce in each case in (11) is reversed. In such cases other processes such as glide formation and vowel deletion apply.

In (9) and (10) glide formation occurs when a high vowel is followed by a mid or low vowel. The glide formation process can be represented as in (12).

(12) Glide formation



Place features do not change when the vowel glides. As we saw above, it is always $i \rightarrow y$ and $u \rightarrow w$. Gliding also does not lead to compensatory lengthening in Ndebele, hence the change from a bimoraic structure to a monomoraic one.

The second way of avoiding ill-formed VV sequences is through vowel coalescence whereby two vowels come together to form one vowel and only non-conflicting features survive (e.g. [+Low, -High] + [+High, -Low] $\rightarrow$ [-High, -Low]). In Ndebele Coalescence occurs mainly in verbs with two consecutive /a/ prefixes such as those in (13). In such cases deletion, the third way of avoiding ill-formed VV sequences, may also apply if the root is vowel initial as in (13a)(i) and (13a)(iii).

(13) Verbs with roots preceded by two /a/ prefixes.

- | | | | | | |
|----|-------|-------------|---------------|-----------|-----------------------|
| a. | (i) | a-a-elaph-a | $\rightarrow$ | elaph-a | 'they treated/cured' |
| | (ii) | a-a-akh-a | $\rightarrow$ | akh-a | 'they built' |
| | (iii) | a-a-ona | $\rightarrow$ | ona | 'they sinned/spoiled' |
| b. | (i) | a-a-thath-a | $\rightarrow$ | a-thath-a | 'they took' |

- (ii) a-a-hlikihl-a → a-hlikihl-a 'they wiped'
 (iii) a-a-dl-a → a-dl-a 'they ate'

Note that in (13)a.(ii) coalescence applies twice. In (13)b. only coalescence applies.

Vowel deletion in Ndebele usually involves dropping the first vowel in a sequence of two (i.e. $V \rightarrow \emptyset / __ V$). In (13a.)(i) and (13a.)(iii) vowel deletion occurs when a [+low] vowel is followed by a [-low, -high] one. Examples in (14) provide other grammatical situations under which vowel deletion may occur.

(14) a. Indicative Mood (Immediate past)

- Ibe ihamba → ibihamba 'it was going/walking'
 Ube uhamba → ubuhamba 'you were going/walking'
 Abe ehamba → abehamba 'they were going/walking'

b. Exclusive Mood (Present tense)

- ise ihamba → i-s-i-hamba ~ s-i-hamba 'it is now going'
 use uhamba → u-s-u-hamba ~ suhamba 'you are now going'
 ase ehamba → a-s-e-hamba ~ s-e-hamba 'they are now going'

As can be seen with immediate past tense compounds in (14a.), a [-high, -low] vowel gets deleted when it is followed by a [+high] one. When both vowels are [e] coalescence occurs as there are no conflicting features. The same facts are confirmed in (14b.) where the verbs have exclusive *se-* in place of immediate past tense *be-*. When looked at in isolation, the two cases of deletion can be presented as in (15).

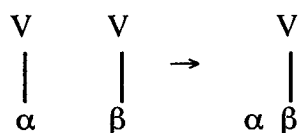
(15) Vowel Deletion

- a. V V
 [+low] → $\emptyset / __ [-high, -low]$
 b. V V
 [-high, -low] → $\emptyset / __ [+high]$

Deletion of **a** before **e** is represented by (15a.) and (15b.) takes care of the deletion of **e** before **i** or **u**. Note that in the two moods given in (14) there are no examples in which the second vowel is **o** or **a**.

The processes represented by the rules in (11), (12) and (15) are better treated together as in (16) since avoidance of ill-formed VV sequences is the driving force in all these cases. (16a.) shows that prohibition of VV is resolved by de-linking the V first from the feature α leaving only the second V linked to β . More specific changes are provided in (16b-d).

(16) a. Prohibition of VV.



- b. $\emptyset \rightarrow C$ if $\alpha = [+high]$
- c. If $\alpha = [+low]$ and $\beta = [-high, -low]$ or if $\alpha = [-high, -low]$ and $\beta = [+high]$, then α gets deleted.
- d. Otherwise $\alpha + \beta$ coalesce:
 - (i) If $\alpha = \beta$ no change in features
 - (ii) If $\alpha = [+low]$ and $\beta = [+high]$ result is $[-high; -low]$

(16b.) represents cases of gliding when α is $[+high]$ and (16c.) the two cases of vowel deletion illustrated in (15). If gliding or deletion cannot occur then coalescence occurs in one of the two ways in (16d.). (16d.i) shows that the output of coalescence when α and β are identical is an identical vowel. However, if α is $[+low]$ and β is $[+high]$ the result is a $[-high; -low]$ vowel as summarized in (16d.ii).

4.2.2 Semantically 'Empty' Syllable -si-

In some moods where **o** or **a** would potentially be in the second position a semantically empty -si- is inserted between the two vowels so that the $[-high]$ vowel is preceded by a

[+high] one which does not surface. More will be said about the failure of the [+high] vowel to surface in the next sub-section where we look at CV- and VCV prefixes. In this sub-section we consider first the Indicative Mood with an exclusive implication exemplified in (17). The interesting prefixes here are V ones such as subject markers occurring in the second person singular and in the third person classes 1, 3, 4, 6 and 9.

(17) Indicative Mood (Exclusive)

- | | | | | | |
|----|------------------|---|-----------------|------------------------|--------------------------------|
| a. | u-se u-khal-a | → | u-s-u-khal-a | 'you are now crying' | (2 nd Person Sing.) |
| | u-se u-hlikihl-a | → | u-s-u-hlikihl-a | 'you are now wiping' | (2 nd Person Sing.) |
| | u-se e-khal-a | → | i-s-e-khal-a | 's/he is now crying' | (cl. 1) |
| | u-se e-hlikihl-a | → | u-s-e-hlikihl-a | 's/he is now wiping' | (cl. 1) |
| | u-se u-khal-a | → | u-s-u-khal-a | 'it is now crying' | (cl. 3) |
| | u-se u-hlikihl-a | → | u-s-u-hlikihl-a | 'it is now wiping' | (cl. 3) |
| | i-se i-khal-a | → | i-s-i-khal-a | 'they are now crying' | (cl. 4) |
| | i-se i-hlikihl-a | → | i-s-i-hlikihl-a | 'they are now wiping' | (cl. 4) |
| | a-se e-khal-a | → | a-s-e-khal-a | 'they now crying' | (cl. 6) |
| | a-se e-hlikihl-a | → | a-s-e-hlikihl-a | 'they are now wiping' | (cl. 6) |
| | i-se i-khal-a | → | i-s-i-khal-a | 'it is now crying' | (cl. 9) |
| | i-se i-hlikihl-a | → | i-s-i-hlikihl-a | 'it is now wiping' | (cl. 9) |
| b. | u-se u-dla | → | u-s-u-si-dl-a | 'you are now eating' | (2 nd Person Sing.) |
| | u-se u-ph-a | → | u-s-u-si-ph-a | 'you are now giving' | (2 nd Person Sing.) |
| | u-se e-si-dl-a | → | i-s-e-si-dl-a | 's/he is now eating' | (cl. 1) |
| | u-se e-si-ph-a | → | u-s-e-si-ph-a | 's/he is now giving' | (cl. 1) |
| | u-se u-si-dl-a | → | u-s-u-si-dl-a | 'it is now eating' | (cl. 3) |
| | u-se u-si-ph-a | → | u-s-u-si-ph-a | 'it is now giving' | (cl. 3) |
| | i-se i-si-dl-a | → | i-s-i-si-dl-a | 'they are now eating' | (cl. 4) |
| | i-se i-si-ph-a | → | i-s-i-si-ph-a | 'they are now giving' | (cl. 4) |
| | a-se e-si-dl-a | → | a-s-e-si-dl-a | 'they are now eating' | (cl. 6) |
| | a-se e-si-ph-a | → | a-s-e-si-ph-a | 'they are now giving' | (cl. 6) |
| | i-se i-dla | → | i-s-i-si-dl-a | 'it is now eating' | (cl. 9) |
| | i-se i-ph-a | → | i-s-i-si-ph-a | 'it is now giving' | (cl. 9) |
| c. | u-se u-eq-a | → | u-s-u-s-eq-a | 'you are now jumping' | (2 nd Person Sing.) |
| | u-se u-akh-a | → | u-s-s-s-akh-a | 'you are now building' | (2 nd Person Sing.) |
| | u-se u-on-a | → | u-s-u-s-on-a | 'you are now spoiling' | (2 nd Person Sing.) |
| | u-se e-eq-a | → | u-s-e-s-eq-a | 's/he is now jumping' | (cl. 1) |
| | u-se e-akh-a | → | u-s-e-s-akh-a | 's/he is now building' | (cl. 1) |
| | u-se e-on-a | → | u-s-e-s-on-a | 's/he is now spoiling' | (cl. 1) |
| | u-se u-eq-a | → | u-s-u-s-eq-a | 'it is now jumping' | (cl. 3) |
| | u-se u-akh-a | → | u-s-u-s-akh-a | 'it is now building' | (cl. 3) |
| | u-se u-on-a | → | u-s-u-s-on-a | 'it is now spoiling' | (cl. 3) |

i-se i-eq-a	→	i-s-i-s-eq-a	'they are now jumping' (cl. 4)
i-se i-akh-a	→	i-s-i-s-akh-a	'they are now building' (cl. 4)
i-se i-on-a	→	i-s-i-s-on-a	'they are now spoiling' (cl. 4)
a-se e-eq-a	→	a-s-e-s-eq-a	'they are now jumping' (cl. 6)
a-se e-akh-a	→	a-s-s-s-akh-a	'they are now building' (cl. 6)
a-se e-on-a	→	a-s-e-s-on-a	'they are now spoiling' (cl. 6)
i-se i-eq-a	→	i-s-i-s-eq-a	'it is now jumping' (cl. 9)
i-se i-akh-a	→	i-s-i-s-akh-a	'it is now building' (cl. 9)
i-se i-on-a	→	i-s-i-s-on-a	'it is now spoiling' (cl. 9)

As can be seen in (17a.) there is no problem when a V affix is prefixed to a CVC- or longer consonant initial stem as processes we saw in the preceding sub-section still apply. However, if the stem is just a sub-minimal -C- root as in (17b.) or is vowel initial as in (17c.) semantically empty -si- is inserted between the prefix and the stem. In vowel initial roots -si- surfaces as -s- to avoid ill-formed VV sequences and for a reason that will be clear in the next section as already alluded to.

Facts similar to those about the Indicative Mood (Exclusive) can also be observed in the Conditional Mood. A few examples in (18) should suffice.

(18) Conditional Mood

a.	nxu u-khal-a	→	nxu u-khal-a	'if you are crying'	(2 nd Person Sing.)
	nxu e-khal-a	→	nxu e-khal-a	'if s/he is crying'	(cl. 1)
	nxu i-khal-a	→	nxu i-khal-a	'if it is crying'	(cl. 9)
	nxu u-hlikihl-a	→	nxu u-hlikihl-a	'if you are wiping'	(2 nd Person Sing.)
	nxu e-hlikihl-a	→	nxu e-hlikihl-a	'if s/he is wiping'	(cl. 1)
	nxu i-hlikihl-a	→	nxu i-hlikihl-a	'if it is wiping'	(cl. 9)
b.	nxu u-dl-a	→	nxu u-si-dl-a	'if you are eating'	(2 nd Person Sing.)
	nxu e-dl-a	→	nxu e-si-dl-a	'if s/he is eating'	(cl. 1)
	nxu i-dl-a	→	nxu i-si-dl-a	'if it is eating'	(cl. 9)
c.	nxu u-eq-a	→	nxu u-s-eq-a	'if you are jumping'	(2 nd Person Sing.)
	nxu u-akh-a	→	nxu u-s-akh-a	'if you are building'	(2 nd Person Sing.)
	nxu u-on-a	→	nxu u-s-on-a	'if you are spoiling'	(2 nd Person Sing.)
	nxu e-eq-a	→	nxu e-s-eq-a	'if s/he is jumping'	(cl. 1)
	nxu e-akh-a	→	nxu e-s-akh-a	'if s/he is building'	(cl. 1)
	nxu e-on-a	→	nxu e-s-on-a	'if s/he is spoiling'	(cl. 1)
	nxu i-eq-a	→	nxu i-s-eq-a	'if it is jumping'	(cl. 9)
	nxu i-akh-a	→	nxu i-s-akh-a	'if it is building'	(cl. 9)

nxa i-on-a → nxa i-s-on-a 'if it is spoiling' (cl. 9)

As seen in (18a.) where the stem is CVC- or longer, input is identical to output. However, in (18b.) and (18c.) **-si-** is inserted between the two successive vowels in the verb since the stems are C- and vowel-initial, respectively. As expected, only **-s-** surfaces in verbs with vowel-initial stems.

The Participial Mood provides another instance where **-si-** is brought in under similar conditions.

(19) Participial Mood

- | | | | | |
|----|--------------------|---|--------------------|---|
| a. | wafika u-khal-a | → | wafika u-khal-a | 'you arrived crying' (2 nd Person Sing.) |
| | wafika e-khal-a | → | wafika e-khal-a | 's/he arrived crying' (cl. 1) |
| | yafika i-khal-a | → | yafika i-khal-a | 'it arrived crying' (cl. 9) |
| | wafika u-hlikihl-a | → | wafika u-hlikihl-a | 'you arrived wiping' (2 nd Person Sing.) |
| | wafika e-hlikihl-a | → | wafika e-hlikihl-a | 's/he arrived wiping' (cl. 1) |
| | yafika i-hlikihl-a | → | yafika i-hlikihl-a | 'it arrived wiping' (cl. 9) |
| b. | wafika u-dl-a | → | wafika u-si-dl-a | 'you arrived eating' (2 nd Person Sing.) |
| | wafika e-dl-a | → | wafika e-si-dl-a | 's/he arrived eating' (cl. 1) |
| | yafika i-dl-a | → | yafika i-si-dl-a | 'it arrived eating' (cl. 9) |
| c. | wafika u-eq-a | → | wafika u-s-eq-a | 'you arrived jumping' (2 nd Person Sing.) |
| | wafika u-akh-a | → | wafika u-s-akh-a | 'you arrived building' (2 nd Person Sing.) |
| | wafika u-on-a | → | wafika u-s-on-a | 'you arrived spoiling' (2 nd Person Sing.) |
| | wafika e-eq-a | → | wafika e-s-eq-a | 's/he arrived jumping' (cl. 1) |
| | wafika e-akh-a | → | wafika e-s-akh-a | 's/he arrived building' (cl. 1) |
| | wafika e-on-a | → | wafika e-s-on-a | 's/he arrived spoiling' (cl. 1) |
| | yafika i-eq-a | → | yafika i-s-eq-a | 'it arrived jumping' (cl. 9) |
| | yafika i-akh-a | → | yafika i-s-akh-a | 'it arrived building' (cl. 9) |
| | yafika i-on-a | → | yafika i-s-on-a | 'it arrived spoiling' (cl. 9) |

Clearly facts about (19a.), (19b.) and (19c.) correspond to those about (18a.), (18b. and (18c.), respectively. There is therefore no need to restate them. Still similar facts can also be observed in the Remote Past Tense (continuous) of the Indicative Mood as illustrated in (20).

(20) Indicative mood (Remote Past (Continouos)).

- a. i-a-ye i-khal-a → y-a-y-i-khal-a 'it was crying' (cl. 9)
 a-a-ye e-khal-a → a-ye-khal-a 'they were crying' (cl. 6)
 u-a-ye u-khal-a → w-a-y-u-khal-a → w-a-w-u-hamba-a 's/he was crying' (cl. 1)
- b. i-a-ye i-dl-a → i-a-ye i-si-dl-a → y-a-y-i-si-dl-a 'it was eating'
 a-a-ye e-dl-a → a-a-ye e-si-dl-a → a-y-e-si-dl-a 'they were eating'
 u-a-ye u-dl-a → u-a-ye u-si-dl-a → w-a-y-u-si-dl-a → w-a-w-u-si-dl-a 'you were eating'
- c. i-a-ye i-on-a → y-a-ye i-si-on-a → y-a-y-i-s-on-a 'it was spoiling'
 a-a-ye e-on-a → a-a-ye e-si-on-a → a-y-e-s-on-a 'they were spoiling'
 u-a-ye u-on-a → u-aye u-si-on-a → w-a-y-u-s-on-a → w-a-w-u-si-on-a 's/he was spoiling'

In (20a.) where the stem is a long CVC-a one, **-khal-a** 'cry', **-si-** cannot be used. However, in (20b.) and (20c.) where the stem is mono-syllabic **-dl-a** and vowel initial **-on-**, respectively, **-si-** is necessary. Of course, in a vowel initial stem such as **-on-**, **-si-** surfaces as **-s-** to avoid an unacceptable VV sequence. Note that in each of the third examples in (20a.), (20b.) and (20c.) there is also a **yu** → **wu** change. In the database used in this study no verb or any other word has a **yu** syllable and the only Ndebele word I could find outside the database is the interjection **mayuyu** used when asking someone to stop fighting. Interestingly, **-wi-** is also dispreferred as it only occurs in the verb **wisa** 'make fall' (which is made up of the root **-w-** 'fall', the causative suffix **-is-** and default final vowel **-a**), and in the noun **isikliwi** 'bandit'. It is clear that when a high vowel is preceded by a glide the preference is for that glide to share the same place of articulation with the vowel. In general acceptability of glide plus vowel can be taken to be as in (21).

(21) Glide + Vowel

yi	*yu	*wi	wu
ye	yo	we	wo
ya		ye	wa

The table shows that most **glide + vowel** combinations are acceptable except **yu** and **wi**.

Before we leave this sub-section it is important to see what happens to **-si-** when there are suffixes. The few examples in (22) are taken from (17), (18), (19) and (20) above but the applicative suffix **-el-** has now been added to each of the verb stems.

(22) Verbs with suffixes.

a. Indicative Mood (Exclusive)

- (i) u-se u-khal-el-a → u-s-u-khal-el-a 'you are now crying for' (2nd Person Sing.)
- (ii) u-se u-dl-el-a → u-s-u-dl-el-a 'you are now eating for' (2nd Person Sing.)
- *u-s-u-si-dl-el-a
- (iii) u-se u-eq-el-a → u-s-u-s-eq-el-a 'you are now jumping for' (2nd Person Sing.)

b. Conditional Mood

- (i) nxa e-khal-el-a → nxa e-khal-el-a 'if s/he is crying for' (cl. 1)
- (ii) nxa e-dl-el-a → nxa e-dl-el-a 'if s/he is eating for' (cl. 1)
- *nxa e-si-dl-el-a
- (iii) nxa e-on-el-a → nxa e-s-on-el-a 'if s/he is spoiling for' (cl. 1)

c. Participial Mood

- (i) yafika i-khal-el-a → yafika i-khal-el-a 'it arrived crying for' (cl. 9)
- (ii) yafika i-dl-el-a → yafika i-dl-el-a 'it arrived eating for' (cl. 9)
- *yafika i-si-dl-el-a
- (iii) yafika i-akh-el-a → yafika i-s-akh-el-a 'it arrived building for' (cl. 9)

d. Indicative mood (Remote Past (Continuous)).

- (i) a-a-ye e-khal-el-a → a-ye-khal-el-a 'they were crying for' (cl. 6)
- (ii) a-a-ye e-dl-el-a → a-a-ye-dl-el-a 'they were eating for' (cl. 9)
- *a-a-ye-si-dl-el-a
- (iii) a-a-ye e-on-el-a → a-a-ye e-s-on-el-a 'they were spoiling for' (cl. 6)

As can be seen in (22a-d.), example (i) which now has a CVC-VC- stem in each case surfaces with no **-si-**. Interestingly, examples numbered (ii) which previously had monosyllabic stems but whose stems are now C-VC- no longer take **-si-**. However, vowel initial verbs exemplified in each of the cases numbered (iii) still surface with the **-s-** from **-si-**. The generalization then is that **-si-** is brought in when the stem is monosyllabic or vowel initial but only in the moods discussed in this section.

4.2.3 CV- and VCV- prefixes

So far we have considered mainly vowel prefixes without checking to see if the generalizations made above also hold when prefixes include consonants. In (23a.) where the infinitive prefix **uku-** is attached to a vowel initial root, we see that [u] glides as expected. Glide formation also occurs in (23b.) and (23c.) where the prefixes are class 15 SM **ku-** and class 11 SM **lu-**, respectively. The gliding of [u] results in the labialization of the preceding consonant not in a consonant cluster which the orthography seems to suggest. In (23d.), however, gliding or labialization of the preceding consonant is not evident due to the fact that Ndebele does not permit labialized labials⁵. The ill-formed VV sequence is resolved by dropping the glide -w- from [u] after glide formation, leaving only the consonant [b] to represent the class 14 SM on the surface.

(23) Resolving the problem of ill-formed VV sequences when the prefix is VCV- or CV-.

a.	uku-elaph-a	→ ukw-elaph-a	'to treat'
	uku-akh-a	→ ukw-akh-a	'to build'
b.	ku-elaph-a	→ kw-elaph-a	'it treats ...'
	ku-akh-a	→ kw-akh-a	'it builds ...'
c.	lu-elaph-a	→ lw-elaph-a	'it treats ...'
	lu-akh-a	→ lw-akh-a	'it builds ...'
d.	bu-eleph-a	→ b-elaph-a	'it treats ...'
	bu-akh-a	→ b-akh-a	'it builds ...'
e.	li-elaph-a	→ l-elaph-a	'it treats ...'
	li-akh-a	→ l-akh-a	'it builds ...'
f.	si-elaph-a	→ s-elaph-a	'it treats ...'
	si-akh-a	→ s-akh-a	'it builds ...'
g.	u-a-wu-elaph-a	→ w-a-w-elaph-a	's/he treated it'
	u-a-yi-akh-a	→ w-a-y-akh-a	's/he built it'

⁵ In Ndebele [w] is treated as a labial and not as a velar sound. More problems associated with labialized labials are discussed in the next chapter.

The vowel is also deleted on the surface in (18e.) and (18f.) where the prefixes are class 5 SM **li-** and class 7 SM **si-**, respectively. The sounds [ly] and [sy] (or palatalized [lʲ] and [sʲ]) are not part of the consonant inventory of Ndebele hence VV sequences are avoided by dropping the vowel of the prefix presumably after glide formation just as in (18d.).

In Ndebele **li-**, **si-** and other Ci- syllables are well-formed just like Bu- (where B stands for bilabial). However, Cy occurs nowhere in the grammar (i.e. *Cy in the language in general) unlike Cw⁶ which is only disallowed root medially if it is not a copy of the consonant in the root-initial syllable or anywhere in the word when the consonant immediately preceding -w- is a bilabial. In other word the constraints *Cy and *Bw hold throughout the grammar but Cw is restricted by position and depends on whether or not the C is a bilabial. The non-occurrence of Cy throughout the grammar can nonetheless be explained by the fact that the environment for [i] to glide is never created except when the preceding consonant is a coronal. While there are prefixes such as **lu-** (class 11 SM) and **ku-** (class 15 SM) where [u] is preceded by a non-labial there are no Ci- prefixes where [i] is preceded by a non-coronal. There is also an asymmetry in that Cw occurs in non-derived environments but not Cy as already noted.

Examples in (23g.) show that glides are treated like any other consonant in Ndebele. The high vowels in the class 1 OM -**wu-** and class 9 OM -**yi-** presumably glide and get deleted as in the other cases we have seen since Cu- and Ci- are acceptable syllables but not a labialized labial or Cʷ. Gliding can in fact be treated as consonantalization.

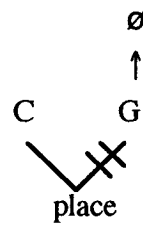
The examples in (23) provide clear evidence that there is a glide deletion process as the language generally permits CV sequences in which the vowel is high. Glide deletion can be presented as in (24a.) or (24b.)⁷.

⁶ See the next subsection for detail about the occurrence and distribution of Cw.

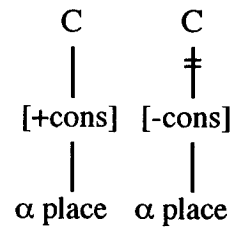
⁷ Glide deletion can also be treated as a constraint, *Bw/*Cy (where B=bilabial). The constraint against labialized labials and 'coronalized' coronals is presented below as a more general one on glides.

(24) Glide Deletion

a.



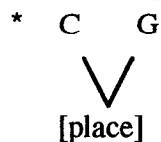
b.



The representations in (24) shows that a high vowel which has become a ‘glide’ and shares the same place of articulation with the preceding consonant gets deleted. If there are two melodic elements instead of a single multilinked one, the deletion of the glide also means that when the vowel is now treated as a consonant there is no violation of the Obligatory Contour Principle (OCP) which prohibits adjacent identical elements at the melodic level. (For details on the OCP, see McCarthy 1986).

4.2.4 Ghost vowel [i]

There are also four verbs out of the twenty-three with sub-minimal -C- roots in the database which sometimes behave as if they are vowel-initial particularly when coalescence applies. The verbs are given in (25) where both (25a.) and (25b.) illustrate the normal shape of the root when coalescence does not apply. While the prefix is infinitive **uku-** in (25a.), it is class 1 or class 3 SM **u-** in (25)b. The verb root is in bold face in each of the examples.



(25) Verbs with sub-minimal roots when coalescence does not apply.

a.	uku-z-a	‘to come’	(PB *-yjj-/-jjj-)
	uku-m-a	‘to stand’	(PB -yím-/-jím-/gi-am-)
	uku-zw-a	‘to hear’	(PB yjgu/-jjg-)
	uku-s-a	‘to dawn	(PB -kí-/-ké)
b.	u-z-a	‘s/he comes’	
	u-m-a	‘s/he stands’	
	u-zw-a	‘s/he hears’	
	u-s-a	‘it dawns’	

As can be seen, the root is just a consonant in each of the examples in (25). However, when vowel [a] immediately precedes the root as in (26) that root behaves as if its initial segment is vowel [i].

(26) Coalescence when there is ghost vowel [i].

a.	a-(i)z-a	→ eza ~ aza	‘they come’
	a-(i)m-a	→ ema ~ ama	‘they stand’
	a-(i)zw-a	→ ezwa ~ azwa	‘they hear’
	a-(i)s-a	→ esa ~ asa	‘they dawn’
b.	ba-(i)z-a	→ beza ~ baza	‘they come’
	ba-(i)m-a	→ bema ~ bama	‘they stand’
	ba-(i)zw-a	→ bezwa ? bazwa	‘they hear’
c.	u-a-(i)z-a	→ weza ? waza	‘s/he came’
	u-a-(i)m-a	→ wema ~ wama	‘s/he stood’
	u-a-(i)zw-a	→ wezwa ~ wazwa	‘s/he heard’
	u-a-(i)s-a	→ wesa ~ wasa	‘it dawned’
d.	lu-a-(i)z-a	→ lweza ? lwaza	‘it came’
	si-a-(i)z-a	→ seza ? saza	‘it came’
	ba-a-(i)z-a	→ beza ? baza	‘they came’

In (26a.) the class 6 SM a- immediately precedes the root and in (26b.) the SM immediately before the root is class 2 ba-. In (26c.) and (26d.) the vowel immediately before the root is remote past -a-. In all the examples the ghost vowel [i] (in brackets), also referred to as

It shows that a ‘glide’ cannot share the same place of articulation with the preceding consonant. The

latent [i] by Doke 1997, coalesces with the preceding [a]. In (26c.) where [a] is preceded by the class 1 or 3 SM **u-** glide formation also occurs as expected. In (26d.) where the class 11, class 7 and class 2 SMs are **CV-** gliding occurs if the vowel of the SM is [+high]. (Deletion of the glide also occurs where applicable). However, if the vowel of the SM is [+low] coalescence is followed by Vowel Deletion (a-a-i- → a-e- → e) although the two processes could also be viewed as coalescence applying twice (a-a-i- → a-i- → e) particularly when affixation is not taken to be cyclic. Note that in each case in (26a.) a variant of the verb in which the root is not preceded by **-i-** is also grammatical but in some instances this variant sounds odd hence the question mark.

The presence of the ghost vowel means that the root can be treated as having two allomorphic forms one of which surfaces only if the root is immediately preceded by [a] while the other does not have this restriction. Alternatively, the root can be treated as a consonant with a floating [i] which is optionally attached if there is a preceding [a]. It can also be posited that the root is vowel initial but the [i] is circumscribed so that most phonological rules have no access to it except coalescence when the vowel preceding the root is [a]. If there is no [a] preceding the root the circumscribed [i] is eventually stray erased. (For more details on ‘prosodic circumscription’ and its implementation see McCarthy and Prince 1986, Hyman and Mchombo. 1992, Katamba 1993 and others). Although suffixed forms such as those in (27a.) may seem to suggest that the ghost vowel is just brought in for prosodic minimality purposes as two forms that take [i] sound odd, examples in (27b.) show that the ghost vowel is acceptable even in suffixed forms.

(27) Ghost Vowel in Suffixed Forms

- | | | | | |
|----|----------------------|-------------------|------------------|------------------|
| a. | ba-(i)z-ela | → bezela | ~ bazela | ‘they come for’ |
| | ba-(i)m-el-a | → ?bemela | ~ bamela | ‘they stood for’ |
| | ba-(i)zw-el-a | → ?bezwela | ~ bazwela | ‘they hear for’ |

motivation for this constraint, particularly *Bw, will be more apparent in the next chapter on palatalization.

- b. lu-a-(i)z-el-a → lwezela ~ lwazela 'it came for'
 si-a-(i)z-el-a → sezela ~ sazela 'it came for'
 ba-a-(i)z-el-a → bezela ~ bazela 'they came for'

It must be pointed out, however, that many young people now tend to drop the initial vowel in vowel initial roots in general so that the root commences with a consonant. Without positing that there are allomorphs, a floating [i] or appealing to prosodic circumscription followed by stray erasure it becomes problematic to explain why in the forms such as those in (28) the vowel from the prefix is retained while the initial vowel of the root is deleted. Perhaps the fact that the sequence **wi** is dispreferred in the language rules out forms like **lwiza** and **kwisa**. If this is the case then forms like **liza** and **kisa** would be the expected ones but root material is deleted instead.

(28) Vowel deleted from root rather than from prefix

- lu-iz-a → luza 'it comes' *liza, *lwiza,
ku-is-a → kusa 'it dawns' *kisa, *kwisa

As noted earlier, material from the root is generally preserved. Gliding of the [+high] prefix vowel is also not possible in (28) as both vowels in the ill-formed VV sequence are [+high]. Nowhere in morpheme concatenation do we see two [+high] vowels combining. As pointed out above gliding only occurs if the first of the two vowels is [+high] and the second is [-high]. A vowel deletion rule would also delete the wrong vowel, the one in the prefix instead of -i-. It is clear that the ghost vowel is not visible to phonological rules except when the root is preceded by [a]. Also important to note is the fact that the ghost vowel -i- never surfaces as a [+high] vowel. We need to link this with the observation we made in Chapter 2, namely that vowel initial roots never commence with high vowels [i] and [u]. It is evident that the initial vowel of a root cannot be [+high] in Ndebele but can only be [e], [a] or [o],

and this holds not only in cases involving ghost vowels, but throughout the grammar⁸. This can be presented formally as in (29).

(29) An initial vowel of a root cannot be [+high].

$$\begin{array}{c} \text{V} \\ [+high] \rightarrow [-high] \quad / \quad [_\text{C}(\text{V})(\text{C})\text{-}]_{\text{Root}} \end{array}$$

This ensures that an underlyingly [+high] initial vowel of a root surfaces as [-high]. The actual distribution of vowel-initial roots is given (30).

(30) Vowel-initial Roots

Initial Vowel	No of Roots
i	0
e	53
a	19
o	14
u	0
TOTAL	86

As can be seen no root begins with [i] or [u] in the database. Most vowel-initial verbs (53) begin with [e] and 19 commence with [a]. Only 14 begin with [o].

4.2.5 Summary

Finally we need to see a complete picture of what happens with different vowel combinations specifically in verbs as other parts of speech have not been considered. The table in (31) where the vertical axis represents V_1 and the horizontal axis V_2 provides a summary of the $V_1 V_2$ combinatorial facts.

⁸ A constraint such as *Structure -iR- (where i = [-cons, +high] and R=Root) would easily capture this fact in an Optimality Theory approach.

(31) Vowel combinations and their products.

	V ₂					
V ₁		i	e	a	o	u
	i		ye	ya	yo	
	e	[i]	e	ye		[u]
	a	e	[e]	a	[o]	o
	o					
	u		we	wa	wo	

Unbracketed products of the form CV (where C is a glide) result from the gliding of the first vowel in a VV sequence while unbracketed vowel products are due to coalescence of the two vowels. Vowels that survive in cases of deletion are in square brackets. Note that no verb stem or affix ends in -o except for the irregular deficient verb **-tsho** ‘say’, hence there is no V₁ V₂ sequence where V₁ is o. There are also no instances where a VV sequence is a combination of two [+high] vowels.

Although we ignored most suffixes as they are either -V, or -VC- and are associated with less interesting morpho-phonological processes in the verb, there is one that deserves special attention. This is perfective **-ile** associated with imbrication which we focus on in the next section.

4.3 Truncation and Imbrication in the Perfective.

Imbrication in Bantu languages has been described by Hyman (1995: 3-4) as “a process by which a formative such perfective ***-jd-** (from Proto-Bantu ***-jd-e**) fuses with its base” (see also Bastin (1983)). Hyman further points out that in many Bantu languages verbal paradigms such as selected perfective, stative and past tenses are now marked by reflexes of ***-jd-e**. In Ndebele reflexes of ***-jd-e** mark the present and past perfect tenses as well as

the immediate past tense. While the immediate past consistently surfaces as **-e**, the two perfective tenses are marked by **-il-e** whose **-il-** part sometimes fuses with the base⁹. As Doke (1997: 132) observes, “the perfect stem is used in the formation of the immediate past tenses, ...but with stative verbs, i.e., with verbs which indicate a state already completed and still persisting, the perfect stem is used in present tense formation also”. Of particular interest in this subsection, will be these two perfective tenses in which imbrication occurs. However, in most cases there will be no need to treat the two tenses separately as the issues discussed apply to both. Before looking at specific examples where imbrication takes place let us first look at Ndebele example with normal past and present perfect tense suffix **-ile** in (32).

(32) a. Normal Perfective **-ile** : Past Perfect Tense

- (i) (u)-ding-ile → -dingile ‘s/he looked for/searched’
- (ii) (u)-vum-ile → -vumile ‘s/he agreed’
- (iii) (ba)-hlek-ile → -hlekile ‘they laughed’
- (iv) (ba)-lob-ile → -lobile ‘they wrote’
- (v) (si)-phal-ile → -phalile ‘it scratched’

b. Normal Perfective **-ile** : Present perfect tense

- (i) (u-)sukum-ile → (u-)sukumile ‘(s/he) is standing up’ [‘(he/she) stood up’]
 (u-)thab-ile → (u-)thabile ‘(s/he) is happy’ [‘(s/he) was happy’]
- (ii) (u-)zond-ile → (u-)zondile ‘(s/he) is angry’ [‘(s/he) was angry’]
 (u-)lunguz-ile → (u-)lunguzile ‘(s/he) is peeping’ [‘(s/he) peeped’]
- (iii)(i-)tshibilik-ile → (i-)tshibilikile ‘(it) turned and is facing the other side’
 [‘(it)turned around’]
 (i)leng-ile → (i)lengile ‘(it)is hanging’ [‘(it) hung’]
- (iv) (ba)cec-ile → (ba)cecile ‘(they) are adorned’ [‘(they) were adorned’]
 (ba)gax-ile → (ba)gaxile ‘(they (have something)) hanging’
 [(‘they) hung (something)’]
 (i)gomonq-ile → (i)gomonqile ‘(it) is upside down’ [(‘it) turned upside down’]

⁹ In a few instances in the perfective only the **-i-** part of **-il-e** surfaces, for example in **-m-i** ‘standing (now)’ and **-hlez-i** ‘sitting (now)’.

In the examples in (32a.) the roots have different vowels, high in (i) and (ii), mid in (iii) and (iv) and low in (v). The root-final consonant is also different as it is a velar in (i) and (iii), a labial in (ii) and (iv) and a coronal in (v). As can be seen, the root and the suffix combine without any phonological changes to the consonants or vowels and output is identical to input. In fact most verbs (1432/1984 or 72.2%) suffix **-il-e** with no accompanying phonological changes in the perfective (present and past perfect tenses) except in the passive. A prefix is normally required for the verb to be complete in the perfective and hence the inclusion in brackets of classes 1, 2 and 7 subject markers **u-**, **ba-** and **si-**, respectively.

While all verbs except deficient or defective ones can be in the past perfect tense only a subset of them can also be in the present perfect tense. In the data base 714 (36%) occur in both the present and past perfect tenses, 1258 (63.4%) occur only in the past perfect tense, 8 (0.4%) are deficient verbs which have no corresponding perfective forms and the remaining 4 or 0.2% are perfectives which are counted under the default stems **hlala** 'sit', **-ma** 'stand, wait', **mitha** 'become pregnant' and **sutha** 'become satisfied or satiated'¹⁰. Examples of verbs whose semantics allows them to be in the present perfect tense are those in (32b.). Since they can also be taken to be in the past perfect tense, their past perfect tense glosses are included but in square brackets. As can be seen again, any of the five vowels **i**, **e**, **a**, **o** and **u** can precede the root final consonant and any type of consonant can precede **-il-e**. Different labials, coronals, velars and even clicks all occur before **-il-e** as can be seen in (i), (ii), (iii) and (iv), respectively. The prefixes in brackets are classes 1, 2 and 9 subject markers **u-**, **ba-** and **i-**, respectively.

There are also cases where only final **-e** surfaces but not the **-il-** part of the suffix **-il-e**. In such instances the stem final consonant is either **-l-** or **-th-** and the vowel preceding the stem final consonant is [e], [o] or [u] as examples in (33) illustrate. While in (33a.) the verb

¹⁰ The perfective forms which will be commented on later are **-hlezi** 'seated', **-mi** 'standing', **mithi** 'pregnant', **suthi** 'satisfied/satiated'.

ends in **-e** the **-il-** optionally surfaces in (33b.) so that the verb ends in either **-e** or **-il-e**.

(33) Truncation: **-il-e** surfaces as **-e**

- a. -swel-ile → swele 'lacks; lacked'
 -phelel-ile → phelele 'complete; completed'
 -bingelel-ile → bigelele 'greeted'
 -enyelel-ile → -enyele 'is/became dislocated, is/became sprained'
- b. -dayizel-ile → -dayizele/-dayizelile 'staggered'
 -bethel-ile → -bethele/-bethelile 'hammer in'
 -phumul-ile → -phumule/-phumulile 'is resting / rested'
 -aphul-ile → -aphule/-aphulile 'broke'
 -godol-ile → -godole/-godolile 'felt the cold'
 -beleth-ile → belethe/belethile 'given birth / gave birth'

Although one could argue for the fusion of **-il-** with the immediately preceding **-VC-** of the stem where only **-e** surfaces rather than **-il-e**, examples in (33) are better treated as cases of truncation whereby **-il-** is dropped and **Dstem-ile** becomes **Dstem-e**. Moreover there is no evidence of **u+i → u**, **o+i → o** or **e+i → e** coalescence in other parts of the grammar. The table in (34) provides some figures for truncation, no truncation and optional truncation when the final **-VC-** of the stem is **-el-**, **-ul-**, **-ol-**, **-eth-**, **-uth-**, and **-oth-**. Figures for cases in which the final **-VC-** is **-il-**, and **-ith-** are also included for comparison. However, figures for stem final **-aC-** are excluded as verbs whose **Dstems** end in **-aC-** will be discussed in detail below.

(34) Figures for truncation of **-il-e**

STEM FINAL -VC-	+TRUNCATION	-TRUNCATION	+/-TRUNCATION
-il-	0	36	0
-el-	161	22	104
-ul-	0	77	103
-ol-	0	16	7
-ith-	0	8	0
-eth-	0	15	1
-uth-	0	10	0
-oth-	0	11	0

As the table shows, obligatory truncation occurs only when the stem final -VC- is **-el-**. An important point to note is that the figure for obligatory truncation is far much higher than the figures for no truncation and optional truncation. The figure for optional truncation, though less than that for obligatory truncation, is also far much higher than the one for no truncation. It is therefore clear that truncation is preferred when the final -VC- is **-el-**. When the final -VC- is **-ul-** the figure for optional truncation is also higher than the one for no truncation. The situation is, however, different when the stem final -VC- is **-ol-**, **-eth-**, **-uth-** or **-oth-** as figures are far much higher for no truncation than for optional truncation. In fact for **-uth-** and **-oth-** the database has no optional truncation or any truncation at all just as is the case with **-il-** and **-ith-**. Thus truncation is not a preferred option when the stem final -VC- is **-ol-**, **-eth-**, **-uth-**, **-oth-**, **-il-**, and **-ith-**.

In four verbs given in (35) the **-le** part of the perfective suffix is optional dropped so that the verb ends with **-i** or **-ile**.

(35) C-ile → Ci or Cile

-suth-ile	→ -suthi/suthile	‘is satiated / became satiated’
-mith-ile	→ -mithi/mithile	‘is pregnant / became pregnant (of animals)’
-hlal-ile	→ -hlezi/hlalile	‘is seated / sat’
-m-ile	→ -mi/mile	‘is standing up, stood up’

In these few cases, final **-i** is preferred in the present perfect tense and **-ile** in the past perfect tense although the latter can also be used in the present perfect tense.

The most interesting cases are those where suffixing the same perfective morpheme **-il-** to a Dstem triggers imbrication, the process whereby a formative such as **il-** from **-il-e** fuses with the base as in (36).

(36) CVC- stems with imbrication (CaC+ile → CeCe)

a. -thath-ile → -thethe ‘took’ *-thathile

b.	-sal-ile	→	-sele	‘remained’	*-salile
	-zal-ile	→	-zele	‘gave birth’	*-zalile
c.	-phan-ile	→	-phene	‘gave each other’	*phanile
	-zwan-ile	→	-zwene	‘became friends; heard each other’	*-zwanile

As seen, there is no truncation this time but the vowel [a] which precedes the stem final consonant and [i] from **-il-e** coalesce (i.e. $a + i \rightarrow e$) while [l] from **-il-e** is deleted or may also be treated as having fused with the immediately preceding consonant of the base which is usually a coronal (**l**, **n** or **t**) although it can also be **m** or **w**. The coalescence of [a] with [i] is a common process in the language as we have already seen some of the instances where it applies in the previous sub-section¹¹. Roots in (36a.) and those in (36b.) end in **-th-** and **-l-**, respectively. In (36c.) the final **-an-**, the reciprocal suffix, occurs in verbs which have become lexicalized. Asterisked unimbricated forms are unacceptable for the verbs in (36). This applies to both the present and past perfect tenses.

The next set of examples in (37) shows that for some verbs imbrication is optional. That is, the imbricated and the unimbricated forms occur in free variation although some speakers may prefer one form as opposed to the other.

(37) Optional Imbrication (CaC+ile → CeCe or CaCile)

- | | | | | |
|----|-----------|---|-------------------|--------------------------------|
| a. | lal-ile | → | lele ~ lalile | ‘slept’ |
| b. | phath-ile | → | phethe ~ phathile | ‘carried in the hands or arms’ |

Also, imbrication may be preferred in the present perfect tense and non-imbrication in the past perfect tense although the imbricated form would also be acceptable in the past perfect tense. The table in (38) provides some statistics about imbrication, non-imbrication and optional imbrication in monosyllabic (CVC) Dstems with different relevant final

consonants. I pay particular attention to statistics pertaining to stems ending in [l] because in most cases where imbrication occurs [l] is the Dstem's final consonant and also most of the examples in this section involve [l]. Although there is no imbrication in CaC- stems ending in **-m-**, Cam- figures for non-imbrication are included for comparison with tables for longer Dstem discussed later below. Figures for **-w-** which are in fact zeros throughout are also included for the same reason.

(38) Figures for imbrication, non- and optional imbrication when the Dstem is CaC-.

FINAL CONS	+IMBRICATION	-IMBRICATION	+/-IMBRICATION
l	2	15	3
n	2	3	0
th	1	6	2
m	0	13	0
w	0	0	0

As can be seen from the figures for **-l-**, **-n-**, **-th-** and **-m-** in the table, imbrication is generally not preferred when the Dstem is CVC-. Even figures for optional imbrication are very low. Note that no CVC- Dstem ends in **-w-** unless it incorporates the passive suffix **-w-/iw-**. However, Dstems whose final consonant is the passive suffix are not included in the figures in the table as they are treated separately later in this section.

There are also some longer forms where imbrication is always necessary. First, let us consider CVCaC stems in (39). These become CVCeCe when **-ile** is suffixed. Without imbrication the stems are unacceptable and the words in which they are used sound as if they are produced by someone who has not fully mastered the language.

(39) CVCVC- stems with imbrication (CVCaC+ile → CVCeCe)

(a) **-dumal-ile** → **-dumele** 'is dejected; became dejected' *-dumalile

¹¹ It is also worth noting that the a+i→e coalescence is not a process only restricted to verbs but applies to other parts of the grammar as well, for example, in nouns and associative forms as in **ama+ihlo** → **amehlo** 'eyes' and **la+inja** → **lenja** 'with the dog', respectively.

-bulal-ile	→	-bulele	‘killed’	*-bulalile
-libal-ile	→	-libele	‘has forgotten; forgot’	*-libalile
(b) -bethan-ile	→	-bethene,	‘clashed’	*-bethanile
-diban-ile	→	-dibene	‘(are) mixed; got mixed’	*-dibanile
-fumana	→	-fumene	‘found it	*-fumanile
(c) -sinam-ile	→	-sineme	‘is angry; became angry’	*-sinamile
(d) -bulaw-ile	→	-bulewe	‘got killed’	*-bulawile

In (39a.) (39b.), (39c.) and (39d.) the stem final consonant is **-l-**, **-n-**, **-m-** and **-w-**, respectively. Note that the stem in (39d.) has already been passivized but is irregular as it is **bulaw-** rather than **bulalw-** expected from **bulal-w-** since the active verb is **bulal-** ‘kill’¹². For this reason **bulaw-** is best treat with regular stems ending in **-aC-** not with passivized ones which end in **-aCw-**.

As with CVC- Dstems there can also be optional imbrication when Dstems are CVCVC-. Examples are given in (40) where the stem final consonants we have already seen are used again here except for **-w-**.

(40) CVCVC- stems with optional imbrication (CVCaC+ile → CVCeCe or CVCaCile)

(a) -bhadal-ile	→	-bhadele/-bhadalile	‘paid’
-khalal-ile	→	-khalele/-khalalile	‘spurned’
(b) -fumbath-ile	→	fumbethe/-fumbathile	‘is clenching the hand; clenched the hand’
-singath-ile	→	-singethe/-singathile	‘is hugging; hugged’
(c) -hlangan-ile	→	-hlanngene/-hlanganile	‘meeting; meet’
-nakan-ile	→	-nakene/-nakanile	‘thought over’
(d) -catham-ile	→	-catheme/-cathamile	‘is crouching down; crouched down’

Although where applicable the imbricated form may be preferred in the present perfect tense

¹² Note that while causativized ***bulaw-is-a** or applicativized ***bulaw-el-a** are ungrammatical, their passivized forms **bulaw-is-w-a** ‘be made to kill’ and **bulanw-el-w-a** ‘be killed at/for’ are acceptable. The unpassivised causative and unpassivised applicative occur as **bulal-is-a** ‘cause to kill or to be killed’ and **bulal-el-a** ‘kill for/at’, respectively.

and the unimbricated form in the past perfect tense both forms can be used interchangeably. Figures for imbrication, non-imbrication and optional imbrication when the Dstem is CVCaC- are presented in the table in (41).

(41) Figures for imbrication, non- and optional imbrication when the Dstem is CVCaC-.

FINAL CONS	+IMBRICATION	-IMBRICATION	+/-IMBRICATION
l	11	4	5
n	26 (-17)	1	4
th	0	7	4
m	1	4	9
w	1	0	0

When the consonant **-l-** is stem final imbrication normally occurs as can be seen from the figures in the table in (41). The four exceptions are actually found in words that are not usually used in the perfective. The figures also show that there are also five forms in which imbrication is optional. When the stem final consonant is **-n-** imbrication is also preferred. This is valid even if 17 out of the 26 verbs are ignored as the stem final **-n-** actually comes from a free morpheme, reciprocal **/-an-/**. Obligatory or optional imbrication only fails to occur in one verb. The situation is different for **-th-** as there is no obligatory imbrication in CVCath-ile forms. The figure for non-imbrication is also higher than that for optional imbrication. When the stem final consonant is **-m-** obligatory imbrication is also not preferred as it occurs only in one verb. However, there is more optional imbrication than non-imbrication. For CVCaw- stems **bulaw-** is the only one in the data base and imbrication is obligatory. Overall, there is more obligatory and optional imbrication than non-imbrication when Dstems are CVCaC- than when they are CaC- especially when the stem final consonant is **-l-**, **-n-** or **-m-**.

It is also important to see what happens when **-il-e** is suffixed to longer CVCVCaC-

stems. In (42) we see that imbrication is imperative when **-ile** is suffixed to some of the CVCVCaC- stems which then become CVCVCeCe.

(42) CVCVCVC- stems with imbrication (CVCVCaC+ile → CVCVCeCe)

- (a) -khakhamal-ile → -khakhamele, 'is stunned/was stunned' *-khakhamalile
 -dondobal-ile → -dondobele, 'grown weak/grew weak(as aged)' *-dondobalile
- (b) -dilingan-ile → -dilingene 'is full or round/became full or round' *-dilinganile
 -futhelan-ile → -futhelene 'is suffocating; suffocated' *-futhelanile

In (42a) the stem final consonant is **-l-** and in (42b.) it is **-n-**. There is no CVCVCaC- stem whose final consonant is **-th-** or **-w-**. Only a single stem, reduplicated **zamazam-** 'shake violently, quake', is CVCVCam- and imbrication does not occur when **-il-e** is suffixed to it.

Optional imbrication also occurs when **-il-e** is suffixed to CVCVCaC- stems but the stem final consonant can only be **-l-**. Here are some examples.

(43) CVCVCVC- stems with optional imbrication (CVCVCaC+ile → CVCVCeCe or CVCVCaCile)

- bhazalal-ile → bhazalele/bhazalalile 'is lying down flat; lied down flat'
 cambalal-ile → cambalele/cambalalile 'is lying down (stretched out); lied down (stretched out)'

In both the present and past perfect tenses the imbricated form is the preferred one. In fact as the stem becomes longer imbrication becomes more likely as the figure in (44) show particularly when compared with those in the two tables above.

(44) Figures for imbrication, non-imbrication and optional imbrication when the Dstem is CVCVCaC-.

FINAL CONS	+IMBRICATION	-IMBRICATION	+/-IMBRICATION
l	14	0	15
n	12	0	0
th	0	0	0
m	0	1	0
w	0	0	0

As can be seen from (44), only one verb with a CVCVCaC- Dstem does not undergo imbrication at all. In all other cases imbrication is either obligatory or optional. Although there seem to be no maximum size limit in terms of the number of syllables Ndebele verbs can have, imbrication appears to be one of the processes which ensure that they do not become excessively long. In the database the only verbs whose Dstems are longer than CVCVCVC- and end with -aC- (where C stands for one of the relevant five consonants) are those in (45). They are lexicalized forms whose Dstems end with reciprocal **-an-**.

(45) CVCVCVCaC- stems with obligatory imbrication (CVCVCVCaC+ile → CVCVCVCeCe)

khulumisan-ile	→ khulumisene	‘talked to one another’
ncintanisan-ile	→ ncintanisene	‘competed’
thengiselan-ile	→ thengiselene	‘traded; sold to one another’

In all of them imbrication is obligatory just as it is when **-il-e** is suffixed to any reciprocalized Dstem where -C-an-il-e always becomes C-en-e.

So far we have only considered imbrication in verbs with consonant initial Dstems. We now need to see if the same facts hold when the Dstem is vowel initial since its length may vary for some phonological process depending on whether the initial vowel syllable is taken to be part of the stem or not. There is only one -aC- Dstem with a relevant stem final consonant in the database, **-al-** ‘refuse’, but no imbrication occurs when **-il-e** is suffixed to it. It is not clear whether or not the **-a-** which coalesces with **-i-** from perfective **-il-e** always requires a consonant to precede it as this is the only relevant example where **-a-** is not preceded by a consonant. Obligatory imbrication occurs only in one -VCaC- Dstem **-azan-** ‘know one another’, a reciprocalized form of **-az-** ‘know’. There are, however, six -VCaC- Dstems in which optional imbrication occurs when **-il-e** is suffixed and these are given in (46).

(46) -VCaC- stems with optional imbrication (VCaC+ile → VCeCe or VCaCile)

- a. -andlal-ile → -andlele ~ -andlalile 'spread (out)'
 -endlal-ile → -endlele ~ -endlalile 'spread (out)'
- b. -ambath-ile → -ambethe ~ -ambathile 'covered oneself (with a blanket)'
 -embath-ile → -embethe ~ -embathile 'covered oneself (with a blanket)'
- c. -engam-ile → -engeme ~ -engamile 'is hanging over; hung over'
 -eyam-ile → -eyeme ~ -eyamile 'is leaning on; leaned on'

In (46a.) the stem final consonant is **-l-** and the two stems which have the same meaning only differ in the initial vowel. In (46b.) where the two stems with the same meaning also differ in the initial vowel the stem final consonant is **-th-**. There are also two examples in (46c.) but these have different meanings and morphophonological shapes except that in both cases the stem final consonant is **-m-**. A table with figures for imbrication, non-imbrication and optional imbrication in verbs with -VCaC- Dstems is provided in (47).

(47) Figures for imbrication, non- and optional imbrication when the Dstem is -VCaC-.

FINAL CONS	+IMBRICATION	-IMBRICATION	+/-IMBRICATION
l	0	0	2
n	1	2	0
th	0	0	2
m	0	2	2
w	0	0	0

Note that obligatory or optional imbrication does not occur only in four verbs with -VCaC- Dstems. The final consonant for two such Dstems is **-n-**, and is **-m-** for the other two.

There are only four verbs with -VCVCaC- Dstems and in all of them imbrication is obligatory when **-il-e** is suffixed. All four are given in (48).

(48) -VCVCaC- stems with obligatory imbrication (-VCVCaC+ile → -VCVCeCe)

- a. -enzakal-ile → -enzakele 'happened'
 -onakal-ile → -onakele 'got spoiled/corrupted'

- b. -ahlukan-ile → -ahlukene 'differs from; differed from'
 -akhelan-ile → -akhelene 'are neighbors; became neighbors'

As can be seen, Dstems of verbs in (48a.) end in **-l-** and those in (48b.) in **-n-**. The Dstems in (48a.) end in stative **-akal-** while those in (48b.) end in reciprocal **-an-**. Since there are no cases of non- and optional imbrication no table will be provided.

In the database only one Dstem ending in the appropriate **-aC-**, **amukezelan-** 'hand to one another', is longer than those in (48). Since it ends with reciprocal **-an-** imbrication is obligatory when **-il-e** is suffixed. Overall, vowel initial Dstems, just like consonant initial ones, show that the longer the stem the higher the probability for imbrication given the right environment. This is valid even if Dstems ending in **-an-** are ignored.

Before looking at examples involving passive **-iw-/-w-** putting together all statistics given so far seems to be in order. The table in (49) provides a summary of imbrication, non-imbrication and optional imbrication when the stem final consonant is **-l-**, **-n-**, **-th-**, **-m-** and **-w-**. Most of the figures are taken from the tables in (38), (41), (44) and (47). Other figures that are included are for verbs whose Dstems are **-aC-**, **-VCVCaC-** and **-VCVCVCVCaC-** not included in any of the tables above.

(49) Combined statistics for imbrication, non- and optional imbrication.

STEM FIN CONS	+IMBRIC	-IMBRIC	+/-IMBRIC	TOTAL
l	29	20	20	69
n	47	6	4	57
t	1	13	8	22
m	1	20	11	32
w	1	0	0	1
TOTAL	79	59	43	181

It is clear from the table in (49) that imbrication occurs mainly when **-il-e** is suffixed to Dstems whose final consonants are **-l-** or **-n-**. In most cases where **-n-** occurs as the final

consonant of a Dstem it is from reciprocal **-an-**. Although **-an-** is still a productive suffix it can be found in some verbs as a bound morpheme and in others as part of the lexicalized item as was noted in Chapter 3. There is less imbrication (including optional imbrication) than non-imbrication when the final consonant is **-t-** or **-m-**. The lowest figures for imbrication are for **-w-** but this is due to the fact that imbrication in passivized verbs is treated separately below.

When **-ile** is preceded by Reciprocal **-an-** or Passive **-w-** there is, almost always, imbrication. Imbrication when the Dstem ends in **-an-**, however, needs no further comment as we have already seen that it occurs in the same manner as when the Dstem ends with **-al-**, **-ath-**, **-am-** or **-aw-**. What we need to see now is what happens if the Dstem is passivized. Let us consider first examples in (50) where in (50a.) the Dstems have vowels that are not **-a-** and in (50b.) the stem final consonants are not the ones normally associated with imbrication when there is no passive morph. In (50c.) both the vowel and the stem final consonant are not normally associated with imbrication when there if no passivization.

- (50) Imbrication or cluster simplefication in the passive when the vowel preceding **-il-e** is not **-a-** or when the stem final cosonant is not **-l-**, **-n-**, **-th-**, **-m-** or **-w-**.
- | | | | | | | |
|----|------------|--------------|----------------|---|------------|---------------------------|
| a. | vul-w-a | ‘be opened’ | -vul-il-w-e | → | -vuliwe | ‘is open; was opened’ |
| | bon-w-a | ‘be seen’ | -bon-il-w-e | → | -boniwe | ‘was seen’ |
| b. | fak-w-a | ‘be put’ | -fak-il-w-e | → | -fakiwe | ‘was put’ |
| | phandl-w-a | ‘be blinded’ | -phandl-il-w-e | → | -phandliwe | ‘is blinded; was blinded’ |
| c. | biz-w-a | ‘be called’ | -biz-il-w-e | → | -biziwe | ‘was called’ |
| | phek-w-a | ‘be cooked’ | -phek-il-w-e | → | -phekiwe | ‘is cooked; was cooked’ |

As can be seen with all examples in (50), when the perfective suffix is brought in after passivization its **-il-** part is infixed between the root and passive **-w-** and its **-e** comes last after **-w-**. (See also Hyman 1995). This is one of the reasons for treating the perfective suffix as having two morphs. It is not clear whether there is then fusion of **-l-** from the

perfective morph **-il-** with passive **-w-** or deletion of **-l-** as a way of cluster simplification.

With some CaC- Dstems such as those in (51a.) normal imbrication occurs as expected when the perfective morph **-il-** is infixd between the root and the passive morph **-w-**. Recall that passive **-w-** leads to the labialization of a preceding consonant hence **-C-w-** is treated as one consonant (**-C^w-**) when **-il-e** is suffixed. Non-imbrication and truncation result in unacceptable forms.

(51) Imbrication when Dstems are passivised: **-aC-w-ile** → **eCwe** or **aCiwe**

- | | | | | |
|----|----------------------|-------------------------------|---------------------------------|--|
| a. | -thath-il-w-e | → -thethwe | ‘taken’ | *thathiwe, *thathwile, *thathwe |
| | -zal-il-w-e | → -zelwe | ‘born’ | *zaliwe, *zalwile, *zalwe |
| b. | -thwal-il-w-e | → -thwelwe ~ -thwaliwe | ‘is being carried; was carried’ | *thwalwile, *thalwe |
| | -phath-il-w-e | → -phethwe ~ -phathiwe | ‘is/was on the lap’ | *phathwile |
| c. | -phal-il-w-e | → -phaliwe | ‘is/was scratched’ | *phalwile, *phelwe, *phalwe |
| | -bhal-il-w-e | → -bhaliwe | ‘is/was written’ | *bhalwile, *bhelwe, *bhalwe |

Examples in (51b.) are those which had optional imbrication (**CaC-ile** → **CeCile** or **CeCe**) when the Dstems were not passivized. This time, however, instead of the option being between imbrication and non-imbrication where output is identical to input, the choice is between imbrication and non-imbrication where output is different from input as a result of fusion of perfective **-l-** and passive **-w-** or deletion of **-l-**. Imbrication can take the form **-aC-il-w-e** → **eCwe** and non-imbrication takes the form **-aC-il-w-e** → **aCiwe**. In imbrication it is not clear whether the final consonant of the base, **-l-** from perfective **-il-** and passive **-w-** all fuse together or the fusion is only for the base’s final consonant and **-w-** when labialization occurs while **-l-** gets dropped. Note that the second option in (51b.) is not available in (51a.). In (51c.) where there was no imbrication before passivization only the second option (non-imbrication) in (51b.) is acceptable. In all examples in (51) truncation of **-il-e** so that it surfaces as just **-e** is unacceptable.

The facts just given about imbrication in the passive hold even when stems are longer or vowel initial. A few examples in (52) should suffice.

(52) Imbrication in the passive when Dstems are longer than CVC- or are vowel initial.

- a. -bethan-il-w-e → -bethenwe ?-bethaniwe 'clashed'
- b. -bhadal-il-w-e → -bhadelwe ~ -bhadaliwe 'is paid up; was paid'
 -singath-il-w-e → -singethwe ~ -singathiwe 'is hugging; hugged'
 -nakan-il-w-e → -nakenwe ~ -nakaniwe 'thought over'
- c. -thengiselan-il-w-e → thengiselenwe/ thengiselwene 'traded; sold to one another'
 *thengiselaniwe
- d. -azan-il-w-e → -azenwe ?-azaniwe 'know one another'
- e. -endlal-il-w-e → -endlelwe ~ -endlaliwe 'spread (out)'
 -ambath-il-w-e → -ambethwe ~ -ambathiwe 'covered oneself (with a blanket)'
- f. -ahlukan-il-w-e → -ahlukenwe, ?-ahlukaniwe 'differs from; differed from'

Although Dstems in both (52a.) and (52b.) are CVCaC- the verbs differ in that in (52a.) imbrication seems obligatory while in (45b.) it is optional. Note that there is a question mark on the second possibility in (52a.) as it sounds odd though grammatical. For the longer example in (52c.) imbrication is obligatory. Similarly in (52d.) there is also one and the same possibility but the Dstem is vowel initial. The second possibility sounds odd. Examples of vowel initial verbs with optional imbrication in the passive are given in (52e.). In (52f.) where the stem is -VCVCaC- there imbrication is obligatory. When -i- from -il-e is infixed between the stem final consonant and passive -w- the verb sounds odd.

Lastly, we consider C-iw- Dstems in (53) which incorporate /-iw-/, the longer allomorph of the passive suffixed to C- stems, rather than the contracted form /-w-/ used with most stems.

(53) Imbrication when the Dstem is C-iw- (C-il-iw-e → Ciwe)

- ph-il-iw-e → -phiwe 'given'

dl-il-iw-e → -dliwe ‘eaten’

As can be seen, it is not clear whether there is fusion of segments or truncation. It can be argued that the [i] of **-il-e** fuses with that of the passive suffix and that either [l] is dropped or [l] and [w] are also fused together. Alternatively it can be assumed that the suffix **-il-e** is truncated so that only **-e** surfaces. Since in other parts of the grammar coalescence normally applies when the first of two successive vowels is [a] (although *ee* → *e* is also possible), it seems reasonable here to assume the latter rather than argue for *i + i* → *i* coalescence not evident in other parts of the grammar.

Having seen truncation and imbrication when perfective **-il-e** is suffixed to different types of verb stems we now turn to root structure conditions.

4.4 Root Structure Conditions

There are conditions that pertain to the internal structure of the root which must be explained before discussing reduplication in the next chapters. First, recall that in Chapter 2 we pointed out that there are no roots beginning in high vowels [i] and [u]. The few roots that can, perhaps, be said to begin with [i] underlyingly are those with a ghost vowel already discussed above. There is also no evidence that Proto-Bantu root initial **i-** and **u-** became **yi-** and **wu-**, respectively, as is sometimes the case in some Bantu languages. Only **wumana**¹³ ‘be delirious’ begins with **wu-** while no verb root begins with **yi-**. However, there are twenty-seven verb roots beginning with a glide followed by a [-high] vowel. Examples are given in (54) where the verbs are grouped by the root initial glide and by the vowel following the glide.

¹³ The **-w-** in **wumana** ‘be delirious’ belongs to the depressor series of consonants discussed in the next chapter on tone.

(54) Verb roots beginning with a glide followed by a [-high] vowel.

- a. yekel-a 'let go; leave'
yeketh-a 'hang loosely'
- b. -y-a 'go'
yang-a 'shame, cause to feel shame'
yakaz-a 'rinse out'
- c. yocuk-a 'get taken off (of skin)'
yocul-a 'take a skin off forcibly (by tearing, by burning, etc.)'
- d. wel-a 'cross over (a river, etc.)'
weza 'take across'
- e. -w-a 'fall'
wahlaz-a 'slap the face'
wakal-a 'slap the face'
- f. wol-a 'gather up rubbish'
wohlok-a 'shower down, fall down'

As can be seen, the three [-high] vowels e, a and o all occur with both y and w. The distribution of root-initial glides before different vowels is given in (55).

(55) Distribution of root-initial glides before different vowels.

	I	e	a	o	u	Total
y	0	5	7	2	0	14
w	0	4	5	3	1	13
Total	0	9	12	5	1	27

Clearly, the sequence glide plus high vowel is dispreferred. Glide plus a is the preferred sequence in such roots although glide plus a mid vowel is also acceptable.

There are two examples given in (56) which seem to suggest that Proto-Bantu root-initial [+high] vowels are not preceded by a glide in Ndebele but have in fact been dropped.

(56) Roots that had a [+high] initial vowel in Proto-Bantu.

Ndebele	Proto-Bantu	Gloss
-kh-	-ík- /-) ik(a)	'draw water, pluck, pull off'
gula	-ugud-	'be ill, groan'

Unfortunately, there are no other examples I could find besides these two. Although these examples could be considered too few to draw any meaningful conclusion, the fate of PB [+high] root initial vowels in Ndebele can be provided by PB roots beginning with j-/y-. In Chapter 2 we saw that vowel initial roots in Ndebele arose as a result of dropping PB j-/y- leaving a [-high] vowel without an onset. The table in (57) shows what became of Proto-Bantu ji-/yi- and ju-/yu- in Ndebele (although there is only one example beginning with ju-/yu-, **-júm-** ‘become dry’).

(57) The fate of Proto-Bantu ji-/yi- and ju-/yu- in Ndebele

	Ndebele	Proto-Bantu	Gloss
a.	-zw-	-ǰǰ(u)-	‘hear’
	vul-	-ǰǰud-	‘open’
	val-	-ǰǰad-	‘shut’
	hlal-	-ǰǰkad-	‘dwell’
	suth-	-ǰǰkut-	‘become satiated’
	nik-	-ǰǰnk-	‘give’
	-m-	-ǰǰm-	‘stand’
	mith-	-ǰǰmit-	‘become pregnant’
	buz-	-ǰǰpud-/búud-/púd-	‘ask (questions)’
	phek-	-ǰǰpik- / -ǰǰpik-	‘cook’
	-z-	-ǰǰ-	‘come’
b.	-ethuk-	-ǰǰituk-	‘be startled’
	-eth-	-ǰǰít-	‘call / name’
	-eb-	-ǰǰíb-	‘steal’
	-om-	-ǰǰúm-	‘become dry’
c.	-mb-/emb-	-ǰǰimb-	‘dig’

As can be seen in (57a.) Proto-Bantu j-/y- has been dropped together with the following high vowel. This supports the conclusion made from the two examples in (56). However, in a few cases such as (57b.) only j-/y- has been dropped and the following high vowel lowered. For the only verb in (57c.) dropping the high vowel or lowering it are both

acceptable. In all these cases dropping or lowering the vowel clearly ensures that it does not surface as [+high].

In the first syllable of a root with an onset there are no vowel restrictions as all vowels occur. Here are some examples.

(58) No vowel restrictions in the first syllable in consonant initial roots.

fik-	'arrive'
phek-	'cook'
thath-	'take'
bon-	'see'
khul-	'grow'

While all vowels can be found in the first syllable of a consonant initial root, consonants have some restrictions. For instance, labialized consonants occur only root initial as in (59a.) unless the initial syllable is reduplicated as in (59b.).

(59) Labialized root consonants

- | | | | |
|----|--------------|-------------------------------|--|
| a. | cwil- | 'sink into' | |
| | kw'ejis- | 'pass time with idle chatter' | |
| | dweb- | 'draw' | |
| | thwal- | 'carry' | |
| | tshwabhan- | 'shrink up' | |
| | jwabul- | 'tear meat from a hide' | |
| | khwabith- | 'desire ardently' | |
| | gwaz- | 'stab' | |
| b. | gwegw- | 'hook' | (from the noun in-gwegwe 'hook') |
| | tshwatshwaz- | 'prick lightly' | |
| | qwaqwaz- | 'fence with sticks' | |
| c | thwal-w- | 'be carried' | |
| | gwaz-w- | 'be stabbed' | |

Suffixing passive **-w-** may also labialize the root-final consonant as examples in (59c.) show. Note that no [+round] vowel is included in the examples in (59) as C^wo and Co are phonetically too close if they do not actually sound the same, making it difficult to

distinguish the two from each other. The same applies to C^wu and Cu. In the Ndebele orthography only Co and Cu are used.

There is also consonant harmony in Ndebele. (See Khumalo 1987 for the discussion of the same phenomenon in Zulu). Roots with stops that are neither clicks nor pre-nasalized normally display consonant harmony in terms of laryngeal features. Our concern here will mainly be C₁ and C₂ as additional consonants in roots longer than CVC- are in most cases part of frozen suffixes and often fail to harmonize with the preceding ones. Let us consider first two sets of examples in (60).

(60) Consonants harmonize in terms of laryngeal features.

- a. Voiced + Voiced

bhadal-a	'pay wages/money'
dobh-a	'pick up'
gug-a	'age'
- b. Aspirated + Aspirated

phaph-a	'fly'
thaph-a	'take out (honey from a nest, clay from a pit'
khuph-a	'remove'
- c. Unaspirated(ejective) + Unaspirated (ejective)

t'op'ol-a	'prick with beak, peck'
t'ot'-a	'sink down in wet or muddy place'
p'at'ul-a	'slap lightly'

As can be seen, the stops in (60a.) harmonize in terms of the feature [+voice] (or [+depressed]¹⁴) while in (60b.) C₁ and C₂ are both aspirated. In (60c.) C₁ and C₂ are both unaspirated. They are in fact weak ejectives which we will say a little more about below. The tables in (61) provide some figures for the number of stops in C₁ position and different combinations of relevant C₁ and C₂ stop consonants in Ndebele verbs. As can be in (61a.) the highest figures in the C₁ position are those of voiceless aspirated stops followed by voiced ones. Figures for voiceless unaspirated stops (ejectives) are the lowest.

¹⁴ Depressors will be discussed when we deal with tone in Chapter 6.

(61) a. C₁ stops in CVC- and longer roots.

C ₁	Total		C ₁	Total		C ₁	Total
p	10		ph	102		bh	49
t	9		th	79		d	55
k	12		kh	96		g	68
Total	31			277			172

b. C₁ and C₂ stops in CVC- and longer roots.

		C ₂								
C ₁		bh	ph	p'	d	th	t'	g	kh	k'
	bh	6	1	0	9	0	0	0	0	0
	ph	0	21	0	0	20	0	0	0	0
	p'	0	0	1	0	0	3	0	0	0
	d	1	1	0	8	0	0	0	0	0
	th	0	3	0	0	14	0	0	0	0
	t'	0	0	1	0	0	5	0	0	0
	g	3	0	0	6	0	0	7	0	0
	kh	0	7	0	2	16	0	0	8	0
k'	0	0	6	0	0	0	0	0	2	

In (61b.) C₁ is shown on the vertical axis and C₂ on the horizontal axis. One verb with a CVC-root, **deph-a** 'be deep' also used with a similar meaning in Zulu, appears to be irregular as C₁ and C₂ are disharmonic. However, as Khumalo (1987: 31) explains, **depha** is derived from the adjectival root **-de** 'long, deep' when combined 'with the suffix **-ph-** used in deriving verbs from nominal/adjectival stems'. The two verbs **khudumala** 'become warm' and **khudumeza** 'warm up' which appear to be derived from the same root also seem to have disharmonic C₁ and C₂. However, most people voice the initial velar so that they are actually pronounced as **gudumala** and **gudumeza** even if orthographically they

are still written with an initial **kh** consonant rather than **g**. All other possible combinations in the table harmonize.

The last three columns and rows in (61b.) are interesting though as they show that velars cannot be in C_2 unless they are preceded by identical consonants. In fact where **g** and **kh** are expected we get a velar continuant **k**[ʏ] as the additional table below illustrates.

(62) Stop + Velar continuant **k**[ʏ].

		C2 = k
C1	bh	2
	ph	9
	p'	0
	d	3
	th	11
	t'	0
	g	0
	kh	0
	k'	0
	k	0

As seen in (62), where the voiced velar stop **g** is expected after **bh** and **d** we get the velar continuant **k**. Where aspirated **kh** is expected after **ph** and **th** we also get **k**. However, in the database there are no verbs where C_1 is **p'** or **t'** and C_2 is a velar stop **k'** or continuant **k**. This can be attributed to the fact that in Ndebele ejectives are used only in very few words. Words such as **p'akitsha** 'load' and **t'ika** 'feed excessively' which came to my mind later after the database had been organized do show that where ejective **k'** is expected after **p'** and **t'** we also get the continuant **k** in C_2 . All this means that each of the three velar stops (**kh**, **g** and **k'**) is almost in perfect complimentary distribution with the continuant except that a velar stop can also occur in C_2 if C_1 is an identical stop. In general velar stops occur root initially while the velar continuant occurs root medial and root final. Note that even the

pre-nasalized velar stop **ng** [ʔg] not included in the table occurs only as the first consonant root and is in complementary distribution with the velar nasal Ng [ŋ] which occurs root finally and root medially. Here are some examples.

(63) Pre-nasalized velar stop **ng** [ʔg] and velar nasal Ng [ŋ]

- a. ngen-a 'enter'
- b. -ang-a 'kiss'
- engam-a 'hang over'
- engez-a 'add on to, increase'
- engul-a 'remove scum'
- ong-a 'nurse the sick'
- ongam-el-a 'preside over'
- c. diNg-a 'look for, search'
- theNg-a 'buy'
- cabaNg-a 'think'
- boNg-a 'thank'
- fuNg-a 'swear'
- d. tsh'eNgis-a 'show'
- vuNgam-a 'grumble'
- goNgod-a 'hummer'
- zuNguz-a 'sway, wave'
- e. NguNguna 'mutter'

In (63a) we see the only consonant initial verb in the database that begins with the pre-nasalized stop **ng**. Although there is only one consonant initial verb beginning with **ng**, this consonant also occurs stem initially in other parts of speech such as nouns and adjectives which, however, are not part of this study. The pre-nasalized stop **ng** also occurs as the first consonant of the root in the six vowel initial verbs given in (63b.). Case where the velar nasal Ng occurs root final are provided in (63c.) and those where it is root medial in (63d.). Recall that frozen suffixes such as those in (63b) (in bold face) are normally treated as part of the root. The nasal Ng can be found in the C₂ position in a total of 111 roots. The

example in (63e.) which looks like an exception is not included in this figure. In (63e.) both C_1 and C_2 have a velar nasal. What is important to note is that the nasal is different from the **Ng** in (63c-d.). While the nasal in (63c-d.) is depressed (a feature that will be discussed in Chapter 6), the one in (63e.) is not. In the database used, the non-depressed **Ng** occurs only in the verb **NguNguna** ‘mutter’.

Another point to note about consonant harmony is that the second consonant in a root can only be an ejective if the first one is also an ejective. While the table in (61b.) provides some statistics and the general pattern, specific examples are given in (64a.). However, if C_2 is a pre-nasalized stop **mp’**, **nt’** or **nk’** as in (64b.), C_1 needs not be ejective. This means that non-nasalized ejectives can only be root final or root medial if preceded by other ejectives. Otherwise they occur root initial. This also shows that the velar ejective **k’** is to a greater extent in complementary distribution with the velar continuant **k[ɣ]** which never occurs as C_1 in verb roots but is always root medial or root final.

(64) Ejectives in the root

- a. **k’op’-a**
t’op’ol-a ‘prick with beak, peck’
t’ot’-a ‘sink down in wet or muddy place’
p’at’ul-a ‘slap lightly’
k’ak’-a
k’ik’izel-a ‘cry out joyfully (as women at a dance)’
- b. **namp’uk-a** ‘be sticky’
thint’-a ‘touch’
khonk’oth-a ‘bark’
- c. **p’esuka** ‘jig, be frisky’
t’ema ‘cheer or greet (using a person’s praise names)’
k’iliz-a ‘speak imperfectly (as not knowing the language)’
kw’ejis-a ‘pass time with idle chatter’
tsh’ok-a ‘shoot an arrow’
- d. **bot’ok-a** ‘be soft when felt with fingers’
bot’oz-a ‘feel gently with fingers, palpate’

Also, if the first consonant is an ejective the second needs not be one as (64c.) illustrates. While in other Nguni languages the sound represented by **-b-** is still implosive [ɓ] in Ndebele it is now bilabial fricative [β]. Examples in (64d.) show that the feature [+constricted glottis] associated with ejectives and implosives is still present underlyingly in Ndebele. Otherwise the second consonant of the root would not be ejective¹⁵. There, is however, disharmony when **-b-** is in C₂. As (65) shows, C₁ needs not be ejective when **-b-** is C₂.

(65) No harmony when **-b-** is in C₂.

- | | | |
|----|----------|---|
| a. | diban-a | 'get mixed' |
| | gebeng-a | 'act lawlessly' |
| | gob-a | 'bend' |
| | bhoboz-a | 'pierce' |
| | dub-a | 'trouble' |
| b. | thab-a | 'be happy' |
| | khab-a | 'kick' |
| | thob-a | 'become humble' |
| | thub-a | 'change color when beginning to ripen (as fruit)' |

It is also impossible to characterize the harmony in terms of voicing (or depression) as C₁ is voiced (or depressed) in (65a.) but voiceless ([-depressed]) in (65b.). Thus [β] does not behave like an ejective or any of the harmonizing stops in these examples. Treating the consonant as bilabial fricative [β] appears appropriate here. However, it remains puzzling that the [+constricted glottis] feature sometimes surfaces when **-b-** is C₂ as examples on passivization will show in the next chapter.

Clicks too, though not included in the table, are interesting in that only one type, dental, palatal or alveolar lateral, can be used in a given root. Here are some examples.

(66) One type of click per word

¹⁵ More will be said about **b** [β] in Chapter 5.

- | | | |
|----|------------|-----------------------------|
| a. | cuc-a | ‘deprive’ |
| | qoq-a | ‘collect, gather, organize’ |
| | xukux-a | ‘work a tight thing loose’ |
| b. | chinc-a | ‘drip’ |
| | qonqosel-a | ‘emphasise’ |
| | xhanxath-a | ‘gnaw’ |

While different shades of the same click, unaspirated, aspirated, nasalized or depressed, can be used together within the same root as in (66b.) there is no instance where two different clicks are found within the same root.

No comment needs to be made on the internal structure of prefixes and suffixes as they are generally very short. As we saw in Chapter 2 the underlying shape is CV- or V for most prefixes and -VC- or -V for most suffixes.

4.5 Summary

A number of points have been raised in this chapter. The main points discussed in Section 4.1 are that at word level a verb must be at least a Minimal Default Stem (Root-a) and also be at least two syllables long. In addition the first syllable of a verb with a vowel initial root must have an onset in the imperative mood. Section 4.2 has shown that there are many restrictions in the way morphemes combine in Ndebele. The shape of the morpheme, particularly whether it is a V or CV- affix, a consonant or vowel initial root, is important in determining the surface realization of a verb. Glide formation, coalescence and deletion were the main processes discussed. In Section 4.3 we saw that imbrication which occurs in both the present and past perfect tenses takes the form $aC+ile \rightarrow eCe$ and occurs obligatorily mainly in forms longer than $CaC-$. In some verbs imbrication is optional and in others it fails to occur altogether. When it fails to occur there is sometimes truncation of the

perfective suffix **-il-e** so that only **-e** surfaces. Imbrication also occurs obligatorily in reciprocalized and passivized verbs where, in the latter, there can also be a **CaC-il-w-e** → **CaCiwe** change. Section 4.4 revealed that the internal structure of a morpheme, particularly a root, cannot be ignored as some restrictions are imposed on some segments and syllables. High vowels were also shown not to occur root initial. Also discussed was the fact that C_1 and C_2 stops in a root harmonize in terms of laryngeal features and velar stops only occur root initial unless they are reduplicated. Labialized consonants were also shown to occur in C_1 position except in cases where the initial consonant is reduplicated or when labialization is a result of passivization.

CHAPTER 5: PALATALIZATION

5.0 Introduction

This chapter attempts to provide a comprehensive account of the phenomenon of labial palatalization in the Ndebele passive from a synchronic perspective. While the chapter is mainly descriptive important theoretical questions are also raised. It is argued here that palatalization of labials is a dissimilatory process which is also sensitive to morpheme boundary.

Ndebele has verbal passivization similar to that of other Nguni languages (Zulu, Xhosa and SiSwati) and, to some extent, also similar to that of languages belonging to the Sotho group¹. As was noted in Chapter 2, the passive in Ndebele can be identified by the suffix /-iw-/ or /-w-/². Sub-minimal C- and -VC- roots such as those in (1a.) suffix /-iw-/ while CVC- and longer roots take /-w-/ as illustrated in (1b.).

(1) Passivization of verbs with short and long roots.

verb	gloss	passive	gloss
a. -kh-a	'pick (fruit from tree)'	kh-iw-a	'be picked (fruit from tree)'
-dl-a	'eat'	dl-iw-a	'be eaten'
-al-a	'refuse/deny'	-al-iw-a	'be refused/denied'
-akh-a	'build'	-akh-iw-a	'be built'
b. sus-a	'remove'	sus-w-a	'be removed'
gudl-a	'rub against'	gudl-w-a	'be rubbed against'
-eluk-a	'weave'	-eluk-w-a	'be woven'
-ethus-a	'frighten'	-ethus-w-a	'be frightened'
hlikihl-a	'rub'	hlikihl-w-a	'be rubbed'
khanzing-a	'roast'	khanzing-w-a	'be roasted'
thethelel-a	'forgive'	thethelel-w-a	'be forgiven'
huquluz-a	'take all or almost all'	huquluzwa	'be taken (all or almost all)'

¹ For details about passivization in some Nguni and Sotho languages, see Doke (1965), Herbert (1977), Khumalo (1987), Louw (1975/76), O'Bryan (1974), Stahlke (1976), Tucker (1929:79-81) and others.

² This may be treated as labialization of the preceding consonant but the distinction is not crucial to the point being made in this chapter as [C^w] and [Cw] actually sound the same.

None of the verbs given in (1) has a labial consonant in the root. The interesting point to note is that in forms with a root-final bilabial such as those in the imperative mood in (2) there is palatalization in addition to labialization when passive **-w-** is suffixed.

(2) Palatalization of root-final bilabials when passive **/-w-/** is suffixed.

verb	gloss	passive	gloss
a. khuph-a	'remove'	khutsh-w-a	'be removed'
b. kop'-a	'pick out (as from hole)'	kotsh'-w-a	'be picked out (as from hole)'
c. gebh-a	'dig'	gej-w-a	'be dug'
d. khab-a	'kick'	khatsh'-w-a	'be kicked'
e. mp'omp'-a	'pump'	mpontsh'-w-a	'be pumped'
f. themb-a	'trust'	thenj-w-a	'be trusted'
g. zam-a	'try'	zany-w-a	'be tried'

The palatalization of labials is illustrated with different bilabials in the root-final position. In such cases palatalization is always obligatory and the resultant changes are given in (3).

(3) Changes from bilabials to palatals.

a.	ph [p ^h]	+ w	→	tshw [tʃ ^{hw}]
b.	p' [p']	+ w	→	tsh'w [tʃ ^w ']
c.	bh [b]	+ w	→	jw [dʒ ^w]
d.	b [β]	+ w	→	tsh'w [tʃ ^w ']
e.	mp [ᵐp']	+ w	→	ntsh'w [ᵐtʃ ^w ']
f.	mb [ᵐb]	+ w	→	njw [ᵐdʒ ^w]
g.	m [m]	+ w	→	nyw [ɲ ^w]

The ejective bilabial plosive [p'] and the bilabial fricative [β] merge when they become palatals (pre-palatals to be more specific). In the other Nguni languages [β] is realized as the

implosive [ɓ]. It is clear from the changes noted above that phonologically, [β] still functions like [b] since it maintains a glottal feature when it is palatalized. The devoicing that occurs when [β] is palatalized is probably due to the glottal feature itself since ejectives are produced with a closed glottis. The [+constricted glottis] feature of voiceless ejective stops is incompatible with voicing unless there is slackening of the glottal tension which would then permit vibration of vocal cords as in the production of voiced plosives.

Not all labials in the root final position are palatalized. As seen in (4) Labio-dental fricatives [f] and [v] are exceptions.

(4) Labio-dental fricatives [f] and [v] are not palatalized.

a.	verb dlov-a	gloss 'attack roughly'	passive dlov-w-a	gloss 'be attacked roughly'
b.	kwif-a	'squirt from mouth'	kwif-w-a	'be squirted from mouth'

The voiceless labio-dental fricative [f] and its voiced counterpart [v] are never palatalized but behave exactly the same way as the non-labial root-final consonants in (1).

A table providing statistics about the occurrence of the different bilabials in the root-final position is given in (5). Recall that the database used has 5000 words of which 1984 are verbs.

(5) Occurrence of different bilabials in root-final position.

FINAL CONS.	ROOT							TOTAL
	-C-	-VC-	CVC-	-VCVC-	CVCVC-	-VCVCVC-	-CVCVCVC-	
b	1	2	44	4	7	0	0	58
bh	0	0	9	0	0	0	0	9
p'	0	0	1	0	0	0	0	1
ph	1	1	18	1	3	0	1	25
m	1	1	39	4	27	0	1	73
mb	1	0	20	0	7	0	2	30
mp'	0	0	2	0	1	0	0	3
TOTAL	4	4	133	9	45	0	4	199

As can be seen from the table, most root final bilabials (133/199 or 66.8%) are found in CVC- roots although there is also a substantial number (45/199 or 22.6%) from CVCVC- verb bases. It should also be noted that ejectives **p'** and **mp'** occur in a very few words in Ndebele, hence the many zeros and low figures in the table.

The rest of the chapter is organized as follows. Section 5.1 provide a detailed account of general properties of passivization in Ndebele focusing specifically on cases that involve labials. Section 5.2 is a synchronic account of passivization. Previous diachronic accounts are discussed in Section 5.3, and Section 5.4 is the conclusion.

5.1 Palatalization of Labials

5.1.1 Some Basic Facts About Root-Internal Palatalization.

It has already been noted in section 5.0 that in a verb whose root ends with a bilabial the bilabial is palatalized when passive /-w-/ is added. Another important point to note is that the final bilabial consonant of the root is not the only target for palatalization but root-internal bilabial consonants not adjacent to /-w-/ as well. This is illustrated in (6) where the root-final consonant is not a labial. As was pointed out in the previous chapters, a frozen suffix is treated as part of the root if present.

(6) Root-internal bilabials which are not adjacent to passive **-w-** are also palatalized.

	verb	gloss	passive	gloss
a.	fiphaz-a	'obscure'	fitshaz-w-a	'be obscured'
	siphun-a	'uproot'	sitshun-w-a	'be uprooted'
b.	k'op'el-a	'button'	k'otsh'el-w-a	'be buttoned'
	t'op'ol-a	'peck at'	t'otsh'ol-w-a	'be pecked at'
c.	cabang-a	'think'	catsh'ang-w-a	'be thought'
	dabul-a	'tear'	datsh'ul-w-a	'be torn'
d.	khumbuz-a	'remind'	khunjuz-w-a	'be reminded'
	hlambulul-a	'cleansed'	hlanjulul-w-a	'be cleansed'

e.	mumath-a	'hold (something) in the mouth'	munyath-w-a	'be held (something) in the mouth'
	limaz-a	'harm'	linyaz-w-a	'be harmed'

While it is unacceptable or extremely odd not to palatalize the labial in the above examples, there are other cases, however, in which palatalization of root internal bilabials is clearly optional. This is illustrated in (7) with different bilabial consonants in the root.

(7) Palatalization of root-internal labials is optional in some cases.

a.	verb	gloss	passive	gloss
	khuphul-a	'promote'	khutshul-w-a	'be promoted'
	xhophos-a	'prick'	~khuphul-w-a	
			xhotshos-w-a	'be pricked'
			~xhophos-w-a	
b.	k'ap'ul-a	'eat a lot fast'	k'atsh'ul-w-a	'be eaten a lot fast'
	k'op'ulul-a	'unbutton'	~kapul-w-a	
			k'otsh'ulul-w-a	'be unbuttoned'
			~kop'ulul-w-a	
c.	labhul-a	'throw away with force'	lajul-w-a	'be thrown away with force'
	t'ubhul-a	'protrude mouth in anger'	~labhul-w-a	
			t'ujul-w-a	'be protruded (mouth) in anger'
			~t'ubhul-w-a	
d.	babaz-a	'praise'	batsh'az-w-a	'be praised'
	cubungula	'analyze'	~babaz-w-a	
			cutsh'ungul-w-a	'be analyzed'
			~cubungul-w-a	
e.	mimiliz-a	'swallow as a whole'	minyiliz-w-a	'be swallowed as a whole'
	xamalaz-a	'stand with legs apart'	~mimiliz-w-a	
			xanyalaz-w-a	'be stood with legs apart'
			~xamalaz-w-a	
f.	nomp'ol-a	'take with a finger'	nontsh'ol-w-a	'be taken with a finger'
	zomp'ol-a	'snatch'	~nomp'ol-w-a	
			zontsh'ol-w-a	'be snatched'
			~zomp'ol-w-a	
g.	mbambath-a	'pat'	mbanjath-w-a	'be patted'
	nembulul-a	'stretch out'	~mbambath-w-a	
			nenjulul-w-a	'be stretched out'
			~nembulul-w-a	

Furthermore, there are also a few cases in which the potentially palatalizable bilabial is never palatalized at all. Examples are given in (8) where even roots with a reduplicated initial CV- are included although they will be considered again later.

(8) In some cases the bilabial is not palatalized.

a.	verb p'op'oth-a	gloss 'talk too much'	passive p'op'oth-w-a *p'otsh'oth-w-a	gloss 'be talked too much'
b.	bhubhudl-a	'foam'	bhubhudl-w-a *bhujudl-w-a	'be foamed'
c.	khwabith-a	'desire ardently'	khwabith-w-a *khwatsh'ith-w-a	'be desired ardently'
d.	nyomul-a	'pull out (as axe from handle)'	nyomul-w-a *nyonyul-w-a	'be pulled out (as axe from handle)'

Here too, each of the examples has a different bilabial consonant root internally.

5.1.2 Consonants Before Which Bilabials are Palatalized and Some Statistics

Ignoring the consonant position for now, palatalized or potentially palatalizable root-internal labials are found before the consonants given in (9).

(9) Ndebele consonants that occur after root internal-bilabials.

	Alveolars	Palatal	Velars
Voiceless Aspirated Stop	th		
Voiced Stop	d		
Voiced Lateral Aproximant	l		
Semi-Vowel		y	
Voiced Fricatives:	z		k
Voice Lateral Fricative	dl		
Voiceless Fricatives	s		
Nasals	n		Ng (ŋ)
Voiced Pre-nasalized Stops	nd		ng (ŋg)
Voiced Pre-nasalized fricative	nz		

CLICKS		
	Voiceless	Nasalized
Post-Alveolar	q	nq

As can be seen, the consonants before which root-internal bilabials can palatalize when passive /-w-/ is suffixed to the root are both coronals and velars. Glottal sounds [h] and [ɦ] never occur after bilabials in the second or third C-slots.

To determine whether or not obligatory palatalization, optional palatalization and non-palatalization of bilabials has something to do with being in the environment of particular consonants or consonant classes it is necessary to look at statistics. Figures for the distribution of palatalization of bilabials in the second and third C-slots before different consonants are provided in (10). Table (10a.) provides figures for cases where there is obligatory palatalization of the bilabial consonant, Table (10b.) for those cases where palatalization is optional and, Table (10c.) for cases where the bilabial is never palatalized. Also included for ease of comparison is Table (10d.) showing figures for consonants that follow a palatal one (not resulting from passivization) in the second or third syllable of the verb. The rest of the consonants are not included in the tables as they never occur after a bilabial or palatal in the second or third C slot (at least in the database I have used). Note that no root-internal or stem-internal bilabial occurs after the third syllable of the verb except in reduplicated forms. Also, some bilabials occur before two different consonants and hence they are counted more than once in one stem.

(10) Root-internal palatalization.

a. Palatalization of a bilabial consonant in the 2nd or 3rd syllable of the verb is obligatory

BILAB. CONS.	CONSONANT AFTER BILABIAL															
	Coronals=186 (89.4%)												Velars=22			Total
	l	s	z	n	th	nz	q	nd	dl	y	d	nq	k	Ng	ng	
bh	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ph	15	3	5	5	0	0	0	0	0	0	0	0	5	0	0	33
b	10	1	3	5	0	3	0	0	0	0	0	0	2	1	0	25
p	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
m	46	19	17	6	5	0	0	0	0	0	0	0	9	0	0	102
mb	19	9	5	4	1	0	1	0	0	0	0	0	5	0	0	44
mp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	93	33	30	20	6	3	1	0	0	0	0	0	21	1	0	208

b. Palatalization of a bilabial consonant in the 2nd or 3rd syllable of the verb is optional.

BILAB. CONS.	CONSONANT AFTER BILABIAL															
	Coronals=125 (77.2%)												Velars=37			Total
	l	s	z	n	th	nz	q	nd	dl	y	d	nq	k	Ng	ng	
bh	2	0	3	0	0	0	0	0	0	0	0	0	2	0	0	7
ph	13	2	6	1	0	0	0	0	0	0	0	0	5	0	0	27
b	21	8	9	5	0	0	0	1	0	0	0	0	9	4	0	57
p	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
m	14	0	6	1	3	0	0	0	0	2	0	0	6	0	0	32
mb	8	2	2	1	4	0	0	0	0	0	0	0	6	0	0	23
mp	4	0	4	0	0	0	0	0	0	0	0	0	4	0	0	12
Total	65	12	30	8	7	0	0	1	0	2	0	0	33	4	0	162

c. A bilabial consonant in the 2nd or 3rd syllable of the verb is not palatalizable.

BILAB. CONS.	CONSONANT AFTER BILABIAL															
	Coronals=78 (70%)												Velars=32			Total
	l	s	z	n	th	nz	q	nd	dl	y	d	nq	k	Ng	ng	
bh	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3
ph	5	0	3	0	2	0	0	0	0	0	0	0	6	0	0	16
b	35	3	6	1	4	0	1	0	0	0	1	0	17	0	0	68
p	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
m	4	2	0	0	0	0	0	0	0	0	0	1	2	0	1	10
mb	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	6
mp	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5
Total	47	5	9	2	10	0	1	0	2	0	1	1	31	0	1	110

d. Consonants following a palatal one in the 2nd or 3rd syllable of the verb.

PAL. CONS.	CONSONANT AFTER PALATAL								
	Coronals=65 (82%)						Velars=14		
	l	s	z	n	t'	y		k	Total
tsh	9	3	8	1	0	0		4	25
tsh'	2	1	3	0	1	0		0	7
j	2	1	1	0	0	0		1	5
ny	11	6	4	2	0	0		8	31
ntsh'	0	1	1	1	0	0		0	3
tshw'	0	0	1	0	0	0		0	1
jw	2	0	1	0	0	3		1	7
Total	26	12	19	4	1	3		14	79

Table (10a.) shows that where bilabials definitely palatalize the consonants following the labials are 89.4% coronal and 10.6% velar. Similarly Table (10b.) also shows a far much higher percentage of coronals (77.2%) than velars (22.8%) before bilabials in cases of optional palatalization. The more interesting figures are those of cases where there is no palatalization of the bilabial at all. The figures become 70% before coronals and 29% before velars. Thus, there is now a greater relative percentage of non-palatalization of bilabials before velars but the opposite when it comes to coronals. The table in (11) provides a summary of these facts.

(11) Comparison of palatalization of bilabials before coronals and velars.

	OBLIGATORY	OPTIONAL	DISALLOWED
CORONALS	186 (89.4%)	125 (77.2%)	78 (70%)
VELARS	22 (10.6%)	37 (22.8)	32 (29%)

While comparing palatalization before coronals and velars might not be statistically significant as there are considerably fewer velars than coronals occurring after bilabials (as also seen in (10d.) it is clear that we get fewer coronals as we go from 'obligatory' to 'optional' and from 'optional' to 'disallowed'. It should also be noted that for palatalization before coronals most of the figures are for palatalization occurring before l, s, z, n and th. Figures for nz, q, nd, dl, y, d, nq on their own are too low to be of any

statistical significance as can be seen from the tables in (10). It should be pointed out that, although **th** is included in the coronals, palatalization of bilabials before **th** is not consistent with the general facts about palatalization of bilabials before coronals given in (11) perhaps due to the fact that it is aspirated while all other coronals are not. In fact the pattern of palatalization before **th** is similar to that of palatalization before velars given in (11). For velars significant figures are only those of palatalization before **k**. The low figures of palatalization before **Ng** and **ng** cannot help draw any reasonable conclusion.

In the Table in (10c.) the figures for non-palatalization of bilabials are generally small except for **b** before **l** and **k**, and to some extent **b** before **z**. Ignoring **b** before **l**, **k** and **z** (which will be dealt with in Section 3) for the time being, the small figures can be explained by the fact that the labials in most of these examples are preceded by palatal consonants. A root-internal bilabial consonant occurring after a palatal one is normally not palatalized and this appears to be a case of avoiding identity. Examples are given in (12a.). Out of 34 verbs with root-internal bilabials preceded by palatals the only exceptions found are the 6 given in (12b.) where palatalization of the labial is optional. In other words 28 words including those in (12a.) resist palatalization.

- (12) A root-internal bilabial preceded by a palatal is not palatalized but there are a few exceptions.

verb	gloss	passive	gloss
a. jwbul-a	'tear (meat from hide)'	jwbul-w-a	'be torn (meat from hide)'
nyomul-a	'pull out'	nyomul-w-a	'be pulled out'
tshobol-a	'peck with beak '	tshobol-w-a	'be pecked with beak '
tshiphe-l-a	'cause to be fed up with'	tshiphe-l-w-a	'get fed up with'
tsh'op'ok-a	'jump'	tsh'op'ok-w-a	'be jumped'
b. jabul-a	'be happy'	-jabul-w-a	'be happy'
		~ -jatshul-w-a	
jujumezel-a	'monopolize (in discussion, etc.)'	jujumezel-w-a	'be monopolize(in discussion, etc.)'
tshombulul-a	'uncoil'	~ jujunyezel-w-a	'be uncoiled'
		tshombulul-w-a	
		~ tshonjululwa	
nyombulul-a	'uncoil'	nyombulul-w-a	'be uncoiled'
		~ nyonjulul-w-a	
tshumayel-a	'preach'	tshumayel-w-a	'be preached'
		~ tshunyayel-w-a	
tshumayez-a	'preach to'	tshumayez-w-a	'be preach to'

Note that **tshombulula** ‘uncoil’ and **nyombulula** ‘uncoil’ in (12b.) are in fact variants of the same word although **tshombulula** is the most commonly used form, and **tshumayela** ‘preach’ and **tshumayeza** ‘preach to’ have the same root. Our exceptions can therefore be reduced to four. It is also important to point out that in cases where the bilabial after a palatal consonant is root-final palatalization occurs as in (13). Adjacency seems to play an important role here. Avoiding **Labial + w** appears more important than avoiding ‘palatal’ feature identity since **Labial + w** is always ill-formed in the language while PVP (Palatal Consonant + Vowel + Palatal Consonant) is not.

(13) A root-final bilabial preceded by a palatal is palatalized.

verb	gloss	passive	gloss
nyob-a	‘rub off (dirt)’	nyotsh’-w-a	‘be rubbed off (dirt)’
tsheb-a	‘take as relish’	tshetsh’-w-a	‘be taken as relish’
juma	‘take by surprise’	juny-w a	‘be taken by surprise’

While I do not palatalize the bilabials in examples such as those given in (12a.), it seems that if anyone palatalizes any of them it is those other than **ph**, **p’** or **mp’** and that the palatalization is always optional. In (12b.) the optional palatalization of **m** in **jujumezela**, **tshumayela**, and **tshumayeza** could be due to the fact that **m** has the highest incidence of palatalization both in terms of numbers and as a percentage compared to other bilabial consonants as it usually occurs in environments where it could be stem final as will be seen when details are provided in Sub-section 2.5. This fact may probably influence people to palatalize it even where the right environment does not exist. It is however not clear why **jabula** and **nyombulula** can also be palatalized as **b** has the highest number of cases of non-palatalization. For ease of comparison (14) is presented here with both absolute figures and percentages as a summary of the statistics on root internal palatalization before different bilabial consonants provided by the first three tables in (10).

(14) Root internal palatalization. (Summary from (10)).

	OBLIGATORY	OPTIONAL	DISALLOWED
bh	1 (0.5%)	7 (4.3%)	3 (2.7%)
ph	33 (15.9%)	27 (16.7%)	16 (14.4%)
b	25 (12%)	57 (35.2%)	68 (61.8%)
p	3 (1.4%)	4 (2.5%)	2 (1.8%)
m	102 (49%)	32 (19.8%)	10 (9.1%)
mb	44 (21.2%)	23 (14.2%)	6 (5.5%)
mp	0 (0%)	12 (7.4%)	5 (4.5%)
TOTAL	208 (100%)	162 (100%)	110 (100%)

As can be seen from the table in (13), **m** provides 49% of the examples of obligatory palatalization where its nearest ‘rival’ **mb** provides 21.2%. Also, while **m** has 102 cases of obligatory palatalization figures for optional and disallowed palatalization decrease significantly to 32 and 10, respectively. For disallowed palatalization **b** has by far the highest number of examples and these make 61.8% of the total of such cases for all bilabials. The figure of 57 for optional palatalization of **b**, though lower than the 68 for non-palatalization, is still high. However, for obligatory palatalization the figure goes down significantly to 25. It can therefore be generalized from (13) that whereas **m** ‘tends’ to palatalize **b** ‘tends’ not to. Note that while identity of C1 and C2 in terms of their palatal features is avoided there appear to be no such restriction when both C1 and C2 are bilabials especially when occurring in intransitive verbs. Out of 41 verbs with identical C1 and C2 it is only in 6 that there is obligatory palatalization of the bilabial in C2. Some examples of obligatory palatalization are given in (15a.). This leaves 22 bilabials in C2 which are optionally palatalized while 13 are never palatalized. Examples of these are given in (15b.) and (15c.), respectively.

(15) Palatalization in verbs whose C1 and C2 are both bilabial, C2 being root internal.

a.	verb bhoboz-a memez-a	gloss ‘pierce’ ‘call aloud’	passive bhotsh’oz-w-a menyez-w-a	gloss ‘be pierced’ ‘be called aloud’
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b.	mbambath-a	‘pat’	mbanjathwa	‘be patted’
			~ mbambathwa	
	mp’emp’ez-a	‘whistle’	mp’entsh’ez-w-a	‘be whistled’
			~ mp’emp’ez-w-a	
c.	babel-a	‘burn off (grass)’	babel-w-a	‘be burnt off (grass)’
	phepheth-a	‘blow away’	phepheth-w-a	‘be blown away’

Tables in (10) also show that there are no examples of **b**, **ph** and **mp’** palatalizing before **th** but examples of non-palatalization of these sounds are too few (4, 2 and 3, respectively) to draw any meaningful conclusion especially considering that other bilabials palatalize before **th**. In **gubuda** ‘turn upside down’ the bilabial **b** also does not palatalize before **d** but this is the only such example in the database. The verb **gomonqa** ‘be inclined’ is the only example where **nq** occurs after a bilabial in the second or third syllable of a verb. The **m** in this word is not palatalized in the passive. Two examples of **bh** failing to palatalize before **dl** are also odd and will be considered together with the **m** of **gomonqa** in Sub-section 2.7 after looking at the failure of **b** to palatalize before **l**, **k** and **z**.

5.1.3 Non-Palatalization of Bilabials in the first C slot of the Root.

Although root-medial palatalization shows that non-local palatalization is possible, a bilabial consonant which occurs as the first consonant of the root is, however, never palatalized. Examples in (16a.) illustrate this with C- and -VC- sub-minimal roots while those in (16b.) confirm the same point with longer roots which have different bilabials in the first C slot of the root. Thus columns headed -C- and -VC- in (5) display figures for non-palatalizable root final labials while the rest of the columns provide figures for bilabials which are always palatalized in the passive.

(16) Bilabials that are first consonants of the root are never palatalized.

	verb	gloss	passive	gloss
a. (i)	ph-a	‘give’	ph-iw-a	‘be given’

	m-a ³	'stop'	m-iw-a	'be stopped'
(ii)	ab-a	'share'	ab-iw-a	'be shared'
	emb-a	'dig'	emb-iw-a	'be dug'
b. (i)	phek-a	'cook'	phek-w-a	'cook'
	phakulul-a	'dish out'	phakulul-w-a	'be dished out'
(ii)	p'ikla	'smear with too much oil on body'	p'ikl-w-a	'be smeared with too much oil on body'
	p'ened-a	'join together by a safety pin'	p'ened-w-a	'be join together by a safety pin'
(iii)	bhul-a	'thresh (corn)'	bhul-w-a	'be threshed (corn)'
	bhadal-a	'pay'	bhadal-w-a	'be paid'
(iv)	biz-a	'call'	biz-w-a	'be called'
	bingelel-a	'greet'	bingelel-w-a	'be greeted'
(v)	mpentsh-a	'puff'	mpentsh-w-a	'be puffed'
(vi)	mboz-a	'cover'	mboz-w-a	'be covered'
	mbokoth-a	'turn upside-down'	mbokoth-w-a	'be turned upside- down'
(vii)	mukul-a	'slap'	mukul-w-a	'be slapped'
	muhluz-a	'slap/beat'	muhluz-w-a	'be slapped/beaten'

5.1.4 Effect of suffixation on Palatalization

Also interesting about Ndebele passive verbs is the fact that palatalization occurs even if other suffixes such as Applicative /-el-/ , Causative /-is-/ , intensive /-isis-/ and Reciprocal /-an-/ intervene between the root and the passive suffix except in cases where the bilabial consonant is the first consonant of the root. In other words suffixes such as the ones just given have no effect on the palatalizability of the preceding base. This is one of the problems which lead Herbert (1977) to conclude that palatalization in Southern Bantu languages must be a morphological process, at least synchronically. Examples in which one or two suffixes intervene between the root and Passive /-w-/ are given in (17).

- (17) Palatalization occurs even if any suffix(es) intervene(s) between the root and /-w-/ (e.g. Applicative /-el-/ , Causative /-is-/ , Intensive /-isis-/ and Reciprocal /-an-/).

	verb	gloss	passive
a. (i)	-elaph-is-a	'cause to cure'	-elatsh-is-w-a
	khuph-el-a	'remove for'	khutsh-el-w-a
(ii)	k'op'-el-a	'pick out for (as from hole)'	k'otsh'-el-w-a
	k'op'-is-a	'cause to copy'	k'otsh'-is-w-a

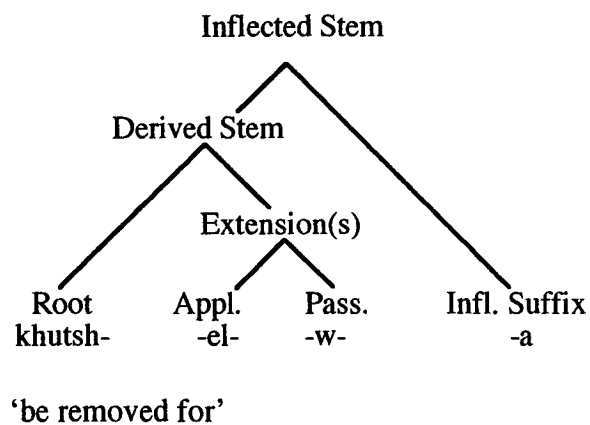
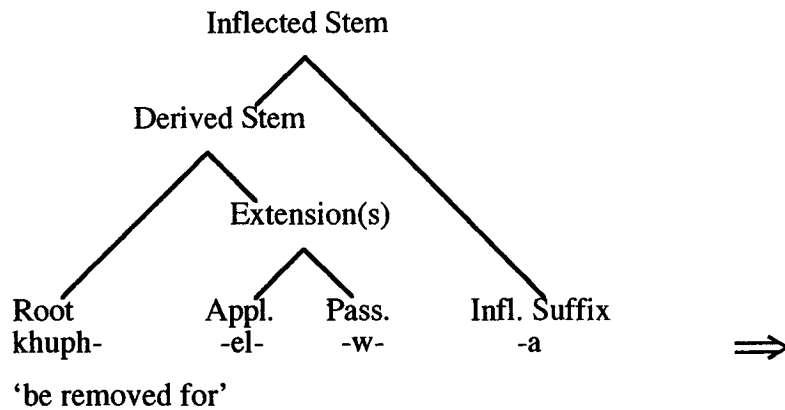
³ This is an intransitive verb. See (24) for other similar but longer examples and the paragraph above it for the relevant discussion.

(iii)	gebh-el-a libh-is-a	'dig for' 'cause to riddle'	gej-el-w-a lij-is-w-a
(iv)	khab-el-an-a vub-is-a	'kick for/to each other' 'cause to mix'	khatsh-el-an-w-a vutsh-is-w-a
(v)	mp'omp'-is-a mp'olomp'-el-a	'make pump' 'take(snuff) in mouth for'	mp'ontsh'-is-w-a mp'olontsh'-el-w-a
(vi)	themb-is-el-a khomb-el-an-a	'promise for' 'pointed for/to each other'	thenj-is-el-w-a khonj-el-an-w-a
(vii)	zam-el-a lum-is-el-a	'trie for' 'caused to bite for'	zany-el-w-a luny-is-el-w-a
b. (i)	siphun-is-a	'cause to uproot'	sitshun-is-w-a
(ii)	k'op'el-el-a k'ap'ul-is-a	'button for' 'cause to eat a lot quickly'	k'otsh'el-el-w-a k'atsh'ul-is-w-a
(iii)	labhul-is-a tubhul-is-el-a	'cause to push and throw away' 'make protrude mouth in eanger for'	lajul-is-w-a ~ labul-is-w-a tujul-is-el-w-a ~ tubhul-is-el-a
(iv)	dubul-el-an-a qabang-el-a	'shoot for each other' 'replanted for'	dutshul-el-an-w-a qatshang-el-w-a
(v)	nomp'ol-isis-a zomp'ol-el-a	'take with finger well' 'snatch for'	nontsh'ol-isis-w-a / nomp'ol-isis-w-a zontsh'ol-el-wa / zomp'ol-el-wa
(vi)	khumbuz-el-a hlambulul-is-a	'remind for' 'cause to cleanse'	khunjuz-el-w-a hlanjulul-is-w-a
(vii)	khumul-is-el-a limaz-el-a	'cause to remove for' 'harm for'	khunyul-is-el-w-a linyaz-el-w-a

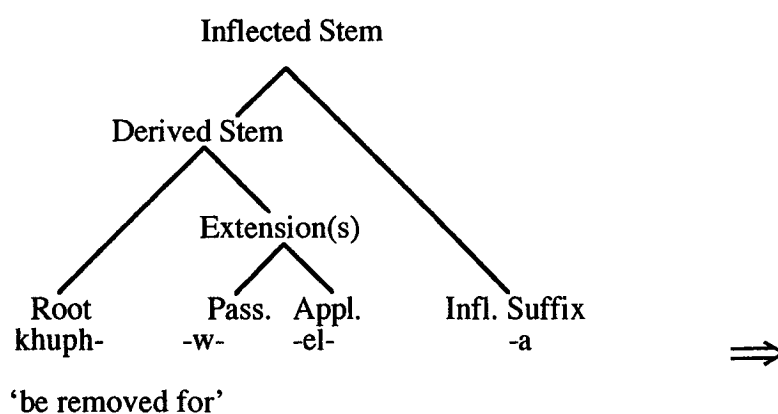
Examples in (17a.) show that the final consonant of the root is palatalized even when there are other suffixes before passive /-w-/. In (17b.) where the bilabial consonant is medial in the 'root' the same generalization is observed. Note that for transitive verbs such as those in (17) it is possible to have both a passivized applicative as in (18a.) and an applicativized passive as in (18b.) although not all example illustrate this. In both cases the passive is spelt out last even if it may be underlyingly adjacent to the root in an applicativized passive. In both cases palatalization occurs. In other words, there is no difference on palatalization whether the sequence in suffixation is **Applicative + Passive** or **Passive + Applicative**. This, therefore, means that palatalization in a passivized applicative is non-local.

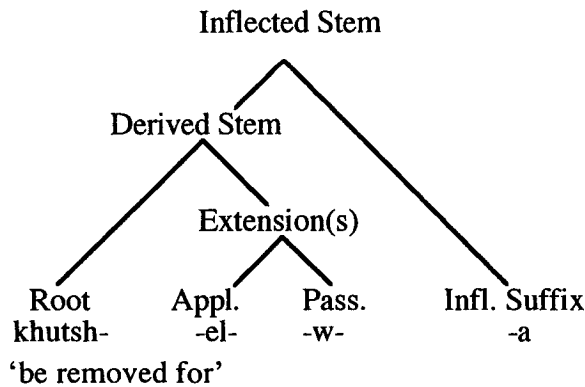
(18) Passivized Applicative and Applicativized Passive

a. Passivized Applicative.



b. Applicativized Passive.

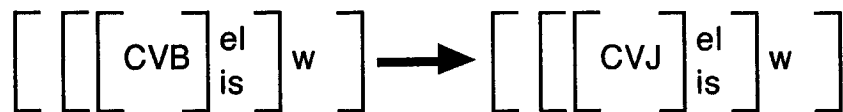




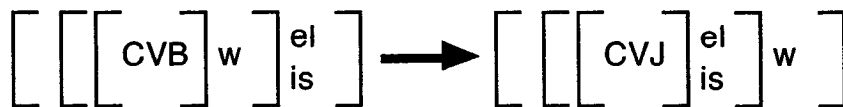
Similarly, it is also possible with transitive verbs to have a passivized causative and a causativized passive. In both cases the passive is spelt out last. A passivised causative has a structure like (18a.) while a causativized passive can be represented by the tree diagrams in (18b.), the only difference being that the applicative suffix /-el-/ is replaced by the causative suffix /-is-/ in both cases. Whether passive /-w-/ is next to the root-final bilabial underlyingly (as in the casativized passive) or not (as in the passivized causative) palatalization occurs. It is clear, therefore, that palatalization occurs both local and at a distance. Cyclicity facts relating to both the applicative and causative just presented are summarized in (19) where B represents a bilabial and J a palatal.

(19) Cyclicity and Palatalization.

a. Passivized Applicative and Passivized Causative.



b. Applicativized Passive and Causativised Passive.



Examples in (20a.) and (20b.) which are similar to those in (17) further confirm that a bilabial which occurs in the first C slot of the root is never palatalized in both sub-minimal and longer roots.

- (20) Even when suffixes intervene between the root and Passive -w- a bilabial in the first C slot of the root is not palatalized.

a.	verb	gloss	passive	gloss
	ph-el-a	'give for/at'	ph-el-w-a	'be given for/at'
	-ab-is-a	'cause to share'	ph-iw-el-w-a	'be caused to share'
	-emb-el-a	'dig for'	-ab-is-w-a	'be caused to share'
	m-is-el-a	'cause to stop for'	-emb-el-w-a	'be dug for'
			m-is-el-w-a	'be caused to stop for'
b. (i)	phakulul-el-a	'dish for'	phakulul-el-w-a	'be dished for'
	phek-is-a	'cause to cook'	phek-is-w-a	'be caused to cook'
	(ii) p'ikl-is-a	'cause to smear too much oil on body'	p'ikl-is-w-a	'be cause to smear too much oil on body'
	p'ened-el-a	'join together by a safety pin for'	p'ened-el-w-a	'be joined together by a safety pin for'
	(iii) bul-el-a	'thresh for'	bul-el-w-a	'be threshed for'
	bhadal-is-el-a	'cause to pay for'	bhadal-is-el-w-a	'be caused to pay for'
	(iv) biz-el-a	'call for'	biz-el-w-a	'be called for'
	bingelel-is-a	'cause to greet'	bingelel-is-w-a	'be caused to greet'
	(v) mp'entsh-is-a	'cause to puff'	mp'entsh'-is-w-a	'be caused to puff'
	(vi) mboz-isis-a	'cover well'	mboz-isis-w-a	'be covered well'
	mbokoth-el-a	'turn upside-down for'	mbokoth-el-w-a	'be turned upside-down for'
	(vii) mukul-el-a	'slap for'	mukul-el-w-a	'be slapped for'
	muhluz-is-a	'cause to slap'	muhluz-is-w-a	'be caused to slap'

In (13) we saw that root-final bilabials are palatalized even if they are preceded by palatal consonants. When affixes such as applicative /-el-/ and causative /-is-/ are suffixed to such root-final bilabials palatalization becomes optional as illustrated in (21). This could be explained by phonology's sensitivity to morpheme boundaries and feature identity. When phonology 'sees' morpheme boundaries then there is palatalization as the bilabial will still be root-final. However, when identity between C1 and C2 in terms of their palatal features has to be avoided then no palatalization occurs.

- (21) A root-final bilabial preceded by a palatal is optionally palatalized when Causative **-is-** (a.) or Applicative **-el-** (b.) is suffixed before passive **-w-**.

a.	verb	gloss	passive	gloss
	nyob-a	'rub off (dirt)'	nyotsh'-is-w-a ~ nyob-is-w-a cf. nyotsh-w-a	'be made to rub off (dirt)' (< nyob-w-a)
	tsheb-a	'take as relish'	tshetsh'-is-w-a ~ tsheb-is-w-a cf. tshetsh-w-a	'be made to take as relish' (< tsheb-w-a)
	juma	'take by surprise'	juny-is-w a ~ jum-is-w a cf. juny-w-a	'be caused to take by surprise' (< jum-w-a)
b.	nyob-a	'rub off (dirt)'	nyotsh'-el-w-a ~ nyob-el-w-a	'be rubbed off (dirt) for'
	tsheb-a	'take as relish'	tshetsh'-el-w-a ~ tsheb-el-w-a	'be taken as relish for'
	juma	'take by surprise'	juny-el-w-a ~ jum-el-w-a	'be taken by surprise for'

Normally, passive **/-w-/** cannot be suffixed to verbs which are already intransitive as it acts like a detransitivizing morpheme. For example, an intransitive verb such as **nciph-a** 'diminish' cannot normally be passivized to become ***nciph-w-a**. However, if a transitivity affix such as causative **/-is-/** is suffixed to the root of an intransitive verb as in (22) it becomes possible to passivize the derived transitive verb by suffixing **/-w-/**. In such cases a root-final bilabial can be palatalized just as it would be in the root of an underived transitive verb. This clearly shows that since there is no cycle in which **/-w-/** is adjacent to the final consonant of the root the palatalization process is non-local. Examples in (22f.), (22g.) and (22h.) provide more evidence that labio-dentals are never palatalized.

- (22) Root-final bilabial consonants of intransitive verbs are palatalized when the verbs are causativized before being passivized.

a.	verb	gloss	passive	gloss
	nciph-a	'diminish'	ncitsh-is-w-a	'be made to diminish'
b.	hwabh-a	'hiss'	hwaj-is-w-a	'be made to hiss'
c.	hlob-a	'go sour'	hlotsh-is-w-a	'be made to go sour'
d.	damb-a	'subside'	danj-is-w-a	'be made to subside'
e.	dum-a	'thunder/rumble'	duny-is-w-a	'be caused to thunder/rumble'

f.	ncif-a	make noise that expresses annoyance'	ncif-is-w-a	'be caused to make noise that expresses annoyance'
g.	bovul-a	'bellow excitedly'	bovul-is-w-a	'be made to bellow excitedly'
h.	gomf-a	'bend'	gomf-is-w-a	'be made to be bend'

The same generalizations noted about examples in (22) are also true even of cases in which the bilabial is root-internal as in (23). As can be seen suffixation does not change any of the points noted above. Palatalization still occurs except in cases in which the labial is actually a labio-dental as in (23d.), (23e.) and (23f.).

(23) Root-internal bilabial consonants of intransitive verbs are palatalized when the verbs are causativized before being passivized.

	verb	gloss	passive	gloss
a.	hluphek-a	'suffer'	hlutshek-isw-a	'be made to suffer'
b.	cambalal-a	'lie down(stretched out)'	canjalal-is-w-a	'be made to lie down (stretched out)'
c.	gomel-a	'swear/insist'	gonyel-is-w-a	'be made to swear/insist'
d.	phefuzel-a	'pant'	phefuzel-is-w-a	'be made to pant'
e.	vuvuk-a	'swell up(as wound)'	vuvuk-is-w-a	'be made to swell up(as wound)'
f.	fumfus-a	'begin to bud'	fumfus-is-w-a	'be made to begin to bud'

Just as we saw with different examples earlier, for some verbs there is also an option of not palatalizing the bilabial after suffixing causative /-is-/. (24a.) illustrates this with verbs which have root-final bilabials while (24b.) does so with examples in which the bilabial is root-internal. Note that for some of the examples C1 and C2 are identical. Although a different point is being made here such examples should not be seen as belonging to a different category from those given earlier in (15b.).

(24) Some Root-final and root-internal bilabial consonants of intransitive verbs are optionally palatalized when the verbs are causativized before being passivized.

	verb	gloss	passive	gloss
a.	bhebh-a	'blaze'	bhej-is-w-a	'be made to blaze'

nab-a	'sit with legs stretched'	~ bhebh-is-w-a natsh'-is-w-a	'be made to sit with legs stretched'
mp'amp'-a	'be agitated'	~ nab-is-w-a mp'antsh'-is-w-a	'be made to be agitated'
hlamb-a	'swim'	~ mp'amp'-is-w-a hlanj-is-w-a	'be made to swim'
jam-a	'look fiercely at'	~ hlamb-is-w-a jany-is-w-a	'be made to look fiercely at'
pheph-a	'escape'	~ jam-is-w-a phetsh-is-w-a	'be made to escape'
k'ap'ula	'eat a lot very fast'	~ pheph-is-w-a k'atsh'ul-is-w-a	'be made to eat a lot very fast'
		~ k'apul-is-w-a	
b. gqabhaz-a	'banter'	gqajaz-is-w-a	'be made to banter'
mp'emp'ez-a	'make noise (as whistle)'	~ gqabhaz-is-w-a mp'etsh'ez-is-w-a	'be caused to make noise (as whistle)'
gabaz-a	'show expertise in dancing'	mp'emp'ez-is-w-a gatsh'az-is-w-a	'be shown expertise (in dancing)'
thembuz-a	'go from wife to wife'	gabaz-is-w-a thenjuz-is-w-a	'be made to go from to wife'
		~ thembuz-is-w-a	
gxumukel-a	'go "plop" into the water'	gxunyukel-is-w-a	'be made to go "plop" into the water'
phapham-a	'awaken'	~ gxumukel-is-w-a phaphany-is-w-a/	'be awakened'
phuphum-a	'overflow'	~ phatshany-is-w-a phuphuny-is-w-a/	'be caused to overflow'
		~ phutshuny-is-w-a	

Only two intransitive verbs in the database, **phuphuma** and **phaphama** have two palatalizable non-root initial bilabials although it should be noted that the initial CV is reduplicated. In both words the root internal bilabial is optionally palatalized although the unpalatalized form in which palatal feature identity is avoided is generally preferred.

In a few intransitive verbs the bilabial consonant is never palatalized, even after suffixing causative /-is-/. Examples in which the bilabial is root-final are given in (25a.) and those in which the bilabial consonant is root-internal are provided in (25b.) Besides the two examples in (25a.) there are no other verb roots in the database which end with a C3 **b** and this could be the reason for treating them as irregular roots whose final **b** needs not be palatalized. In addition **hlahluba** 'devine' is rarely used since its variant **hlahlula** (with no bilabial and, of course, no palatalization) is preferred. For most of the examples in (25b.) C1 and C2 are identical. Such examples belong to the same category as those given earlier in

(15) where it was shown that palatalization is dispreferred in cases where both C1 and C2 are bilabial. As for **gomonqa** ‘be upside down’ palatalization appears to be blocked by the fact that the verb cannot be analyzed as **gom-onq-a** thereby making [m] a root final consonant since /-onq-/ is not a suffix, a point which will be pursued later.

(25) In a few intransitive verbs the bilabial consonant is never palatalized even after suffixing causative /-is-/.

verb	gloss	passive	gloss
a. hlahlub-a	devine’	hlahlub-is-w-a	‘be made to devine’
		*hlahlutsh’-is-w-a	
holob-a	rumble’	holob-is-w-a	‘be made to rumble’
		*holotsh’is-w-a	
b. bubul-a	groan’	bubul-is-w-a	‘be made to groan’
		*butsh’ul-is-w-a	
bhibhidl-a	‘fester’	bhibhidl-is-w-a	‘be made to fester’
		*bhijidl-is-w-a	
phump’utha	‘feel and grope in the dark’	phump’uth-is-w-a	‘be made to feel and in the dark’
		*phuntsh’uth-is-w-a	
popotha	talk too much’	popoth-is-w-a	‘be made to talk too much’
		*potsh’oth-is-w-a	
gomonq-a	‘be upside down’	gomonq-is-w-a	‘be turned upside down’
		*gonyonq-is-w-a	

Suffixing applicative /-el-/ , a transitivizing morpheme, yields the same generalization as with causative /-is-/ ((22), (23), (24) and (25)). (26) provides examples of obligatory palatalization in which /-el-/ is used in place of /-is-/ but omitting verbs which sound odd to applicativize. Note that labio-dentals are included here again to further show that they are never palatalized.

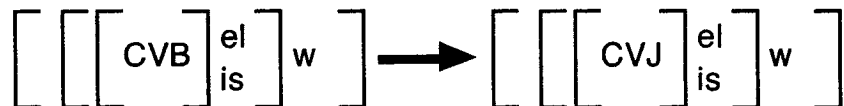
(26) Root-final and root-internal labial (but not labio-dental) consonants of intransitive verbs are palatalized when the verbs are applicativized before being passivized.

verb	gloss	passive	gloss
a. damb-a	‘subside’	danj-el-w-a	‘be subsided for’
dum-a	‘thundered’	duny-el-w-a	‘be subjected to thundered for’
b. cambalal-a	‘lied down (stretched out)’	canjalal-el-w-a	‘be lied down (stretched out) for’
hluphek-a	‘suffered’	hlutshek-el-w-a	‘be suffered for’
gomel-a	‘swear/insist’	gonyel-el-w-a	‘be sworn /insisted for’
bovul-a	‘bellowed excitedly’	bovul-el-w-a	‘be bellowed excitedly for’
vuvuk-a	‘swell up’	vuvuk-el-w-a	‘be swollen up for’

- | | | | | |
|----|------------|---------------------------------------|-----------------|--|
| c. | ncif-a | 'make noise that expresses annoyance' | ncif-el-w-a | 'be made noise that expresses annoyance or contempt for' |
| | gomf-a | 'bend' | gomf-el-w-a | 'be bent for' |
| d. | phefuzel-a | 'panter' | phefuzel-el-w-a | 'be panted for' |
| | fumfus-a | 'begin to bud' | fumfus-el-w-a | 'began to bud for' |

Since for intransitive verbs a causativized or applicativized passive is not possible cyclicity involving examples with root-final bilabials can be illustrated by the bracketing in (19a.) (which is reproduced here as (27)) and not the representation in (19b.). As can be seen, palatalization is non-local.

- (27) Passivized Applicative and Passivized Causative for intransitive verbs.
(*Applicativized Passive and *Causativized Passive)



When some intransitive verbs are applicativized before being passivized the bilabial consonant is optionally palatalized as illustrated with root-final bilabials in (28a.) and with root-internal bilabials in (28b.).

- (28) When some intransitive verbs are applicativized and then passivized the root-final and root-internal bilabial consonants are optionally palatalized.

verb	gloss	passive	gloss
a. nab-a	'sat with legs stretched'	natsh'-el-w-a	'be sat with legs stretched for'
		~ nab-el-w-a	
mp'amp'-a	'be agitated'	mp'antsh'-el-w-a	'be agitated for'
		~ mp'amp'-el-w-a	
hlamb-a	'swim'	hlanj-el-w-a	'be swam for'
		~ hlamb-el-w-a	
jam-a	'look fiercely at'	jany-el-w-a	'be looked fiercely at for'
		~ jam-el-w-a	
pheph-a	'escape'	phetsh-el-w-a	'be escaped for'
		~ pheph-el-w-a	
kapula	'eat a lot very fast'	katsh'ul-el-w-a	'be eaten a lot very fast for'
		~ kapul-el-w-a	
b. gqabhaz-a	'banter'	gqajaz-el-w-a/	'be bantered for'
		~ gqabhaz-el-w-a	

mp'emp'ez-a	'make noise (as with whistle)'	mp'etsh'ez-el-w-a	'be made noise for (as with whistle)'
gabaz-a	'show expertise' (in dancing)	~ mp'emp'ez-el-w-a gatsh'az-el-w-a	'be shown expertise in dancing) for'
thembuz-a	'go from wife to wife'	gabaz-el-w-a thenjuz-el-w-a	'be gone from wife to wife for'
gxumukel-a	gone "plop" into the water'	~ thembuz-el-w-a gxunyukel-el-w-a	'be gone "plop" into the water for'
phapham-a	'awaken'	gxumukel-el-w-a phaphany-el-w-a	'be be awakened for'
phuphum-a	'overflow'	~ phatshany-el-w-a phuphuny-el-w-a	'be overflown for'
		phutshuny-el-w-a	

There are also a few cases in which the bilabial consonant is never palatalized when the intransitive verb has been applicativized and then passivized. Examples in which root-final bilabial consonants are involved are given in (29a.) and those in which the bilabial consonants are root-internal are provided in (29b.). Again here C1 and C2 are identical in some of the verbs.

- (29) In a few cases the root-final (a.) and root-internal (b.) bilabial consonant is never palatalized when the intransitive verb is applicativized and then passivized.

verb	gloss	passive	gloss
a. hlahlub-a	'devine'	hlahlub-el-w-a	'be devined for'
		*hlahlutsh'-el-w-a	
holob-a	'rumbled'	holob-el-w-a	'be rumbled for/at'
		*holotsh'-el-w-a	
b. bubul-a	'groan'	bubul-el-w-a	'be groaned for/at'
		*butsh'ul-el-w-a	
bhibhidl-a	'fester'	bhibhidl-el-w-a	'be festered for'
		*bhijidl-el-w-a	
phump'utha	'feel and grope in the dark'	phump'uth-el-w-a	'be felt and groped in the dark for'
		*phuntsh'uth-el-w-a	
popotha	'talked too much'	popoth-el-w-a	'be talked too much for/at'
		*potsh'oth-el-w-a	
gomonq-a	'be upside down'	gomonq-el-w-a	'be turned upside- down for/at'
		*gonyonq-el-w-a	

The only time intransitive verbs can take passive /-w-/ directly is when they are used in sentences in which there is an 'empty' subject expressed by the prefix **kwa-** (equivalent to 'it' or 'there' in English). Even in such cases palatalization of bilabials occurs in the environments already described above. Here are some examples:

- (30) Palatalization when the sentence has an 'empty' or locative subject expressed by the prefix **kwa-**.

verb	gloss	passive	gloss
bhubh-a	'die'	kwa-bhuj-w-a	'There was death/dying'
hluphek-a	'suffer'	kwa-hlutshek-w-a	'There was suffering'
qumb-a	'be consipated'	kwa-qunj-w-a	'There was constipation'
som-a	'joke'	kwa-sony-w-a	'There was joking/ It was joked'
gabaz-a	'show expertise	kwa-gatshaz-w-a	'There was a display of expertise (in dancing)'
		~ kwa- gabaz-w-a	

5.1.5 Exceptions to Palatalization

In order to explain why we sometimes get exceptions to palatalization it is necessary to look at figures. (31) which is, in a way, three tables in one provides a summary of palatalization of bilabials in Ndebele. The table shows the frequency of cases where there is obligatory palatalization (C > PALATAL), optional palatalization (OPTIONAL P.) and no palatalization (NO PALATAL) of each given bilabial in different consonant positions of the Root. The first consonant in a vowel initial root is treated as C1 since it is also not subject to palatalization like C1 bilabials in consonant initial roots. When figures in (31) are compared with those in (5) it can be seen that out of 586 potentially palatalizable bilabials 191 (199-4-4) are root-final. This means that there are 395 (i.e. 586-191) potentially palatalizable root-internal cases. Actual figures for root-internal palatalization were given in (10). Note that the few cases of palatalization in C4 involve only forms that appear to be reduplicated.

- (31) Summary of palatalization of bilabials in Ndebele.

		C > PALATAL				OPTIONAL P.				NO PALATAL.				TOTAL
		C2	C3	C4		C2	C3	C4		C2	C3	C4		
C O N S O N A N T	b	65	2	0		48	6	0		33	26	0		180
	bh	10	0	0		5	0	0		4	0	0		19
	p'	4	0	0		3	0	0		2	0	0		9
	ph	41	4	1		20	1	0		15	0	0		82
	m	102	54	4		18	8	0		8	1	0		195
	mb	59	6	2		17	0	0		3	0	0		87
	mp'	2	1	0		8	0	0		3	0	0		14
	TOTAL	283	67	7		119	15	0		68	27	0		586

While for almost all bilabials (ignoring **mp**’ which in fact appears to favor optional palatalization) figures for obligatory palatalization in C2 are higher than figures for non-palatalization in the same position, figures in C3 show that **b** does not behave like the rest of the bilabials. In C3 **b** has a far much higher figure for non-palatalization than for obligatory palatalization and yet other bilabials display the pattern observed in C1 with the exception of **bh** and **p** which have zeros throughout in C3. Figures for **m** are particularly significant. Tables in (32) which include percentages make the point clear.

(32) Palatalization of bilabials in C2 and C3.

(a) Figures for palatalization of bilabials in C2.

C2 BILAB.	C > PALATAL	OPTIONAL P.	NO PALATAL	TOTAL
b	65 (44.5%)	48 (32.9%)	33 (22.6%)	146 (100%)
bh	10 (52.6%)	5 (26.3%)	4 (21.1%)	19 (100%)
p	4 (44.4%)	3 (33.3%)	2 (22.2%)	9 (100%)
ph	41 (53.9%)	20 (26.3%)	15 (19.7%)	76 (100%)
m	102 (79.7%)	18 (14.1%)	8 (6.3%)	128 (100%)
mb	59 (74.7%)	17 (21.5%)	3 (3.8%)	79 (100%)
mp	2 (15.4%)	8 (61.5%)	3 (23.1%)	13 (100%)

(b) Figures for palatalization of bilabials in C3

C3 BILAB.	C > PALATAL	OPTIONAL P.	NO PALATAL	TOTAL
b	2 (5.9%)	6 (17.6%)	26 (76.5%)	34 (100%)
bh	0 (0%)	0 (0%)	0 (0%)	0 (100%)
p	0 (0%)	0 (0%)	0 (0%)	0 (100%)
ph	4 (80%)	1 (20%)	0 (0%)	5 (100%)
m	54 (85.7%)	8 (12.7%)	1 (1.6%)	63 (100%)
mb	6 (100%)	0 (0%)	0 (0%)	6 (100%)
mp	1 (100%)	0 (0%)	0 (0%)	1 (100%)

Following O’Byran (1974) I argue that in C3 **b** occurs as part of one of the verb forming affixes /-bal-/ , /-bez-/ and /-bul-/ suffixed to ideophones. When added to ideophones longer than a syllable such as those in (33), the suffixes /-bal-/ , /-bez-/ , /-bul-/ are analyzed as /-bVC-/ not as /-b-al-/ (Verb forming suffix -b- + Extensive verbal suffix -

al-), /-b-ez-/ (Verb forming suffix /-b-/ + Causative /-ez-/) or /-b-ul-/ (Verb forming suffix /-b-/ + Reversive /-ul-/) since, verb stems generally do not end with a final consonant [b] except in cases involving a reduplicated initial syllable. Analyzing the suffixes as historical /-b-VC-/ would make the bilabial a possible stem final consonant thereby forcing it to palatalize. On the other hand treating the suffixes as /-bVC-/ ensures that the bilabial is never stem final. We saw earlier that root initial bilabials are never palatalized. If we treat roots and affixes as morphemes, it is clear that the generalization is not restricted only to roots but holds for all morphemes. In other words the **b** of /-bal-/, /-bez-/ or /-bul-/ is not palatalized because it is morpheme initial.

(33) Ndebele examples of bisyllabic ideophone + /-bal-/, /-bez-/ or /-bul-/.

	ideophone	verb	gloss
a.	dondo	dondo-bal-a	“grow weak (due to age, sickness)”
	gozo	gozo-bal-a	“sit restfully”
	?thundu	thundu-bal-a	“become blunt”
	?gungu	gungu-bal-a	“become bent or curved”
b.	ntshulu	ntshulu-bez-a	“dart through (a crowd, bushes, etc.)
	*hlanga	hlanga-bez-a	“go to meet”
	?qili	qili-bez-el-a	“cheat, defraud”
c.	?qubu	qubu-bul-a	“drive off flies”

For all examples in (33) and other similar ones (that is, examples where the bilabial consonant of the suffix /-bal-/, /-bez-/ or /-bul-/ is the third consonant of the stem) there is no palatalization of the bilabial in the passive. It is difficult to say whether or not ideophones with question marks are actually attested in the language as most attested ideophones are not included in the database I used. It has already been pointed out that there are two verbs **hlahluba** ‘divine’ and **holoba** ‘boil’ with roots ending in **b** rather than /-bal-/ (or /-bul-/ or /-bez-/) and whose first two syllables which are possible ideophones (hlahlu*, holo*) do not involve any reduplication before **b**. Although, potentially, these would serve as models

for palatalization, they are, however, intransitive and do not seem to take the passive -w- even in constructions where there is an ‘empty’ or locative subject⁴.

The **b** of the suffixes /-bal-/ , /-bez-/ and /-bul-/ is also not palatalized in the third syllable of the stem when the initial syllable is reduplicated as the examples in (34) show. Also, no attested example could be found of a CV ideophone which could be identified as forming the reduplicated initial CV of a verb ending in one of the suffixes in question. In fact verbs with a reduplicated initial CV and ending in -bal- seem to be derived from unattested bisyllabic ideophones whose syllables are identical. (See forms with question marks in (34 a.). Similar verbs but ending in /-bez-/ could not be found. Verbs with a reduplicated initial CV and ending in /-bul-/ seem to be derived from attested ideophones ending in -bu. Examples are provided in (34b.). Of course, historical distortions involving the re-analysis of verb stems and resulting in ideophones taking new shapes cannot be ruled out.

- (34) In Ndebele the **-b-** of the suffixes /-bal-/ , /-bez-/ and /-bul-/ is not palatalized in the third syllable of the stem when the initial syllable is reduplicated.

ideophone	verb	gloss	passive
a. qu* / ququ? / ququba*	ququbala	“cower”	-ququbalwa
thi* / thithi? / thithiba*	thithibala	“become perplexed”	-thithibalwa
tsho* / tshotsho? / tshotshoba*	tshotshobala	“cringe”	-tshotshobalwa
b. khe* / kekhe? / kekhebu	kekhebula	‘scrape off in large clods or flakes’	kekhebulwa *kekhetshulwa
xe* / xexe? / xexebu	xexebula	“peel off”	xexebulwa *xexetshulwa

These examples further support that the environment for non-palatalization is morpheme initial.

⁴ If I were to passivize these I would use the suffix -iw- used with sub-minimal roots or -w- with palatalization of the preceding bilabial. In fact there are a number of longer intransitive forms where it seems possible to take -iw- because they are hardly used in the passive, for example, **khokhoba** ‘stoop’

Recall that for a few verbs (six) there is optional palatalization of the **b** in the third syllable. Optional palatalization of a few **bs** which are part of the verb forming suffixes can be attributed to morphological misparsing where **b** is sometimes treated as root-final or a possible stem-final consonant (i.e. CVCVb-VC or CVCV-b-VC).

The suffixes /-bal-/ , /-bez-/ and /-bul-/ though similar to the suffixes /-mal-/ (Verb-forming suffix /-m-/ + Extensive verbal suffix /-al-/), /-mez-/ (Verb-forming suffix /-m-/ + Causative verb forming suffix /-ez-/), and /-mul-/ (Verb-forming suffix /-m-/ + Reversive /-ul-/) each of which can be treated as a combination of two suffixes differ in that there are many verbs longer than two syllables whose final consonant is [m] but not [b] and many of which are derived from ideophones or possible ideophones whose initial syllables have not been reduplicated. Examples of verbs derived from ideophones or potential ideophones and whose final consonant is [m] are given in (35).

- (35) Ndebele verbs derived from ideophones (or possible ideophones) and longer than two syllables may have palatalizable consonant **m** in the last syllable.

Ideophone	Verb	Gloss	Passive
phazi	phazima	'flash'	phaziny-w-a
phapha	phaphama	'awaken'	phaphany-w-a
suku	sukuma	'stand up'	sukuny-w-a
vunga	vungama	'grumble'	vungany-w-a

As can be seen in (35), the [m-] (the verb forming suffix) is palatalized when the verb is passivized. Verbs which end in /-mVC-/ therefore have a model for the palatalization of [m] in the third syllable even if there might be no corresponding CVCa verbs. CVCVmVC- is normally parsed as CVCVm-CV or CVCV-m-VC- so that [m] is treated as root-final or as being in a possible stem-final position, the environment for palatalization⁵. As was seen in the table in (32b.) there is only one exception **nyukumala** 'look gloomy' out of 63. In this exception the [m] is in fact preceded by a palatal **ny**. For verbs with no corresponding

and **nyonyoba** 'stalk' which become **-khokhob-iw-a** (*khokhotsh'-w-a) and **-nyonyob-iw-a** (*nyonyotsh'-w-a) in the passive.

⁵ It is also possible that **m** is more palatalizable compared to other bilabials but this would require a phonetic explanation if correct.

CVCa forms it should be expected that there would be some confusion in the morphological parsing of the stem. It is therefore not surprising that there are a few cases (8/63) in which palatalization is optional as the stem can sometimes be morphologically parsed as CVCV-mVC- rather than CVCVm-CV or CVCV-m-VC-.

5.1.6 Palatalization of Bilabials Before [l]

In the tables in (10) it is clear that palatalization occurs mostly before [l]. To test whether this might be due to the fact that [l] occurs as part of the applicative suffix */-el-/* and reversion suffix */-ul-/* it is important to look at the distribution of vowels before this consonant. Tables in (36) show the distribution of obligatory, optional and non-palatalization of bilabials when [l] is preceded by different vowels [i], [e], [a], [o] and [u]. Table a. clearly shows that obligatory palatalization occurs mainly before *-el-* and *-ul-* which are in fact (or at least look like) the applicative suffix and transitive reversion suffix, respectively. Thus palatalization is obligatory where the bilabial comes immediately before a suffix or possible suffix. Table b. displays similar facts even though palatalization is optional. Note that figures for Bilabial plus *-al-* are higher than in Table a.. May be *-al-* is sometimes taken to be part of the root. It seems, as O'Bryan notes, the vowel before [l] can be treated as part of the reversion suffix or as part of the ideophone stem from which the verb is derived, and thus making optional palatalization possible. Figures for *-el-* drop from 42 to 9. For the nine examples the vowel also seems to be treated sometimes as part of the suffix and in other instances as part of the ideophone stem. In Table c. figures are high when bilabials precede reversion *-ul-* and *-al-* probably because people feel the vowel before [l] in some verbs always belongs to the ideophone stem, making it impossible for the labial to be treated as being in a stem-final position. Note the further drop in figures before *-el-*. All the three examples are derived from ideophones. The [e] before [l] in these examples is probably never felt to be part of the applicative suffix.

(36) Distribution of obligatory, optional and non-palatalization of bilabials before [l].

a. Obligatory Palatalization.

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	il	el	al	ol	ul	
bh	0	0	0	0	0	0
ph	0	3	0	0	8	11
b	0	4	0	1	3	8
p	0	1	0	2	0	3
m	0	25	1	0	12	38
mb	0	9	1	1	6	17
mp	0	0	0	0	0	0
TOTAL	0	42	2	4	29	77

b. Optional Palatalization

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	il	el	al	ol	ul	
bh	0	0	0	0	1	1
ph	1	1	3	0	6	11
b	0	6	4	1	8	19
p	0	0	0	0	3	3
m	1	2	5	0	4	12
mb	0	0	0	0	7	7
mp	0	0	0	3	1	4
TOTAL	2	9	12	4	30	57

c. No Palatalization

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	il	el	al	ol	ul	
bh	0	0	0	0	0	0
ph	0	1	1	0	3	5
b	4	2	11	1	12	30
p	0	0	0	0	0	0
m	0	0	2	0	0	2
mb	0	0	0	0	3	3
mp	0	0	0	0	0	0
TOTAL	4	3	14	1	18	40

d. Summary (Figures taken from the three tables).

	il	el	al	ol	ul	TOTAL
Obligatory	0 (0%)	42(54.6%)	2 (2.6%)	4 (5.2%)	29 (37.7%)	77 (100%)
Optional	2 (3.5%)	9 (15.8%)	12 (21.1%)	4 (7%)	30 (52.6%)	57 (100%)
No Pal.	4 (10%)	3 (7.5%)	14 (35%)	1 (2.5%)	18 (45%)	40 (100%)

Comparing figures from all the three tables (summarized in (36d.)), the tendency is for palatalization to occur before **-el-** and **-ul-**. As can be seen, 71 out of 77 (92.2%) examples of obligatory palatalization occur before **-el-** and **-ul-** (i.e. before the sequences that resemble the applicative and reversive suffixes) and 39 out of 57 (68.4%) cases of optional palatalization occur before the same suffixes. The figures for non-palatalization before these two suffixes go down to 21 out of 40 (52%). The opposite can be observed with regards to **-al-** and **-il-**. For obligatory palatalization only 2 cases out of 77 (2.6%) are before these suffixes. Optional palatalization before **-al-** and **-il-** increases to 14 cases out of 57 (24.6%) and non-palatalization goes up to 16 cases out of 40 (40%). These facts strengthen the argument that palatalization will occur stem-internally if what comes after the bilabial is a possible suffix.

5.1.7 Palatalization of Bilabials Before [k]

As already alluded to, other important exceptions to palatalization are those involving **k** of the suffixes **/-k-/** (Verb forming suffix for intransitive verbs), **/-ek-/** (Stative) and **/-uk-/** **-uluk-/** **-ilik-/** (Intransitive reversive). These can be explained partly by the fact that some of them have palatals before the bilabials. Examples are given in (37a.). In five other examples in (37b.) the **b** is also not palatalized even if there is no palatal consonant. Perhaps for **ncibilika** ‘melt’ and **nabuluka** ‘get stretched out’ people are influenced by the fact that all other forms whose stems without the final vowel end in **/-ilik-/** or **/-uluk-/** do not have any palatalizable bilabial. In other words this could be a case of uniform exponence where a

morpheme has to be instantiated by the same morph in all words where it occurs. As for the other three examples it could be a case of an incomplete process of analogical leveling.

(37) Exceptions to palatalization when a bilabial consonant occurs before **-k-**.

a.	nyobulukw-	(from the ideophone <u>nyobu</u>)	'come uncoiled'
	jibulukw-	(from the ideophone <u>jibu</u>)	'spring act'
	qubukw-	(from the ideophone <u>qubu</u>)	'break out in sores'
	tshibilikw-	(from the ideophone <u>tshibi</u>)	'turn (around)'
b.	nabulukw-	(from the ideophone <u>nabu</u>)	'get stretched out'
	nanabukw-	(from the ideophone <u>nanabu</u>)	'get stretched out'
	xexebukw-	(from the ideophone <u>xexebu</u>)	'peel off'
	ncibilikw-	(from the ideophone <u>ncibi</u>)	'melt'
	ncibilikisw-	(from the ideophone <u>ncibi</u>)	'melt-Causative'

There are also five more examples which are probably not derived from ideophones where **-b-** of the suffixes in question is not palatalized. These are given in (38). The examples probably reflect my own dialect or idiolect. They sound grammatical when palatalized although I never use them in that form.

(38) Other exceptions to palatalization not derived from ideophones.

sibekel-w-a	(< sibekel-a)	'be covered with a lid, etc.'
subuk-w-a	(< subuk-a)	'got grazed'.

Tables in (39) show the distribution of obligatory, optional and non-palatalization of labials when **k** is preceded by different vowels. Table a. clearly shows that obligatory palatalization occurs mainly before **-ek-** and **-uk-** which are in fact (or at least look like) the stative and reversive suffixes, respectively. Thus palatalization is obligatory where the bilabial comes immediately before a suffix or possible suffix. Table b. displays similar facts even though palatalization is optional. It seems the vowel before **k** can be treated as part of the reversive suffix or as part of the ideophone stem from which the verb is derived, and thus making optional palatalization possible. In Table c., although there is a slight drop, figures are also high when bilabials precede **-ek-** and **-uk-** probably because people feel the vowel before **k**

in some verbs always belongs to the ideophone stem, making it impossible for the labial to be treated as being in a stem-final position.

(39) Distribution of obligatory, optional and non-palatalization of bilabials before **k**.

a. Obligatory Palatalization.

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	ik	ek	ak	ok	uk	
bh	0	0	0	0	0	0
ph	0	1	1	0	2	4
b	0	2	0	0	1	3
p	0	0	0	0	0	0
m	0	3	0	0	4	7
mb	0	3	0	0	0	3
mp	0	0	0	0	0	0
TOTAL	0	9	1	0	7	17

b. Optional Palatalization

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	ik	ek	ak	ok	uk	
bh	0	0	0	0	1	1
ph	0	0	0	0	4	4
b	1	4	0	1	4	10
p	0	0	0	0	0	0
m	0	0	0	0	5	5
mb	0	1	0	0	2	3
mp	0	0	0	0	1	1
TOTAL	1	5	0	1	17	24

c. No Palatalization

BILAB. CONS.	VC SEQUENCE AFTER BILABIAL					TOTAL
	ik	ek	ak	ok	uk	
bh	0	0	0	0	0	0
ph	0	1	0	0	0	1
b	0	3	0	0	7	10
p	0	0	0	1	0	1
m	0	0	0	0	2	2
mb	0	0	0	0	0	0
mp	0	0	0	0	0	0
TOTAL	0	4	0	1	9	14

d. Summarry (Figures taken from the three tables).

	ik	ek	ak	ok	uk	TOTAL
Obligatory	0	9	1	0	7	17
Optional	1	5	0	1	17	24
No Pal.	0	4	0	1	9	14

Turning now to **gomonqa** ‘hang upside down’, **bhubhudla** ‘foam’ and **bhibhidla** ‘suppurate’, we note that the final endings are not (or at least do not look like) regular suffixes and therefore it is not possible to split the root in each case. However, **gomonqa** already has a palatal **nq** although it is a click. Identity seems to be avoided by not palatalizing [m]. For **bhubhudla** and **bhibhidla** the initial syllable is reduplicated and may be the one which ends up in the root-internal position is still felt to be root-initial. We also saw in (14) that in cases where C1 and C2 are identical bilabials non-palatalization is tolerated.

5.1.8 Summary

This section has therefore revealed that palatalization of bilabials in Ndebele can be local or non-local. It has also shown that the potentially problematic exceptions involving **b** are eliminated once we characterize the environment for non-palatalization as morpheme initial rather than root-initial.

5.2 Synchronic Account of passivization

5.2.1 Dissimilation

Now that the data has been presented, the clear problem is how to characterized the passive affix in order to come up with a general rule for the formation of passives in Ndebele. However, before doing that, it is necessary to establish exactly what is going on given that it is only bilabials which are palatalized. As alluded to earlier, I consider palatalization to be a

dissimilatory process: You cannot get a bilabial in the presence of **-w-**. The dissimilatory nature is apparent when we consider other parts of the grammar. When locative adverbs are derived from nouns, for instance, there is palatalization of bilabials when locative **-eni/-ini** is suffixed to those nouns whose final vowel is [+round] ([u] or [o]) as in (40a.). If the noun ends with an unrounded vowel ([i], [e], or [a]) as in (40b.) or if the consonant preceding the final vowel of the noun is not a bilabial as in (40c.) palatalization does not occur.

(40) Palatalization in the Locative.

	noun	gloss	locative	gloss
a.	iphaphu	'lung'	ephathshini	'in the lung'
	isigubhu	'drum'	esigujini	'on the drum'
	umumbu	'corn'	emunjini	'on the corn'
	intamo	'neck'	entanyeni	'on the neck'
	ingubo	'blanket'	engutsh'eni	'on the blanket'
b.	ulimi	'tongue'	elimini	'on the tongue'
	ichibi	'lake'	echibini	'in the lake'
	indebe	'lip'	endebeni	'on the lip'
	inswempe	'partridge'	enswempeni	'on the partridge'
	igabha	'can'	egabheni	'in the can'
c.	isisu	'stomach'	esiswini	'in the stomach'
	inkukhu	'chicken'	enkukhwini	'on the chicken'
	indlegu	'squirrel'	endlegwini	'on the squirrel'
	ilihlo	'eye'	elihlweni	'in the eye'
	inyongo	'bile'	enyongweni	'on the bile'

Examples in (40c.) are important in that they show that the final rounded vowel of the noun glides⁶ when the noun is turned into a locative. In (40a.) gliding would lead to a **Bilabial + w** sequence which the language does not permit. Palatalization is therefore a way of repairing the unacceptable **Bilabial + w** sequence. In (40b.) there is no palatalization because the final vowel of the noun is not a rounded one which would glide and become [w]. Besides being evidence for dissimilation examples in (40) show that the derived glide which triggers palatalization is different from the passive suffix since [w] is lost once palatalization occurs in the locative but is maintained in the passive. In the locative [w] is

⁶ As alluded to in a footnote above the distinction between dissimilation resulting from the passive suffix and that from [+round] vowels does not rely on representing the actual sound as [C^w] or [Cw].

only phonological but in the passive it is both phonological and morphological. It seems that [w] is retained in the passive for morphological reason, specifically to avoid a situation whereby the passive is realized as a zero morpheme. I therefore suggest that the passive suffix has an underlying [w] which is maintained after palatalization unlike the locative one derived from underlying [u] or [o] which is lost. However, the mere presence of the glide [w] does not tell us why in dissimilation the preceding consonant should be a palatal other than something else. Before addressing this issue let us consider more evidence for dissimilation which also supports that the passive suffix is underlyingly [w].

Diminutives can also be formed from the nouns such as those locativized in (40) by using the suffix **-ana** in place of **-ini/-eni** but not prefixing locative **e-**. This is illustrated in (41) where examples in (41a.) show that there is obligatory palatalization of the bilabial when the final vowel of the noun is [+round]. Note that [+round] is lost as a result of palatalization further supporting the argument raised above. In (41b.) where the final vowel of the noun is [-round] palatalization of the bilabial is optional. The optional palatalization can be attributed to analogical leveling. People seem to treat the diminutive affix on its own as the trigger of palatalization of a preceding bilabial consonant without considering the final vowel of the noun. In (41c.) where the final vowel of the noun is not immediately preceded by a bilabial there is no palatalization and the [+round] vowel glides just as we saw in (40c.). I have also added examples in (41d.) where I do not control for the final vowel of the noun to show that the situation in the diminutive is more complicated than in the locative as even coronals in some cases are palatalized or turned into laterals. For examples in (41d.)(i) there is an option of palatalizing the coronal (or turning it into a lateral) or leaving it unchanged. When the coronal is a nasal such an option does not exist as the nasal is always palatalized. Perhaps this is also another case of dissimilation since the diminutive suffix also has a coronal nasal. Note that in (41d.) [w] is not lost in some cases even after palatalization because the dissimilation process is a ‘fake’ one (if not of coronals) since the preceding consonant is actually a coronal, not a labial. Thus example in (41) are

consistent with points raised about examples in (40). (See (49) for more examples on the diminutive).

(41) Palatalization in the Diminutive.

	noun	gloss	diminutive	gloss
a.	iphaphu	'lung'	iphatshana	'small lung'
	isigubhu	'drum'	isigujana	'small drum'
	umumbu	'corn'	umunjana	'small amount of corn'
	intamo	'neck'	intanyana	'small neck'
	ingubo	'blanket'	ingutsh'ana	'small blanket'
b.	ulimi	'tongue'	ulimana	'small tongue'
	ichibi	'lake'	~ ulinyana	
			ichibana	'small lake'
	indebe	'lip'	~ ichitshana	
			indebana	'small lip'
	inswempe	'partridge'	~ indetshana	
			inswemp'ana	'small partridge'
	igabha	'can'	~ inswentshana	
			igabhana	'small can'
			~ igabhana	
c.	isisu	'stomach'	isiswana	'small stomach'
	inkukhu	'chicken'	inkukhwana	'small chicken'
	indlegu	'squirrel'	indlegwana	'small squirrel'
	ilihlo	'eye'	ilihlwana	'small eye'
	inyongo	'bile'	inyongwana	'small bile'
d.(i)	ukhalo	'waste'	ukhalwana	'small waste'
	ingqondo	'brain'	~ ukhadlwana	
			ingqondwana	'small brain'
	ikhanda	'head'	~ ingqonjwana	
			ikhandana	'small head'
			~ ikhanjana	
(ii)	inhloni	'hedgehog'	inhlonyana	'small hedgehog'
	ingane	'child'	inganyana	'small child'
			*inganana	
	umganu	'plate'	umganywana	'small plate'
			*umganwana	

It is worth pointing out that the constraint on **Bilabial + w** (***Bw**) is not just motivated by the passive, diminutive and locative affixes which are well documented but its presence can also be detected in other parts of the grammar. Consider the following Ndebele examples.

(42) Avoiding bilabial and passive -w- in other parts of the grammar: a. Noun class prefix + stem , b. Subject marker + verb stem. c. SM-OM+Stem.

- | | | | |
|----|-------------|----------------------|------------------------|
| a. | uku-akha | → ukw-akha | 'building cl.15' |
| | ulu-andle | → ulw-andle | 'ocean cl 11' |
| | umu-akhi | → um-akhi, *umw-akhi | 'builder cl 2' |
| b. | ku-akh-a | → kw-akh-a | 'it builds cl.15' |
| | SM-build-a | | |
| | lu-akh-a | → lw-akh-a | 'it builds cl.11' |
| | SM-build-a | | |
| | bu-akh-a | → b-akh-a, *bw-akha | 'it builds cl.14' |
| | SM-build-a | | |
| c. | ba-ku-enz-a | → ba-kw-enz-a | 'they make it...' |
| | SM-OM-do | | |
| | ba-lw-enz-a | → ba-lw-enz-a | 'they make it...' |
| | SM-OM-do | | |
| | ba-m-enz-a | → ba-m-enz-a | 'they make her/him...' |
| | SM-OM-do | | |

(42a.) illustrates noun formation from prefix plus stem, (42b.) shows verb formation from subject marker (SM) plus stem together with final vowel -a, and (42c) is like (42b.) except that there is now an OM which immediately precedes the stem. The examples in (42) illustrate that [u] can glide after velars and coronals in order to avoid a vowel plus vowel (VV) sequence although there is a problem when this affects bilabial consonants. If the consonant before [u] is bilabial the ill-formed sequence is repaired by deleting [u].

5.2.2 Passivization Rule

Having shown that palatalization of bilabials in Ndebele is a dissimilatory process and that the passive suffix has [w] underlyingly I now turn to the question of why bilabials become palatals rather than something else and then try to formulate the passivization rule. While some previous accounts have argued that palatalization of labials is conditioned by a palatal glide or high front vowel, I diverge from this. McCarthy's (1983) analysis of feature-sized agreement morphemes of Chaha and Mester and Ito's (1989) analysis of palatalization in Japanese mimetics where the palatal prosody is viewed as the surface

manifestation of an independent autosegmental morpheme provide useful insights for dealing with palatalization in Ndebele. Following their proposals, I suggest that the passive affix is [w] plus an independent autosegmental feature complex similar to the one proposed by McCarthy for Chaha and also to the one Mester and Ito propose for palatalization in Japanese mimetics. I assume that the independent autosegmental bundle has the features [+lingual, +high]⁷, [+lingual] being a feature of coronals and velars proposed by Lass (1976). The feature targets bilabials because they lack this lingual node. Glottals are not targets probably because they are compatible with [w]. The lingual feature is required only in cases of conflicting labial features. Thus, the passive can be treated as /^[+ling, +high] w/, where [+ling, +high] represents the floating lingual and high features and [w] is a fully specified labio-velar glide. The rule itself is stated in two parts as follows:

(43) Passivization Rule:

- a. Associate [+lingual, +high] to the rightmost bilabial consonant of the stem but do not associate or spread [+lingual, +high] to a bilabial which is the first consonant of a morpheme. Else stray erase [+lingual, +high].
- b. Suffix [w] to the final consonant of the stem.

The rule ensures that there is dissimilation whenever an ill-formed **Bilabial + w** sequence is formed. Its application is illustrated in (44). In cases involving sub-minimal roots the [+lingual, +high] feature surfaces as the universal default lingual high vowel [i] and [w] takes the second C slot of the verb. For C- roots to satisfy stem or word minimality conditions, two syllables with the shape CVCV are required, the initial C slot being taken by the root consonant and the final V slot being normally taken by the verb default final vowel -a or by a tense marker as illustrated in (44e.). The rule has the advantage in that it applies to cases involving both sub-minimal and longer roots. One does not need to posit allomorphs since the fact that [+lingual, +high] will surface as [i] in cases involving subminimal roots is

⁷ The SPE feature [+pal] could also be used in place of [+lingual, +high] but it would be difficult to explain why it targets only bilabials and not other consonants.

predictable given that the positions taken by [w] and the other root segment (segments in case of VC roots) is fixed.

(44) Application of the Passivization Rule.

a. [+lingual, +high]

phuphum-is-w-a > phuphuny-is-w-a 'be caused to overflow (as bubbles)'

b. [+lingual, +high]

phek-w-a > phek-w-a 'be cooked'

c. [+lingual, +high]

sus-w-a > sus-w-a 'be removed'

d. [+lingual, +high]

dundu-bal-w-a > dundu-balw-a 'be arrived at the summit'

e. [+lingual, +high]

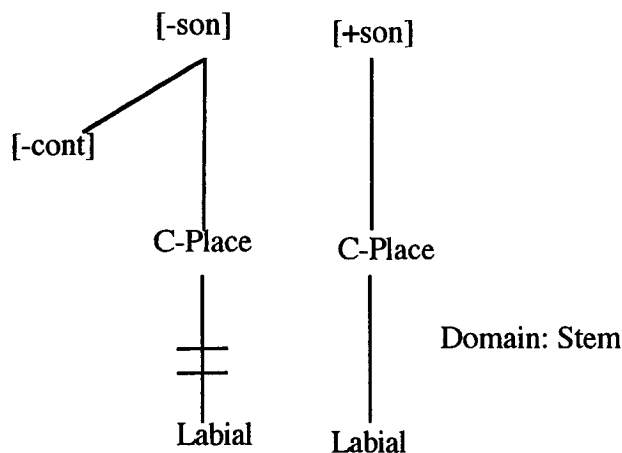
ph -V-w-a > ph-i-w-a 'be given'

As in Stahlke (1976) and others' debate on segmental fusion, it is also possible to treat the suffix as /-iw-/ although one would then have to take a historical approach such as the one argued for by O'Bryan (1974) to explain the palatalization of stem-internal labials, or else be forced to say that the [i] of /-iw-/ behaves like a floating feature where stem-internal labials are involved. For the majority of cases, that is, those that do not involve sub-minimal roots or a preceding labial, one would then argue that the [i] simply gets dropped. Treating the [i] in sub-minimal roots as epenthetic is also possible although it seems unnecessary

given that there is already a lingual feature to account for stem-internal palatalization in the passive suffix.

Another possible approach is a feature geometry one such as the one proposed by Beckman (1993) for palatalization in Zulu. Beckman (1993: 9-10) suggests that palatalization in Zulu is a dissimilatory process whereby the passive suffix triggers dissimilation of a preceding labial consonant when its [Labial] specification is in the same plane as the [Labial] specification of the target. She says “in order for the passive suffix /-w-/ to trigger dissimilation of a preceding consonantal [Labial] specification, the glide’s [Labial] specification must be dominated by C-place, rather than by V-place” so that intervening round vowels will fail to block dissimilation. The dissimilation rule in which the trigger (glide [w]) is specified as [+sonorant] is reproduced here as (45).

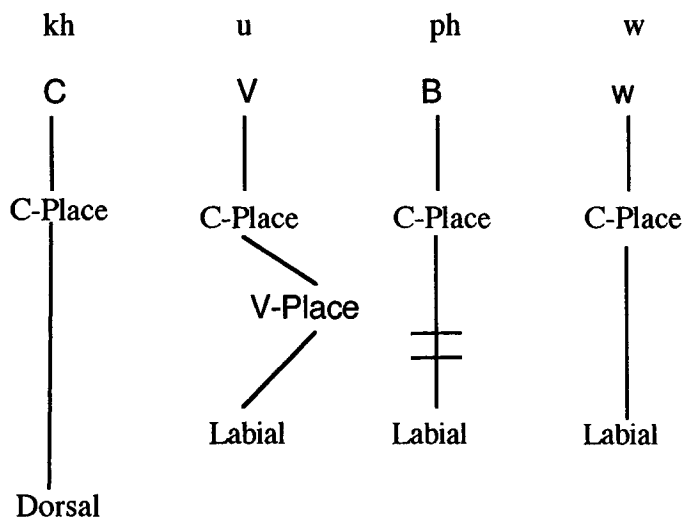
(45) Labial Dissimilation Rule (Beckman 1993:10)



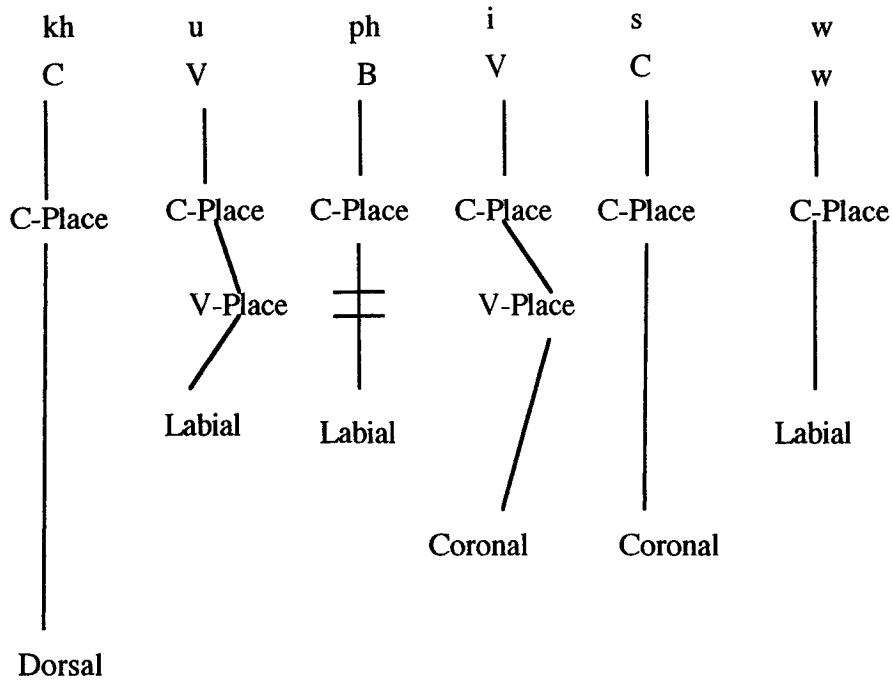
The target needs not have a [-son] specification since the nasal is [+son] but it is crucial that the trigger be specified as [+son]. Once the Labial Dissimilation Rule has been applied “a [Coronal] specification is supplied by default”. However, as Beckman herself notes in her footnote 11, there is a problem in that the coronal comes out as [-anterior] and yet the literature supports a [+anterior] default specification for [Coronal]. In spite of this problem Beckman’s representation can be adopted for Ndebele but, this time, [Coronal] specification

is supplied by the floating feature bundle [+lingual, +high] since a default lingual is a coronal and a [+high] coronal is a palatal. The [+anterior] problem falls out when [Coronal] specification is supplied by associating the consonant whose labial feature has de-linked with [+lingual, +high]. The [-anterior] outcome could also be partly determined by the language's inventory of consonants. Assuming that a non-nasal bilabial before -w- cannot change to anything else other than an affricate, it can be argued that the coronals come out as [-anterior] because the default affricate in the language is [-anterior]. It would however be difficult to account for the nasal although it is not expected to behave differently from other labials. [+anterior] affricates are generally disfavored and are probably a result of borrowing. In the Ndebele database alveolar ([+anterior]) affricates **ts'** and **tsh** [ts^h] are used in only 9 words of which 2 are verbs whereas corresponding palatal ([-anterior]) affricates **tsh'** and **tsh** are used in 272 words of which 127 are verbs. Dissimilation in Ndebele before [+lingual, +high] associates with the rightmost bilabial can then be represented as in (46) where **B** stands for a bilabial.

(46) a. Local Dissimilation: CVB-w-



b. Non-local Dissimilation: CVB-VC-w-



What is important to remember is that dissimilation will not affect root-initial labials and that [coronal] will be supplied when the floating lingual feature associates with the consonant whose labial feature has de-linked. The floating feature [+high] will make the coronal palatal. Coronals and velars will not block dissimilation since they are on different planes.

5.3. Previous Diachronic Approaches

The phenomenon of palatalization of labials before w has been given a considerable amount of attention in the literature on Southern Bantu languages. Most accounts have tended to focus on diachronic changes or at least suggested diachronic solutions (see, for example, O'Bryan (1974), Louw (1975/76), Stahlke (1976), Herbert (1977) and Ohala (1978))

although there has also been works looking at the phenomenon from a synchronic point of view (see, for example, Khumalo (1987), Beckman (1993), Chen and Malambe (1998)). Diachronic accounts have been motivated largely by the fact that the palatalization of labials before **w** appears to be an unnatural phonological process. In these languages labial consonant plus glide [w] results in a labialized (alveolar-/pre-) palatal affricate or fricative as already seen in Ndebele. Palatalization of labials before [w] has often been treated as the same process as palatalization of labials in the environment of the diminutive suffix -ana (~-ane) (see Stahlke (1976), Ohala (1978), Louw (1975/76)) where the process is conditioned by a historical palatal glide. This is illustrated with some of Stahlke's (1976) examples from Tswana⁸ in which the high front vowel became a palatal glide through application of a phonological rule.

- (47) Tswana examples of labial palatalization conditioned by a palatal glide or high front vowel.

kolobe 'pig'		kolojwane	'piglet'
(kolobe + yane > kolobyane > kolojwane)		b + y > jw	
tshipi 'iron'		tshitshwana	'small piece of iron'
(tshipi + yana > tshipyana > tshitshwana or tshipi + ana > tshipyana > tshitshwana)		b + y (or i) > tshw	

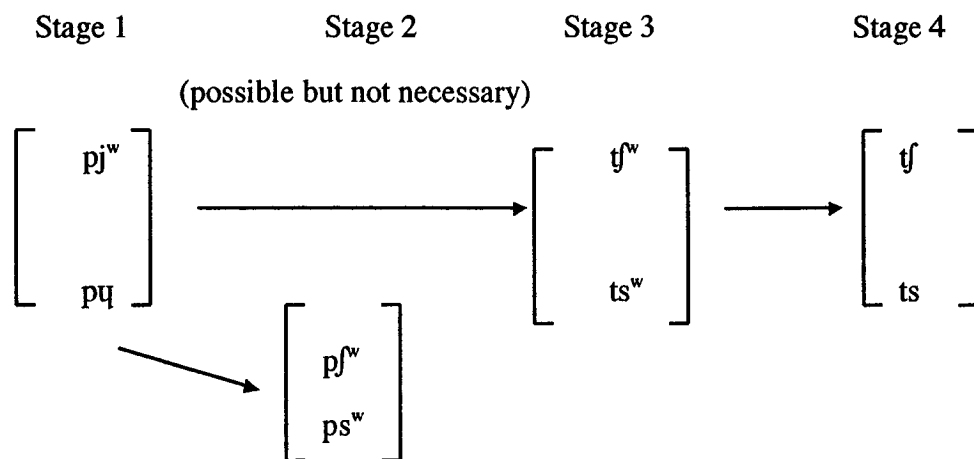
According to such analyses, the glide or high vowel has since been lost before -ana (in most of the languages) and also before the passive suffix. However, in many languages the passive now surfaces as **-w-** when suffixed to disyllabic and polysyllabic stems but as **-iw-** when suffixed to monosyllabic stems. On the surface, palatalization of labials before the diminutive and passive suffixes now appears to be morphologically or morphophonologically conditioned since the conditioning environment (the high front vowel or palatal glide) no longer exists. In fact the palatalization rule has now been extended to apply to alveolars as well in some of the languages when the environment is -ana (e.g. Ndebele and Zulu: ikhanda 'head' > ikhanjana 'small head').

⁸ Note: y = [j] and j=[dʒ].

One of the important contributions of diachronic accounts has been the proposals about phonetically natural conditions under which the passive suffix would lead to the palatalization of a preceding labial. Ohala (1978: 380-382) supports Stahlke (1977) who argues for ‘segmental fusion’. He argues that there was most likely only one passive suffix /-iw-/ which coalesced to [j] or [ɥ], with labialization after palatalization coming from the labial itself (not from the labio-velar) as shown schematically in (48) where [p] is used as an example of a labial.

a. Stages leading to coalescence.

b. Palatalization after coalescence:



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palatals. He suggests that the suffix /-iw-/ is preserved in monosyllabic stems for satisfaction of other prosodic factors (presumably prosodic minimality). He also agrees with Herbert (1977) that palatalization is activated by specific morphological environments not by phonetic environments. Although Ohala and others just mentioned in this section, refer to analogy, they do not provide details or take the issue further to show why some stem-medial bilabials are palatalized while others are left unchanged.

The accounts of Ohala and others who argue for segmental fusion also do not explain clearly a number of inconsistencies in the diminutive when the phonetically supported rule of ‘segmental fusion’ is applied. Some Ndebele examples are given in (49). (See also examples give earlier in (41)).

(49) Some diminutive examples show that palatalization may not occur before [i] or [j] while it occurs before back rounded vowels.

- | | | | | |
|----|-------------------|---|-------------------|----------------------------|
| a. | ithumbu + ana | > | ithunjana | ‘small intestine’ |
| | inzipho + ana | > | inzitshana | ‘small nails’ |
| b. | izibi + ana | > | izibana | ‘a bit of rubbish’ |
| | ibibi + ana | > | ibibana | ‘a small heap of rubbish’ |
| c. | ibheki + ana | > | ibhekana | ‘small suitcase’ |
| | ihloka + ana | > | ihlokana | ‘small axe’ |
| d. | iqanda + ana | > | iqanjana | ‘small egg’ |
| | | | iqandana | |
| | isisu + ana | > | isiswana | ‘small stomach’ |
| e. | ingcebethu + ana | > | ingcebetshwana | ‘small dish-shaped basket’ |
| | | | ? ~ ingcebethwana | |
| | umhlubulo + ana | > | umhlutsh’ulwana | ‘small side’ |
| | | | ~ umhlubulwana | |
| f. | inhlabathi + ana | > | inhlabatshana | ‘small quantity of soil’ |
| | | | ~ inhlabathana | |
| | ilambazi + ana | > | ilanjazana | ‘small amount of porridge’ |
| | | | ~ ilambazana | |
| | amachaphazi + ana | > | amachatshazana | ‘few young bees in |
| | | | ~ amachaphazana | ‘honey cells’ |
| g. | igabazi + ana | > | igabazana | ‘a bit of an expert’ |
| | isidumuka + ana | > | isidamukana | ‘small water buck’ |

If it is assumed, as Ohala and other references have suggested, that the diminutive affix was originally *-jana* (i.e. Proto Bantu **jánà* ‘child’), then it becomes difficult to reconcile this fact with the behavior of above examples. It is such examples which probably led them to conclude that synchronic palatalization is morphologically conditioned. What remains confusing though, is the fact that the rule fails to apply where it is expected to but, in many cases, goes on to apply in the ‘wrong’ environment. Usually, in analogical leveling a rule applies in the right environment but is then extended to cases where it should not apply. It seems likely that palatalization would occur where the consonant is a coronal or a velar, and also in the environment of a high front vowel, but examples in (48a.) to (48d.) actually show the opposite. It is bilabials which are palatalized in the environment of back rounded vowels! When a coronal is palatalized in these particular examples there is also an acceptable unpalatalized form in (48d.). Longer forms in (48e.) to (48f.) illustrate similar facts except that nouns ending in rounded vowels have an option of not palatalizing as in (48e.) and some of those ending in non-rounded vowels can optionally palatalize as in (48f.). Also worth pointing out is the fact that, unlike in shorter forms, derived [w] is not lost after palatalization in longer forms although the reason for this is not clear. Since back rounded vowels normally glide to avoid a VV sequence (as in (48e.)), the examples in (48) illustrate that a **Bilabial + w** is ill-formed and one way the language repairs this is through palatalization. The diminutive and passivization rules must therefore be formulated in such a way that when ever there is a potential of creating a **Bilabial + w** sequence the situation is automatically corrected. This is what the rule proposed in this chapter does. Suggesting that the passive suffix is underlyingly /-yw-/ or /-iw-/ clearly is not enough in accounting for synchronic palatalization.

Further problems with the ‘segmental fusion’ hypothesis which might have led to the conclusion that exceptions should be explained in terms of morphology or analogy are seen when examples from other languages are also considered. Below are examples from Ikalanga.

(50) Labial + passive /-w-/ avoided in Ikalanga (Mathangwana (1996)).

	verb	passive	gloss
a.	pet-a	petw-a/pet-iw-a	'be folded'
	sund-a	sundw-a/sund-iw-a	'be pushed'
	gotf-a	gotfw-a/gotf-iw-a	'be baked on hot coals'
	dus-a	dusw-a/dus-iw-a	'be removed'
b.	lap-a	lap-iw-a	'be cured'
	lip-a	lip-iw-a	'be paid'
	pháp ^b -á	pháp ^b -íw-a	'be chopped'
	bab-a	bab-iw-a	'be carried on the back'
	kov-a	kov-iw-a	'be given away'
c.	kús ^w -á	kús ^w -íw-a	'be sharpened'
	buz ^w -a	buz ^w -iw-a	'be asked'
	náz ^w -a	náz ^w -iw-a	'be liked'

Examples in (50a.) show that either of the affixes /-w-/ or /-iw-/ can be used when the final consonant of the root is not a labial or is not labialized. In fact these are examples where palatalization is normally expected to occur. What has suddenly blocked the rule if /-iw-/ or the fusion of [i] and [w] triggers palatalization? If analogy is considered here we would again expect the rule to apply in the right environment and then be extended to cases where it should not apply. The rule, however, fails to apply in the right environment. Perhaps the answer is in Louw's (1975/76) suggestion that languages in the region where Ikalanga is spoken are still at an earlier stage of the development of palatalization. Forms in (49b.) and (49c.) show that /-iw-/ is used where the final root consonant is a labial or is labialized. It is clear, at least from a synchronic perspective, that what conditions the choice of affix is the labial or labialized consonant. The affix /-w-/ is not used with forms in (49b.) and (49c.) because it would create ill-formed labialized labials. Although a developmental stage may have played a role in deciding the language's choice of affixes, it appears, facts regarding palatalization can still be explained without appealing to historical changes as was seen in the previous section.

Herbert (1977) also provides similar examples from Tswana (neighbors of Ikalanga) and these are given below.

(51) Palatalization of labials in Tswana.

a.	-bɒniwa/-bɒn ^w a	-bɒna	‘be seen’
	-ratiwa/-rat ^w a	-rata	‘be loved’
	-rokiwa/-rok ^w a	-roka	‘be sewn’
b.	-bopiwa/-bot ^f w ^a	-bopa	‘be molded’
	-rɔbiwa/-rɔdʒ ^w a	-rɔba	‘be broken’
	-bɔfiwa/bɔf ^w a	-bɔfa	‘be bound’

The Tswana data clearly shows that where /-iw-/ is used there is no palatalization of a preceding labial but where /-w-/ is used there is. It is evident from the forms in (50b.) that the language’s strategy of avoiding ill-formed **Labial +w** (or labialized labials) is palatalization of labials or having a vowel between a labial consonant and [w].

5.3.2 Analogy

Perhaps the most insightful diachronic account on palatalization of labials particularly in the passive is the one presented by O’Bryan (1974). O’Bryan explains what appears to be irregular palatalization in Zulu in terms of analogy and shows that the process is, to a greater extent, regular as it occurs “in a much more well-defined manner in complete accordance with the morphemic structure of the language”. For cases involving the suffixes /-bal-/ , /-bez-/ , and /-bul-/ where there is non-palatalization of **b** (B) before **l** or **z** O’Bryan (1974:168) notes that “although -B- is a verb-forming suffix it is added only to monosyllabic ideophones to derive verbs” and adds that ‘a form such as **dondoBal-** could never be felt to have the ‘possible’ segmentation **dondo-B-al-***, since a verbal stem like **dondoB-*** (< **dondo-B-**) is not possible in Zulu, because it contains an attested ideophone of more than one syllable (**dóndo**)”. This means that while a form such as **zwib-** ‘swing to and fro’ derived from a monosyllabic idiophone **zwii** can be analyzed as **zwi-b-**, a form like **dondobal-** derived from a bisyllabic idiophone **dondo** is always analyzed as **dondo-bal-**, never as **dondob-al-** or **dondo-b-al-** as the bilabial would be in a possible stem final

position . Thus palatalization of the **b** in the suffixes /-bal-/ , /-bez-/ , and /-bul-/ is prevented by the fact that there is no analogous structure to serve as a model with a segmentation such that the bilabial could be a “possible” stem final consonant. In other words, when added to ideophones longer than a syllable, the suffixes /-bal-/ , /-bez-/ , /-bul-/ are not analyzed as /-b-al-/ (Verb forming suffix /-b-/ + Extensive verbal suffix /-al-/), /-b-ez-/ (Verb forming suffix /-b-/ + Causative /-ez-/) or /-b-ul-/ (Verb forming suffix /-b-/ + Reversive /-ul-/) since, with the exception of forms whose initial syllables are reduplicated, there is no verb stem whose final consonant is [b].

For Zulu, according to O’Bryan, the only exceptions, are examples such as **xaxaBul-** ‘belabor’ and **gogoBal-** ‘crouch in a corner’ where it can be assumed that the ideophones **xa*** and **go***, although not actually attested, are reduplicated since there are many examples of reduplicated monosyllabic ideophones in the language (e.g. **bubul-** ‘groan’ < the ideophone **bu** and **kleklebul-** ‘tear; rip; scratch’ < the ideophone **kle**). Labials in both stems undergo palatalization and thus we get **xaxatshulw-** and **gogotshalw-**. As noted in Section 3 such examples are not exceptions in Ndebele.

5.3.3 Dissimilation

Although most diachronic studies cited in this paper focus mainly on segmental fusion and analogy, dissimilation is not completely ignored. Ohala (1978:381), for instance, mentions briefly that a palatal element can come from a [w] through dissimilation. He says it is possible that [bw] becomes [bY] (Y representing a voiced velar glide) before palatalization occurs although it is not clear whether or not [Y] becomes [y] before palatalization takes place. However, the voiced velar glide is close enough to a palatal glide.

The idea which is further developed in Ohala (1981) is that the listener can be the source of sound change. In the [bw] to [bY^w] change, for example, listeners may ignore the labial part of [w] since they ‘expect inherent labialization after the labial [b]’. When the labial

feature in [w] is treated as redundant what remains distinctive then is the velar component [ɣ]. This is clearly a dissimilatory process which one could appeal to in explaining labial palatalization in Ndebele. However, one would still have to deal with exceptions in terms of morphology or analogy.

5.4 Conclusion

It is clear that palatalization of bilabials in Ndebele is a dissimilatory process arising due to the incompatibility between **bilabial** plus **w** (or the constraint ***Bw**). If it is not treated as dissimilatory then it becomes difficult to explain why palatalization affects only labials when the literature support mainly palatalization of velars and coronals. When labials are palatalized the expected environment is that of a palatal glide or high front vowel but many Ndebele examples in this chapter have shown no consistence with this 'standard' view.

To account for palatalization of labials in the passive, it seems one can take a diachronic view as presented by O'Bryan (1974) or the synchronic one proposed here. In the synchronic analysis, besides taking palatalization to be dissimilatory, it has been shown that a reasonable generalization can be captured by positing that there is a floating autosegmental feature complex in addition to non-floating /-w-/. Also, it has been demonstrated that there are exceptions in palatalization because morpheme initial bilabials are not affected by the palatalization rule. This means that phonology can be sensitive to morpheme boundaries.

CHAPTER 6: TONE

6.0 Introduction

Although the approach in this study is generally descriptive it would be less informative if not confusing to describe the Ndebele tone system without adopting some framework such as Autosegmental Phonology. As will be seen in the examples below, in many cases underlying tones seem to migrate to other syllables and surface tones may even appear different from those in the underlying forms of the verbs due to the interaction of rules or to competing constraints.

In Ndebele each verb stem can be categorized as high tone (H) or toneless (TL)¹, low tone (L) being assigned by default to syllables that remain toneless after H tone spreading rules have applied. The contrast between high and toneless verb stems can be seen in (1) where the shortened infinitive prefix **ku-** is used instead of **úku-**². This shortened prefix is normally attached to the verb stem in the construction **Akukho ku..** ‘There is no ...’³ although **Akukho úku...** ‘There is no ...’ can also be used. In the imperative where there is no prefix or where the only prefix is the OM the tonal contrast is, in most cases, neutralized.

(1) Tone patterns in CVC-a verbs with shortened infinitive prefix

- a. **ku-kháma** (H) ‘to choke’

¹ Sometimes toneless stems are simply treated as L tone (See for example Rycroft 1983).

² Throughout this chapter and in the following chapters high tone is marked by an acute accent (´) and low tone is not marked. The sign (ˊ) marks falling tone and (ˋ) a rising offglide. (ˊ) is used as opposed to (ˋ) because some short vowels are also pronounced with a rising tone off-glide. Underlyingly H tone vowels are underlined. Note also that a penultimate syllable is long unless otherwise stated.

³ This is a construction used similarly by, for example, Rycroft 1983 and Downing 1990.

b. ku-pheka (TL) ‘to cook’ (PB. -gɿpik-/ -jɿpik- ‘cook/put on cooking fire’)

By using the shortened infinitive prefix **ku-** which is a toneless syllable we see that the verb **khama** ‘choke’ in (1a.) has a high tone which surfaces on the first syllable of the stem while underlyingly toneless **pheka** ‘cook’ in (1b.) is realized with low tone⁴.

Some Ndebele verbs may also surface with a falling tone or a rising offglide on some syllables but these two patterns are predictable from the consonant environment as will be seen later in the main discussion. Tone contrast is essentially between High and Toneless.

Various prefixes and suffixes can be added to the CVC- root morpheme or any other type of root in deriving new verbs or for certain tenses and moods of the verb or for negation as we saw in the last two chapters. Productive derivational suffixes and inflectional suffixes we saw in Chapter 2 all of which are toneless except immediate past **-é** are presented here again as (2)

(2) Productive derivational suffixes and inflectional suffixes.

DERIVATIONAL SUFFIXES		INFLECTIONAL SUFFIXES	
-w- ~ -iw-	Passive	-é	Immediate past (Conjunctive)
-ek- ~ -akal-	Stative	-ile	Perfective (Past & Present)
-el-	Applicative	-i	Negative
-an-	Reciprocal	-ang-	Negative
-is-	Casative	-e	Subjunctive
-isis-	Intensive	-e	Imperative
		-ni	Plural (imperative)
		-nini	Plural (imperative)
		-a	Final Vowel (Default)

⁴ Note that some verbs take both tone patterns, for example,

ku-bóna (H) ‘to see’ (PB. -bón- ‘see’)
ku-bona (TL)

Suffixing one of the derivational suffixes adds one more syllable to the verb except for passive **-w-** which does not add any syllable and stative **-akal-**, intensive **-isis-** and imperative plural **-nini** all of which add two more syllables. Note that negative **-ang-** adds two more syllables to the stem but since it must co-occur with negative prefix **(k)a-** the verb ends up with three additional syllables.

For easy of reference, Ndebele Prefixes we saw in chapter 2 are also presented here again with their underlying tones as (3). There are also examples of how the prefixes are used with both H and toneless verbs.

(3) Ndebele Prefixes and their underlying tones

PREFIX	EXAMPLES	
HIGH TONE	TONELESS VERB	H TONE VERB
úku- Infinitive	úkúpheka	úkúkháma
-á- Remote Past Tense	sáphekela	sákhamele
-sá- Progressive	sísápheka	sísákháma
sé- Exclusive	sésíphékela	sésíkháméla
All 3rd Person subject prefixes	bá-phéka	bá-kháma
1st & 2nd Person Subj.Prefixes (In some Moods)	ngí-phéka	ngíkháma
All Object Prefixes	líphéka	líkháma
-zí- Reflexive	sí-phéke	sí-kháme
	báziphéka	bázikháma
TONELESS	TONELESS VERB	H TONE VERB
be- Immediate Past Continuous Tense	besiphékela	besikhaméla
-ya- Present Continuous Tense	siyapheka	siyakháma
-za- Future Tense	sizapheka	sizakháma
-zaku- Immediate Future Tense	sizakupheka	sizakukháma
-yaku- Remote (distant) Future Tense	siyakupheka	siyakukháma
-(k)a- Negative	(k)asiphéki	(k)asikhámi
	(k)asiphéki	(k)asikhámi
-ka- Negative Exclusive	(k)asíkapheki	(k)asíkhakhami
-nga- Negative	sasingapheki	sasingakhami
(m)a- Dependent Imperative	(m)asiphékele	(m)asikhámele
-nga- Potential	singaphéka	singăkháma
	singăpheka	
1st & 2nd Person Subj.Prefixes	ngi-pheka	ngi-khama / ngíkháma
	li-pheka	li-khama / líkháma
FALLING TONE	TONELESS VERB	H TONE VERB
-ngê- Potential (negative)	singêlime	singêthume

While CV and V prefixes may add one or no syllable to the verb, VCV and CVCV prefixes may add two or one syllable. The number of additional syllables depends on whether or not process such as gliding, deletion and coalescence we saw in Chapter 4 apply.

What is of interest in this chapter is to see how the stem tones are realized on the surface and how they interact with affixal tones which may also be high or ‘toneless’. Also, since affixation creates additional syllable and may introduce different types of consonants to the verb, it is worth considering what effect this has on the tone pattern.

The purpose of this chapter is to discuss the Ndebele verb-stem tone system. The discussion focuses on how verbal tones such as the ones illustrated in (1) are realized when different affixes are added to the verb stem. Cases involving roots shorter or longer than CVC- are also considered. Also important is the realization of tone when there are depressor consonants and when tone serves as a morpheme. Section 6.1 provides a general outline of the tone system when there are no depressors. Depressor effects are discussed in Section 6.2 while morphological marking is discussed in Section 6.3. The last section is the conclusion.

6.1 Non-Depressor Consonants.

In considering the tone system of Ndebele it seems appropriate to look first at what happens when no depressor consonants are involved and then later see how depressors affect the general pattern. In this section we only discuss tone when no depressors are involved. Cases involving CVC- roots (without and with productive suffixes) are

considered in 2.1, CVCVC- roots and CVC- roots with non-productive suffixes in 2.2, -C- Roots in 2.3 and Vowel initial Roots in 2.4.

6.1.1 CVC- roots

In (1) we saw that a toneless prefix, the shortened infinitive **ku-** to be specific, can be used in distinguishing high tone from toneless verbs. We now need to see what happens when we add other affixes to the same verbs whose roots are CVC-. While in (4a-b.) the new suffix is CAUS **-is-**, in (4c-d.) APP **-el-** has been added.

(4) Verbs with CVC-VC-a stems preceded by a shortened infinitive prefix **ku-**.

- a. ku-khamísa (H) 'to make choke'
- b. ku-phekisa (TL) 'to make cook'
- c. ku-khaméla (H) 'to choke for'
- d. ku-phekela (TL) 'to cook for'

As can be seen, stem H tone shifts one syllable to the right in (4a.) and (4c.) but underlying toneless verbs in (4b.) and (4d.) surface with L tone. The same can be observed in (5) where shortened infinitive **ku-** is replaced with toneless second person plural subject prefix **li-** and the suffix is now **-il-e** instead of a -VC- derivational suffix plus default final vowel **-a**. In fact examples in (4) and those in (5) have the same number of syllables which also correspond in terms of their tones.

(5) Verbs with CVC-**il-e** stems preceded by second person plural subject prefix **li-**.

- a. li-khamíle (H) 'you choked'
- b. li-phekile (TL) 'you cooked'

The shifting of H tone one syllable to the right can be taken to be rightward spreading followed by left branch delinking. (See also Downing 1990). Thus, from the examples in

(4) and (5) it can be concluded that there is a rule which spreads H tone to the right and then delinks the left branch although one can not tell yet how far the rightward spreading goes. It is, however, clear from (1), (4) and (5) that H tone cannot spread to the final syllable.

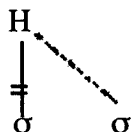
In (6) we add a fifth syllable to see if there is more rightward spreading of H tone. While we get the extra syllable by suffixing reciprocal **-an-** to **ku-khaméla** 'to choke for' and **ku-phekela** 'to cook for' ((6a-b.)), causative **-is-** is added to **li-khamíle** 'you choked' and **li-phekile** 'you cooked' ((6c-d.)).

(6) Five syllable verbs with a toneless prefix.

- | | | | |
|----|----------------|------|---------------------------|
| a | ku-khamélana | (H) | 'to choke for each other' |
| b. | ku-phekelana | (TL) | 'to cook for each other' |
| c | li-khamísile | (H) | 'you made choke' |
| d. | li-liphekisile | (TL) | 'you made cook' |

As can be seen in (6a.) and (6c.) there is no more spreading of the stem H tone to the penultimate syllable. In (6b.) and (6c.) where the stems are underlyingly toneless, the verbs still surface with L tone in all the syllables. The rule that spreads stem H tone one syllable to the right and then de-links the left branch can be presented as in (7). This is in fact the Local Tone Spread Rule proposed by Downing (1990) except that it is now combined with left branch de-linking. (See also Peterson 1989).

(7) Local Tone Spread Rule with Left Branch Delinking.



The rule shows that H tone spreads to the next syllable to the right and this is accompanied by de-linking of the left branch of the H tone.

It is also important to consider verbs longer than those we have seen so far. In (8a-b.) another syllable is added to examples we saw in (6a-b) by suffixing CAUS **-is-** as well while in (8c-d.) adding an extra syllable is achieved by suffixing REC **-an-** to the examples in (6c-d.).

(8) Six syllable verbs with a toneless prefix.

- | | | | |
|----|----------------|------|-----------------------------|
| a. | ku-khamisélana | (H) | ‘to choke for each other’ |
| b. | ku-phekiselana | (TL) | ‘to cook for each other’ |
| c. | li-khamanísile | (H) | ‘you made choke each other’ |
| d. | li-phekanisile | (TL) | ‘you made cook each other’ |

At first glance the examples in (8) seem to contradict what we have just established about the Local Tone Spread Rule as H tone now spreads further to the right but only up to the antepenult. The fact that H tone gets to the penult in (4) and (5) but not in (6) and (8) where it only spreads up to the antepenult suggests that there are two H tone spreading rules, one spreading H tone to the next non-final syllable to the right and another to the antepenult. It is their interaction which leads to confusion. For the second rule which spreads H tone to the antepenult I also adopt Downing’s (1990) rule, Metrical Tone Spread in (9).

(9) Metrical Tone Spread.

Spread a high tone rightwards to the metrically prominent (accented) syllable.

I also agree with her that the two rules must be ordered. Local Tone Spread must apply before Metrical Tone spread so that there is no H tone spreading to the penult in cases

where H tone only spreads to the antepenult. In other words, Metrical Tone Spread must not feed Local Tone Spread. Metrical Tone Spread assumes that the final syllable is extrametrical. This is necessary in order to explain why the antepenult is a prominent syllable, otherwise it would be odd for H tone to spread up to a less prominent syllable. It also explains why the final syllable cannot be affected even by Local Tone Spread.

After establishing that there are two rules at play it becomes easy to explain the different tone patterns we have seen so far. In (1a.) Local Tone Spread cannot apply because the final syllable is extrametrical. Metrical Tone Spread also fails to apply as the H tone is already on the penult, beyond its target. In (4a.) and (5a.) Local tone Spread takes H tone to the penult and Metrical Tone Spread does not apply. The two rules have the same syllable as their target in (6a.) and (6c.), the second syllable of the stem which also happens to be the antepenult. In (8a.) and (8c.) Local Tone Spread applies but does not take the H tone to the antepenult. It is Metrical Tone Spread which eventually does.

In cases we have seen so far the H tone sponsor has been the first syllable of the stem. We now need to see what happens when H tone is coming from one of the prefixes. Let us consider examples in (10) in which the H tone class 7 object prefix *-si-* is preceded by two toneless prefixes, plural second person subject prefix *li-* and Present Continuous Tense *-ya-*.

(10) The OM as a H tone sponsor.

- a. *li-ya-si-kháma* (H) 'you are choking it'
- b. *li-ya-si-phéka* (TL) 'you are cooking it'

In (10a.) both the object prefix and the stem are underlyingly H tone but H tone only surfaces on the stem. The stem H tone cannot spread one syllable to the right as the final

syllable is extrametrical. In (10b.) only the object prefix is underlyingly H tone but H tone surfaces on the stem. This suggests that Local Tone Spread with left branch de-linking applies even if the H tone is coming from the OM.

While tonal contrast is neutralized in (10) longer forms in (11) show that H tone and toneless verbs take different patterns.

(11) Longer forms in which the OM is a H tone sponsor.

- a. li-ya-si-khaméla (H) 'you are choking for it'
- b. li-ya-si-phékela (TL) 'you are cooking for it'

In (11a.) stem H tone spreads one syllable to the right so that it surfaces on the penult and in (11b.) the H tone from the object prefix spreads to the first syllable of the stem which is also the target of Metrical Tone Spread as it is the antepenult.

Longer forms in (12) show clearly that Metrical Tone Spread also applies when H tone also comes from the OM.

(12) Metrical Tone Spread also applies when there is an OM.

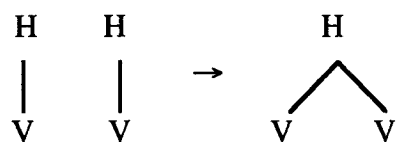
- a. li-ya-si-khamélana (H) 'you (pl.) are choking it for each other'
- b. li-ya-si-phékélana (TL) 'you (pl.) are cooking it for each other'
- c. li-ya-si-khamisélna (H) 'you (pl.) are getting it choked for each other'
- d. li-ya-si-phékisélna (TL) 'you (pl.) are getting it cooked for each other'

While it is not obvious in (12a.) whether the H tone that remains is a result of Local Tone Spread or Metrical Tone Spread, in the other three examples ((12b.), (12c.) and (12d.)) the rightmost H tone which survives is no doubt a result of Metrical Tone Spread since Local Tone Spread cannot get H tone to the antepenult. Examples in (12) also illustrate

that tonal contrast is neutralized when the stem is four syllables or longer and when H tone comes from a prefix.

In the cases involving the OM we have seen it can be assumed that when the H tone from the OM spreads one syllable to the right it fuses with the stem H tone (which will have spread one syllable to the right where possible) and left branch de-linking then occurs. In fact whenever there are two adjacent H tones I assume that the Obligatory Contour Principle (OCP) fuses the two H tones together. If the antepenultimate syllable is still available after fusion then there is more spreading so that the antepenult surfaces with H tone. I follow Downing's (1990: 290-292) suggestion that for Ndebele Meeussen's Rule must be formulated like the OCP Tone Fusion Rule in (13) proposed by Kisseberth and Mmusi (1989) for Setswana.

(13) Tone Fusion Version of Meessen's Rule



In the formulation in (13) a series of high tones are fused together into a single, multiply-linked high tone.

We now turn to cases involving H tone prefixes other than the OM. In (1) we saw that a low tone prefix, the shortened infinitive **ku-** to be specific, can be used in distinguishing high tone from toneless verbs. We now need to see what happens when we prefix the full form **úku-** which has an initial high tone. As can be seen in (14), the high and toneless distinction is still maintained in the stems but the high tone in the prefix spreads one

syllable to the right. It is clear that the high tone is coming from the initial syllable of the prefix because the contracted infinitive prefix was toneless.

(14) High and toneless verbs with CVC-a stems

- a. úkú-!kháma (H) 'to choke'
- b. úkú-pheka (TL) 'to cook'

Spreading is also rightward because there was no leftwards H tone spreading when toneless affixes, including shortened infinitive **ku-**, were prefixed to H tone stems above. The question then is how far can rightward spreading go if the H tone sponsor is a prefix? In (14) it is not obvious whether the target is always one syllable to the right or if high tone always spreads up to an antepenultimate syllable, or just to a syllable before the stem. Also interesting is the fact that in the H tone verb in (14a.) there is downstep. Why there is downstep this time is not clear from the single examples we have just seen. To solve these puzzles we need to consider longer forms such as those in (15) which include causative **-is-**.

(15) High and toneless verbs with CVC-VC-a stems

- a. úkú-!khámisa (H) 'to cause to choke'
- b. úkú-!phékisa (TL) 'to make cook'

In (15a.) Local Tone Spread takes stem H tone to the penultimate syllable as expected but there is now no left branch de-linking. The toneless verb in (15b.) makes it clear that high tone from the prefix spreads up to the antepenultimate syllable due to Metrical Tone Spread. Thus in (14a.) and (15a.) the second syllable **ku** gets H tone when Metrical Tone Spread applies followed by tone fusion ((13)). However, we still cannot tell whether or

not Local Tone Spread also applies to H tone prefixes other than the OM. An interesting point to note is that the verb whose stem is underlyingly toneless now has downstep just like the H tone verb.

Longer forms in (16), like those we saw in (12) where the H tone prefix was an OM, show that tonal contrast is neutralized once the verb-stems get to four syllables. Note that in these examples, in addition to causative **-is-**, applicative **-el-** has also been suffixed.

(16) High and toneless verbs with CVC-VC-VCa stems

- a. úkú-!khámísela (H) 'to cause to choke for'
- b. úkú-!phékísela (TL) 'to make cook for'

In both H and toneless stems H tone spreads iteratively up to the antepenult and there is still no left branch de-linking. Clearly, the antepenult is the primary target in H tone spreading. In (15a.) spreading went up to the penultimate syllable because a stem high must spread one syllable to the right even if it means going beyond the antepenult (See also Peterson 1989 and Downing 1990). However, as we have seen, spreading cannot get to the final syllable (in fact final mora as the immediate past will show) as it always surfaces with a low tone.

Further evidence showing that H tone from the prefix normally spreads up to the antepenult is provided by even longer forms in (17) where another suffix, reciprocal **-an-** is also added.

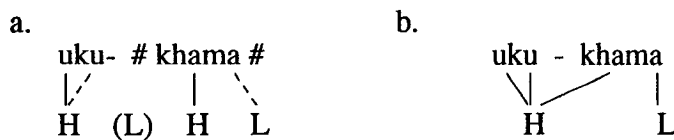
(17) High tone and toneless verbs with CVC-VC-VC-VC-a stems

- a. úkú-khamiséłana (H) 'to cause to choke for each other'
- b. úkú-phékiséłana (TL) 'to make cook for each other'

As in (16) there is no need for spreading H tone beyond the antepenult because the H tone from the first syllable of the stem has enough room to spread before getting to the antepenult. What we also observe in (17) is that when a stem gets to five syllables where more than two would be realized with H tone it is only the antepenult which surfaces with H tone after Metrical Tone Spread applies⁵. This suggests that there is left branch de-linking within the stem whereby the left branches of a multiply-linked H tone get de-linked with only the rightmost surviving. The examples also provide evidence that a de-linking rule applies after Metrical Tone Spread which itself applies after Local tone Spread. It must therefore be a separate rule from Local Tone Spread. The two rules, Metrical Tone Spread and Leftbranch De-linking, will be formalized later after considering examples with prefixes other than infinitive úku-.

To account for the downstep and the de-linking in the above forms it is proposed here that there are floating L tones at the edges of the stem which may be associated with some syllables after application of the two rules we have seen. The downstep is caused by the floating L tone at the left edge of the stem which lowers the following H tone. For instance, a úku-!kháma 'to choke' has tone pattern in (18a.) although the pattern may appear to be the one in (18b.) on the surface. Note that the floating L tone that remains unassociated is bracketed.

(18) Tone pattern of úku-!kháma 'to choke'

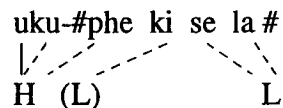


⁵ The first two of the five syllables of the stem may also be considered to have H tone rather than L tone on the surface. This seems to be a problem of tonal assimilation. Low tone seems to be what is targeted by the two syllables but because they occur between two H tones their tone is higher than that of other L tone syllables and yet it is also lower than that of the adjacent H tone syllables.

As seen in (18), the floating L tone on the right edge of the stem associates with the final extrametrical syllable after application (or failure to apply in this case) of Local Tone Spread and Metrical Tone Spread.

The floating L tone is also responsible for the downstep in forms such as those in (15) and (17). The tone pattern in H tone verbs will be similar to that seen in (18) except that in a verb whose stem is four syllables long such as úkú-!khámíselá ‘to cause to choke for’ the floating L tone on the right edge associates with the toneless penult and then spreads rightwards to the final syllable. What needs to be illustrated is downstep in a L tone verb. Consider the tone pattern of úkú-!phékíselá ‘to make cook for’ in (19).

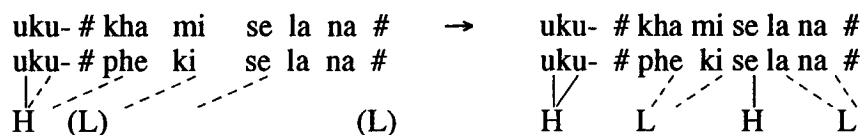
- (19) The tone pattern of úkú-!phékíselá ‘to make cook for’



As can be seen, H tone spreads from the first syllable up to the antepenult and floating L tone on the right edge associates with the penult and spreads to the last syllables. It is the floating L tone on the left edge which remains unassociated and causes a downstep.

The presence of floating tones at the edges of the stem is further supported by the tone pattern of verbs such as those in (17). Their tone pattern can be presented as in (20) where the presence of floating tones is taken into account.

- (20) Tone pattern for úkú-khamisélaná ‘to cause to choke for each other’ and úkú-phékisélaná ‘to make cook for each other’



High tone spreads from the prefix **úku-** up to the antepenult before stem left branch delinking occurs as a result of the presence of a floating tone on the left edge of the stem. De-linking then allows the floating L tone to fill the two ‘empty’ syllables. The floating L tone on the right edge gets associated with the penult and then spreads to the final syllable. In these forms Local Tone Spread plays no role in determining how tones eventually surface even if the stem in **úku-khamisé⁶lana** is underlyingly H tone. Once the stem gets to five syllables Local Tone Spread becomes completely redundant and this is when stem H tone surfaces only on the antepenult due to Metrical Tone Spread. This is the case whether the stem is underlyingly H tone or toneless. It seems as if stem H tone blocks the association of the floating tone with the stem initial syllable and the spread of L tone to the second syllable. However, once Local tone spread becomes completely redundant the first two stem syllables can take L tone. Interestingly toneless stems also behave as if their first two syllables are blocked from associating with the floating L tone unless the third (or forth, etc.) syllable of the stem is the antepenult.

In the examples we have seen so far no other H tone syllable from a prefix immediately precedes the verb stem besides that from the OM. We need to know whether or not Local Tone Spread applies to H tone syllables from other prefixes as well. Examples in (21) where Progressive **-sá-⁶** is used preceded by class 2 subject prefix **-bá-** answer our question on whether or not the H tone of the prefix spreads one syllable to the right. Note that when **-sá-** is used there is no tone contrast between ‘third person’ and ‘first and second person’ subject prefixes. All surface with a high tone and therefore the verb cannot begin with a L tone subject prefix so that **-sá-** is the only prefix with a H

⁶ The fact that **-sá-** is underlyingly H tone will be clear when we consider cases involving shorter C- roots.

tone. Unfortunately, Negative (k)a- and Immediate Past Continuous Tense be- can also not be used here in place of the subject prefix for a the problem we will see in Section 4.

(21) High tone prefix, Progressive -sá-, immediately preceding the root

- | | | | |
|----|----------------|------|------------------------------|
| a | bá-sá-!kháma | (H) | ‘they are still choking’ |
| b. | bá-sá-pheka | (TL) | ‘they are still cooking’ |
| c | bá-sá-!kháméla | (H) | ‘they are still choking for’ |
| d. | bá-sá-!phékela | (TL) | ‘they are still cooking for’ |

While (14a.) cannot prove the presence or absence of rightward spreading as the stem has an underlying H tone, (21b.) makes it clear that prefixal H tone does not spread. Unlike with stem H tone which can spread to the penultimate syllable, spreading of prefixal H tone appears to be blocked by the fact that the H tone is already on the antepenultimate syllable targeted by Metrical Tone Spread. In (21c-d) one more syllable has been added each of to the forms in (21a-b.) by suffixing applicative -el-. While In (21c.) H tone spreads up to the penultimate syllable because the stem has a H tone, in (21d.) we see that high tone now spreads to the first syllable of the stem which is in fact the antepenult due to Metrical Tone Spread. Note the downstep in (21a.), (21c.) and (21d.) which, however, needs no further comment as the facts are the same as in the cases we have discussed above.

It is clear that the OM is treated differently from Progressive -sá-. In fact the OM is a privileged prefix which can be treated as part of the stem as it belongs to the Macro-Stem while -sa- and other prefixes fall under the PreStem in the verb structure we discussed in Chapter 2.

We now need to see what happens when the stem is preceded by prefixes other than infinitive **uku-**. In (22), where the class 7 object prefix -si- is preceded by the class 2

subject prefix **bá-** and Present Continuous Tense **-ya-** both H and L tone verbs exhibit the same pattern⁷.

(22) Verb stems preceded by **bá-ya-sí-**.

- | | | | |
|----|-----------------------------|------|---|
| a. | bá-ya-sí-kháma | (H) | 'they are choking it' |
| b. | bá-ya-sí-phéka | (TL) | 'they are cooking it' |
| c. | bá-ya-sí-khaméla | (H) | 'they are choking for it' |
| d. | bá-ya-sí-phékela | (TL) | 'they are cooking for it' |
| e. | bá-ya-sí-khamélana | (H) | 'they are choking it for each other' |
| f. | bá-ya-sí-phékélana | (TL) | 'they are cooking it for each other' |
| g. | bá-ya-sí-khamisékana | (H) | 'they are getting it choked for each other' |
| h. | bá-ya-sí-phekisékana | (TL) | 'they are getting it cooked for each other' |

Facts about H tone surfacing on the penult or antepenult in these examples are now obvious and need no further comment. However, there are new facts relating to leftbranch de-linking. As can be seen, H tone does not surface on prefixes **-ya-** and **sí-**, and in some cases on syllables that follow these prefixes. Given that **-ya-** is toneless, left branch delinking can be seen as occurring when at least two H tone syllables or branches of a multiple linked H tone are preceded by a toneless prefix (which is usually a syllable), in addition to what we saw with stem leftbranch de-linking above. Note that 'prefix' is preferred here rather than 'syllable' because in cases where the toneless syllable is **-ku-** of H tone infinitive prefix **úku-**, that syllable does not lose the H tone⁸. Leftbranch De-linking does not affect a word-initial H tone syllable or prefix⁹. The L tone which

⁷ Examples where verb stems are immediately preceded by **bá-ya-** are left out as the tone patterns are identical to those we saw when the prefix was infinitive **úku-**.

⁸ Perhaps the H tone is preserved in **-ku-** due to the fact that the two vowels in the prefix **úku-** are one and the same melody as illustrated below.



⁹ This is a case of positional faithfulness to H tone at the beginning of the word. (See Beckman 1997).

eventually surfaces on **-ya-** and **sí-** in (22), is a result of the floating L tone on the left edge of the stem being associated with **-ya-** and then spreading to the now toneless **-si-** after Leftbranch De-linking has applied.

It is not possible to formalize the three main rules discussed above plus the floating L tone association one as in (23).

(23) Tone rules.

- a. Local Tone Spread (Downing 1990) (Applies only within the Macro-Stem)



- b. Metrical Tone Spread
Spread a high tone rightwards to the metrically prominent (accented) syllable.
- c. Left Branch De-linking

When at least two H tone syllables of a multiple linked H tone are preceded by an underlyingly toneless prefix (which is usually a syllable) de-link all branches but the rightmost one and leave a H linked to the first prefix of the verb (word) if that prefix is underlyingly H tone.

OR

If a multiply-linked high tone has three or more branches linked to syllables within the stem delink all (within the stem) but the rightmost branch.

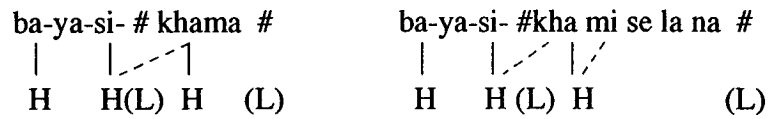
- d. Default Low Tone Rule

Associate a Floating L tone with a toneless syllable, spreading L tone from left to right to other toneless syllables where possible.

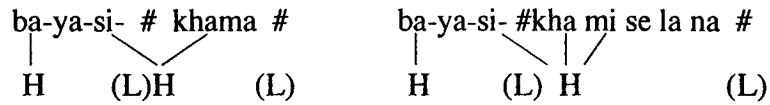
At this point some sample derivations should be in order. Ignoring the problem of whether or not tones are underlyingly linked which we do not focus on, tones for **bá-ya-si-kháma** ‘they are choking it’ and **bá-ya-si-khamiséłana** ‘they are getting it cooked for each other’ can be derived as in (24).

(24) Derivation of **bá-ya-si-kháma** and **bá-ya-si-khamiséłana**

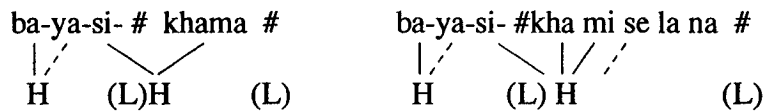
a. Local Tone Spread



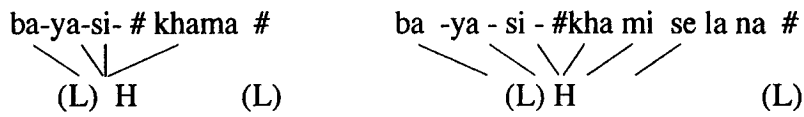
b. Tone Fusion



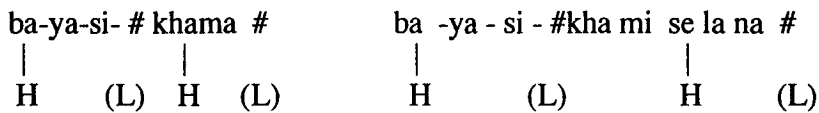
c. Metrical Tone Spread



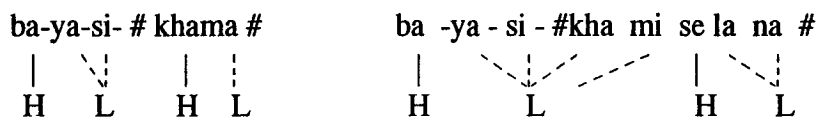
d. Tone Fusion



e. Leftbranch De-linking



f. Default L Tone Rule



g. Surface Representation

bá-ya-si-kháma **bá-ya-si-khamiséłana**

Local Tone Spread applies first in (24a.) and adjacent H tones are fused together to get a single multiple linked H tone in (24b.). Metrical Tone Spread then applies in (24c.). This

is when the antepenult in **bá-ya-si-khamiséłana** gets is H tone. It is important that this rule spreads all the H tones together to the antepenult not just the rightmost one. Otherwise a prefix such as infinitive **úku-** would surface with L tone on the second syllable in the examples we saw above. If a spreading H tone gets adjacent to another H tone fusion automatically occurs so that there is no OCP violation. Thus (24c.) and (24d.) should actually be combined but are separated for clarity. Leftbranch De-linking follows in (24e.) making some syllables available for Low tone Association in (24f). Recall that the L tone comes from the floating Ls at the edges of stem. Where there is more than one toneless syllable available L tone spreads from left to right and the spreading is only blocked by H tone or non-availability of more toneless syllables.

This sub-section has established four ordered tone rules for Ndebele. Local Tone Spread applies first but only within the Macro-Stem. It is then followed by Metrical Tone Spread which applies to the whole prosodic word (verb) and Leftbranch De-linking which delinks left branches of a multiple linked H tone when at least two H tone syllables of a multiple-linked H are preceded by an underlyingly toneless syllable or when the stem has at least three H tone branches. (We get three H tone branches normally when the stem is five or more syllables). Finally, there is a default rule, Low tone Association which allows floating L tones to be associated with syllables which remain toneless at the end of the derivation. Downstep has been shown to be caused by the floating L tone at the left edge of the stem. Another important point established here is that adjacent H tones are automatically fused together into a single multiple-linked H tone by the Tone Fusion rule, thereby avoiding violation of the OCP. Note that the tone spreading rules discussed here

are post cyclic as the way they apply is partly determined by the total number of syllables a verb has after all affixes have been attached to the stem.

6.1.2 CVCVC- roots and CVC- roots with Non-Productive suffixes

We now turn to cases involving longer CVCVC- roots and CVC- roots with non-productive suffixes. First, it must be pointed out that there are very few non-derived verbs with roots longer than CVC- in Ndebele as we saw in Chapter 2 and that most of them have depressor consonants which are not discussed in this subsection. However, the few that have no depressors do provide the H and toneless contrast we are interested in. As seen in (25), verbs whose roots are CVCVC- can be H tone as in (25a.) or toneless as in (25b.)¹⁰ and there is still downstep as in the preceding section.

(25) Tone patterns in verbs with CVCVC-a stems

- a. úkú-!híkíhla (H) 'to wipe'
- b. úkú-!húmutsha (TL) 'to entice'

In (25a.) the stem has two H tone syllables but in (25b.) only the initial syllable of the stem has H tone. This is parallel to what we saw in (15). Since it was clear for H tone verbs in (15) that the H tone in the second syllable of the stem was a result of Local Tone Spread, we can assume that the same rule applies to (25a.). In other words H tone spreads from the first syllable of the stem to the second in this examples. In the toneless examples ((25b.) H tone on the first syllable of the stem, which is also the penultimate syllable of

¹⁰ There are also verbs with CVCVC- roots which take both the H and toneless patterns. An example is given below.

- úkú-!xúkúxa (H) 'to work a tight thing loose'
- úkú-!xúkuxa (TL)

the prosodic word, is a result of Metrical Tone Spread. Longer verbs in (26) confirm this analysis.

(26) Tone patterns in verbs with CVCVC-VC-a stems

- a. úkú-!h^íkíh^ílela (H) 'to wipe for/to'
- b. úkú-!hú^ímú^ítshela (TL) 'to entice for'

When the stems get to four syllables there is neutralization of tonal contrast. In (26a.) H tone does not spread one syllable to the right, confirming that it has already done so by spreading from the first syllable of the stem to the second. Since the second syllable of the stem is the antepenult of the verb the Metrical Tone Spread rule cannot lead to further rightward spreading. In (26b.) H tone spreads from the prefix to the antepenultimate syllable of the verb as a result of Metrical Tone Spread.

It is also important to test whether Leftbranch Delinking also applies to the longer forms we are focusing on in this subsection. Examples in (27) confirm that application of the rule is not restricted to cases involving CVC- roots.

(27) Tone patterns in verbs with CVCVC-a stems

- a. li-ya-y^í-h^íkíh^íla (H) 'you are wiping it '
- b. li-ya-y^í-hú^ímutsha (TL) 'you are enticing it'

While Leftbranch Delink applies after H tone spreads to the penult in a H tone verb ((27a.)), a toneless verb in (27b.) shows that high tone from the object prefix -y^í- spreads one syllable to the right or up to the antepenultimate syllable before Leftbranch Delinking applies.

Although there are few roots whose final -VC- sequences are -Vf-, -Vmp-, -Vc-, -Vd-, -in-, --un-, -Vhl-, -Vdl-, -Vx-, -Vj-, -Vtsh-, -Vq- or -Vng-, not considered to be suffixes, there are many with the shape CVC-VC- where the final -VC- is a non-productive suffix. The non-productive suffixes are still productive in some Bantu languages. All non-productive suffixes are underlyingly toneless in Ndebele. A list of them which was provided in Chapter 2 with names adopted from Doke (1931) is given again in (28). Note that productive derivational suffix are also used like frozen non-productive suffixes when suffixed to some roots but they are not included in (28).

(28) Non-Productive suffixes (all toneless)

NON-PRODUCTIVE SUFFIXES		
Suffixes Forming Derived Verbs From verbs:		
1. Dispersive		-alal-
2. Stative II		-am-
3. Contactive		-ath-
4. Perfective		-elel-
5. Persistive		-ezel-
6. Transitive Reversive (short)		-ul-
7. Transitive Reversive (long)		-ulul-
8. Intransitive Reversive (short)		-uk-
9. Intransitive Reversive (long)		-uluk-
10. Miscellaneous	a.	-ay-
	b.	-m-
	c.	-nz-
Suffixes Forming Derived Verbs From Noun and Adjective roots		
11.		-ph- (vilapha).
Suffixes Forming Derived Verbs From Radicals		
12. Intransitive:	-k-	(dazuluku)
13. Transitive:	-l-	(dazula)
14. Causative	-z-	(bhodloza)
15. do.	-s-	(godusa)
and others:	-b-, -bh-, -l-, -th-, -ny-, -z- (suffixed to radicals)	

Non-productive suffixes are normally treated as part of the root in phonological processes as we saw in earlier chapters. Thus examples in which the stem has a non-productive suffix such as those in (29) can be treated like cases involving CVCVC- roots discussed above. The non-productive suffix used in the examples is transitive reversive **-ul-**.

(29) Tone patterns in verbs with CVC-VC-a stems where -VC- is a non-productive suffix.

- a. úkú-!khúlúla (H) 'to set free'
- b. úkú-!cúnula (TL) 'to offend'

As can be seen, the facts about (29) are just the same as those about (25). Just as in (25) examples in (29) show that Local Tone Spread and Metrical Tone Spread are active.

Perhaps only one more illustration is necessary to show that cases with non-productive suffixes under consideration are treated exactly like those involving CVCVC- roots. Compare (30) with (27) above.

(30) Tone patterns in verbs with CVC-VC-a stems

- a. li-ya-yi-khulúla (H) 'you are setting it free '
- b. li-ya-yi-cúnula (TL) 'you are offending it'

Clearly, when the same prefixes are used the contrast between H and toneless verbs in (30) is the same as that in (27). Just as in (27), examples in (30) show that all the three rules apply including Leftbranch Delinking.

This subsection has shown that tone rules which apply to cases involving CVC- roots also apply to those involving CVCVC- roots and to those in which non-productive suffixes are suffixed to CVC- roots. The number of syllables in a stem has also been

shown to be important since short verbs with productive suffixes reflect some parallels with longer ones which may be unsuffixed.

6.1.3 -C- Roots

Next to be considered is the tone pattern in verbs whose roots are just a consonant. There are very few such verbs in Ndebele as we saw in Chapter 2 but their tone pattern is worth commenting on. In (32) the infinitive affix is prefixed to -C-a stems. Verbs in square brackets have depressor consonants in them and are not commented on in this section. They are included in order to provide a complete list of verbs with -C-a stems found in the database.

(31) High and toneless verbs with -C-a stems.

a. High Tone

ú <u>k</u> ú-ba	‘to become; to be’	(PB. -bá-)
*ú <u>k</u> u-ba		
ú <u>k</u> ú-l <u>w</u> a	‘to fight’	(PB. -du-)
?ú <u>k</u> u-l <u>w</u> a		
ú <u>k</u> ú-h <u>l</u> e	‘happen suddenly’	(PB.-kí/-ké) ?
?ú <u>k</u> u-h <u>l</u> e		
[ú <u>k</u> ú-ze	‘so that’]	
[*ú <u>k</u> u-ze]		
ú <u>k</u> ú-thi	‘to say’	(PB. -ti)
*ú <u>k</u> u-thi		
ú <u>k</u> ú-t <u>sh</u> o	‘assert, say’	
?ú <u>k</u> u-t <u>sh</u> o		
ú <u>k</u> ú-y <u>a</u>	‘go’	(PB. -gi-)
?ú <u>k</u> u-y <u>a</u>		
[ú <u>k</u> ú-za	‘come’	(PB. -yǽj-/-jǽj-)]
[*ú <u>k</u> u-za]		

b. Toneless

ú <u>k</u> u-fa	‘to die’	(PB. -kǽ-)
*ú <u>k</u> ú-fa		
ú <u>k</u> u-ph <u>a</u>	‘to give’	(PB. -pá-)

* <u>ú</u> kú-pha		
<u>ú</u> ku-sa	‘dawn’	(PB. -kí/-ké)
* <u>ú</u> kú-sa		
[<u>ú</u> ku-zwa	‘hear’	(PB. yǐgu/-jǐg-]
[* <u>ú</u> kú-zwa]		
úku-hlwa	‘become dark (at evening)’	(PB. yǐd/-jǐd-)
* <u>ú</u> kú-hlwa		
[<u>ú</u> ku-dla	‘eat’	(PB. -dí-)]
[* <u>ú</u> kú-dla]		
úku-tsha	‘become burnt / burn’	(PB. -pí-)
* <u>ú</u> kú-tsha		
úku-kha	‘draw water, pluck’	(PB. -ik/-k(a)-)
? <u>ú</u> kú-kha		

c. High and Toneless

<u>ú</u> kú-ma	‘to stop/stand’	(PB. -yím/-jím-/gi-am-)
úku-ma		
[<u>ú</u> kú-(e)mba	‘dig’	(PB. -jimb-)]
[<u>ú</u> ku-(e)mba]		
úkú-wa	‘fall’	(PB. -gu-)
úku-wa		
úkú-na	‘rain’	
úku-na		
úkú-nya	‘defecate’	(PB. -nj/-ne)
úku-nya		
úkú-(e)tha	‘pour milk through a funnel,	(PB. -yit-)
úku-(e)tha	give a name, tell a story’	

d. Not compatible with infinitive úku-.

* <u>ú</u> kú-se	‘to now/then/ already’	(PB. -kí/-ké)
* <u>ú</u> ku-se		
(It seems s → hl. See <u>úku</u> -hle above)		

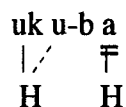
While the stems in (31a.) are acceptable with a H tone, they sound odd or completely unacceptable when toneless. In (32b.) the stems are acceptable when toneless but sound odd or completely unacceptable with H tone. Tones of some verb stems ~~stih~~ ‘say’ and **-fa** ‘die’ are the opposite of what is expected given that PB equivalents **-ti** - ‘say’ and **-kú** - ‘die’ have L and H tone, respectively. (31c.) shows that for some stems both H and toneless patterns are acceptable, regardless of the fact that the PB equivalent

is H tone or toneless. Note that Ndebele H tone verbs with -CV stems generally do not have H tone on the final syllable even though some PB equivalents have H tone on that syllable. In both H and toneless verbs the final syllable surfaces with a L tone (or falling tone in the immediate past¹¹) as in longer examples we have seen. The only difference is that the penult is now part of the prefix and not part of the stem. As a result the H and toneless patterns are distinguished by the first two syllables which are not part of the stem. The H tone of the prefix does not spread to the penult in toneless verbs as it is already at the expected location, the antepenult. In H tone verbs it seems a floating H tone docks on the penult since in longer verbs with CVC- roots a H tone surfaces or spreads from this position. This is illustrated in (32a.) where it is shown that the H tone is subsequently fused together with an adjacent one from the prefix.

(32)a. Floating H tone docks on penult.



b. A pre-linked H tone in the final syllable de-links.



c. Leftwards spreading and right branch delinking.



Alternatively one can think of this as delinking of a prelinked H tone in the final syllable as in (b.). However, in this case there must be a rule which spreads H tone from the first

¹¹ See section 6.3

to the second syllable but which is clearly not Local Tone Spread or Metrical Tone Spread as this is a different environment from the ones in which they apply. A third possibility is spreading H Tone leftwards from a H prelinked to the final syllable followed by delinking of the right branch. Given that in Local Tone Spread or Metrical Tone Spread the spreading is rightward this is the least plausible option. (32a.) appears to be the most plausible as no additional rule is required and also since in most cases the final vowel is underlyingly absent synchronically, and toneless FV **-a** is only brought in by default.

When a suffix is added to each of the verbs in (31) we still get H and toneless contrast but some tone patterns appear to be mixed up. In (33a.) we see that the toneless pattern which sounded odd before applicative **-el-** (or **-ol-** when the stem is irregular **-tsho** ‘assert, say’) was suffixed is now definitely acceptable and is, in the case of **úkú-lwela** ‘to fight for’ and **úkú-yela** ‘to go for’, now consistent with what is expected from PB forms. In the H tone variants, the H tone of the stem surfaces on the penultimate syllable of the verb which is now part of the stem and which also happens to be the initial syllable of the stem, a position where it normally docks in verbs with longer roots. Note also the presence of downstep as in verbs with CVC-a and longer stems we have seen. As already noted, the H tone variants **úkú-!lwéla** and **úkú-!yéla** are not expected given that the PB stems have L tone.

(33) High tone and toneless verbs with C-el-a stems

- | | | | |
|----|--------------------|------|--------------------------|
| a. | úkú-!lwéla | (H) | ‘to fight for’ |
| | úkú-lwela | (TL) | |
| | úkú-!yéla | (H) | ‘to go for’ |
| | úkú-yela | (TL) | |
| | úkú-!tshólo | (H) | ‘to assert for, say for’ |

- | | | | |
|----|----------------------|------|-----------------------|
| | <u>ú</u> kú-tsholo | (TL) | |
| b. | * <u>ú</u> kú-fela | (TL) | ‘to die’ |
| | <u>ú</u> kú-!féla | (H) | |
| | ? <u>ú</u> kú-phela | (TL) | ‘to give for’ |
| | <u>ú</u> kú-!phéla | (H) | |
| | ? <u>ú</u> kú-tshela | (TL) | ‘become burnt / burn’ |
| | <u>ú</u> kú-!tshéla | (H) | |
| | ? <u>ú</u> kú-khela | (TL) | ‘draw water, pluck’ |
| | <u>ú</u> kú-!khéla | (H) | |
| c. | <u>ú</u> kú-!méla | (H) | ‘to stop/wait for’ |
| | <u>ú</u> kú-mela | (TL) | |
| | <u>ú</u> kú-!wéla | (H) | ‘fall’ |
| | <u>ú</u> kú-wela | (TL) | |
| | <u>ú</u> kú-!nyéla | (H) | ‘defecate’ |
| | <u>ú</u> kú-nyela | (TL) | |
| d. | <u>ú</u> kú-!lwisa | (H) | ‘to make fight’ |
| | <u>ú</u> kú-lwisa | (TL) | |
| e. | ? <u>ú</u> kú-phisa | (TL) | ‘to make give’ |
| | <u>ú</u> kú-!phisa | (H) | |
| | ? <u>ú</u> kú-tshisa | (TL) | ‘to burn’ |
| | <u>ú</u> kú-!tshisa | (H) | |
| | ? <u>ú</u> kú-khisa | (TL) | ‘draw water, pluck’ |
| | <u>ú</u> kú-!khisa | (H) | |
| f. | <u>ú</u> kú-!misa | (H) | ‘to stop’ |
| | * <u>ú</u> kú-misa | (TL) | |
| | * <u>ú</u> kú-!wisa | (H) | ‘to drop’ |
| | <u>ú</u> kú-wisa | (TL) | |
| | <u>ú</u> kú-!nyisa | (H) | ‘defecate’ |
| | <u>ú</u> kú-nyisa | (TL) | |

In (33)b. the expected TL tone pattern results in a verb which sounds odd. The H tone pattern is the one which is definitely acceptable and yet before suffixation it was not. The H tone pattern is the one consistent with the PB one. In (33)c. the tones surface as expected and in the H tone variant the underlying tone surfaces on penultimate syllable. The tone patterns in (33a.), (33b.) and (33c.) are maintained in (33a), (33b.) and (33f),

respectively, where a different suffix, causative **-is-**, is used. However, not all examples in (33a) are given in (33d.) as some sound odd with causative **-is-**. In (33f) variation in the first two verbs is blocked by the fact that **misa** ‘stop’ and **wisa** ‘drop’ are lexicalized forms.

It appears, the confusion in (33) arises because verbs whose stems have **-C-** roots probably have two variants underlyingly, H and TL tone stems, although this variation does not seem to go all the way to PB. People probably use one variant more than the other such that the less frequently used one eventually sounds odd. It is also possible that all verbs with **-C-** roots were at some stage treated as H tone underlyingly. Rycroft (1983:93) notes that older people pronounce the final syllable of TL verbs such as **úkupha** ‘to give’ with a H tone. In fact younger people also have a final H tone on such verbs but only in cases of emphasis. This seems to suggest that an underlying H tone is sometimes lost because rules of the language now require all words to end with a L tone mora. A H tone in a **-CV** stem leads to confusion as it can be treated as being in an initial or final syllable.

The H and toneless patterns in (33) are identical to those we saw in (14) as the stem in each case now has two syllables just like **CVC-a** ones. When the stem becomes two or more syllables long as a result of suffixation all patterns we saw in our discussion of verbs with **CVC-** roots can also be seen in cases involving **-C-** roots. We will only look at two sets of examples to illustrate this. In (34) reciprocal **-an-** is suffixed in addition to applicative **-el-**.

(34) High tone and toneless verbs with **-CV-el-an-a** stems

a. **úkú-!lwélána** (H) ‘to fight for each other’

- úkú-!lwélana (TL)
- b. úkú-!phélana (TL) 'to give for each other'
 úkú-!phélána (H)
- c. úkú-!mélána (H) 'to stop/wait for each other'
 úkú-!mélana (TL)

As seen in H tone variants, Local Tone Spread applies so that H tone spreads up to the penult. In toneless variants prefixal H tone spreads up to the antepenultimate syllable as expected since only Metrical Tone Spread applies.

(35) provides the last set of examples in this subsection. In these examples the stem is made even longer by suffixing causative *-is-* as well.

(35) High tone and toneless verbs with CV-is-el-an-a stems

- a. úkú-!lwísélana (TL/H) 'to make fight for each other'
 b. úkú-!phísélana (H/TL) 'to make give for each other'
 c. úkú-!mísélana (H/TL) 'to make stop for each other'

As was the case in verbs with CVC- roots (and, indeed, in longer ones with CVCVC- roots), when the stem gets to four syllables or more tone contrast is lost because Local Tone Spread can not spread the H tone beyond the second syllable of the stem and Metrical Tone Spread always spreads H tone to the antepenult.

Although verbs with *-C-* roots seem to display some irregularities before suffixation or when they have one suffix, it has been show in this section that rules noted above also apply to them. When suffixes are added to verbs with *-C-* roots the tone patterns are those we saw earlier in our discussion of verbs with longer CVC- and CVCVC- roots.

6.1.4 Vowel Initial Stems

Not much needs to be said about vowel initial stems as the tone patterns do not differ much from those we have seen above. If the verb has a -VC- root the tone pattern after prefixing infinitive **úku-** is that of CVC- roots but minus the second syllable **-ku-**. The number of syllables is reduced because the second [u] of the infinitive prefix glides or is dropped before a vowel so that **-kw-** or **-k-** serves as an onset to the initial syllable of the root. The contrast between H and TL verbs with -VC- roots can be seen in (36).

(36) High and Toneless verbs with -VC-a stems

- | | | | | |
|----|-----------------|------|------------|----------------------------|
| a. | <u>ú</u> kwákha | (H) | ‘to build’ | (PB. -jak- ‘build’) |
| | <u>ú</u> kwakha | (TL) | | |
| b. | <u>ú</u> kósa | (H) | ‘to roast’ | (PB. -joki- ‘roast; burn’) |
| | <u>ú</u> kosa | (TL) | | |

In the first examples in (36a.) and (36b.) the penult has high tone because the stems now have underlying H tone variants although their PB equivalents only had L tone. In the second examples where the stems are underlyingly TL the penult surfaces with L tone because H tone from the prefix cannot spread as it is already on the antepenultimate syllable.

When a TL suffix such as applicative **-el-** is added to each of the forms in (36) we get the tone patterns in (37). While H tone patterns are acceptable in (37a.), they are disallowed in (37b.). A TL pattern is unacceptable in (37a.) but is the only acceptable pattern in (37b.).

(37) High and Toneless verbs with -VC-el-a stems

- a. úkwá-lkhéla or úkw-akhéla (H) 'to build for'
*úkwákhela (TL)
- b. *úkó-!séla or *úk-oséla (H) 'to roast for'
úkósela (TL)

It is not clear why there is no more variation after suffixation as H and TL patterns could still be realized without any neutralization for each of the verbs. Note that the initial vowel in a vowel initial root is sometimes treated as extrametrical for some phonological processes. If extrametrical then it cannot be associated with an underlying H tone as it is treated as part of the prefix. When it is part of the stem Local Tone Spread and Leftbranch delinking apply. Leftbranch delinking occurs due to tone stability. When the second [u] of the prefix glides its tone is preserved on the stem-initial vowel. Thus when H tone spreads, the stem gets three branches rather than two thereby creating an environment for Leftbranch Delinking to apply.

If we add one or two more syllable to the acceptable forms in (37) by suffixing, for example, reciprocal **-an-** or both causative **-is-** and reciprocal **-an-** as in (38) we get a tone pattern common to both H and TL verbs but with also some variation. The common pattern is the one where High tone spreads up to the antepenult and is then followed by leftbranch delinking. While in (38a.) we get this pattern only when the stem initial vowel is not extrametrical, in (38b.), (38c.) and (38d.) it does not matter whether or not the initial vowel of the stem is extrametrical. The neutralization of the tonal contrast in these cases could be predicted from earlier facts about the interaction of the tone rules.

(38) High and TL verbs with -VC-el-an-a stems

- a. úkw-akhélana or úkwa-khelána (H) 'to build for each other'
úkwá-!khélána
- b. úk-osélana / úko-sélana (TL) 'to roast for each other'
úkó-!sélana
- c. úkw-akhiséšana / úkwa-khisélana¹² (H) 'to cause to build for each other'
úkwá-!khiséšana
- d. úk-osisélana / úk-osisélana (TL) 'to cause to roast for each other'
úkó-!sisélana

In the first example in (38a.) and the second variant in (38c) both Local Tone Spread and Metrical Tone Spread ensure that H tone spreads only up to the antepenult while Local Tone Spread is responsible for the H tone that surfaces on the penult in the second variant in (38a). In the first two examples in (38b.) and (38d.), and the first variant in (38c.) it is Metrical Tone Spread which spreads H tone up to the antepenultimate syllable as the stem now has four or five syllables. Local Spread alone would not get the H tone to the antepenult in the first example in (38c.) where it applies. Note that in the TL verbs in (38b.) and (38d.) extrametricality is made redundant by the fact that H tone only comes from the prefix. In the first two examples in (38a-d.) there is leftbranch de-linking because the stem has at least three H tone branches, in some cases the prefixal vowel contributing one of the branches when it glides. When the stem-initial vowel is extrametrical in (38) we also get patterns identical to those we saw in verbs with consonantal-initial stems above where there is also a downstep. These need no further comment as the facts are already known. Although it can be argued that there are two

¹² There is also an irregular pattern úkwakhiselána/ úkwakhiselána 'to cause to build for each other' where H tone surfaces on the penult and which is acceptable only with this verb. If a different verb root or different suffixes are used then the pattern can only be the one in (38c).

underlying structures for each of the vowel initial verbs, the variation can also be taken as evidence that H tone is underlyingly unassociated, its association depending on the prosodic parsing of the stem just explained.

Verbs with longer -VCVC- roots behave like those exemplified in (37) where the second -VC- of the stem is a suffix. This is the same pattern we saw in verbs with CVCVC- roots except that the **ku** syllable of the prefix is missing if we treat -kw- as having been incorporated into the root since it serves as an onset to the initial syllable of the root. In the first variant in (39a.), H tone spreads up to the penultimate syllable due to the Local Tone Spread rule. Leftbranch delinking also applies as in similar examples in (37). In the second variant where the initial vowel of the stem is considered to be extrametrical Local Tone Spread does not apply as the penultimate syllable is associated with H tone. High tone only spreads from the first to the second syllable when Metrical Tone Spread applies.

(39) High and Toneless verbs with -VCVC-a stems

- | | | | |
|----|---|-------------|------------|
| a. | <u>ú</u> kw- <u>eph</u> úla or <u>ú</u> kwé-!ph <u>ú</u> la
* <u>ú</u> kwéphula | (H)
(TL) | ‘to break’ |
| b. | <u>ú</u> kw-élusa / <u>ú</u> kwé-lusa
* <u>ú</u> kwé-!lúsa or * <u>ú</u> kw- <u>el</u> úsa | (TL)
(H) | ‘to herd’ |

In the TL verb in (39b.) where H tone only comes from the prefix, H tone spreads up to the antepenultimate syllable since only Metrical Tone Spread applies. Whether or not the initial vowel of the stem is extrametrical is irrelevant in such TL verbs since no syllable in the stem is a H tone sponsor.

As expected, when one or more suffixes are attached to the verbs in (39) but ignoring the second variant in (39a.) the H-TL tonal contrast is neutralized because the stems now have four or more syllables. As examples in (40) illustrate, H tone spreads to the antepenultimate syllable in all cases except for the second and third variants in (40a.). Leftbranch de-linking follows where it applies. In the second and third variants in (40a.) where the stem initial vowel is extrametrical Local Tone Spread gets the H tone to the penult as expected.

(40) High and Low tone verbs with -VCVC-a stems

- a. úkw-ephúlela / úkwe-phúléla (H) 'to break for'
úkwé-!phúléla
- b. úkw-elúsela / úkwé-!lúsela (TL) 'to herd for'
- c. úkwephulélana / úkwe-phulélana (H) 'to break for each other'
úkwé-!phulélana
- d. úkwelusélana / úkwé-!lusélana (TL) 'to herd for each other'

Facts about variation in tone realization in (40) are in fact the same as in (38). Applicative -**el-** is suffixed to all verbs in (40) and reciprocal -**an-** has also been added to those in (40c.) and (40d.).

Another predictable pattern is that taken by verbs with even longer -VCVCVC- roots. Since the verb stems have four syllables both H and TL verbs should have the same tone pattern whereby H tone spreads up to the antepenult. This would have been confirmed in (41) but unfortunately no H tone verbs with -VCVCVC- roots (and with no depressor) were found in the database used. Note that the examples in (41) actually have 'frozen' suffixes which behave as if they are part of the root, a point already mentioned above.

(41) Toneless verbs with -VCVCVC-a stems

<u>ú</u> kwébóleka	(TL)	‘to borrow’
<u>ú</u> kwéthékela	(TL)	‘to visit’

No suffixed forms need be provided here as it is already clear from earlier examples that H tone will spread to the antepenultimate syllable in all cases.

Finally we need to confirm that LeftBranch De-linking not restricted to the stem also holds in cases involving vowel initial stems. Examples are provided in (42) where the H tone class 7 object prefix –sǐ- is preceded by two TL prefixes, plural second person subject prefix li- and Present Continuous Tense -ya-.

(42) Left Branch Delinking in verbs with vowel initial stems.

- | | | |
|-----------------------------|------|---------------------------|
| a. li-ya-s- <u>á</u> kha | (H) | ‘you are building it’ |
| b. li-ya-s- <u>ó</u> sa | (TL) | ‘you are roasting it’ |
| c. li-ya-s- <u>e</u> phúla | (H) | ‘you are breaking it’ |
| d. li-ya-s- <u>é</u> lusa | (TL) | ‘you herding/watching it’ |
| e. li-ya-s- <u>e</u> bóleka | (TL) | ‘you are borrowing it’ |

In all these examples in (42) we see that Left Branch Delinking applies and that the object marker loses its vowel but not before its H tone is transferred to the stem through Local Tone Spread. While it is not obvious whether the H tone in the verb stem in (42a.) is coming from the stem itself or from the object marker, in the TL verbs (42b.), (42d.) and (42e.) it is clear that it originates from the object marker. In (42c.) the penultimate H comes from the stem itself as a result of Local Tone Spread. In (42e.) H tone gets to the antepenult as a result of Metrical Tone Spread. After seeing these other examples, it becomes clear that in (42a.) both the H tone from object and that from the stem itself end up on the penult. Local Tone Spread allows the H tone of the object marker to get to the

initial syllable of the stem but the same rule cannot permit the stem H tone on the same syllable to spread to the right as the final syllable is extrametrical.

This sub-section has shown that Local Tone Spread, Metrical Tone Spread and Left Branch De-linking all apply to cases involving vowel initial roots. There must, however, be slight adjustments which take into account that vowel initial stems reduce the number of possible syllables by one in each verb since the prefix vowel immediately preceding the stem glides or is dropped. Whether the initial vowel of the stem is extrametrical or not is also important especially in H tone verbs since how the tones finally surface may be determined by the way the stem is parsed into syllables. Assuming that suffixation is cyclic, it is clear that the tone rules discussed so far, though lexical, are post cyclic as they are sensitive to the number of syllables the verb has after all the affixation has been done.

6.2 Depressor consonants

So far we have only seen that a syllable in Ndebele verbs can surface with either low or high tone but may be toneless or H tone underlyingly. However, the pattern discussed above sometimes appears somewhat distorted due to the presence of depressor consonants which may give rise to falling or rising tone. Patterns that emerge when depressors are present are, nonetheless, fairly regular and can still be described in terms of high and low tone.

Depressors in Ndebele and other Nguni languages (SiSwati, Xhosa and Zulu) have a tone lowering effect on the following vowel. The lowering of F_0 is far much greater for H tones than for L tones.(see, for example, Traill, Khumalo and Fridjhon: 1987). Although

a L tone goes lower than normal in the environment of a depressor it is not necessary to treat Ndebele as having an extra-low tone as this seems to be only phonetic and not phonological. While it is a general accepted linguistic fact that voiced obstruents lower pitch¹³ what is unusual about Nguni depressors is that, besides voiced obstruents, the class also includes sonorant consonants which are normally not expected to lower pitch.

There are many different views on the phonetics of depressors and most of these are discussed and rejected by Traill, Khumalo and Fridjhon (1987) in their work on Zulu depressors. Perhaps the most persuasive view comes from Rycroft (1980) who claims that breathy voice is an important feature in depression. The consonants in question actually sound as if they are breathy voiced when produced. However, results from experiments carried out by Traill, Khumalo and Fridjhon show that breathy voice is not the primary characteristic of a depressor as some depressors are in fact not breathy voiced. Also, some non-depressors are breathy voiced, further complicating the issue. From their studies Traill, Khumalo and Fridjhon (1987: 269-270) conclude that depression involves 'a distinctive laryngeal gesture'. They state that the 'pitch lowering feature requires extreme relaxation of the vocal cords' and 'at the same time, vocal chords are fairly closely adducted in a position typical for voiceless unaspirated stops'. More recently, Downing and Gick (2001 BLS Manuscript) in their paper on voiceless depressors in Nambya and Botswana Kalanga suggest that longer duration of frication noise may also distinguish depressors from their non-depressor equivalents.

Synchronically, Ndebele depressors include consonants in (43) which, with the exception of the velar nasal normally written as **ng** like the pre-nasalized stop, are written

¹³ See for example, Ohala (1973), Hyman (1977), Hombert (1978), Hombert, Ohala, and Ewan (1979), and others.

in standard orthography so that they can be easily identifiable in examples that will be discussed below. Consonants in ((43a.) are non-clicks and those in (43b.) are clicks.

(43) Depressor consonants

a. Non-clicks.

	Bilabial	Labiodental	Alveolar	(Pre-)Palatal	Velar	Glottal
Voiced Stop	bh		d		g	
Vd Pre-Nzd	mb		nd		ng	
Nasal	m		n	ny	Ng	
Fricative	b	v	z		k	h
Lat.			dl			
Approximant	w			y		
Lat. Approx.			l			
Affricate				j		
Pre-Nzd				nj		

b. Clicks

	Dental	Post-Alveolar	Alveolar Lateral
Voiced	gc	gq	gx
Voiced Nasalized	ngc	ngq	ngx

All these consonants can also be labialized except labials. As is now almost standard when describing Nguni depressors, I mark depressors with a subscript dieresis sign, for example, **ṇ**, rather plain **n** following Rycroft (1980, 1983). Note that sonorants and three fricatives, **b**, **k** and **h**, are depressors only in cases where they are marked as such, otherwise they are not¹⁴.

¹⁴ Although I have not been able to get a source which clearly describes the historical origins of depressor sonorants in Ndebele and other Nguni languages, a few Ndebele examples below suggest that the three approximants **w**, **ḷ**, and **y** come from forms that had a voiced stop followed by a long vowel in PB. Note that **ḷēth-a** ‘bring, fetch’ is irregular in that **ḷ** is a depressor only in the imperative.

Having made a few remarks about depressors, let us now turn to Ndebele examples similar to those we saw in the previous section but now with depressors in different positions. The letter D will be used to represent a depressor consonant. In (44) verbs with -CVC- roots are presented again but now the examples are those in which the initial consonant of the root is a depressor.

(44) High and TL verbs with -DVC-a stems

- a. úkú-zǎla (H) 'to give birth' cf. úkú-!kháma 'to choke'
(PB -bǎad- / -guad- / -jǎbad-)
- b. úkú-bǎala (TL) 'to write' cf. úkú-pheka 'to cook'

While TL verbs the pattern remains the same as the one we saw for verbs with CVC-a stems in (14) (provided again for comparison in (44)), H tone verbs display a new pattern as they now have a rising tone. In H tone verbs the depressor lowers the tone of the following vowel and its H tone is 'pushed' to the right. Since the penult is a long vowel the rising tone can be represented as a LH sequence realized on the two V slots. I assume that the L tone comes from the depressor itself¹⁵, otherwise it would be difficult to explain its existence, or else one would be forced to say the verb's tone feature is

Depressor approximants

- | | | | | |
|----|--------------|---------------------|--------------------|---|
| a. | ǀěth-a | 'bring, fetch' | (PB -déet-/-déét-) | |
| b. | ǁ- (< ø-/ú-) | 's/he Class 1 SM' | (PB a-) | [e.g. ǁ-ǎ-bon-a 's/he saw'] |
| | ǁ- (< ú-) | 'it sg. Class 3 SM' | (PB gu-) | [e.g. ǁ-ǎ-elaph-a > w-ělaph-a 'it treated'] |
| | ǃ- (< í-) | 'it pl. Class 4 SM' | (PB gi-) | [e.g. ǃ-ǎ-w-a 'it fell'] |
| | ǂ- (< í-) | 'it Class 9 SM' | (PB gi-) | [e.g. ǂ-ǎ-zal-a 'it gave birth'] |

The observation by Downing and Gick that longer duration of frication noise may distinguish depressors from their non-depressor equivalents seems to be supported by this as compensatory lengthening after 'loss' of the vowel through gliding seems to go to the consonant. Where coalescence occurs we may also assume that the preceding depressor consonant makes up for the lost length as Ndebele generally does not permit long vowels, penultimate lengthening coming very late in the derivational process. For nasal depressors vowel length does not seem to have been the conditioning factor.

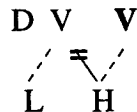
¹⁵ See also Hyman and Mathangwane 1998.

underlyingly LH which does not seem to be desirable given that the presence of a L tone is predictable from the presence of the depressor. The depressor rule that applies in (44) can be presented as in (45). Note that depressor rules are post lexical as they apply after the default L tone rule. The depressor's tone is also a floating L as it does not block H spreading as will be seen below.

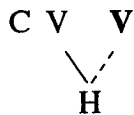
(45)a. Depressor rule in verbs with -DVC-V stems (surfacing as DVVC-a): Rising tone.



b. Depressor rule followed by vowel lengthening



c. Vowel lengthening followed by H tone spreading when there is no depressor.



The rule in (45a) shows that the depressor's floating L tone associates with the following long vowel which already has H tone. The left branch of the H tone delinks and the penult surfaces with rising tone. The rule assumes that the vowel in the penult is already long. However, it might as well be the case that penultimate vowel lengthening occurs when the L tone from the depressor associates with the vowel following that depressor. If this is the case then (45b.) where H tone spreads to the following new V (in bold) applies. In cases where there is no depressor H tone spreads to the new V as in (45b) but there is no accompanying leftbranch delinking as illustrated in (45c.). At this point it is not clear whether the rule that applies is (45a) or (45b.) since vowel length has not been an issue as

each syllable surfaces with either H or L tone, none surfacing with a LH rising tone or a HL falling tone.

It should perhaps be more interesting to see what happens when productive suffixes are added or when longer verbs with -DVCVC- roots are used including -DVC- roots with frozen suffixes which are treated like -DVCVC- roots in this sub-section. We saw earlier that a distinction between CVC-VC stem whose suffixes are non-productive and -CVCVCV- ones is unnecessary as tone rules apply to them in the same way. In (46a-b.) we have the same -DVC-a stems as in (47) but with an added applicative suffix -el-. Stems in the examples in (48c-d.) are -DVCVC-a. Note that if the depressor's L tone were pre-linked it would block H spreading to the antepenult in toneless verbs.

(46) High and TL verbs with -DVC-VC-a and -DVCVC-a stems

- a. úkú-zaléla (H) 'to give birth for' cf úkú-!khámísa 'to cause to choke'
- b. úkú-b_haléla (TL) 'to write to/for' cf. úkú-!phékisa 'to make cook'
- c. úkú-galúla (H) 'to drown'
- d. úkú-ḍĩŋka (TL) 'to fall dawn (of building)'

High tone examples in (46) do not show clearly what is happening as the penultimate H tone is merely the result of applying the Local Tone Spread rule. Toneless examples, however, show clearly that if there is room H tone on a syllable with a depressor shifts rightwards to the next syllable. In TL examples H tone from the prefix is expected to spread only up to the antepenult but in (46) we see that it spreads up to the first half of the long vowel in the penultimate syllable. In other words the penultimate syllable now has falling tone rather than the expected L tone. A depressor rule which shifts H tone to the right must apply after Metrical Tone Spread, otherwise H Tone would not spread to the

penult. In fact Metrical Tone Spread feeds the depressor rule. Given that Local tone spread applies before Metrical Tone Spread it follows that in the H tone verbs in (46) the depressor rule applies after Local Tone Spread has applied. This, in a way, confirms that depressor rules are post lexical and also helps explain the absence of a rising tone on the first syllable of the stem in H tone verbs in (46). The high tone shifts to the next syllable on the right as in TL verbs but the same syllable happens to have H tone already due to Local Tone Spread. Examples in (46) in fact show that if there is room no rising tone is realized on the first syllable of the stem but high tone shifts rightwards to the next syllable which has no depressor. From these examples, it is clear that H tone in (44) could not be realized on the second syllable of the stem because the final syllable always surfaces with L tone.

Since the depressor rules in (45a-b.) do not apply to both H and toneless verbs in (46) we now need new rules to capture what we have just seen. These are provided in (47) where rules in (i) apply if we assume that the penult is already long and those in (ii) when depression is accompanied by vowel lengthening.

(47) a. Depressor rule in H tone verbs with -DVC-VC-a and DVCVC-a stems (surfacing as DVCVVCa): High tone on penult.



b. Depressor rule in TL verbs with -DVC-VC-a and DVCVC-a stems (surfacing as DVCVVCa): Falling tone on penult.



The rules in (47a.) shows that the depressor's floating L associates with the following V while the H tone already associated with that V spreads to the next V of the following H tone syllable (the penult) before de-linking. Spreading and de-linking occurs in the same manner in (47b.) but this time the syllable following the one with a depressor (the penult) has L tone. When H tone spreads to the penult, the penult gets a falling tone unlike in (47a.) where the penult still surfaces with H tone.

In (46) one might be tempted to conclude that the depressor rule shifts all branches of a H tone in H tone verbs to the right while in L tone verbs it shifts only one branch. However, longer examples in (48) seem to suggest that the falling tone in L tone verbs in (46) is there to preserve contrast between L and H tone verbs or that the depressor rule counts moras unlike the other rules which count syllables. What is really happening should be clear as we consider more examples. Examples in (48) are the same as those in (46) except that the causative suffix /-is-/ has been added to each example.

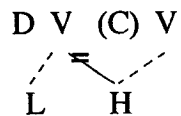
(48) High and toneless verbs with -DVC-VC-a and -DVCDVC-a stems

- a. úkú-zalísela (H) 'to cause to give birth for' cf. úkú-!khámísela 'to cause to choke for'
- b. úkú-bhālísela (TL) 'to cause to write to/for' cf. úkú-!phékísela 'to make cook for'
- c. úkú-galúlisa (H) 'to cause to drown'
- d. úkú-ḍilíkisa (TL) 'to cause to fall down (of building)'

As seen in (48), H tone surfaces on the antepenult in both H and TL examples. If both branches of a H tone shifted rightwards then we would expect a falling tone on the penult in both H and TL verbs. Depressor effect is therefore only local. As already pointed out, a

depressor shifts a H tone to the next syllable to the right but if it cannot rising tone surfaces within the same syllable. The rules in (47) still apply here except that the syllable following the one with a depressor is now short as it is not the penult. In fact the rules in (47) and (45b) can now be collapsed to the more general one in (49) if we assume that H tone always spreads one V to the right before leftbranch delinking.

(49) Depressor Rule.



The rule requires that a depressor's floating L tone associates with the following vowel whose H tone spreads to the next V to the right and then the left branch delinks. The next V to the right can be within the same syllable as the first if the depressor is part of the penult or it can be in the next syllable. If it is in the following syllable and that syllable happens to be the penult only the first V of the long vowel will be affected by the spreading H tone. In the rule the bracketed (C) represents zero or more non-depressor consonants. Note that in long vowels the second V retains the original tone of the syllable in cases where H tone spreads to the first V and hence there is no need to included the second V in the general rule. In cases where H spreads from the first to the second V within the same syllable the spreading is not obvious as the second V will also be H tone already. Thus in (45) this was presented as delinking of the left H tone branch of an already double linked H tone or spreading the H tone to a new V introduced as a result of penultimate lengthening.

If another syllable is added to verbs such as those exemplified in (48) only one branch of a multiply linked high tone survives within the stem. Examples are given in (50).

(50) High and toneless verbs with -DVC-VC-VC-VC-a and -DVCVC-VC-VC-a stems

- | | | | |
|----|--------------------------------------|------|---|
| b. | <u>ú</u> kú-g <u>al</u> ulísana | (H) | ‘to make each other drown’ |
| | cf. <u>ú</u> kú-k <u>h</u> amiséłana | | ‘to cause to choke for each other’ |
| a. | <u>ú</u> kú-b <u>h</u> aliséłana | (TL) | ‘to cause to write to/for for each other’ |
| | cf. <u>ú</u> kú-p <u>h</u> ekiséłana | | ‘to make cook for each other’ |

The branch that survives is the one which links the H to the antepenult as in verbs without depressors. Left branch de-linking here only applies within the stem as the prefix is H tone. The depressor has no effect on the tone pattern as it is on a syllable that is already L tone. In other words the depressor is part of a syllable where there is no H tone to spread to the next V.

We now need to see what happens if a depressor is in the second syllable of the stem. As expected, verbs with -CVD- roots take the H and TL patterns of verbs with -CVC- roots. This we see in (51).

(51) High and toneless verbs with -CVD-a stems

- | | | | | |
|----|-----------------------------|------|--------------|-------------|
| a. | <u>ú</u> kú-th <u>é</u> nga | (H) | ‘to buy’ | (PB -teng-) |
| b. | <u>ú</u> kú-ch <u>a</u> za | (TL) | ‘to explain’ | |

A depressor in the final syllable of the verb has no effect on the tone pattern since the final syllable always surfaces with L tone. However, if a suffix such as causative -is- is added a new pattern emerges in verbs with H tone. This is the pattern we get even with verbs whose roots are -CVDVC-. Examples are given in (52) where stems in (52a-b.) are -CVD-VC-a and those in (52c-d.) are CVDVC-a.

(52) High and toneless verbs with -CVD-VC-a and -CVDVC-a stems

- a. úkú-thengisa (H) 'to sell (to cause to buy) cf. úkú-!khámisa 'to cause to choke'
- b. úkú-!cháziisa (TL) 'to make explain' cf. úkú-!phékisa 'to make cook'
- c. úkú-khwezela (H) 'to stoke the fire'
- d. úkú-!húdula (TL) 'to drag along'
(PB -kud(ud)-)

While TL verbs surface with the expected tone pattern (we saw on CVC-VC-a and CVCVC-a stems) as the H tone from the prefix does not spread up to the penultimate syllable which has a depressor, H tone verbs now surface with a rising tone on the second stem syllable (the penult). The depressor changes the HH tone pattern on the long penultimate syllable to LH as in (44). Again, here we see the depressor shifting the H tone to the right within the same syllable which already has H tone as the final syllable always surfaces with L tone. High tone verbs also show left branch de-linking occurring only within the stem. The L tone brought by the depressor causes this. The de-linking cannot go all the way to the prefix because the prefix has an underlying H tone. At first glance the H tone examples in (52) seem to support that vowel lengthening accompanies depression as the stem can now be viewed as having the required three H tone branches for Leftbranch De-linking to apply. However, a comparison with a verb whose stem has no depressor such as úkú-!khámisa 'to cause to choke' shows that this is not the case as its penult is also long, giving the stem three H tone branches, but with no de-linking of the left branch. It is clear that H tone from the penult counts as one branch and penultimate lengthening comes much earlier in the derivation, perhaps before tone rules

apply. In (44) and (52) the correct rule then should be (45a.) where both Vs of a long vowel are present when the depressor rule applies rather than (45b.) where vowel lengthening occurs in order to accommodate the H tone shifted to the right. Since the de-linking in question only occurs within the domain of the stem and after application of the depressor rule it seems necessary to have a second left branch de-linking rule which applies only within the stem and which is post-lexical. However, recall that there is a floating stem initial L tone that causes downstep in verbs whose stems have no depressors. It is this L tone which associates with the stem initial syllable and spreads rightwards as in 6.1 when the multiple linked H tone is broken up by the L tone from the depressor.

When applicative **-el-** is suffixed to the verbs in (52) the H tone on the second syllable of the stem shifts to the right in both H and toneless verbs because of the extra syllable created. This is illustrated in (53).

(53) High and TL verbs with -CVD-VC-a and -CVDVC-a stems

- a. úkú-thengisêla (H) 'to sell for/to (to cause to buy for)
cf. úkú-!khámísela 'to cause to choke for'
- b. úkú-chazisêla (TL) 'to make explain for'
cf. úkú-!phékísela 'to make cook for'
- d. úkú-khwezêla (H) 'to stoke the fire for'
- e. úkú-hudulêla (TL) 'to drag along for'

Only the first half of the long vowel in the penultimate syllable is affected so that the syllable surfaces with a Falling tone. These examples confirm that the depressor rule, unlike the other rules we have seen, counts moras. Otherwise the whole penultimate syllable would surface with H tone. Where high tone spreads to two moras, the spread is

due to another rule, for example, in H tone verbs in (46) it is a result of Local Tone Spread. Where there is only one mora the whole LH sequence is linked to the same mora. Again here left branch de-linking occurs within the stem due to the presence of a L tone from the depressor and the fact that the right-most branch is on the third syllable.

The points discussed above are further confirmed when the depressor is in the third syllable as in (54). In these examples all the roots are -CVCVD-. There are no productive -VD- suffixes which could be attached to -CVC- roots to create CVC-VD- stems.

(54) High and TL verbs with -CVCVD-a stems

- | | | | | |
|----|------|------------------|------|---------------------------------|
| a. | (i) | úkú-khátáza | (H) | ‘to trouble’ |
| | (ii) | úkú-kháphaza | (TL) | ‘to splash’ |
| b. | (i) | úkú-khátázela | (H) | ‘to trouble for’ |
| | (ii) | úkú-khápházela | (TL) | ‘to splash for/onto’ |
| c. | (i) | úkú-khathazelâna | (H) | ‘to trouble for each other’ |
| | (ii) | úkú-khaphazelâna | (TL) | ‘to splash for/onto each other’ |

In (54a.) the depressor has no effect on the regular tone pattern because it is in the final syllable of the verb. The applicative suffix -el- is added in (54b.) and the H-TL tonal contrast is neutralized as the verb stem is now four syllables long and the depressor is in the penult. In (54c.) reciprocal -an- is also suffixed and this puts the depressor in the metrically prominent antepenultimate syllable. The expected H tone on the antepenultimate syllable is shifted to the penult which surfaces with a falling tone. The two stem syllables preceding the depressor are then realized with L tone coming from the stem initial position.

Before we reconsider the depressor rules we saw above it is important to see what happens in cases where there is more than one depressor in the root or stem. In (55) the root has two depressors.

(55) High and Low tone verbs with -DVD-a stems

- | | |
|---|-----------------------------------|
| a. <u>ú</u> kúgǔga (H) 'to wear out / to age'
?(PB -kong-) | cf. <u>ú</u> kú-!kháma 'to choke' |
| b. <u>ú</u> kú-ndǐza (TL) 'to fly' | cf. <u>ú</u> kú-pheka 'to cook' |

As can be seen, TL verbs with -DVD- roots have the tone pattern we saw in TL verbs with -CVC- and -DVC- roots. High tone verbs with -DVD- roots take the pattern of H tone verbs whose roots are -DVC- examples of which we saw in (44). The depressor in the first syllable of the stem cannot shift the H tone to the next syllable because it is the final L tone one. Thus, the stem H tone shifts to the right within the same syllable so that the initial syllable of the stem surfaces with a rising tone.

If a suffix such as causative -is- is added to the verbs in (55) we get the TL and H tone patterns in (56a-b.). These are in fact the same patterns we get in verbs with -DVDVC- roots such as those in (56c-d.). In H tone verbs the penult has rising tone because the depressor cannot shift the H tone resulting from local spreading to the final syllable which must always surface with L tone. Stem left branch de-linking occurs as in the examples we have already seen above.

(56) High and Toneless Verbs With -DVD-VC-a and -DVDVCV-a Stems

- | | |
|---|--|
| a. <u>ú</u> kú-gugǐsa (H) 'to cause to age' | cf. <u>ú</u> kú-!khámisa 'to cause to choke' |
| b. <u>ú</u> kú-ndǐzisa (L) 'to make fly' | cf. <u>ú</u> kú-!phékisa 'to make cook' |
| c. <u>ú</u> kú-gagǎsa (H) 'to stammer' | |
| d. <u>ú</u> kú-bhǎḍala (L) 'to pay' | |

While H tone examples in (56), like those we saw earlier, show that local tone spreading applies even if there is a depressor, TL examples in (56) illustrate that the depressor rule which shifts H tone to the next syllable does not apply if that following syllable also has a depressor. The shift is only within the same syllable and hence we get a rising tone. The depressor rule for such cases is given in (57).

(57) Depressor rule when a H tone is between two depressors.



As can be seen, when the depressor's L tones associates with the following H tone vowel that vowel ends up linked to both the L and H tone. As expected shifting of the H tone to the next syllable is possible if a suffix such as applicative *-el-* is added to the verbs in (56) as a new syllable is created. This we see in (58) where the penult has a falling tone.

(58) High and Toneless Verbs With -DVD-VC-a and -DVDVCV-a Stems

- | | | | |
|----|-----------------------|------|---|
| a. | <u>ú</u> kú-gugisêla | (H) | 'to wear out for / to cause to age for' |
| b. | <u>ú</u> kú-ndizisêla | (TL) | 'to make fly for' |
| c. | <u>ú</u> kú-gagasêla | (H) | 'to stammer for' |
| d. | <u>ú</u> kú-bhàḍalêla | (TL) | 'to pay for' |

The stem left branch de-linking rule also applies to both (56) and (58) as before.

Other possibilities still to be considered are when the verb roots are -CVDVD-, -DVCVD- and -DVDVD-. All these are illustrated in (59) with no suffixes as they present no new information.

a. High and Toneless verbs with -CVDVD-a stems.

(i) úkú-khumbǔḷza (H) 'to remind'

(ii) úkú-thánḍaḷza (TL) 'to pray'

b. High and Toneless verbs with DVCVD-a stems.

(i) úkú-mbulḷza (H) 'to act in a deceptive manner'

(ii) úkú-ḍiḷza (L) 'to demolish'

c. High and Toneless verbs with DVDVD-a stems.

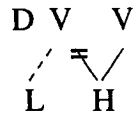
(i) úkú-guḍǔḷza (H) 'to grope about'

(ii) úkú-yōḍlḷza (L) 'to smash'

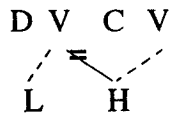
It is not easy to formulate a single depressor rule which captures all the facts mentioned above without obscuring detail. Rycroft (1983:131) has a single transformational rule but it does not seem to apply to all the cases discussed in this chapter. Three variants of the depressor rule we have discussed are present together in (60).

(60) Depressor Rule.

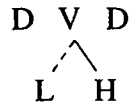
a. Rising tone.



b. Low Tone followed by High or Falling tone.



c. Rising Tone.



The choice as to which variant of the rule applies depends on the syllables involved. If the depressor is part of penultimate syllable which already has H tone (50a.) applies. The depressor's L tone associates with the first V of the long penultimate syllable forcing the left branch of the doubly linked H tone to de-link. The variant in (50b.) applies when the syllable with a depressor is not penultimate or final. The rule treats H tone shifting to the right as spreading followed by left branch de-linking. The syllable following the one with a depressor can be short or long. If short, it surfaces with H tone as a result of the spreading and if long, it surfaces with either high or falling tone. The long penultimate vowel surfaces with H tone if it already had H tone and, with falling tone if it already had L tone before the spreading of H tone from the preceding syllable. Should there be a H tone between two depressor consonants, then (50c.) applies. When the first depressor's L tone gets associated with the vowel, the vowel's H tone does not spread to the right as it

is blocked by the presence of the following depressor which also has its own L tone (though not included in (50c.)). The vowel thus surfaces with a LH rising tone. Note that it does not matter whether the final syllable has a depressor or not, it always surfaces with a L tone.

Before we leave verbs with consonant initial roots we need to see if our generalizations about depressors also hold if the depressor is part of an object prefix. Examples in (61) show that the depressor rule applies to the macro stem just as it applies to the inflectional stem.

(61) Depressor is part of an Object Prefix

- a. úkú-zì-kháma (H) 'to choke them'
- b. úkú-zì-phéka (TL) 'to cook them'
- c. úkú-zì-khaméla (H) 'to choke for them'
- d. úkú-zì-phékela (TL) 'to cook for them'
- e. úkú-zì-khamélana (H) 'to choke them for each other'
- f. úkú-zì-phekélana (TL) 'to cook them for each other'

If an object marker is a depressor its H tone is shifted one syllable to the right. Left branch de-linking also applies within the stem.

The depressor rule applies to verbs with vowel initial roots just as it does to those with consonant initial roots we have seen. It is important, however, to remember that in the infinitive vowel initial roots do not have the **-ku-** syllable of the prefix as [u] glides so that **-kw-** becomes an onset to the first syllable of the stem. Examples of short verbs with **-VD-** roots are given in (62).

(62) High and Toneless verbs with **-VD-**a stems.

- a. úkwénda (H) 'to marry' cf.
- b. úkwázi (L) 'to know' (PB -jji)

In (62) we see that the depressor has no effect on the regular tone pattern as it is in the final syllable of the verb. Examples with longer roots in (63), however, show some inconsistencies in the treatment of the initial vowel of the root. Note that there are no H and TL verbs with -VCVD-, -VCVDVC-, -VCVDVD-, -VDVDVC-, and -VDVDVD- roots.

(63) Longer vowel-initial stems

- a. High and Toneless verbs with -VDVC-a stems
 - (i) úkwédjǔla (H) 'to pass' (PB -dut-)
 - (ii) úkwéngula (TL) 'to remove scum' (PB -jeng-)
- b. High and Toneless verbs with -VDVD-a stems
 - (i) úkwéngéza (TL) 'to add on to' (PB -jong-id-)
 - (ii) No H tone verb found.
- c. High and Toneless verbs with -VDVCVCV stems
 - (i) úkwéjayéla (H) 'to get accustomed to'
 - (ii) úkongamêla (TL) 'to preside over'
- d. High and Toneless verbs with -VCVCVD-a stems
 - (i) úkwámúkeza (TL) 'to hand (something) to' (PB -jamuk-)
 - (ii) No H tone verb found.
- e. High and Toneless verbs with VDVCVD-a stems
 - (i) úkwéjayéza (H) 'to make get accustomed to'
 - (ii) No TL verb found.

While the shifting of H tone to the right is not different from what we saw above, left branch de-linking varies between H and TL stems. High tone stems treat the initial vowel of the root as part of the prefix while TL examples treat it as part of the stem. Thus in TL verbs the H tone on the initial vowel of the root de-links ((63c.)ii)) while it survives in H tone verbs ((63a.)i)), ((63c.)i)), ((63e.)i)).

The depressor rule also applies to verbs with sub-minimal -D- roots. As we saw with -C- roots, most sub-minimal roots cannot easily be categorized as H or TL tone as they show a lot of variation. Sometimes PB tones are even ignored as in the verb úkú-za ‘to come’ ((64a.)(i)) where the preferred form is H tone whereas the PB root had L tone. In (64a.), with the exception of úku-dlǎ, we see regular H and TL patterns we have already seen above because the depressor is in the final syllable of the verb. The verb úku-dlǎ is the form used in emphasis and which would otherwise surface with a H tone at the end if there was no depressor. The depressor has therefore ‘pushed’ it to the right as expected except that this is a final syllable.

(64) High and Toneless verbs with -D-a and -D-VC-a stems

- a. (i) úkú-za (H) ‘to come’ (PB -jǐ-)
 *úku-za (TL)
 (ii) úku-dlǎ (TL) ‘to eat’ (PB -dí)
 úku-dlǎ (H)
 *úkú-dlǎ
- b. (i) úkú-zǎla (H) ‘to come for’
 úku-zela (TL)
 (ii) úkú-dlǎla (H) ‘to eat for’
 úku-dlela (TL)

In (64b.) where the applicative suffix has been added to the stem the tone patterns we get are the ones we expect from application of the depressor rule. Note that the H tone verb úkú-za ‘to come’ which had no variant in (64a.)(i) now has a TL variant, the expected form from the PB root. For verbs with -D- roots the examples in (64) should suffice as it is clear that adding more suffixes will just yield patterns we have already seen.

This section clearly shows that depressor rules in Ndebele apply after the normal lexical rules have applied and have the effect of changing the general pattern though in a

predictable way. They appear to be post lexical especially if we assume that they apply after the Default L Tone Rule. We noted also that depressor rules count moras and yet lexical tone rules are sensitive to the number of syllables in the word.

6.3 Morphological Marking

While depressors may modify the regular tone patterns in a predictable way, morphological marking may completely ignore the patterns or rules we have seen above. Even the presence of a depressor plays no role in most of such cases. There are many cases where we get no tonal contrast but H or L tone on some syllables marks a tense or mood of that verb. The present tense illustrated in (65) is a good example. This is a tense in which the verb must always be followed by a complement or adjunct such as a noun or adverb.

(65) Present Tense

TONELESS		HIGH TONE	
ba- <u>l</u> ím-a	‘they are cultivating ...’	ba-thú <u>m</u> -a	‘they are sending ...’
ba-lim-é <u>l</u> -a		ba-thum-é <u>l</u> -a	
ba-lim-el-á <u>n</u> -a		ba-thum-el-á <u>n</u> -a	
ba-lim-is-el-á <u>n</u> -a		ba-thum-is-el-á <u>n</u> -a	
ba-yi- <u>l</u> ím-a	‘they cultivate it...’	ba-yi-thú <u>m</u> -a	‘they sent it...’
ba-yi-lim-é <u>l</u> -a		ba-yi-thum-é <u>l</u> -a	
ba-yi-lim-el-á <u>n</u> -a		ba-yi-thum-el-á <u>n</u> -a	
ba-yi-lim-is-el-á <u>n</u> -a		ba-yi-thum-is-el-á <u>n</u> -a	
ba- <u>z</u> i- <u>l</u> ím-a	‘they cultivate them...’	ba- <u>z</u> i-thú <u>m</u> -a	‘they cultivate them...’
ba- <u>z</u> i-lim-é <u>l</u> -a		ba- <u>z</u> i-thum-é <u>l</u> -a	
ba- <u>z</u> i-lim-el-á <u>n</u> -a		ba- <u>z</u> i-thum-el-á <u>n</u> -a	
ba- <u>z</u> i-lim-is-el-á <u>n</u> -a		ba- <u>z</u> i-thum-is-el-á <u>n</u> -a	

As can be seen from the TL and H tone paradigms, the present tense (conjunctive) is marked by H tone on the penultimate syllable whether the verb is underlyingly H or TL. The affixes used in (65) are the class 2 subject prefix /bá-/ , class 9 object prefix /-yí-/ , class 8/10 object prefix /-zǐ-/ , applicative suffix /-el-/ , reciprocal suffix /-an-/ and causative suffix /-is-/ . Their tones are also ignored.

Another example is the immediate past tense ((66)) which requires the verb to end with vowel [e] and a H tone on the final syllable whether its tone is underlyingly H or TL. All other H tones are suppressed. A verb in this tense also requires an adjunct or complement. Since the language generally does not permit high tone on the final syllable of the word some adjustment has to be made.

(66) Immediate Past tense

TONELESS		HIGH TONE	
si-limê	‘we cultivated ...’	si-thumê	‘we sent ...’
si-lim-elê		si-thum-elê	
si-lim-el-anê		si-thum-el-anê	
si-lim-is-el-anê		si-thum-is-el-anê	
si-yi-limê	‘we cultivated it...’	si-yi-thumê	‘we sent it...’
si-yi-lim-elê		si-yi-thum-elê	
si-yi-lim-el-anê		si-yi-thum-el-anê	
si-yi-lim-is-el-anê		si-yi-thum-is-el-anê	
si-zǐ-limê	‘we cultivated them...’	si-zǐ-thumê	‘we sent them...’
si-zǐ-lim-elê		si-zǐ-thum-elê	
si-zǐ-lim-el-anê		si-zǐ-thum-el-anê	
si-zǐ-lim-is-el-anê		si-zǐ-thum-is-el-anê	

As seen in (66), the final syllable surfaces with a falling tone rather than a H tone. Normally it is the penultimate syllable whose vowel is long but in this tense it is the final one. The shift of one V slot from the penult to the final syllable ensures that the verb does not end with a H tone but with a falling one. I assume here that the V slot shifts before H

tone gets associated with the final vowel [e]. The affixes used in (66) are the same as in (65) except that the subject prefix is now first person plural /si-/ rather than /bá-/.

The remote past tense which is marked by [á] also suppresses other H tones. The paradigms in (67) illustrate that H tone only from the remote past tense morpheme surfaces on the verb whether it is underlyingly TL or H tone.

(67) Remote Past Tense

TONELESS		HIGH TONE	
s-á-lim-a	‘we cultivated’	s-á-thum-a	‘we sent’
s-á-lim-el-a		s-á-thum-el-a	
s-á-lim-el-an-a		s-á-thum-el-an-a	
s-á-lim-is-el-an-a		s-á-thum-is-el-an-a	
s-á-yi-lim-a	‘we cultivated it’	s-á-yi-thum-a	‘we sent it’
s-á-yi-lim-el-a		s-á-yi-thum-el-a	
s-á-yi-lim-el-an-a		s-á-yi-thum-el-an-a	
s-á-yi-lim-is-el-an-a		s-á-yi-thum-is-el-an-a	
s-á-zi-lim-a	‘we cultivated them’	s-á-zi-thum-a	‘we sent them’
s-á-zi-lim-el-a		s-á-zi-thum-el-a	
s-á-zi-lim-el-an-a		s-á-zi-thum-el-an-a	
s-á-zi-lim-is-el-an-a		s-á-zi-thum-is-el-an-a	

The other affixes are still the ones used in (66) but the vowel of the subject prefix /si-/ is dropped to avoid an unacceptable VV sequence.

The last set of examples to be considered in the positive in this subsection is that of the exclusive in the perfective. The exclusive is marked by /sé-/ and the perfective by /-ile/. The exclusive affix must be followed by a subject prefix. The object prefix which always precedes the stem (if present) may or may not be included. Examples in (68) illustrate that when the exclusive is used in the perfective all syllables in the stem or macro-stem must be L tone.

(68) Exclusive (Perfective)

TONELESS	HIGH TONE
sé-sí-lim-ile ‘we have cultivated’	sé-sí-thum-ile ‘we have sent’
sé-sí-lim-el-e	sé-sí-thum-el-e
sé-sí-lim-el-en-e	sé-sí-thum-el-en-e
sé-sí-lim-is-el-en-e	sé-sí-thum-is-el-en-e
sé-sí-yi-lim-ile	sé-sí-yi-thum-ile
sé-sí-yi-lim-el-e	sé-sí-yi-thum-el-e
sé-sí-yi-lim-el-en-e	sé-sí-yi-thum-el-en-e
sé-sí-yi-lim-is-el-en-e	sé-sí-yi-thum-is-el-en-e
sé-sí-zi-lim-ile	sé-sí-zi-thum-ile
sé-sí-zi-lim-el-e	sé-sí-zi-thum-el-e
sé-sí-zi-lim-el-en-e	sé-sí-zi-thum-el-en-e
sé-sí-zi-lim-is-el-en-e	sé-sí-zi-thum-is-el-en-e

Besides exclusive /sé-/ and perfective /-ile/, affixes used in (68) are the ones already seen in other examples above.

Morphological marking is not limited only to positive forms. Even negative forms of verbs may ignore the regular tone pattern. For instance, the negative forms of the exclusive (perfective) just seen in (68) are marked by high tone on the second syllable which is in fact the subject marker. Examples are given in (69)

(69) Exclusive (Perfective) “we have not yet VERB-ed”

TONELESS	HIGH TONE
ka-sí-ka-lim-i	kasi-sí-thum-i
ka-síkalim-el-i	ka-sí-ka-thum-el-i
ka-síkalim-el-an-i	ka-sí-ka-thum-el-an-i
ka-sí-ka-lim-is-el-an-i	ka-sí-ka-thum-is-el-an-i
ka-sí-ka-yi-lim-i	ka-sí-ka-yi-thum-i
ka-sí-ka-yi-lim-el-i	ka-sí-ka-yi-thum-el-i
ka-sí-ka-yi-lim-el-an-i	ka-sí-ka-yi-thum-el-an-i
ka-sí-ka-yi-lim-is-el-an-i	ka-sí-ka-yi-thum-is-el-an-i
ka-sí-ka-zi-lim-i	ka-sí-ka-zi-thum-i
ka-sí-ka-zi-lim-el-i	ka-sí-ka-zi-thum-el-i

ka-sil-ka-z^ai-lim-el-an-i
 ka-sil-ka-z^ai-lim-is-el-an-i

ka-sil-ka-z^ai-thum-el-an-i
 ka-sil-ka-z^ai-thum-is-el-an-i

Note that if the subject marker is a depressor then the second syllable is realized with rising tone rather than H tone, for example, **ka-z^ai#-ka-limi** ‘they have not yet cultivated’.

The Immediate and Remote Past Tenses have identical negative forms. As illustrated in (70), these too do not follow the regular tone pattern as H tones are suppressed.

(70) Negative Immediate and Remote Past Tense

TONELESS

“k’a-si-lim-ang^a-a ‘we did not cultivate’
 “k’a-si-lim-el-ang^a-a
 “k’a-si-lim-el-an-ang^a-a
 “k’a-si-lim-is-el-an-ang^a-a

“k’a-si-yi-lim-ang^a-a
 “k’a-si-yi-lim-el-ang^a-a
 “k’a-si-yi-lim-el-an-ang^a-a
 “k’a-si-yi-lim-is-el-an-ang^a-a

“k’a-si-z^ai-lim-ang^a-a
 “k’a-si-z^ai-lim-el-ang^a-a
 “k’a-si-z^ai-lim-el-an-ang^a-a
 “k’a-si-z^ai-lim-is-el-an-ang^a-a

HIGH TONE

“k’a-si-thum-ang-a ‘we did not send’
 “k’a-si-thum-el-ang^a-a
 “k’a-si-thum-el-an-ang^a-a
 “k’a-si-thum-is-el-an-ang^a-a

“k’a-si-yi-thum-ang^a-a
 “k’a-si-yi-thum-el-ang^a-a
 “k’a-si-yi-thum-el-an-ang^a-a
 “k’a-si-yi-thum-is-el-an-ang^a-a

“k’a-si-z^ai-thum-ang^a-a
 “k’a-si-z^ai-thum-el-ang^a-a
 “k’a-si-z^ai-thum-el-an-ang^a-a
 “k’a-si-z^ai-thum-is-el-an-ang^a-a

The negative forms surface with L tone in all syllables whether a verb stem or affix is underlyingly TL or H tone. However, the penult may optionally surface with falling tone in both H and L tone verbs, for example, “**k’a-si-yi-lim-el-an-a\$ng^a-a** ‘we did not cultivate it for each other’.

6.4 Summary.

This chapter has shown that Tone contrast in Ndebele is essentially between High and Toneless. Low, Rising and falling tones are predictable from the interaction of H tones with different types of syllables and consonants. Various prefixes and suffixes can be added to a H or TL stem and this may result in different tone patterns depending on whether the affix is TL or H tone, the number of syllables a verb has and whether the consonants involved are depressors or non-depressors. The tone system of Ndebele can be described in terms of ordered rules but there are exceptions as some tenses are marked by specific tone patterns which cannot be derived by rule.

CHAPTER 7: REDUPLICATION

7.0 Introduction.

Having looked at some important aspects of the phonology and morphology of Ndebele in the preceding chapters, we now turn to reduplication whose discussion we postponed earlier on. In Ndebele verbal reduplication is used to express the idea that an action is done for a short while before it stops or is done from time to time, perhaps not very well, as examples in (1) in the next section will show. The domain for reduplication, as in many other Bantu languages, is the stem and the reduplicant (RED) is a prefix.

Most of the issues dealt with in this chapter concerning verbal reduplication in Ndebele except tone and variation in vowel initial roots are also discussed in Hyman, Inkelas and Sibanda (1999). The approach is however slightly different as no detailed OT analysis is pursued here. As in the foregoing chapters the approach will mainly be descriptive.

This chapter begins by looking at general properties of reduplication in 7.1 followed by a discussion on the nature of reduplication, addressing the question whether it is phonological or morphological, in 7.2. In 7.3 the focus is on reduplication of verbs with sub-minimal -C- roots while in 7.4 it is on reduplication of those with vowel initial roots. Other important cases of reduplication particularly those involving imbrication, passivization and tone are considered in 7.5, 7.6 and 7.7, respectively. The last section of the chapter, 7.8, is the summary.

In all examples of reduplicated verbs in this chapter the signs – and + mark the usual morpheme boundary and boundary between RED and base, respectively. The RED is in bold face. In order to keep different issues separate tone is not marked except in the tone section where it is discussed in detail.

7.1 General properties of reduplication

Verbs with different types of stems can be reduplicated and these will be considered in turn in this section and in the following ones. The verbs are classified in terms of the type of root constituting part of the I-stem. First to be considered are verbs with CVC- roots in 7.1.1 followed by verbs with consonant initial roots longer than CVC- in 7.1.2. Verbs with sub-minimal -C- roots and those with vowel initial roots are considered later in their own sections as they deserve special treatment. Sub-section 7.1.3 is a summary for this section.

7.1.1 Reduplication Of Verbs With CVC- Roots.

Since most verbs in Ndebele have CVC- roots just like in other Bantu languages it seems appropriate to see first how these reduplicate before considering verbs with other types of roots. In (1) reduplication is illustrated with verbs in the imperative mood which have no prefixes and only suffix default final vowel -a, making them bi-syllabic.

(1) Bi-syllabic verb stems ending in -a (CVC-a)

Verb	Gloss	Reduplicated form	Gloss
ding-a	'look for/search'	ding-a +ding-a	'look for/search for a short while'
phek-a	'cook'	phek-a +phek-a	'cook for a from time to time'

bal-a	'read/count'	bal-a+bal-a	'read/count for a short while'
goq-a	'fold'	goq-a+goq-a	'fold (roughly) for a short while'
vub-a	'mix'	vub-a+vub-a	'mix'(roughly) for a short while'

As can be seen, there is total reduplication as the RED is identical to the base. Both the root and default final vowel **-a** get into the RED.

Although default final vowel **-a** can be incorporated into the RED inflectional suffixes cannot be copied. This we see in (2) where the verb roots are identical to those in (1). Note that prefixes which do not play a role in reduplication are included and bracketed in (2) because the stems in such cases normally occur with prefixes. The class 2 SM **ba-** is used in all the examples and (2b.) also has negative **ka-**. Unacceptable forms are marked with an asterisk.

(2) Root + Inflectional morpheme ((a) subjunctive **-e** , (b) negative **-i**, (c) perfective **-ile**).

Verb	Gloss	Reduplicated form
a. (ba-)ding-e	'((may)they) look for/search'	(ba-)ding-a+ding-e *(ba-)ding-e+ding-e
(ba-)goq-e	'((may)they) fold'	(ba-)goq-a+goq-e *(ba-)goq-e+goq-e
b. (ka-ba-)ding-i	'(they do not) search'	(ka-ba-)ding-a+ding-i *(ka-ba-)ding-i+ding-i
(ka-ba-)goq-i	'(they do not) fold'	(ka-ba-)goq-a+goq-i *(ka-ba-)goq-i+goq-i
c. (ba-)ding-ile	'(they) looked for'	(ba-)ding-a+ding-ile ?(ba-)ding-i+ding-ile *(ba-)ding-ile+ding-ile
(ba-)goq-ile	'(they) folded'	(ba-)goq-a+goq-ile ?(ba-)goq-i+goq-ile *(ba-)goq-ile+goq-ile

Examples in (2a.) illustrate that subjunctive **-e** is excluded from the RED as CVC-e REDs are starred. When subjunctive **-e** is suffixed to the root in the base the RED takes default

final vowel **-a** in place of the **-e**. Similarly, (2b.) shows that negative **-i** does not get into the RED as CVC-i REDs are also marked with an asterisk. Default final vowel **-a** is used in the RED instead of **-i**. In (2c.) perfective **-ile-** or **-i-** from this suffix is also excluded from the RED¹. Its place is taken by default final vowel **-a** as in the subjunctive and negative. Downing (1997a.) observes that in SiSwati derivational morphemes can become part of the reduplicant but not inflectional morphemes. She suggests that the final vowel **-a** which appears to be an exception should be taken to be “the default Final Vowel morpheme”. According to Downing a RED which differs from the base can be acceptable if it resembles a canonical stem (CS), the canonical stem being Root + **a** (usually CVC-a). Indeed, examples above confirm some of Downing’s observations about SiSwati with which Ndebele is mutually intelligible.

The RED in each of the examples in (1) and (2) is bi-syllabic but the data is not enough for drawing a conclusion about the general restrictions on the size of the reduplicant. While examples in (2c.) may suggest that the RED must be a bi-syllabic foot one could also argue that not much suffixal material could get into the RED as **-ile** is inflectional and the default suffix used in its place is just a vowel. However, examples in (3) where the I-stems include productive derivational suffixes make it clear that the RED is exactly two syllables. The derivational suffixes in (3a.), (3b.), (3c.) and (3d.) are Causative **-is-**, Intensive **-isis-**, Applicative **-el-** and Stative **-ek-**, respectively.

¹ For some people the starred examples with CVC-i REDs in (2)c. are also acceptable. This should be expected as we noted that the **-il-** part of perfective **-ile** patterns with derivational morphemes for some morphophonological processes.

² In OT terms one could say in reduplication the constraint Max Root can be violated but only when the root is two or more syllables long, i.e. RED=σσ >> Max Root.

(3) CVC Root + Productive derivational morpheme +a

	Verb	Gloss	Reduplicated form
a.	ding-is-a	‘cause to search/look for’	(i) ding-a+ding-is-a (ii) ding-i+ding-is-a
	goq-is-a	‘make fold’	(i) goq-a+goq-is-a (ii) goq-i+goq-is-a
b.	ding-isis-a	‘search thoroughly’	(i) ding-a+ding-isis-a (ii) ding-i+ding-isis-a
	goq-isis-a	‘really fold’	(i) goq-a+goq-isis-a (ii) goq-i+goq-isis-a
c.	ding-el-a	‘look (for something) for’	(i) ding-a+ding-el-a (ii) ding-e+ding-el-a
	goq-el-a	‘fold for’	(i) goq-a+goq-el-a (ii) goq-e+goq-el-a
d.	ding-ek-a	‘be required’	(i) ding-a+ding-ek-a (ii) ding-e+ding-ek-a
	goq-ek-a	‘be possible to be folded’	(i) goq-a+goq-ek-a (ii) goq-e+goq-ek-a

These examples also confirm that material from derivational morphemes can get into the RED in Ndebele just as is the case in SiSwati. The vowel which is the initial segment of the suffix in (3a.) through (3d.) is just as good as default final vowel **-a** in the second vowel position of the RED. While **-a** creates a CS the vowel from the derivational suffix is good as a contiguous string is copied from the base, specifically from the Dstem. Thus both reduplicated forms (i) and (ii) in each of the cases from (3a.) to (3d.) are acceptable and have the same meaning. (See Downing 1996 for similar examples in SiSwati). If an inflectional suffix replaces **-a** material from it would not get into the RED as that suffix will be beyond the first two syllables that are copied from the base. Besides, inflectional material does not get into the RED as already pointed out.

It is also important to see how a verb reduplicates when the stem has more than one productive derivational suffix especially given that some suffix orders do not reflect their sequencing in the underlying structure. Let us consider first in (4), sequences that maintain the same order on the surface as in their underlying forms.

(4) Reduplication when there is more than one derivational suffix in the stem.

Verb	Gloss	Reduplicated form
a. bon-is-ek-a	'be possible to be shown'	(i) bon-a+bon-is-ek-a (ii) bon-i+bon-is-ek-a (iii) * bon-e+bon-is-ek-a
phek-is-ek-a	'be possible to be made to cook'	(i) phek-a+phek-is-ek-a (ii) phek-i+phek-is-ek-a (iii) * phek-e+phek-is-ek-a
b. bon-is-el-a	'show for'	(i) bon-a+bon-is-el-a (ii) bon-i+bon-is-el-a (iii) * bon-e+bon-is-el-a
phek-is-el-a	'cause to cook for'	(i) phek-a+phek-is-el-a (ii) phek-i+phek-is-el-a (iii) * phek-e+phek-is-el-a

In (4a.) and (4b.) where only default orders **-is-ek-** (CAUS-STAT) and **-is-el-** (CAUS-APP.) are acceptable contiguity (and CS if we follow Downing's approach) still play an important role. Besides the root, only default final vowel **-a** and **-i-** from the causative suffix **-is-** can make their way into the RED. The vowel **-e-** from stative **-ek-** or applicative **-el-** is disallowed in the RED as the copied material would then not form a contiguous sub-string of the base (or a CS).

Sequences which are interesting as their underlying forms do not surface are **-el-is-** (APP-CAUS), **-ek-el-** (STAT-APP), **-an-el-** (REC-APP), **-w-is-** (PASS-CAUS), **-w-el-** (PASS-APP) and **-w-isis-** (PASS-INT). However, as we saw in Chapter 3, **-el-is-** (APP-CAUS) and **-ek-el-** (STAT-APP) are not used in Ndebele as their meanings seem to be

identical or normally indistinguishable from that carried by the reversed orders **-is-el-** (CAUS-APP) and **-el-ek-** (APP-STAT). For **-an-el-** we noted that the order may be switched to **-el-an-** on the surface or there may be doubling of **-an-** so that the whole sequence surfaces as **-an-el-an-** (REC-APP-REC). The underlying sequence **-an-el-** would therefore still be available in reduplication due to the doubling of **-an-**. As seen in (5), the reduplicant surfaces with **-a** from **-an-** which is, however, indistinguishable from default final vowel **-a**.

(5) Reduplication when the order of derivational suffixes is **-an-el-**.

Verb	Gloss	Reduplicated form
a. bon-an-el-an-a	'see each other for/at'	(i) bon-a+bon-an-el-an-a (ii) ? bon-e+bon-an-el-an-a
b. ding-an-el-an-a	'look for each other for/at'	(i) ding-a+ding-an-el-an-a (ii) ? ding-e+ding-an-el-an-a

Forms with **-e** in the reduplicant seem possible because **-an-** still comes after **-el-** due to the doubling but sound odd as they violate contiguity. The other three sequences, **-w-is-**, **-w-el-** and **-w-isis**, which all involve the passive are the ones which are more interesting. They are, however, not discussed here but will be considered in section 7.6 where focus is on the passive.

7.1.2 Reduplication Of Verbs With Roots Longer than CVC- (Including Verbs With Non-Productive Suffixes).

For verbs whose roots are longer than CVC- the RED is always an exact copy of the first two syllables of the base. As seen in (6), even default final vowel **-a** cannot get into the RED as the root has enough material.

(6) Reduplication of verbs with CVCVC- or CVCVCVC- roots

Verb	Gloss	Reduplicated form
a. cabang-a	‘think’	caba-cabanga *cab-a+cabanga
cacad-a	‘shell nuts’	caca-cacada *cac-a+cacada
b. hlikihl-a	‘wipe’	hliki+hlikihl-a *hlik-a+hlikihl-a
gomonq-a	‘slope’	gomo+gomonq-a *gom-a+gomonq-a
c. bangul-a	‘extract thorn’	bangu+bangul-a *bang-a+bangul-a
phenduk-a	‘return’	phendu+phenduk-a *phend-a+phenduk-a
d. dlubulund-a	‘break free of control’	dlubu-dlubulunda *dluba-dlubulunda
bhilikic-a	‘touch/hold with dirty hands’	bhili-bhilikica *bhila-bhilikica
e. thukulul-a	‘untie’	thuku+thukulul-a *thuk-a+thukulul-a
tshombuluk-a	‘become unrolled’	tshombu+tshombuluk-a *tshomb-a+tshombuluk-a

While in (6a.) it might not be obvious which [a] gets into the reduplicant as the second syllable of the base has this same vowel, (6b.) through (6e.) make it clear that it is not the default final vowel -a. If the base has enough material final -a does not get into the reduplicant. In (6a.), (6b.) and (6c.) the roots are CVCVC- and in (6d.) and (6e.) they are CVCVCVC-. The final -VC- of the root in (6c.) and (6e.) is in fact a ‘frozen’ non-productive suffix, transitive reversive **-ul-/ulul-** or intransitive reversive **-uk-/uluk-** which, as we noted in Chapter 2, now functions as part of the root in morpho-phonological processes.

The examples in (6) also show that in reduplication the root can be truncated but only when it is two or more syllables long². In verbs with CVC- roots where the root was not truncated it was possible to include default final vowel **-a** in the RED because the roots were monosyllabic and therefore did not have enough material to be copied by the RED. When the root is longer than one syllable even material from derivational suffixes cannot get into the RED since the copied material must be a contiguous substring of the base. Examples are given in (7) where some of the verbs with CVCVC- or CVCVCVC- roots in (6) now have derivational suffixes in addition to default final vowel **-a**.

(7) Reduplication of verbs with CVCVC- or CVCVCVC- roots when derivational suffixes are also included.

Verb	Gloss	Reduplicated form
a. cabang-is-a	'make think'	caba -cabang-is-a
hlikihl-el-a	'wipe for'	hliki +hlikihl-el-a
b. bangul-is-an-a	'make each other extract thorn'	bangu +bangul-el-an-a
thukulul-el-an-a	'untie for each other'	thuku +thukulul-a

As can be seen, the RED is a copy of the first two syllables of the root.

7.1.3 Summary

This section has therefore established the following important facts about reduplication in Ndebele.

(8) Facts about reduplication in Ndebele.

- The RED is a copy of the first two syllables of the base.
- Copied material must be a contiguous sub-string of the base.
- No inflectional morpheme is allowed in the Red

- d. Material from a derivational morpheme and default final vowel **-a** can get into the RED but only if the root is CVC- (in fact less than two syllables long as will be seen in 7.3).

These facts clearly touch on both phonology and morphology making it difficult to define reduplication only in phonological or morphological terms. It seems important therefore at this point to be clear whether in reduplication we are dealing with a phonological or morphological phenomenon or both. This we address in the next section.

7.2 The Nature of Reduplication: Phonology or Morphology?

Reduplication has different meanings in different languages and as Katamba (1993:181-182) notes, in verbs it “often indicates continuation, frequency or repetition of an event or action”. As he farther observes, it usually has an augmentative meaning and “signals an increase in size, frequency or intensity.” However, it may also “have a diminutive effect, often with connotations of endearment ... or simply of attenuation...” As we noted at the beginning of the chapter reduplication in Ndebele has a diminutive effect since it means that an action or activity is done for a short time before it stops or is done from time to time, usually not very well. The augmentative meaning, particularly increase in intensity, is taken care of by the intensive suffix **-isis-**.

What reduplication means, however, has not been much of a concern to linguists but current debate has focuses mainly on what exactly is copied in reduplication. That some material is copied from the base by the reduplicant has also not been an issue but what material in particular may or may not be copied by the reduplicant from the base is what

has been the subject of debate. Total reduplication obviously poses minor problems if any at all but a number of questions arise when it comes to partial reduplication. Perhaps the most important are those that have to do with whether reduplication is a phonological or morphological process.

In characterizing the relationship between the reduplicant and the base earlier works treated reduplication mainly as a phonological process. The relationship was accounted for in terms of a CV-template following a model proposed by McCarthy (1981) for the analysis of Arabic. (See for example, Marantz 1982, Broselow 1983, Archangeli 1983, Broselow and McCarthy 1983). The reduplicant was treated as an underspecified morpheme not linked to any consonant or vowel but copying the melody of the base to get full phonological representation. (For a more detailed discussion of this issue see, for example, Katamba 1993:184). Accounting for reduplication in terms of the CV-template seemed appropriate especially considering that what the reduplicant copies from the base is not necessarily a constituent such as a syllable or foot. For instance in Maori and in Quileute plural-formation the reduplicant is the first CV of a word even if this results in splitting the syllable and leaving behind a stranded V or coda. Similarly, in Shilh only the first consonant is copied while the other part of the syllable is ignored. (For examples, see Katamba 1993, Krupa 1966 and Moravcsik 1978). In Ndebele we have seen that the reduplicant copies the first two syllables of the base so that it surfaces as CV.CV- (or V.CV- as will be seen later). Since the language has no codas and the onset of a CV syllable cannot be ignored, the two copied syllables are always constituents.

Approaches based on the theory of Prosodic Morphology proposed by McCarthy and Prince (1990) were later preferred to accounting for reduplication in terms of the CV-

template. (See for example, Steriade 1988, Mutaka and Hyman 1990). In Prosodic Morphology the CV-skeleton is by-passed and “a morphological melody maps directly on to a prosodic phonological template consisting of a genuine prosodic unit such as syllable, the foot, phonological word, etc”(Katamba 1993:192-193). If we focus on the RED rather than on the base from which the material is copied what supports the by-passing of the CV-skeleton is that in many instances the template supplied by a reduplicative process can be better defined in terms of units such as moras, syllables, feet and phonological words rather than C and V slots. Prosodic Morphology has been important for recognizing that morphology plays a role in reduplication.

Although the reduplicant has often been characterized in prosodic terms using units such as mora, syllable, foot and prosodic word more recent literature has shown an increasing awareness of the role of morphological structure in reduplication. For instance, the works of Downing (1997 et seq.), Hyman, Inkelas and Sibanda (1999), Urbanczyk (1996), McCarthy and Prince (1993, 1995) have all demonstrated that the shape of the reduplicant can be determined by purely morphological requirements in addition to prosodic constraints. In many Bantu languages where prosodic and other phonological requirements imposed on the RED may apply equally to all reduplicated verbs, mono-morphemic and poly-morphemic verb stems reduplicate differently. Also, derivational and inflectional suffixes are often treated differently in reduplicative processes just as we have seen with Ndebele examples in the above sections. The underlying morpho-syntactic order of suffixes is also important in determining the shape of the RED as will be seen in 7.6. To account for reduplication in Ndebele and other Bantu languages we must therefore consider both phonological and morphological

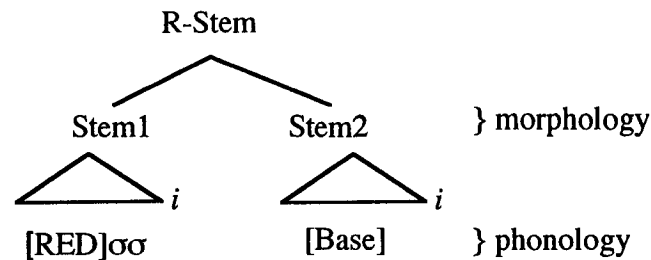
conditions that characterize the relationship between the base and the reduplicant.

The position taken in this study is that reduplication is a **morphological process**. Like many morphological processes, there will obviously be some interaction with phonology and hence some constraints on the RED will be phonological. As noted by Hyman, Inkelas and Sibanda (1999) “research on partial reduplication has mostly been conducted by phonologists who, most recently, emphasize surface base/reduplicant correspondence, and hence view morphology in terms of morphs rather than morphosyntactic structure”. Reduplication, it will be argued, is like compounding except that special phonological and morphological conditions are imposed on the RED. The base is compounded with itself but the part that forms the RED may then be reduced due to both morphological and phonological constraints. This obviously implies that partial reduplication is derived from total reduplication. A similar conclusion is drawn by Eulenberg (1971:73) who notes that “cases of so-called partial reduplication are simply phonological reductions, sometimes drastic, from cases of full reduplications”. The position taken here is, however, different in that reductions are not only phonological but morphological as well. Should there be no special morphological and/or phonological conditions imposed on the RED other than those defining the base then there will be total reduplication on the surface. We have already seen that in Ndebele total reduplication occurs when the stem is bi-syllabic and has no inflectional suffix. A neutral suffix such as default final vowel **-a** (or stabilizer **-yi-** as will be seen in verbs with sub-minimal roots) can, however, get into the RED. Bi-syllabicity and absence of inflectional material are in fact conditions which must be met by the RED. If the stem has inflectional material and/or is less or longer than two syllables there cannot be full copy but partial

reduplication occurs instead.

In reduplication, the RED is a stem prefixed to another stem with which it is in morphosyntactic featural agreement and appears to reduplicate as illustrated by the structure in (9) taken from Hyman, Inkelas and Sibanda (1999).

(9) Reduplication as juxtapositioning

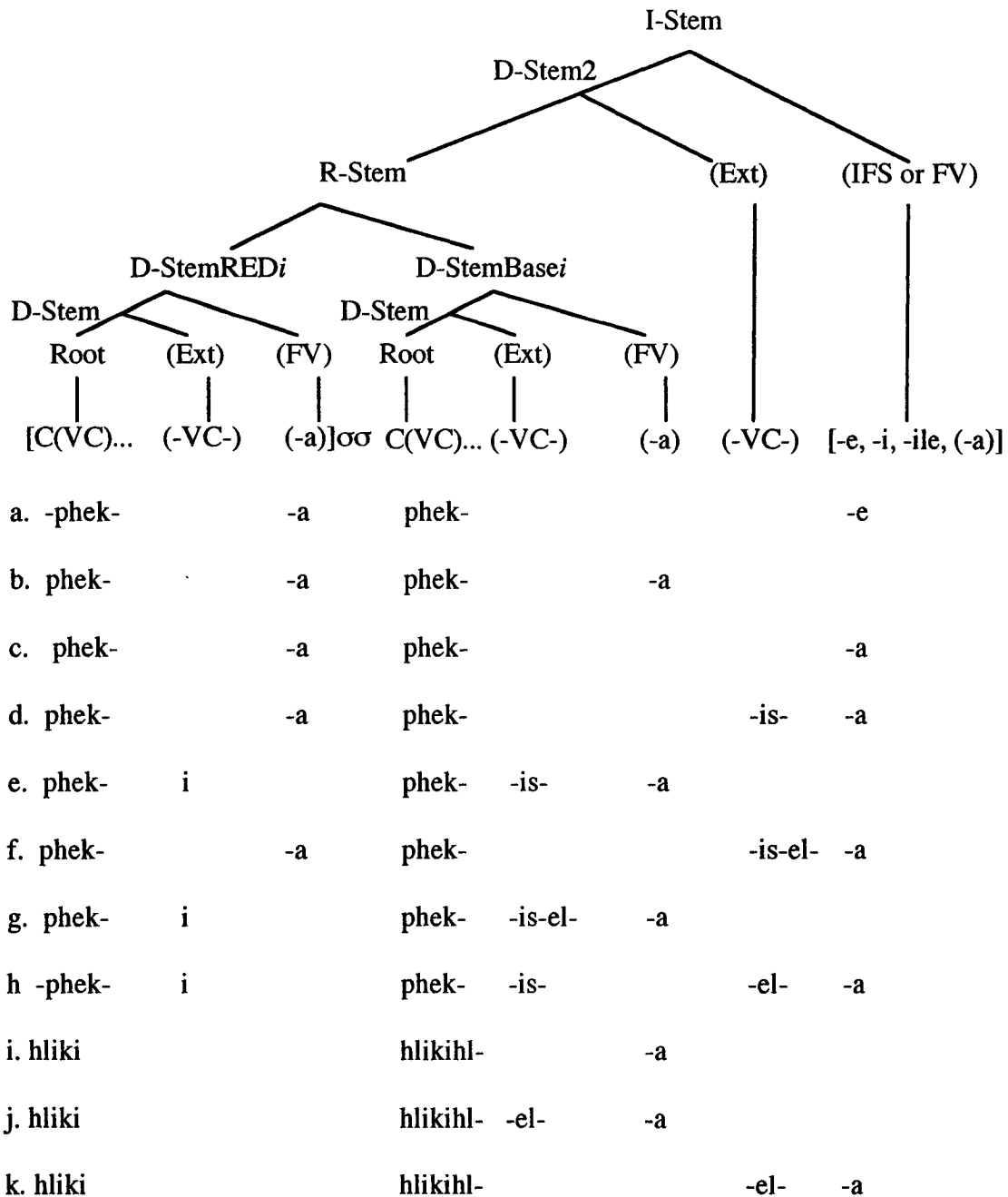


The structure shows reduplication as stem juxtaposition, Stem1 (RED) being in featural agreement with Stem2 (Base) as marked by subscript *i*. A bisyllabic size condition is, however, imposed on Stem1 but not Stem2.

The more articulated structure proposed for reduplication in Ndebele and which may be applied to other Bantu languages can also be given in the form of a tree diagram as in (10) where some examples used in section 7.1 are used for illustration. Note that the structure is a modified version of the one given in Hyman, Inkelas and Sibanda (1999) as it now has D-STEM2 previously not included. D-STEM2 takes into account the fact that suffixation can still occur after reduplication just as there can be reduplication after suffixation. Note that 'Ext' in the tree represents one or more branches with extensions but extensions need not be present all the time. This structure obviously redefines the base for reduplication. While it is generally accepted that the whole derivational stem is the base in many Bantu languages, here the base depends on the cycle on which reduplication occurs. As will be illustrated with examples below, with this structure one

can easily predict where there will be variation in the RED.

(10) Reduplicated Verb Stem.



As can be seen, two stems are juxtapositioned but D-StemREDi is restricted to two syllables, a condition not imposed on D-StemBasei from which it is copied. The two D-

stems form a reduplicated stem, R-Stem, which contains no inflectional material. Each of the two D-Stems is made up of at least a root but may include an extension or extensions. Default final vowel **-a** may also be brought in when necessary. In D-StemBase*i* **-a** is suffixed when no inflectional suffix is required so that the final syllable of the verb is not a closed one as we saw in Chapter 4. In D-StemRED*i* **-a** is brought in when there is no more root or extension material to copy from D-StemBase*i* in order to make the required two syllables. It may also be copied from D-StemBase*i* in cases of total reduplication. Note that the R-Stem can be dominated by another D-Stem if one or more derivational affix (extension) is suffixed after reduplication. The tree diagram thus takes care of cyclicity in the derivational process as already pointed out. Also, note that default final vowel **-a** can occur as the final vowel of the base, the RED or the whole verb stem because it is a neutral suffix, being neither inflectional nor derivational as we noted in earlier chapters.

In (10a.) we see that when the verb takes subjunctive or immediate past tense **-e** D-StemBase*i* does not take default final vowel **-a**. Since **-e** is inflectional it is not within the domain of reduplication and is not part of the base. As a result there is not enough material to copy and the RED has to surface with default final vowel **-a** for it to meet the bisyllabic size condition and also to avoid surfacing with an unacceptable coda since the root **phek-** ‘cook’ is CVC-. In (10b.) where no inflectional suffix is required the base has default final vowel **-a**. This **-a** comes with the base as it is suffixed at the time when the verb that forms the base is derived ensuring that the final syllable of the verb is not closed as we saw in Chapter 4. Morpheme boundaries are not erased and the RED has access to them. The RED also takes **-a** in order to achieve the bi-syllabicity and thus there is total

reduplication. Assuming only the root forms D-StemBase*i* then the FV -a will be under 'IFS or FV' branch in the tree. It will not be copied but the RED will still surface with an identical vowel as it is the only neutral vowel acceptable in the final V slot of the RED. Although underlyingly there is no total reduplication, on the surface there appear to be and thus (10c.) derives the same surface form as (10b.).

The variation we get when an extension is attached to a CVC- root is illustrated by (10d.) and (10e.). While (10d.) shows a causativised reduplicated stem, (10e.) is an illustration of a reduplicated causativised stem. As seen in (8d.), where causativization comes after reduplication, the causative suffix is not part of the D-StemBase*i* hence it is not available for copying. To achieve the required two syllables, the RED has to incorporate default final vowel -a. In (10e.) where causativization occurs before reduplication the causative suffix -is- is within D-StemBase*i* and is available for copying. For the RED to surface as CVCV- (phek-V) the -i- from -is- is copied. Examples (10f.) and (10g.) need no comment as they illustrate the same point as (10d.) and (10e.) except that there are now two suffixes instead of one. (10h.) shows what happens when one of the two suffixes is not part of D-StemBase*i*. As can be seen, the RED in (10h.) is identical to the one in (10g.) as the vowel from CAUS -is- is the only one allowed in the RED in both cases. The presence or absence of a second suffix in D-StemBase*i* is inconsequential as far as the shape of the RED is concerned.

Reduplication of verbs with roots longer than CVC- is illustrated in (10i.), (10j.) and (10k.) where it is clear that the presence or absence of an extension does not affect the shape of the RED as it is always the first two syllables of the root within the base that are copied. (10j.) and (10k.) further demonstrate that whether an extension is part of D-

StemBase*i* or not is immaterial as far as the shape of the RED is concerned. For both the reduplicated applicativized stem ((10j.)) and the applicativized reduplicated stem ((10k)) the RED is **hliki-**, the first two syllables of D-StemBase*i* in each case.

From this short discussion, it is clear that a theory of reduplication which ignores morphology is less insightful as it fails to capture a crucial aspect of this morpho-phonological process. If morphology is ignored then it becomes difficult to explain the variation in RED which has been shown here to be mainly due to cyclic effects. The next sections will provide more evidence for the role played by morphology in reduplication.

7.3 Reduplication Of Verbs With Sub-minimal Roots.

We saw in Chapter 2 that default final vowel **-a** can also be suffixed to verbs with **-C-**roots except in a few irregular cases. Although suffixing **-a** or any other **V** suffix creates an acceptable I-Stem, the stem cannot stand on its own at word level. In Chapter 4 it was shown that a verb has to be at least two syllables long at word level. The bi-syllabic prosodic requirement is met when the verb also incorporates at least a prefix or suffix. Of interest in this sub-section will be to see how such sub-minimal verbs reduplicate given that the root is always less than the two syllables required of a RED and that prefixes are not within the domain of reduplication.

7.3.1 Augmentative -yi in reduplicated verbs with sub-minimal roots.

Verbs in the imperative (singular affirmative) are the only ones which suffix default final vowel **-a** with no other accompanying affix if the root is CVC- or longer. We have already seen how such verbs reduplicate in 7.1 and 7.2. In (11) some affirmative

singular imperative verbs with sub-minimal -C- roots are presented together with their reduplicated forms.

(11) Reduplication of verbs with -C- roots in the affirmative singular imperative

	Stem	Gloss	Imperative	Reduplicated form
a.	-dl-a	'eat'	dl-an-a	dla-yi+dla *dl-an-a+dl-an-a, *dl-an-a+dla
b.	-ph-a	'give'	ph-an-a	pha-yi+pha *ph-an-a+ph-an-a, *ph-an-a+pha
c.	-m-a	'stand/wait'	m-an-a	ma-yi+ma *m-an-a+m-an-a, *m-an-a+ma
d.	-zw-a	'taste'	zw-an-a	zw-a-yi+zwa *zw-an-a+zw-an-a, *zw-an-a+zwa

As was noted in Chapter 4, verbs in the imperative that have sub-minimal -C- roots may take stabilizer **-an-** in addition to default final vowel **-a** due to a prosodic minimality condition requiring every word to be at least two syllables long. In (11) we see that when such imperative verbs are reduplicated a semantically empty morph **-yi** (a suffix) surfaces in the RED but not **-an-**. Stabilizer **-an-** cannot be part of the RED as it is probably treated as an inflectional imperative singular suffix when the singular imperative is in fact marked by a $\emptyset$ morpheme. It is also possible that stabilizer **-an-** is not used in reduplicated forms in order to avoid confusion with reciprocal **-an-**. As can be seen, the suffix **-yi** ensures that the RED is bi-syllabic as required and the stem remains monosyllabic as the bisyllabic size condition only applies to the RED and at word level. The morph **-yi** is only available if suffixing FV **-a** is not enough to meet the bi-syllabic minimality condition imposed on the RED.

Verbs with sub-minimal roots presented in (12) together with their reduplicated

forms also confirm that the bisyllabic minimality condition applies to the RED and prosodic word but not to the stem. The only prefix and suffix used in the unreduplicated verbs are infinitive **uku-** and default final vowel **-a**, respectively.

(12) Bisyllabic minimality condition applies to the RED, not to stem.

Verb	Gloss	Reduplicated form
uku-dl-a *uku-yi-dl-a	‘to eat’	uku-dl-a-yi+dl-a *uku-yi-dl-a+yi-dl-a
uku-ph-a *uku-yi-ph-a	‘to give’	uku-ph-a-yi+ph-a *uku-yi-pha+yi-ph-a
uku-m-a *uku-yi-m-a	‘to stand/wait’	uku-m-a-yi+m-a *uku-yi-m-a+yi-m-a
uku-zw-a uku-yi-zw-a	‘to taste’	uku-zw-a-yi+zw-a *uku-yi-zw-a+yi-zw-a

As can be seen, the infinitive prefix **uku-** is ruled out of the RED as in verbs with longer roots but the RED is still bisyllabic as it includes an augmentative syllable **-yi** not copied from the base. The augmentative or “stabilizer” **-yi** is brought in to ensure that the RED has the required two syllables as there is not enough material to copy from the base **-dl-** (a) which itself can be taken to be the root consonant **-dl-** or the monosyllabic stem **-dla**. In the unreduplicated verbs **-yi** augmentation cannot occur as the bi-syllabic minimal size condition which applies to the whole verb, including the prefix **uku-**, is already met.

We also need to see how verbs with consonantal roots reduplicate when extensions are added. In (13a-b.) verbs with only one extension are reduplicated and (13c-d.) each of the verbs that are reduplicated has two derivational suffixes.

(13) Reduplication of verbs with -C- roots when there are extensions.

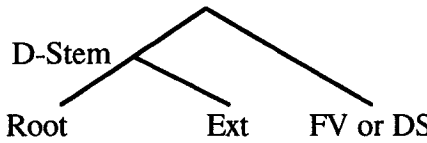
Verb	Gloss	Reduplicated form
a. uku-ph-el-a	'to give for'	uku-ph-el-a+ph-el-a uku-ph-a-yi+ph-el-a uku-ph-e-yi+ph-el-a
b. uku-zw-is-a	'to cause to taste '	uku-zw-is-a+zw-is-a uku-zw-a-yi+zw-is-a uku-zw-i-yi+zw-is-a
c. uku-ph-el-an-a	'to give for each other'	uku-ph-el-a+ph-el-an-a ? uku-ph-a-yi+ph-el-an-a ? uku-ph-e-yi+ph-el-an-a
d. uku-zw-is-el-a	'to make taste for'	uku-zw-is-e+zw-is-el-a uku-zw-is-a+zw-is-el-a ? uku-zw-a-yi+zw-is-el-a ? uku-zw-i-yi+zw-is-el-a

While there was only one possible outcome when each of the verbs with sub-minimal roots in (12) were reduplicated, (13a) and (13b.) show that adding an extension results in there being three possible reduplicated surface forms. The most acceptable reduplicated form is when the RED is identical to the base, that is, when both the extension and FV -a make their way into the RED. However, some people also use two forms that incorporate -yi into the RED. In one case both FV -a and -yi are brought in when the extension is not part of the base but is suffixed in the next cycle after reduplication in the derivational process. In another case, the least preferred one, only the vowel is copied from the extension before -yi augmentation. This seems to parallel what we saw in longer forms but in those cases the vowel from the extension was copied to the second V slot of the root, not the first. What makes this last alternative the worst is that part of the extension which would, otherwise, make its way to the RED is left out.

When the number of extensions increases as in (13c-d.) introducing **-yi** in the RED is dispreferred. In fact reduplicated forms in which there is stabilizer **-yi** sound very odd. There are nonetheless two definitely acceptable reduplicated forms. The RED can be a copy of the first two syllables of the base or a copy of the root consonant and the first extension from the base, the second V slot being taken by FV **-a** by default.

The RED in reduplicated verbs with sub-minimal **-C-** roots discussed so far has the structure in (14). Note that the default syllable (DS), stabilizer **-yi**, takes the same position as default FV **-a** in the tree structure.

(14) D-StemRED in reduplicated verbs with **-C-** roots.

D-StemRED				
				
	Root	Ext	FV or DS	[+D-StemBase]+ ...
a.	dl-		-a-yi	[+ dl-(a)]
b.	tsho-		-yi	[+ tsho]
c.	ph-	-el-	-a	[+ ph-el-(a)]
d.	zw-	-is-e-		[+ zw-is-el-(a)]
e.	zw-	-is-	-a	[+ zw-is-]-el-a

The selection of **-a** or **-yi** or both depends on the shape of the base. If the base is C-VC- or C-VC-a as in (14c.) and (14e.) only **-a** will make its way into the RED due to total reduplication or to the fact that only a V slot is available in the RED. Should the base be CV as in the irregular verb **tsho-** ‘say’ ((14b.)), then only **-yi** will get into the RED to take the remaining CV slots. When the base has no extension as in (14a.) both **-a** and **-yi**

surface in the RED. However, if the base is C-VC-VC- or longer as in (14d.) neither **-a** nor **-yi** can make its way into the RED as the RED will be a copy of the first CVCV- of the base. Note that in (14a), (14c.) and (14d.) the shape of the RED remains the same whether FV **-a** is taken to be part of the base or not.

It can be observed in this sub-section that when the RED takes default final vowel **-a** it does not necessarily form a canonical stem as Downing suggests. For instance **ph-a-yi** does not have the shape Root-a or CVC-a as defined by Downing for a CS. Steriade's (1997) suggestion that a RED must look like an independent word would also not be adequate as there are no existing words that look like **ph-a-yi** and **phe-yi**, for example.

7.3.2 Sub-Minimality and the Macro-Stem

In Chapter 4 it was noted that imperative verbs with **-C-** roots may optionally prefix a semantically empty morph **yi-** instead of suffixing stabilizer **-an-** to make the verb bi-syllabic at word level. In (15) we show how the verbs reduplicate when the imperative takes **yi-** rather than **-an-**.

(15) Reduplication of **yi-C-a** verbs.

	Stem	Gloss	Imperative	Reduplicated form
a.	-dl-a	'eat'	yi-dl-a	yi-dla+yidla
b.	-ph-a	'give'	ph-an-a ~ yi-ph-a	yi-pha+yi-pha
c.	-m-a	'stand/wait'	m-an-a ~ yi-m-a	yi-ma+yima
d.	-zw-a	'taste'	zw-an-a ~ yi-zw-a	yi-zw-a+yizwa

As can be seen, both the RED and the Base surfaces with **yi-**. Like the suffix **-yi**, the prefix **yi-** makes the RED bi-syllabic but its occurrence in the base is unexpected since a monosyllabic stem is acceptable. Also, this is the first time we have seen a prefix get

into the RED.

Similar behavior in reduplication can be observed when the stem contains perfective suffix **-ile** which is outside the domain of reduplication as it is normally taken to be inflectional. Consider reduplication of the stem **-zw-ile** ‘...tasted’ in (16).

(16) Reduplication when the stem is suffixed with perfective **-ile**.

- | | | | |
|----|------------------------|---------------|-------------------------------------|
| a. | (ba)-zw-ile | ‘they tasted’ | *(ba)-yi-zw-ile |
| b. | (ba)-zw-a-yi+zw-ile | | (-yi suffixed in RED) |
| c. | (ba)-yi-zw-a+yi-zw-ile | | (yi- prefixed in both RED and Base) |

In (16a.) we see that the unreduplicated base is not augmented with **yi-**. When reduplication occurs the RED may take suffix **-yi** as in (16b.) or the prefix **yi-** may again unexpectedly surface in both the RED and the Base as in (16c.).

The occurrence of the empty morph **yi-** in both the RED and the Base in (15) and (16c.) at first sight appears to be a case of total reduplication. However if we recall that examples in (11) and (12) in the previous subsection demonstrated that there is no bi-syllabic condition imposed on the stem it becomes apparent that this is in fact a case of **backcopying**. That is, the RED is prosodically augmented with a prefix **yi-** which is then copied by the base. This is unusual as the RED normally copies material from the base, not the other way round. A few such examples of backcopying are discussed by McCarthy & Prince (1985). (See also Kiparsky 1997 and Inkelas & Zoll 1999 for reanalysis of the data).

More evidence for backcopying is provided by reduplication of verbs whose bases are preceded by an object marker (OM) as in (17) where the OM's used in (17a.), (17b.) and (17c.) are from Class 11, Class 7 and Class 14, respectively.

(17) Reduplication of verbs with bases preceded by an object marker (OM)

Verb	Gloss	Reduplicated form
a. uku-lu-dl-a	'to eat it'	uku-lu- dl-a-yi +dl-a uku-lu- dl-a +lu-dl-a
b. uku-si-ph-a	'to give it'	uku-si- ph-a-yi +ph-a uku-si- ph-a +si-ph-a
c. uku-bu-zw-a	'to taste it'	uku-bu- zw-a-yi +zw-a uku-bu- zw-a -bu+zw-a

These examples show that a verb with a subminimal -C- root can incorporate the OM into the RED as an alternative to a pattern of reduplication we have already seen whereby -yi is suffixed to the RED. The OM, which occurs in the same position as prefix yi-, enables the RED to meet the bi-syllabic size condition imposed on it. Interestingly, when the RED takes an OM, a copy of that OM also surfaces in the base and yet the base could otherwise be realized as a monosyllabic stem.

While yi- is normally used when the verb takes no extension, the OM can be part of the RED even when the -C- root is followed by extensions, for example, APP -el- and CAUS -is-, as in (18a) and (18b). Note that backcopying still occurs. However, the OM never gets into the RED in verbs with CVC- or longer roots such as (18c.).

(18) Reduplication of verbs with OM when there are extensions

a.	uku-lu-zw-el-a	'to taste it for'	uku-lu- zw-el-a +zw-el-a (-OM in Red) uku-lu- zw-a-yi +zw-el-a uku-lu- zw-e-yi +zw-el-a
			uku-lu- zw-a +lu-zw-el-a (+OM in Red) uku-lu- zw-e +lu-zw-el-a
b.	uku-lu-zw-is-a	'to make it taste'	uku-lu- zw-is-a +zw-is-a (-OM in Red) uku-lu- zw-a-yi +zw-is-a uku-lu- zw-i-yi +zw-is-a

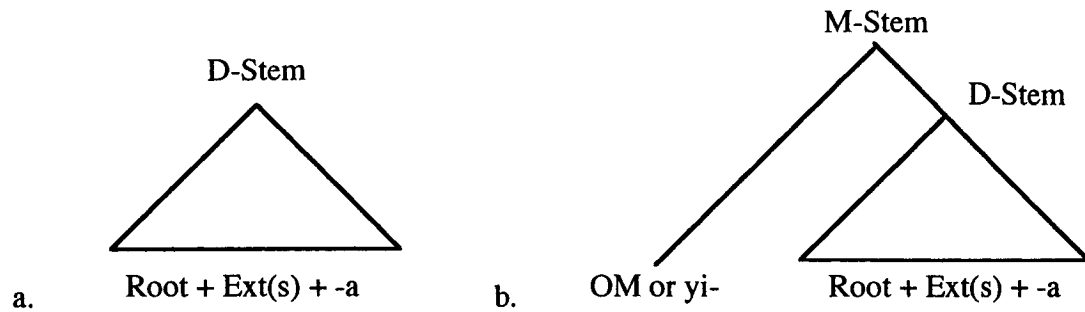
- | | | |
|----|----------------------------|-------------------------------------|
| | | uku-lu-zw-a+lu-zw-is-a (+OM in Red) |
| | | uku-lu-zw-i+lu-zw-is-a |
| c. | uku-lu-phek-a 'to cook it' | uku-lu-phek-a+phek-a (-OM in Red) |
| | | *uku-lu-phe+lu-phek-a |

As seen in (18a.) and (18b.) the only unavailable pattern of reduplication for verbs with -C- roots is the one that takes the prefixal **yi-**. In fact **yi-** is in complementary distribution with OM's as they take the same position in the verb and never co-occur within the same verb. A form such as the one in (19) where both **yi-** and the OM are present is disallowed.

- (19) *uku-lu-yi-zw-a+yi-zw-a '(intended:) to taste it from time to time'

It is clear that the OM is a privileged prefix which, unlike other prefixes, can get into the RED. Just as we saw with tone in the previous chapter, here we also see the importance of the Macro-stem (M-stem). Given that **yi-** and OM's take the same position in the verb and are in complementary distribution it seems reasonable to assume that **yi-** also belongs to the M-stem just like the OM's. Once we recognize the M-stem the problem of backcopying disappears. It becomes clear that the domain for reduplication in verbs with sub-minimal -C- roots can either be the D-Stem as in (20a) or the M-Stem as in (20b.). There is in fact no backcopying but variation of the base.

(20) Domain for reduplication in verbs with Sub-minimal -C- roots.



What is important is to make the RED bi-syllabic. If material copied from the base comes after the root then it must be derivational or neutral (-a) and if it is before the root then it must be an OM or neutral (yi-). Recall that extensions and FV-a may be present or absent in the D-stem.

It is also necessary to see if the syllable -si- prefixed to verbs with sub-minimal and vowel initial roots in the Indicative (exclusive), Conditional and Participial Moods when the root is preceded by a vowel prefix also behaves like -yi- in reduplication. Here are some examples in which the -si- in question is underlined.

(21) Syllable -si- in rduplication

- | | | |
|--------------------------------|-----------------------|--------------------------------|
| a. Indicative mood (Exclusive) | | |
| i-s-i- <u>si</u> -dl-a | 'it is now eating' | i-s-i- <u>si</u> -dl-a-yi+dl-a |
| i-s-i- <u>si</u> -ph-a | 'it is now giving' | i-s-i- <u>si</u> -ph-a-yi+ph-a |
| b. Conditional Mood | | |
| (nxa) i- <u>si</u> -dl-a | '(if) it is eating' | i- <u>si</u> -dl-a-yi+dl-a |
| (nxa) i- <u>si</u> -ph-a | '(if) it is giving' | i- <u>si</u> -ph-a-yi+ph-a |
| c. Participial Mood | | |
| (yafika) i- <u>si</u> -dl-a | '(it arrived) eating' | i- <u>si</u> -dl-a-yi+dl-a |
| (yafika) i- <u>si</u> -ph-a | '(it arrived) giving' | i- <u>si</u> -ph-a-yi+dl-a |

As can be seen in (21), **-si-** is not copied in all the three moods and **-yi** still surfaces in the RED. In fact **-si-** is treated like an inflectional prefix as it is prefixed to the RED and not to the base. Although this syllable appears semantically empty there must be an inflectional feature which restricts it to the three moods. However, the feature common only to the three moods is not an obvious one. On the other hand **-yi** is clearly semantically empty as it is not restricted to a particular mood (or tense, etc.) but is brought in when an extra syllable is required to meet a subminimality condition. It seems appropriate, therefore, to treat **-si-** as inflectional even if the meaning it introduces to the verb is unclear.

7.3.3 Summary

This section has shown that there is a lot of variation in the RED when verbs with sub-minimal **-C-** roots are reduplicated. The variation may be due to factors we have already seen in verbs with **CVC-** roots, specifically whether or not the base has extensions and **FV -a**. Also, augmentation with an extra syllable, empty morph **-yi**, may occur in order for the RED to achieve bi-syllabicity. Another way the RED may be varied is by bringing in a prefixes provided it is an OM or semantically ‘empty’ morph **yi-** both of which belong to the M-Stem, not the D-Stem as other materials of the base discussed before. In fact it has been shown that for reduplication of verbs with **-C-** roots the base can be a D-Stem or M-Stem. It has also been demonstrated with examples such as **ph-a-yi** and **ph-e-yi** that a RED is not necessarily a CS and does not have to look like an existing independent word as suggested in some previous accounts.

7.4 Reduplication Of Verbs With Vowel-Initial Roots.

More variation in the shape of the RED can be seen in reduplicated verbs with vowel initial roots. Recall that in the imperative a verb with a vowel initial root surfaces with a glide which serves as an onset to the initial syllable and the only suffix is default FV **-a**. Examples in (22) show how verbs with vowel initial **-VC-** roots reduplicate.

(22) Reduplication Of Verbs With **-VC-** Roots in the imperative mood.

Root	Imperative	Gloss	Reduplicated form
-akh-	y-akh-a	'build'	y-akh-a+y-akh-a
-eth-	y-eth-a	'tell a story'	y-eth-a+y-eth-a
-os-	w-os-a	'roast'	w-os-a+w-os-a

As can be seen, there is total reduplication and the glide surfaces in both the base and the RED. The glide is treated as part of the base and its presence and that of default FV **-a** make the RED bi-syllabic. For the glide to be part of the base it must take the same position as the OM just like augmentative **yi-** in verbs with sub-minimal **-C-** roots. Like the **yi-**, the glide inserted in the imperative is semantically empty and is there to ensure that the initial syllable of the root begins with an onset in the absence of a preceding morpheme.

Reduplicated forms with OMs in (23), though not in the imperative but in the indicative mood, confirm that the glide takes the position normally taken by the OM.

(23) Reduplication of verbs with **-VC-** roots when there is an OM.

(si)-z-akh-a	'(we) build them'	(si)-z- akh-a +y-akh-a ~ (si)-z- akh-a +z-akh-a
(si)-z-eth-a	'(we) narrate them'	(si)-z- eth-a +y-eth-a ~ (si)-z- eth-a +z-eth-a
(si)-z-os-a	'(we) roast them'	(si)-z- os-a +w-os-a ~ (si)-z- os-a +z-os-a

The variation in the initial consonant of the base illustrates that the OM is in complementary distribution with the glides *y* and *w*. An initial glide surfaces in the base only when the OM is unavailable, they never co-occur.

An inflectional affix such as first person SM *si-* or negative formative *nga...i* can, however, not be reduplicated just as in consonant initial roots. Examples in (24) illustrate this.

(24) Inflectional affixes are excluded from RED or R-Stem as a whole.

- | | | | | | | |
|----|---------------------|---|--------------------|-------------------------|------------------------------|------------------------------|
| a. | <i>si-akh-a</i> | → | <i>s-akh-a</i> | 'we build ...' | <i>s-akha+y-akha</i> | <i>*s-akh-a+s-akh-a</i> |
| | <i>si-eth-a</i> | → | <i>s-eth-a</i> | 'we narrate' | <i>s-eth-a+y-etha</i> | <i>*s-eth-a+s-eth-a</i> |
| | <i>si-os-a</i> | → | <i>s-os-a</i> | 'we roast ...' | <i>s-os-a+w-os-a</i> | <i>*s-os-a+s-os-a</i> |
| b. | <i>si-nga-akh-i</i> | → | <i>si ng-akh-i</i> | 'we should not build' | <i>si-ng-akh-a+y-akh-i</i> | <i>*si-ng-akh-a+ng-akh-i</i> |
| | | | | | <i>*si-ng-akh-i+ng-akh-i</i> | <i>*si-ng-akh-i+y-akh-I</i> |
| | <i>si-nga-eth-i</i> | → | <i>si-ng-eth-i</i> | 'we should not narrate' | <i>si-ng-eth-a+y-eth-i</i> | <i>*si-ng-eth-a+ng-eth-i</i> |
| | | | | | <i>*si-ng-eth-i+ng-eth-i</i> | <i>*si-ng-eth-i+y-eth-I</i> |
| | <i>si-nga-os-i</i> | → | <i>si-ng-os-i</i> | 'we should not roast' | <i>si-ng-os-a+w-os-i</i> | <i>*si-ng-os-a+ng-os-i</i> |
| | | | | | <i>*s-ng-os-i+ng-os-i</i> | <i>*s-ng-os-i+ng-os-i</i> |

As seen, only material from the *-VC-a* base is copied onto the RED although the base also surfaces with a glide in the slot normally reserved for the OM in order to avoid hiatus. Glides *y* and *w* which are semantically 'empty' are default consonants in Ndebele just as *-a* is a default vowel. Note that in (24b.) REDs that prefix negative *ng(a)-* and also suffix FV *-a* sound odd but are better than those which prefix *ng(a)* and suffix negative *-i* which are definitely unacceptable.

Suffixed forms such as the ones in (25) show that once the glide is incorporated into the base before reduplication the variations in the shape of the RED are identical to those we saw when the verbs had CVC- roots except that there is now one more alternative.

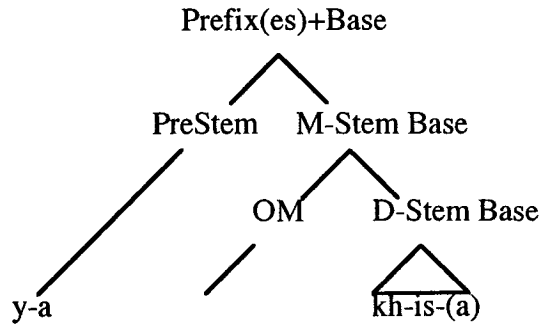
(25) Reduplication of suffixed forms

Imperative	Gloss	Reduplicated form
y-akh-is-a	‘make build’	y-akh-i+y-akh-is-a ~ y-akh-a+y-akh-is-a y-a-kh-is-a+kh-is-a
y-eth-el-a	‘tell a story to’	y-eth-e+y-eth-el-a ~ y-eth-a+y-eth-el-a y-e-th-el-a+th-el-a
w-os-ek-a	‘be possible to be roasted’	w-os-e+w-os-ek-a ~ w-os-a+w-os-ek-a w-o-s-ek-a+s-ek-a

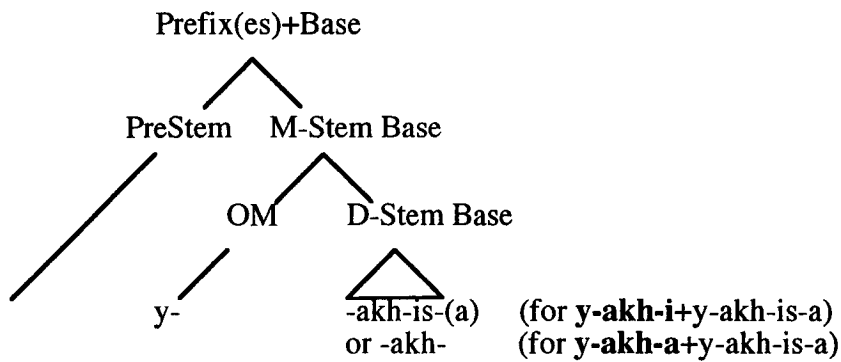
As can be seen from the first two variants in each case, the RED can take the vowel of the derivational suffix following the root or default final vowel -a to fill its second V slot just as we saw in cases involving verbs with CVC- roots. No further comment needs to be made about these as all the crucial facts were discussed when we dealt with reduplication of verbs with CVC- roots. It is the third variant which provides what we have not already seen above as it shows that the initial vowel of the root can be ignored in reduplication together with the preceding glide. The initial vowel of the root is treated as extrametrical in such cases so that the base begins with the following consonant. This means that the initial vowel of the stem is unavailable for copying but is relegated to the prefix position in the Prestem which is outside the D-Stem or M-stem as illustrated with y-a-kh-is-a ‘make build’ the base for y-a-kh-is-a+kh-is-a in (26a). The glide which satisfies the requirement that a verb begins with an onset in the imperative or when there is no preceding prefix also occurs as a PreStem prefix.

(26) Base structure when the verb has a vowel initial root.

a. Initial vowel is extrametrical



b. Initial vowel is part of the root.



When the initial vowel is part of the root the structure is that in (26b.) where even the inserted glide is copied by the RED as it is part of M-Stem Base. The occurrence of the glide in both the PreStem and OM positions is made possible by the fact that it is a default semantically empty consonant carrying only the feature [+verbal] just like default final vowel -a. As was pointed out in Chapter 4, whether the glide surfaces as y or w depends on the following vowel. If the vowel is [+round] then it surfaces as w but is realized as y when the vowel is [-round].

There is also extra-metricality when the vowel initial root is longer than -VC- as exemplified in (27).

(27) Reduplication of verbs with roots longer than -VC- in the imperative mood.

a. -VCVC- Roots		
Imperative	Gloss	Reduplicated form
-aluk-a	'knit/weave'	y-alu +y-aluka ~y-a- luk-a +luk-a * y-al-a +y-aluka
-esul-a	'wipe'	y-esu +y-esula ~ y-e- sul-a +sul-a * y-es-a +y-esula
-elaph-a	'cure/treat'	y-ela +y-elapha ~ y-e- laph-a +laph-a * y-el-a +y-elapha
b.		
-ebolek-a	'borrow'	y-ebo +y-ebolek-a ~ y-e- bole +bolek-a * y-eba +y-ebolek-a ~*y-e- bola +bolek-a
-othamel-a	'bask in the sun'	w-otha +w-othamela ~ w-o- thame +thamela *w-o- thama +thamel-a
c.		
-esul-el-a	'wipe for'	y-esu +y-esul-el-a ~ y-e- sul-a +sul-a * y-es-a +y-elus-el-a ~ y-e- sul-e +sul-el-a
-esul-is-a	'make wipe'	y-esu +y-esul-is-a ~ y-e- sul-a +sul-is-a * y-es-a +y-esul-is-a ~ y-e- sul-i -sul-is-a
-elaph-an-a	'cure/treat each other'	y-ela +y-elaph-an-a ~ y-e- laph-a +laph-an-a ~ y-e- laph-a +laph-an-a * y-el-a +y-elaph-an-a
d.		
-ebolek-an-a	'borrow each other'	yebo +yebolek-an-a ~ ye- bole +bolek-an-a * yeba +yebolek-an-a *ye- bol-a +bolek-an-a
-othamel-is-a	'make bask in the sun'	w-otha +w-othamel-is-a ~ w-o- thame +thamel-is-a w-oth-a +w-othamel-is-a *w-o- tham-a +thamel-is-a

In (27a.) where the verbs have -VCVC- roots there are two possible ways of reduplication. If the initial vowel is part of the base then the RED is the glide (which is in the OM position in the tree structure) plus the initial -VCV- of the root. Default FV -a cannot be part of the RED as the root has enough material for two syllables. Although the root has the required two syllables the glide is necessary as it fulfills another requirement, that there be an onset to the root initial syllable in the absence of a preceding morpheme. When the initial vowel of the root is extrametrical the RED can only be the remaining

CVC- part of the root plus default FV **-a**. There are also two possible shapes of the RED in (27b.) where the verbs have longer **-VCVCVC-** roots. When the initial vowel of the root is part of the base the facts are the same as in (27a.). However, if it is treated as extrametrical the RED is the first CVCV of the base. Default FV **-a** cannot be part of the RED as the root has enough material.

Suffixed forms in (27c) and (27d) are included to confirm what we already know. In (27c.) the verbs have the same roots as in (27a) but an extension has been added to each stem. As expected, the only acceptable additional variant of the RED is the one which takes the vowel of the extension when the initial vowel of the root is extra-metrical. In longer forms in (27d.) which are the same as those in (27b.) except that extensions have been attached to the stems, there cannot be any additional variants to the RED as the root has enough material even in cases where the initial vowel of the root is extrametrical.

Before we leave this section we also need to see how forms that do not take glides are reduplicated. For instance, in the past tense V- prefixes are dropped so that on the surface the verb appears as vowel initial root plus FV **-a**. Examples of such verbs and how they reduplicate are given in (28) where class 6 SM **a-** and past tense **-a-** precede the root.

(28) Reduplication in the Past Tense

a.	a-a-akh-a	→	akh-a	‘they built’	akh-a+y-akh-a a-y-akh-a+y-akh-a
	a-a eq-a	→	eq-a	‘they jumped’	eq-a+y-eq-a a-yeq-a+y-eq-a
	a-a-os-a	→	os-a	‘they roasted’	os-a+w-os-a a-w-os-a+w-os-a
b.	a-a-aluk-a	→	aluk-a	‘they weaved’	a-luk-a+luk-a a-y-alu+y-aluk-a
	a-a-esul-a	→	esul-a	‘they wiped’	alu+yaluka e-sul-a+sul-a

a-a-elaph-a → elaph-a ‘they treated’

a-y-esu+y-esul-a
 esu+yesula
 e-laph-a+laph-a
 a-y-ela+y-elaph-a
 ela-yelapha

c. a-a-ebolek-a → ebolek-a ‘they borrowed’

e-bole+bolek-a
 a-y-ebo+y-ebolek-a
 ?ebo-ybolek-a

a-a-othamel-a → othamel-a ‘they basked in the sun’

o-thame-thamel-a
 a-w-oth-a+w-othamel-a
 ?otha+w-othamel-a

In (28a) where the stems are bi-syllabic the initial vowel of the root cannot be extrametrical as all the material needs to be copied by the RED. However, there is variation in the shape of the RED due to the fact that reduplication can occur before or after vowel coalescence or deletion. If reduplication takes place before vowel coalescence or deletion then the SM **a-** surfaces and both the base and RED surface with a glide as in **a-y-eq-a+y-eq-a**. Before vowel coalescence or deletion occurs the stem and prefixes are in clearly separate domains such that the stem which forms the base can take a semantically empty glide as in the imperative since the OM position would still be available. The glide gets into the RED as a result of total reduplication. Should reduplication take place after vowel coalescence or deletion then the base from which the RED is copied will be VCV. However a VCV+VCV verb has an unacceptable VV sequence which is resolved by inserting a glide in the OM position of the M-Stem and hence the base has an extra consonant which does not appear in the RED. Solving the problem by not copying the final V of the base would leave the RED with only one syllable and inserting a final consonant in the RED would create an unacceptable coda

besides there being no slot for it. Root material is also never deleted in the base in Ndebele. Prefixing a glide to the base is therefore the best solution.

In verbs with longer roots such as those in (28b.) and (28c) (especially (28c.)) copying only the first VCV of the base and then avoiding hiatus by inserting a glide to separate two successive Vs is less preferred though an available option. Treating the initial vowel of the root as extrametrical and then copying the first CVCV of the base is the most preferred form of reduplication. Reduplication before coalescence or deletion occurs is also acceptable. Note that the same range of possibilities we have seen in (28) are also available even when the prefix is CV- as in (29).

(29) Reduplication in the Past Tense when the SM is CV-

- | | | | | | |
|----|---------------|---|-----------|-----------------|--|
| a. | ba-a-akh-a | → | b-akh-a | ‘they built’ | b-akh-a+y-akh-a
ba-y-akh-a+y-akh-a
b-os-a+w-os-a
ba-w-os-a+w-os-a |
| | ba-a-os-a | → | b-os-a | ‘they roasted’ | |
| b. | ba-a-esul-a | → | b-esul-a | ‘they wiped’ | b-e-sul-a+sul-a
ba-yesu+yesul-a
b-esu+y-esul-a |
| c. | ba-a-ebolek-a | → | b-eboleka | ‘they borrowed’ | b-e-bole+bolek-a
ba-yebo+yebolek-a
? b-ebo+yebolek-a |

The SM is class 2 **ba-** in (29) but the vowel sequences remain the same as in (28).

This section has shown that in addition to the variations of the RED discussed in the preceding sections there are also more variation when the verb root is vowel initial. For instance, an OM or a semantically empty glide prefixed to the base may be copied onto the RED but the glide and OM may not co-occur within the same base or RED. In verbs

with -VC-a stems the whole stem may be copied in reduplication but the base must prefix a glide so that the verb does not surface with an ill-formed VV sequence. Another important point made was that in verbs with stems longer than -VC-(a) the initial vowel of the root may be treated as extrametrical in reduplication so that the base from which material is copied begins with the following consonant. It was also shown that variation in the shape of the RED may be due to the fact that in cases involving vowel coalescence or deletion reduplication may occur before or after these processes.

7.5 Imbrication in reduplication.

As may have been predicted from examples in the preceding sections, imbrication has no effect on the reduplicant in long forms such as the ones in (30). Final vowel -a and even the final -e of -ile cannot get into the reduplicant because the base has enough material.

(30) CVCVCVC- stems with imbrication

Verb	Gloss	Reduplicated form
a. -nyamalele, *-nyamalalile /nyamalal+ile/	'disappeared'	(i) - nyama +nyamalal-ile (ii) - nyama +nyamalel-e (iii) *- nyam-a +nyamalel-e (iv) *- nyam-e +nyamalel-e
b. -khakhamele, *-khakhamalile /khakhamal+ile/	'was stunned'	(i) - khakha +khakhamal-ile (ii) - khakha +khakhamel-e (iii) *- khakh-a +khakhamel-e (iv) *- khakh-e +khakhamel-e
c. -dondobele, *-dondobalile /dondobal+ile/	'grew weak (as aged)'	(i) - dondo +dondobal-ile (ii) - dondo +dondobel-e (iii) *- dond-a +dondobel-e (iv) *- dond-e +dondobel-e
d. -khuluphele, *-khuluphalile	'became fat and sleek'	(i) - khulu +khuluphal-ile

/khuluphal+ile/

- (ii) -**khulu**+khuluphel-e
- (iii) ***khul-a**+khuluphel-e
- (iv) ***khul-e**+khuluphel-e

What is important to note is that it is possible to undo imbrication in reduplication even if the unimbricated form is unacceptable in the non-reduplicated stem. This means that reduplication has access to underlying structure. Both the unimbricated (i) and the imbricated (ii) forms in each of the examples, (30a.) to (30d.), are acceptable and have the same meaning.

A different picture emerges when the [i] of **-il-e** gets into the second syllable of the DStem as in (31). In reduplication, besides the option of undoing imbrication as in (30), each of the examples numbered (ii) in (31) shows that the second V of the RED can surface with the underlying vowel of the root while the base's second V surfaces with [e] resulting from the coalescence of **a** and **i** from the root and **-il-e**, respectively. There is also a third option where the [i] (or [il]) of **-il-e** is allowed into the reduplicant once it fuses with the preceding vowel (or VC) as the (iv) forms in each of the examples ((31a-c.)) below illustrates.

(31) CVCVC- stems with imbrication

Verb	Gloss	Reduplicated form
a. -dumele, *dumalile /dumal+ile/	'became dejected'	(i) - duma +dumal-ile (ii) - duma +dumel-e (iii) * -dum-a +dumel-e (iv) - dume +dumel-e
b. -bulele, *bulalile /bulal+ile/	'killed'	(i) - bula +bulal-ile (ii) - bula +bulel-e (iii) * -bul-a +bulel-e (iv) - bule +bulel-e
c. -libele, * -libalile	'forget'	(i) - liba +libal-ile

/libal+ile/

- (ii) -liba+libel-e
- (iii) *-lib-a+libel-e
- (iv) -libe+libel-e

However, as examples numbered (iii) in (31) show, the default FV **-a** cannot be part of the reduplicant as the base has enough material. Thus, there are three acceptable outcomes when imbricated CVCVC- stems are reduplicated although the RED takes only two shapes, CVCa- and CVCe-.

In shorter verbs with CVC- roots such as those in (32) imbrication affects the first syllables. In reduplication, there is here also the possibility of undoing imbrication as in the examples we have seen above. Also, the reduplicant may or may not incorporate the **i(I)-** of **-il-e** when it is prefixed to an imbricated base as illustrated by (iii) and (ii) forms, respectively.

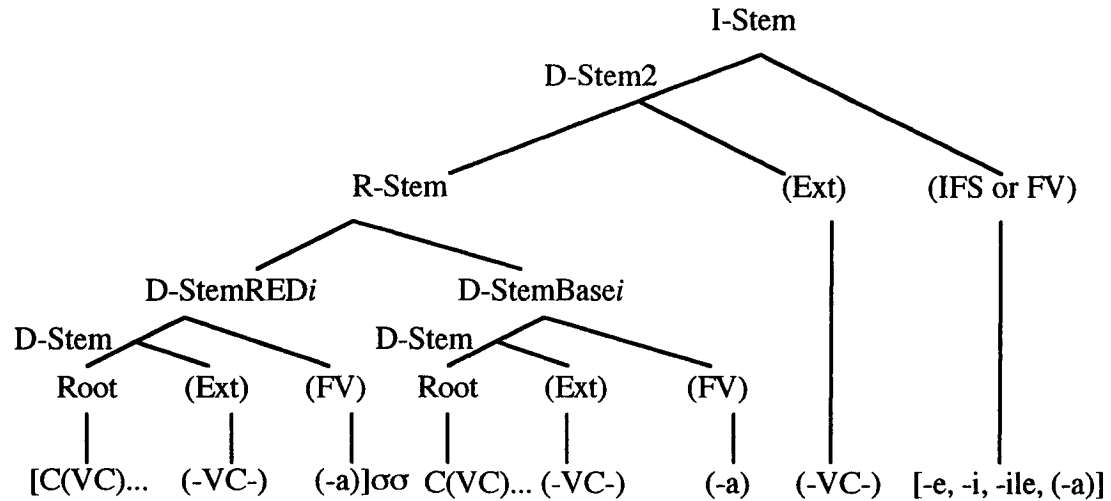
(32) CVC- stems with imbrication

Verb	Gloss	Reduplicated form
(a) -thethe, *-thathile /thath+ile/	'took'	(i) - <u>thath-a</u> -thath-ile (ii) - <u>thath-a</u> -theth-e (iii) - <u>theth-a</u> -theth-e (iv) *- <u>theth-e</u> -theth-e
(b) -sele, *-salile /sal+ile/	'remained'	(i) - <u>sal-a</u> -sal-ile (ii) - <u>sal-a</u> -sele (iii) - <u>sel-a</u> -sel-e (iv) *- <u>sel-e</u> -sel-e
(c) -zele, *-zalile /zal+ile/	'gave birth'	(i) - <u>zal-a</u> -zal-ile (ii) - <u>zal-a</u> -zel-e (iii) - <u>zel-a</u> -zel-e (iv) *- <u>zel-e</u> -zel-e

However, in both cases the **-e** of **-il-e** does not get into the reduplicant but, instead, default final vowel **-a** is used.

To account for the variation in the shape of the RED we have seen in (30), (31) and (32) we go back to the tree structure which is provided here again as (33) and with some of the examples we have seen in this section.

(33) Reduplicated Verb Stem.



a. nyama-	nyamalal-	-ile
b. nyama-	nyamalal- [nyamalel-]	-il- -e
c. nyama-	nyamalal- -il- [nyamalel-]	-e
d. duma-	dumal-	-ile
e. duma-	dumal- [dumel-]	-il- -e
f. dume-	dumal- -il- [dumel-]	-e
g. thath-	-a thath-	-ile
h. thath-	-a thath- [theth-]	-il- -e
i. theth-	-a thath- -il- [theth-]	-e

As can be seen, each of the three examples **nyamalel-e**, **dumel-e** and **theth-e** has three possible ways of reduplication. In (33a.), (33d.) and (33e.) **-ile** is treated as inflectional and is therefore unavailable in the base for copying. However, in the rest of the examples in (33) the **-il-** part of **-il-e** appears to be treated as a derivational suffix or an extension. While in (33b.), (33e. and (33h.) **-il-** is unavailable for copying as it is outside D-StemBase*i*, in (33c.), (33f.) and (33i) it is copied as it is within the base where it is fused with the root. Fusion of **-il-** with the base in (33b.), (33e. and (33h.) comes in a later cycle after reduplication, that is, when material from the base has already been copied onto the RED. In (33e. and (33h.) this results in the base surfacing with vowel **e** while the RED surfaces with **a** in corresponding syllables (i.e. **duma+dumel-e** and **thath-a+theth-e**). Note that in (30) **nyamalel-e** appeared to have only two possible ways of reduplication because the structure in (33b.) and that in (33c.) derive the same surface structure since the first two syllables that are copied in reduplication are not affected by imbrication whether it is within the base or it comes later after reduplication.

Each of the acceptable reduplicated forms given in this section has an advantage and disadvantage. In (32) for example, (i) has the advantage of identity of the CVC of reduplicant with the first CVC of the base; it has the disadvantage of having to block imbrication in the base which otherwise would have occurred. (ii) has the advantage of keeping the inflectional material out of the reduplicant; it has the disadvantage that the CVC of reduplicant is different from the CVC of the base. (iii) has the advantage of identity of the CVC of reduplicant with the first CVC of the base; it has the disadvantage of having to take inflectional material (the imbricated “i”) into the

reduplicant to get this effect.

A question which is raised by the various outcomes in the reduplication of imbricated verb forms is whether perfective **-ile** is a derivational or inflectional morpheme. The **-il-** part of the morpheme patterns with derivational morphemes for some reduplicative processes (where it gets into the reduplicant) and with inflectional morphemes for others (where it does not get into the reduplicant and may even undo imbrication to achieve this). However, the **-e** part always patterns with inflectional morphemes as it never gets into the reduplicant. Perhaps **-ile** should be analyzed as two morphemes **-il-** and **-e** both of which should be characterized as inflectional morphemes but noting that after imbrication **-il-** cannot be identified or isolated from the stem as an independent morpheme.

7.6 Reduplication in the passive

When we looked at general properties of reduplication in 7.1 we postponed the discussion of reduplication in the passive. The facts given about the reduplication of a verb when it takes one productive derivation suffix are slightly different when the suffix is passive **-w-** as verbs with CVC- roots in (34) show.

(34) Reduplication when the derivational suffix is Passive **-w-**.

Verb	Gloss	Reduplicated form
phek-w-a	'be cooked'	(i) phek-w-a+phek-w-a (ii) phek-a+phek-w-a
ding-w-a	'be looked for'	(i) ding-w-a+ding-w-a (ii) ding-a+ding-w-a
goq-w-a	'be folded'	(i) goq-w-a+goq-w-a (ii) goq-a+goq-w-a

The passive morpheme in these verbs is just a consonant, unlike other derivational suffixes which are -VC-. As we noted in the preceding chapters, this consonant (-w-) does not surface independently but triggers labialization of the preceding consonant. Thus, inclusion of -w- alone does not satisfy the prosodic requirement that the RED be bi-syllabic. In order to get the required two syllables default final vowel -a has to be brought in as well when [w] is included in the RED. As a result there are two acceptable reduplicated forms with the same meaning both of which allow final vowel -a into the RED. They, however, differ in that one incorporates the passive -w- into the RED while the other does not. Thus, in (34) there is both total and partial reduplication, total being exemplified in the forms in (i) and partial in the variants in (ii).

In all the cases we have seen so far the RED copies a contiguous sub-string of the base even in cases where there is more than one derivational suffix. As seen in each of the examples numbered (iii) in (35), the only suffix which appears not to respect contiguity is Passive -w-. The suffix -w- gets into the RED while the suffix that precedes it in the base does not.

(35) Passive -w- can violate contiguity on the surface

- | | | | |
|----|---------------|----------------------------|--------------------------------------|
| a. | bon-is-w-a | ‘be shown (to)’ | (i) bon-a +bon-is-w-a |
| | | | (ii) bon-i +bon-is-w-a |
| | | | (iii) bon-w-a +bon-is-w-a |
| | phek-is-w-a | ‘be made to (be) cook(ed)’ | (i) phek-a +phek-is-w-a |
| | | | (ii) phek-i +phek-is-w-a |
| | | | (iii) phek-w-a +phek-is-w-a |
| b. | bon-isis-w-a | ‘be really seen’ | (i) bon-a +bon-isis-w-a |
| | | | (ii) bon-i +bon-isis-w-a |
| | | | (iii) bon-w-a +bon-isis-w-a |
| | phek-isis-w-a | ‘be cooked well’ | (i) phek-a +phek-isis-w-a |
| | | | (ii) phek-i +phek-isis-w-a |
| | | | (iii) phek-w-a +phek-isis-w-a |

- | | | |
|---------------|-----------------|------------------------------------|
| c. bon-el-w-a | 'be seen for' | (i) bon-a +bon-el-w-a |
| | | (ii) bon-e +bon-el-w-a |
| | | (iii) bon-w-a +bon-el-w-a |
| phek-el-w-a | 'be cooked for' | (i) phek-a +phek-el-w-a |
| | | (ii) phek-e +phek-el-w-a |
| | | (iii) phek-w-a +phek-el-w-a |

Recall, however, that in Chapter 3 it was pointed out that the underlying sequences **-w-is-** (PASS-CAUS), **-w-isis** (PASS-INT) and **-w-el-** (PASS-APP) are realized as **-is-w-** (CAUS-PASS), **-isis-w-** (INT-PASS) and **-el-w-** (APP-PASS) on the surface. Underlyingly, contiguity is therefore respected even though it is violated on the surface. REDs which take default final vowel **-a** and **-i-** or **-e-** from CAUS **-is-** or APP **-el-** in examples numbered (i) and (ii) in (35) are, of course, also acceptable as they copy a contiguous sub-string from the surface base. However, **phek-w-e-** is unacceptable even if it looks like a contiguous substring of the base as it has the PASS-APP sequence which is disallowed on surface forms.

While a RED which takes FV **-a** or the vowel of a suffix following the root is less restricted in terms of the argument structure, a RED which incorporates **-w-** can only be used when the subject of the sentence is a patient. The fact that a RED which includes passive **-w-** sub-categorizes for a patient subject shows the relevance of the morpho-syntactic structure in reduplication. To make this point clear, consider the examples in (36).

(36) A reduplicated verb with passivized RED takes a patient subject.

- a. (i) Inyama yap**ph**ekw**ap**hekiswa abantwana. [y-a-**ph**ek-**w-a**+phek-is-w-a]
 'Intended meaning: The children were made to cook the meat for a short while'
- (ii) *Abantwana bap**ph**ekw**ap**hekiswa inyama. [b-a-**ph**ek-**w-a**+phek-is-w-a]
 'The children were made to cook the meat for a short while'

- b. (i) Inyama y**phekwaphekelwa** abantwana [y-a-**phek-w-a**+phek-el-w-a]
 'The meat was cooked for the children from time to time'
 (ii) *Abantwana b**phekwaphekelwa** inyama. [b-a-**phek-w-a**+phek-el-w-a]
 'The children were cooked meat from time to time'

In (36a.i) and (36b.i) where the subject **inyama** 'meat' is a 'patient' there is no problem of interpretation as it is clear from the RED that the meat is the thing being cooked. However, there is a problem in (36a.ii) and (36b.ii) as the RED makes it appear as if it is **abantwana** 'children' who are being cooked when the 'patient' is in fact the object **inyama** 'meat'.

We also need to see what happens when passivized verbs with roots longer than CVC- such as those in (37) are reduplicated.

(37) Verbs with roots longer than CVC-.

hlikihl-w-a	'be wiped'	hliki+hlikihl-w-a * hlik-a+hlikihl-w-a * hlik-w-a+hlikihl-w-a
bhilikic-w-a	'be held with dirty hands'	bhili+bhilikic-w-a * bhil-a+bhilikic-w-a * bhil-w-a+bhilikic-w-a

As expected, the RED in such forms can only be the first CVCV- of the base. Default FV -a and Passive -w- cannot be part of the RED.

In Chapter 5 we saw that PASS -w- leads to palatalization of bilabial consonants if they are not morpheme initial. Examples in (38) show how passive verbs with palatalized consonants are reduplicated.

(38) Reduplication of palatalized forms.

- a. khab-w-a → khatsh-w-a 'be kicked' **khatsh'-a+khatsh-w'-a**

gebh-w-a	→	gej-w-a	‘be dug’	khatsh-w-a+khatsh-w-a gej-a+gej-w-a gej-w-a+gej-w-a
khuph-w-a	→	khutsh-w-a	‘be removed’	khutsh-a+khutsh-w-a khutsh-w-a+khutsh-w-a
zam-w-a	→	zany-w-a	‘be tried’	zany-a+zany-w-a zany-w-a+zany-w-a
b.				
khatsh-el-w-a			‘be kicked for’	khatsh’-a+khatsh’-el-w-a khatsh’-e+khatsh’-el-w-a khatsh-w-a+khatsh-el-w-a
gej-el-w-a			‘be dug for’	gej-a+gej-el-w-a gej-e+gej-el-w-a gej-w-a+gej-el-w-a
khutsh-el-w-a			‘be removed for’	khutsh-a+khutsh-el-w-a khutsh-e+khutsh-el-w-a khutsh-w-a+khutsh-el-w-a
zany-el-w-a			‘be tried for’	zany-a+zany-el-w-a zany-e+zany-el-w-a zany-w-a+zany-el-w-a
c.				
limaz-w-a	→	linyaz-w-a	‘be harmed’	linya+linyaz-w-a * liny-w-a+linyaz-w-a
khumbuz-w-a	→	khunjuz-w-a	‘be reminded’	khunju+khunjuz-w-a *khunj-w-a+khunjuz-w-a
gombolozel-w-a	→	gonjolozel-w-a	‘be encircled’	gonjo+gonjolozel-w-a *gonj-w-a+gonjolozel-w-a

The patterns of reduplication in (38a.), (38b.) and (38c.) are the same as those in (34), (35) and (37), respectively. A point to note though is that while in (38a-b.) the CVC-a RED whose second C is palatalized such as **khatsh-a** may be taken to be a CS, it is certainly not an existing word as Steriade (1997) suggests. A theory relying on output-output correspondence of RED and Base does not seem to be good enough in handling such data as it does not take into account the existence of such REDs as **khatsh-a** which never surface as independent words.

Other problematic forms for a theory relying on output-output correspondence of RED and Base are those involving verbs with a frozen passive suffix such as those we

saw in 3.3.2 and which are presented here with their reduplicated forms as (39)

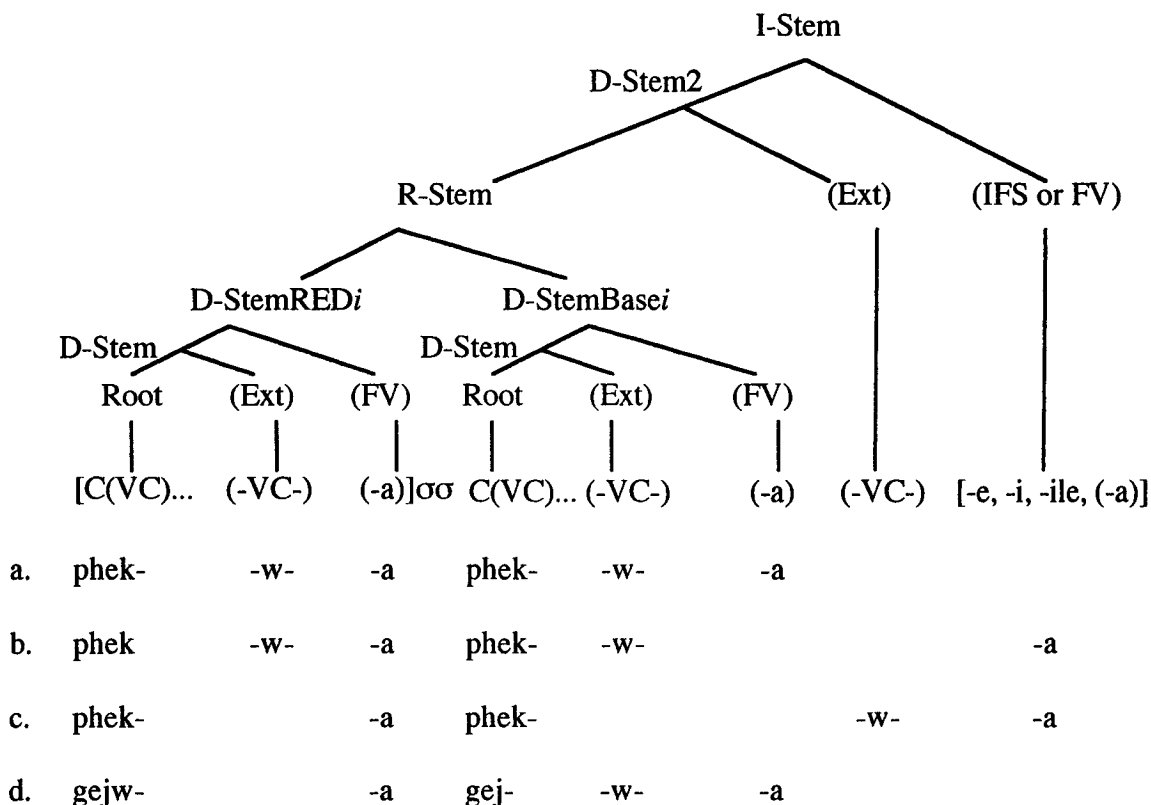
(39) Frozen Passive -w-.

*khol-a					
khol-w-a	‘believe’	khol-w-a+khol-w-a	~	khol-a+khol-w-a	
*khohl-a					
khohl-w-a	‘forget’	khohl-w-a+khohl-w-a	~	khohl-a+khohl-w-a	

Given that **khol-a** and **khohl-a** are ill-formed, we only expect the REDs to be passivized **khol-w-a+** and **khohl-w-a+** if there is output-output correspondence. However, as seen in (39), unpassivized REDs **khol-a+** and **khohl-a+** are also acceptable.

The structure already proposed in this chapter also captures the variation in the shape of the RED discussed in this section more straight forwardly as illustrated in (40).

(40) Reduplicated verb stem in the passive



e.	gej-	-w-	-a	gej-	-w-		-a
f.	[gebh-		-a	gebh-		]	-w-
	[gej-		-a	gej-			-w-
							-a]
g.	linya			linyaz-	-w-	-a	
h.	linya			linyaz-	-w-		-a
i.	[lima			limaz-		]	-w-
	[linya			linyaz-			-w-
							-a]
j.	gej-	-w-	-a	gej-	-w-el-	-a	
					[-el-w-]		
k.	gej-	-e-		gej-	-el-w-		-a
l.	[gebh-		-a	gebh-		]	-el-w-/-w-el-
	[gej-		-a	gej-			-el-w-
							-a]
m.	gej-	-w-	-a	gej-	-w-		-el-
					[	-el-w-	]
							-a
n.	gebh-	-e-		gebh-	-el-		-w-
	[gej-	-e-		gej-	-el-		-w-
							-a

In (40a.) and (40d.) where PASS **-w-** and FV **-a** are in D-StemBase_i there is total reduplication. Total Reduplication is, however, not possible in (40g.) even though the two suffixes are also within D-StemBase_i because the root has more than the required two syllables. Examples in (40b.), (40e.) and (40h.) show that even if FV **-a** is outside the base the end result is the same as in (40a), (40d.) and (40g.), respectively. In (40b.) and (40e.) FV **-a** gets into the RED by default to fill the remaining V slot but in (40h.) the same slot is taken by the second vowel of the root. In (40c.) and (40f.) where both **-w-** and **-a** are not part of the base, **-w-** cannot get into the RED but **-a** again gets in by default. Note that in (40f.) palatalization occurs after reduplication when PASS **-w-**

becomes available in the next cycle. This also applies to (40i.) where **-w-** and **-a** are also outside D-StemBase*i*. What goes on in (40j-n) where two extensions are suffixed to **gebh-** ‘dig’ thereby creating more variation should now be obvious. What is important is that PASS **-w-** surfaces in the RED only when it comes before APP **-el-** and when it is in D-StemBase*i*. If one of these conditions is not met the base surfaces as **gej-e** or **gej-a** depending on whether **-el-** is within or outside the base. If **-el-** is within the base then its **-e-** is copied but if outside FV **-a** takes the second V slot in the RED.

Reduplication in the passive clearly shows that the morpho-syntactic structure cannot be ignored as it plays an important role in determining the shape of the reduplicant. The structure of the reduplicated verb stem proposed in this chapter easily captures all the possible variations in both the RED and the Base.

7.7 Tone in reduplication

Having seen how verbs with different roots and affixes reduplicate we now turn to tone. In 7.7.1 to 7.7.3 we look at the realization of tone when verbs with non-depressor consonants are reduplicated. A discussion on reduplication of verbs with depressor consonants follows in 7.7.4. Reduplicated verbs in which tone is used for morphological marking are considered in 7.7.5.

7.7.1 Tone in reduplicated verbs with CVC- and longer consonant initial roots.

First, we consider tone realization in reduplicated verbs with CVC- and longer consonant-initial roots when there are no depressors. No comment will be made on the

variation already seen above unless there is also variation in the tone pattern. In (41) we see how H tone and TL verbs with bi-syllabic -CVC-a stems reduplicate when preceded by a toneless monosyllabic prefix.

(41) Reduplicated verbs with CVC-a stems preceded by shortened infinitive prefix **ku-**.

- | | | | | |
|----|----------|------|------------|-------------------------|
| a. | ku-kháma | (H) | 'to choke' | ku- khamá +khamá |
| b. | ku-pheka | (TL) | 'to cook' | ku- pheka +pheka |

By using the TL shortened infinitive prefix **ku-** we see that the reduplicated H tone verb in (41a.) is realized with H tone on the antepenult while its penult, the H tone sponsor in the base, unexpectedly surfaces with L tone. The different tone patterns in the base and RED make what would otherwise be total reduplication appear like partial reduplication. Leftbranch delinking, however, occurs as expected since the initial syllable of the verb is TL. Also, as expected, underlyingly toneless **pheka** 'cook' is realized with L tone in all syllables when reduplicated as seen in (41b.).

The example in (41a.) seems to suggest that Metrical Tone Spread applies after reduplication but not Local Tone Spread. However, when a suffix is added to each of the forms in (41) as in (42) we get different facts. Here the TL pattern is identical to the one we saw in Chapter 6 but the H tone pattern is a new one as H tone now gets to the penult in a verb stem with five syllables. In unreduplicated forms spreading H tone only got to the penult in verbs with three syllables

(42) Verbs with three syllable stems preceded by toneless prefixes (shortened infinitive prefix **ku-** or second person plural subject prefix **li-**).

- | | | | | |
|----|------------|-----|-----------------|---------------------------|
| a. | ku-khamísa | (H) | 'to make choke' | ku- khami +khamísa |
| | | | | ku- khamá +khamísa |

- | | | | | |
|----|------------|------|----------------|--|
| b. | ku-phekisa | (TL) | 'to make cook' | ku- pheki +phekisa
ku- pheka +phekisa |
| c. | ku-khaméla | (H) | 'to choke for' | ku- khamé +khaméla
ku- khamá +khaméla |
| d. | ku-phekela | (TL) | 'to cook for' | ku- pheke +phekela
ku- pheka +phekela |
| e. | li-khamíle | (H) | 'you choked' | li- khamá +khamíle
(li- khami +khamíle) |
| f. | li-phekile | (TL) | 'you cooked' | li- pheka +phekile
(li- pheki +phekile) |

As seen in (42a-b.), (42c-d) and (42e-f) where CAUS **-is-**, APP **-el-** and Perfective **-ile** have been suffixed, respectively, H tone spreads to the penult due to Local Tone Spread in H tone verbs and Leftbranch De-linking applies as expected. Even if the RED has a H tone sponsor no H tone surfaces in it due to Leftbranch Delinking which ensures that only the rightmost branch of a multiply linked H tone survives when there is a preceding TL syllable. In TL verbs all syllables surface with L tone as expected since they are all TL underlyingly.

Longer verbs in (43) also show consistency with what we saw in Chapter 6. The prefixes used are the ones already seen above but (43a-b.) and (43e-f.) also have REC **-an-**.

(43) Reduplication of Verbs with four or five syllable stems preceded by toneless prefixes (shortened infinitive prefix **ku-** or second person plural subject prefix **li-**).

- | | | | | |
|----|--------------|------|---------------------------|--|
| a | ku-khamélana | (H) | 'to choke for each other' | ku- khamé +khamélana
ku- khamá +khamélana |
| b. | ku-phekelana | (TL) | 'to cook for each other' | ku- pheke +phekelana
ku- pheka +phekelana |

- | | | | | |
|----|----------------|------|-----------------------------|--|
| c | li-khamísile | (H) | ‘you made choke’ | li- khama +khamísile
(li- khami +khamísile) |
| d. | li-phekisile | (TL) | ‘you made cook’ | li- pheka +phekisile
(li- pheki +phekisile) |
| e | ku-khamiséłana | (H) | ‘to choke for each other’ | ku- khame +khamiséłana
ku- khama +khamiséłana |
| f. | ku-phekiselana | (TL) | ‘to cook for each other’ | ku- pheke +phekiselana
ku- pheke +phekiselana |
| g. | li-khamanísile | (H) | ‘you made choke each other’ | li- khama +khamanísile |
| h. | li-phekanisile | (TL) | ‘you made cook each other’ | li- pheka +phekanisile |

As can be seen, when verbs with stems four or more syllables long are reduplicated H tone surfaces only on the antepenult due to Metrical Tone Spread and Leftbranch De-linking. Even if Local Tone spread applies it becomes irrelevant since it does not take the H tone beyond the antepenult. As in similar examples above, TL verbs surface with L tone in all syllables as there is no H tone sponsor.

In Chapter 6 we also saw that CVC-a verb stems display a H and TL contrast when preceded by infinitive prefix **úku-**. When they are reduplicated the tonal contrast is neutralized as illustrated in (44). The tone pattern is identical to the one we saw in cases where each of the no-reduplicated verb stems had four syllables.

(44) Reduplication of High and TL verbs with CVC-a stems

- a **ú**kú-!kháma (H) ‘to choke’ **ú**kú-!khámá+khama³ cf. **ú**kú-!khámélana

³ Although young people sometimes use **ú**kú-khama+kháma it is a less preferred form which I assume is not yet fully accepted. I consider similar patterns including those seen in verbs with sub-minimal roots such as the one below to be also not yet fully intergrated into tone system of the language.

ú kú-lwéla	‘to fight for’	ú kú- lwela +lwéla
		ú kú- lwayi +lwéla
		ú kú- lweyi +lwéla

‘to choke for each other’

- b. úkú-pheka (TL) ‘to cook’ úkú-!phéká+pheka cf. úkú-!phékélana
‘to cook for each other’

In (44a.) H tone does not surface on the base **khama** which has an underlying H tone just as in (41a). The tone pattern in (44b.) is identical to the one in (44a) but this time the prefix is the only H tone sponsor. These examples suggest that tone is not copied in reduplication but Metrical Tone Spread applies after reduplication as H tone spreads only up to the antepenult. However, longer examples we have already seen and those in (45) point to the opposite as H tone verbs surface with L tone on the reduplicant and H tone on the penult.

(45) Reduplication of H and TL verbs with CVC-VC-a or CVCVC-a stems

- a. úkú-!kháméla (H) ‘to choke for’ úkú-**khame**+khaméla
úkú-!hlíkíhla (H) ‘to wipe’ úkú-**hliki**+hlikíhla
- b. úkú-!phékela (TL) ‘to cook for’ úkú-**pheke**+phékela
úkú-!cúnula (TL) ‘to offend’ úkú-**cunu**+cúnula

The H tone on the penult can only be spreading from the initial syllable of the base when Local Tone Spread applies since Metrical Tone Spread takes the H tone only up to the antepenult. In other words the base does not lose its H tone in reduplication. Absence of H tone on the reduplicant is due to stem left branch delinking since the longer stem resulting from reduplication has five syllables. This is the kind of delinking we saw in unreduplicated five syllable stems in Chapter 6. TL examples in (45b.) do not tell us

These are cases of overapplication since the H tone in the base surfaces when it should not. High tone is associated with the base so that the base is identical to the reduplicant. Other rules, Local Tone Spread, Left Branch delinking and Meessen’s Rule, later apply and obscure this identity relationship.

much as H tone only spreads from the prefix as a result of Metrical Tone Spread and is then followed by stem left branch delinking.

The tone copying paradox we have just seen in (41a) and (44a) on the one hand, and the rest of the H tone examples in this sub-section on the other, seems to suggest that we are missing a generalization. It seems undesirable to say some H tone verbs copy tone in reduplication while others do not. Perhaps we need to know under what circumstances tone may or may not copy. It has been demonstrated in the phonology literature that tone may be segmental (see, for example, Halle & Stevens 1971; Sagey 1986; Bao 1990; Clark 1990) or prosodic (see, for example, Leben 1973, 1978; Goldsmith 1976; Yip 1980, 1989; Archangeli & Pulleyblank 1986; and Hyman 1989). Walsh's (1993) study shows that if tone is segmental then it must copy in reduplication but if it is prosodic it may or may not copy. Prosodic tone is copied in cases where reduplication copies prosodic information, otherwise it is not.

To diagnose whether tone is segmental or prosodic in a language Walsh uses the segment-tone interaction test. Prosodic tones are not expected to interact specifically with laryngeal features but if tone is one of the laryngeal features (i.e. if it is segmental) then it can be expected to interact with voicing, glottalization and aspiration. The interaction must be passive such as blocking of H tone spreading by voiced consonants or blocking of L tone spreading by voiceless consonants. If a language has such segment-tone interaction it will necessarily reduplicate tones as well. We saw that in Ndebele there is no segment-tone interaction according to this definition as H tones spread across voiced segments or the depressor class as a whole although left-branch delinking subsequently occurs. Also, Ndebele tone does not interact with aspiration or glottalization. We can

therefore take it to be prosodic. Whether it is copied or not should depend on what reduplication requires. If reduplication requires that prosodic information be copied then it will be copied, otherwise it should not be.

If we go back to the same examples we observe that in (41a) and (44a) the initial syllable of the base is in a metrically weak position (the penult) whereas in (42a.), (42c.), (42e.) and (45a.) the initial syllable of the base is in a metrically strong position (the antepenult). Recall that the antepenult is metrically prominent or strong because the final syllable is extrametrical. From this fact it seems reasonable to assume that in both cases the base's initial syllable comes with underlying H tone which it de-linked and stray erased if it is in a weak metrical position⁴. Local tone Spread then applies just as it applies to non-reduplicated forms. The reduplicant also comes with an identical underlying H tone in its initial syllable but in this instance it cannot be de-linked as it is always in a strong metrical position which is in fact the first syllable of the whole extended or reduplicated stem (RED+Base). Although metrical feet are built from right to left but with the left branch being the stronger one, the initial syllable of the whole verb stem (reduplicated or not) is always treated as being in a metrically prominent position. However, the initial syllable of the base in a reduplicated verb may or may not be in a metrically strong position as it is stem internal.

We now need sample derivations to make the point clearer but before we get to them we need to go back to an issue left undecided in our rules. Recall that in the sample derivations we saw in Chapter 6 we ignored Accent Assignment as its presence was not crucial to the discussion at that point and also as it was not clear how it was order with

⁴ As we noted in the previous chapter, the H tone can also be unassociated underlyingly but be associated early in the derivation following UAC. This time pre-linking the H tone is not a problem as the vowel of the initial syllable of the stem is available unlike in cases involving sub-minimal -C- roots we saw.

respect to other rules except that it had to come before Metrical Tone Spread. It is now clear that the metrical structure has to be available early in the derivation so that H tone is not de-linked in the initial syllable of the base if it is in a strong metrical position in the new extended or reduplicated stem⁵. Accent Assignment must therefore come even before Local Tone Spread as application of the latter in the base depends on the metrical structure. In (46a.) and (46b.) we see how úkú-khámá+k hama and úkú-khame+khaméla are derived, respectively. Note that floating tones are bracketed and that the extrametrical final vowel is between the signs < and >.

(46) a. Sample derivation for úkú-!khámá+k hama

UR

H	(L)	H	H	(L)
ú	-	#	khama	+k hama #

Accent Assignment

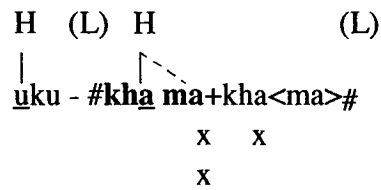
H	(L)	H	H	(L)
ú	-	#	khama	+kham<a> #
			x	x
			x	

De-linking And Stray Erasure of H Tone On Weak Syllable

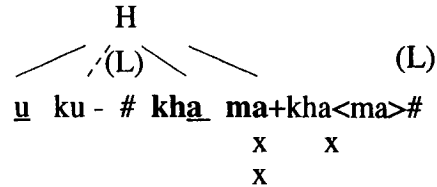
H	(L)	H	H	(L)
ú	-	#	khama	+kham<a> #
			x	x
			x	

⁵ The metrical structure must be available early in the derivation even if H tone de-linking is treated as failure of a floating H tone to associate with a syllable.

Local Tone Spread

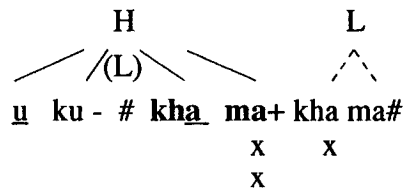


Metrical Tone Spread



Left Branch Delinking Does not apply.

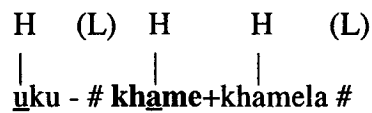
Default Low Tone



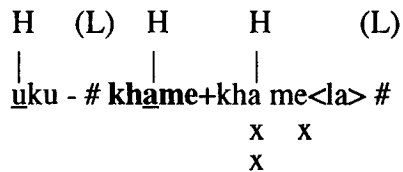
SR úkú-!khámá+khama

b. Sample derivation for úkú-khame+khaméla

UR:

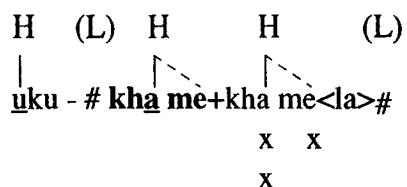


Accent Assignment:

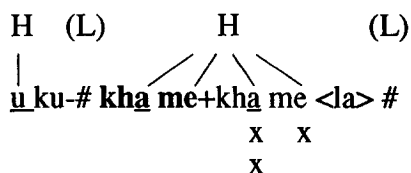


De-linking And Stray Erasure of H Tone On Weak Syllable:
Does not apply.

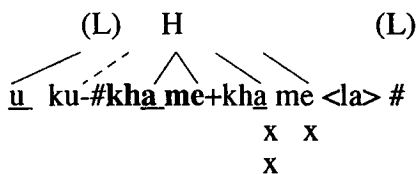
Local Tone Spread:



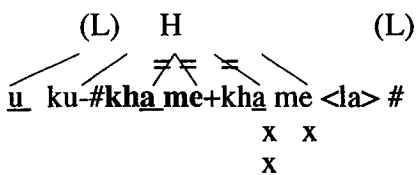
Tone Fusion



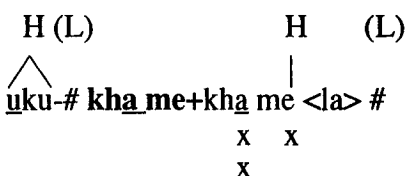
Metrical Tone Spread



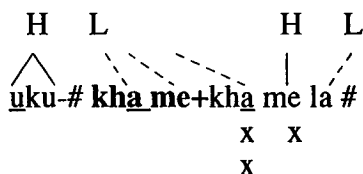
Left Branch Delinking



→



Default Low Tone



SR

úkú-khame+khaméla

As can be seen, the tone rules we saw before apply to reduplicated forms just as they did to non-reduplicated verbs. However reduplication has helped in placing Accent

While longer forms cannot provide clearer evidence for the analysis just given above, they certainly do not contradict it. In (47a-b.) reciprocal suffix **-an-** has been added to the verbs in (45) to make the stem four syllables long. The two other examples (47c-d.) are verbs with CVCVC-a stems to which **-an-** has also been suffixed to make the stem four syllables long. In all the four examples the reduplicated stem has a H tone only on the antepenult.

a. úkú-!khámélana (H) ‘to choke each other’ úkú-**kham**a+kha mé la na
 x x x x ◇
 x x

b. úkú-!phékélana (TL) ‘to cook for each other’ úkú-**pheke**+phekélaná

- c. úkú-!hlíkíhlana (H) ‘to wipe each other’ úkú-~~**hlik**~~i+hli kí la na
 X X X X ◇
 X X
- d. úkú-!cúnúlana (TL) ‘to offend each other’ úkú-~~**cunu**~~+cunúlana

No comment is necessary on TL verbs as they present nothing new. In H tone verbs it can be assumed that the initial syllable of the reduplicant gets H tone since this position is always prominent. However, in the base the initial syllable does not get H tone as it is in a metrically weak position. Since Local Tone Spread only spreads H tone to the second syllable of the extended stem, it is Metrical Tone Spread which spreads H tone to the antepenult before left-branch delinking applies.

(48) Reduplication of H tone and TL verbs with CVC-VC-VC-a or CVCVC-VC-a stems.

- | | | | | |
|----|--------------------------|------|-----------------------------------|---|
| b. | <u>úkú</u> -phekisélana | (TL) | 'to cause to cook for each other' | <u>úkú</u> - pheki +phekisélana |
| c. | <u>úkú</u> -hlikihlísana | (H) | 'to make each other wipe' | <u>úkú</u> - hliki + hli ki hli sa na
<div style="text-align: right; margin-right: 50px;"> x x x x <
 x x </div> |
| d. | <u>úkú</u> -cunulísana | (TL) | 'to make each other offend' | <u>úkú</u> - cunu +cunulísana |

- c. úkú-hlikihlísana (H) ‘to make each other
wipe’ úkú-**hlík**i + hli ki hlí sa na
 x x x x ◇
 x x

- d. úkú-cunulísana (TL) ‘to make each other offend’ úkú-**cunu**+cunulísana

When Local Tone Spread applied the H tone spreads to the next syllable to the right but does not get to the antepenult. It is Metrical Tone Spread which spreads H tone up to the antepenult so that in the end the output of application of an earlier Local Tone Spreading rule is redundant as H tone could still spread to the antepenult from the prefix. Left branch delinking then applies as before. Again, TL examples present nothing new as the H tone on the antepenult clearly comes from the prefix as a result of Metrical Tone Spread.

The tone patterns we have seen in reduplicated verb stems can also be seen when the same stems are preceded by two TL prefixes followed by a H tone one. In (49) the stems are preceded by the plural second person subject prefix **li-**, present continuous tense **-ya-** and class 7 object prefix **-sí-**.

(49) Reduplication of H tone and TL stems preceded by one H and two TL prefixes.

- | | | | |
|--------|--|------|--|
| a. (i) | li-ya- <u>si</u> -kháma | (H) | li-ya- <u>si</u> - khámá +khama |
| | ‘you are choking it’ | | |
| (ii) | li-ya- <u>si</u> -phéka | (TL) | li-ya- <u>si</u> - pheká +pheka |
| | ‘you are cooking it’ | | |
| b. (i) | li-ya- <u>si</u> -khaméla | (H) | li-ya- <u>si</u> - khame +khaméla |
| | ‘you are choking for it’ | | |
| (ii) | li-ya- <u>si</u> -phékela | (TL) | li-ya- <u>si</u> - pheke +phékela |
| | ‘you are cooking for it’ | | |
| c. (i) | li-ya- <u>si</u> -khamélana | (H) | li-ya- <u>si</u> - khame +khamélana |
| | ‘you are choking it for each other’ | | |
| (ii) | li-ya- <u>si</u> -phekélana | (TL) | li-ya- <u>si</u> - pheke +phekélana |
| | ‘you are cooking it for each other’ | | |
| d. (i) | li-ya- <u>si</u> -khamiséla | (H) | li-ya- <u>si</u> - khami +khamiséla |
| | ‘you are getting it choked for each other’ | | |
| (ii) | li-ya- <u>si</u> -phekiséla | (TL) | li-ya- <u>si</u> - pheki +phekiséla |
| | ‘you are getting it cooked for each other’ | | |

The only deference we see is in the tone pattern of the whole verb as this time left branch delinking affects all verbs and all left H tone branches within those verbs because the first syllable is TL in each case.

For Xhosa Cassimjee (1994: 121-131) deals with the H tone problem we have seen in this sub-section in terms of optimal domains. She argues that in a H tone verb such as **ndi-ya-(fuma+fu)mana** whose tone domain is bracketed there are two problems with the head of the domain (second **fu**). She says “it is not only bad for the head of a domain to be the H-anchor, it is also bad for the head to be in an identity relationship with the H-anchor.” The H-anchor in this case is the first **fu** syllable. The domain is extended to include the penult (where H tone surfaces) for these reasons. For unreduplicated verb forms the constraint EXTEND just requires a H tone domain to have a non-anchor as head. Extending the domain to include the penult makes this possible. This Optimality Theory approach also works for Ndebele but is counter intuitive as it claims that lexical H tone is not reduplicated but H tone on the penultimate syllable of the extended stem comes from the initial syllable in the reduplicant. Also the kind of identity referred to plays no role in unreduplicated forms and yet it looks as if the process which leads to H tone being realized on the penult is the same in both reduplicated and unreduplicated verbs. In TL verbs identity does not seem to play a role too as it is violated in many cases.

What seems more likely is that Local Tone Spread applies equally to both reduplicated and unreduplicated stems and that the base in the reduplicated stem must have an underlying H tone for the penult to surface with a H tone. Treating reduplication as copying the whole stem or as morphological doubling seems to provide the right

solution as underlying tones will also be copied. (See Hyman, Inkelas and Sibanda 1999, and Inkelas and Zoll (ms)).

7.7.2 Tone realization in reduplicated verbs with sub-minimal roots.

As we saw in 7.3, when unsuffixed verbs with sub-minimal roots are reduplicated the reduplicant may be augmented by a semantically empty morph **-yi-** since it has to be exactly two syllables long and cannot include prefixal material. The stem, however, remains **-CV** as the bi-syllabic requirement does not hold at stem level. What is interesting with these forms is that the unreduplicated form appears to define where the new extended stem will begin for tone purposes. In Chapter 6 we observed that in H tone verbs the H tone does not dock on the root syllable but associates with a preceding syllable which is part of the prefix because the root syllable which comes with the H tone is extrametrical. Although part of the prefix, the syllable where the H tone docks is thus treated like a syllable at the beginning of the stem where H tone normally docks in longer H tone stems. When the verb is reduplicated the ‘special’ syllable in the prefix seems to be treated as the first syllable of the new extended stem. This appears to be the reason for failure of H tone to spread to **-yi-** in reduplicated H tone verbs in (50). In fact H tone seems to spread from **-kú-** in the prefix to **-lwa-** in the stem. However, this is obscured by the fact that Metrical Tone Spread also spreads H tone up to **-lwa-** which is the antepenultimate syllable.

(50) Reduplication of High and Toneless verbs with **-C-a** stems

- | | | | | |
|----|-----------------|------|------------|------------------------|
| a. | <u>ú</u> kú-lwá | (H) | ‘to fight’ | <u>ú</u> kú-!lwáyí+lwa |
| | ?úku-lwa | (TL) | | úkú-!lwáyí+lwa |

pattern remains the same. I assume here that Local Tone Spread applies as expected but the output is then obscured by the application of Metrical Tone Spread which also spreads H tone to the second syllable of the reduplicant (the antepenult of the verb). High Tone does not surface in the base as its initial syllable **-lwe-** is in a metrically weak position, the penult.

When another syllable is added to the forms in (51) by suffixing reciprocal **-an-** we also get the expected patterns we saw in (45) where H tone spreads up to the penult in H tone verbs due to Local Tone Spread. Left Branch Delinking later applies. In L tone examples Metrical Tone Spreads H tone up to the antepenult before Left Branch Delinking applies. Examples are given in (52).

(52) Reduplication of High and Toneless verbs with -CV-el-an-a stems

- | | | | |
|----|--------------------------|-------------------------------|------------------------------------|
| a. | <u>úkú</u> -lwélána (H) | ‘to fight for each other’ | <u>úkú</u> - lwela +lwelána |
| | <u>úkú</u> -lwélana (TL) | | <u>úkú</u> - lwela +lwélana |
| b. | <u>úkú</u> -phélana (TL) | ‘to give for each other’ | <u>úkú</u> - phela +phélana |
| | <u>úkú</u> -phélána (H) | | <u>úkú</u> - phela +phelána |
| c. | <u>úkú</u> -mélána (H) | ‘to stop/wait for each other’ | <u>úkú</u> - mela +melána |
| | <u>úkú</u> -mélana (TL) | | <u>úkú</u> - mela +mélana |

These example need no further comment as facts given about the examples in (45) also hold here.

Longer forms in which causative **-is-** is also suffixed show nothing new too as H tone surfaces on the antepenult in both H and TL verbs due to Metrical Tone Spread. Nothing more will therefore be said about such forms although a few examples are given in (53).

(53) Reduplication of High and Toneless verbs with -CV-is-el-an-a stems

- a. úkú-lwíselana (H) 'to cause to fight for each other' úkú-**lwíse**+lwíselana
úkú-lwíselana (TL) úkú-**lwíse**+lwíselana
- b. úkú-míselana (H) 'to cause to stop/wait for each other' úkú-**míse**+míselana
úkú-míselana (TL) úkú-**míse**+míselana

More interesting examples are those in which the stem is also preceded by an object prefix which is also reduplicated as in (54). Recall that reduplication of the object prefix may occur in verbs with sub-minimal -C- roots and those with vowel-initial stems.

(54) Reduplication of H and TL verbs with -C-a stems when there is an OM -yi-.

- a. úkú-yí-lwa (H) 'to fight it' úkú-**yílwa**+yílwa
úkú-yí-lwa (TL) úkú-!yíl**wá**+yílwa
- b. *úku-yi-pha (TL) 'to give it' úkú-!yí**phá**+yipha
úkú-yí-pha (H) úkú-yí**pha**+yípha

Reduplication of TL variants whose stem H tones do not surface in the base is generally preferred to reduplication of H tone ones. When TL verbs are reduplicated the H tones that appear on the RED spread from the prefix due to Metrical Tone Spread. In the H tone variant in (54a.) the penult has H tone due to Local Tone Spread. The H tone which surfaces on the initial syllable of the base in H tone verbs spreads from the antepenult, the second syllable of the reduplicant. This is not very obvious because the object prefix has a H tone underlyingly. However, as we have seen from other examples above, the H tone of the base should not surface on the metrically weak penult of the extended stem except through spreading.

In this sub-section we only need to consider two sets of examples as most of the facts have already been dealt with. In (55) we see that the tone pattern in verbs with reduplicated -VC- stems is the same for both H and TL verbs. In reduplicated TL stems the H tone sponsor is the prefix and in H tone ones it is both the initial syllable of the RED and the prefix.

a. úkwákha (H) 'to build' ú-~~kwák~~há+yakha
úkwakha (TL) ú-~~kwák~~há+yakha

b. úkósa (H) 'to roast' ú-~~kos~~á+wosa
úkosa (TL) ú-~~kos~~á+wosa

In longer verbs ((56)) where the parsing of the stem varies as the initial vowel may or may not be extrametrical, we also get identical H and TL patterns in reduplicated forms when the stem is four syllables. The patterns differ, however, when the stem includes the initial vowel (with, of course, an onset **-kw-** from the prefix on the RED and an onset glide **-y-** on the base) to make it five syllables.

a. úkwéphúla (H) 'to break' úkwe-**phúlá**+phùla
ú-**kwephu**-yephúla

- b. úkwélusa (TL) ‘to herd’ úkwé-lusá+lusa
ú-kwelu-yélusa

As seen in (56a.), a reduplicated H tone stem with five syllables surfaces with H tone on the penult just as in **úkú-khama-khaméla**. The syllable with the initial vowel in the base, is now the antepenult and its H tone can now spread when Local Tone Spread applies. In TL verbs H tone spreading cannot go beyond the antepenult as H tone gets to the stem only through Metrical Tone Spread.

The two sets of examples we have just seen show that vowel initial stems behave like all other stem in terms of tone. The variation in the parsing of the stem also reflects the variation we get in tone patterns.

7.7.4 Reduplication of verbs with depressors.

The tone patterns we have seen in reduplicated verbs can also be modified if the stem contains a depressor or depressors just as in unreduplicated verbs. The same depressor rules we saw above still apply, the only difference being that we can now get depressors in the fourth and fifth syllables of the stem. In (57) where the base is -DVCV H and TL contrasts are neutralized as in reduplicated verbs without depressors we saw in (44). The only difference is that the initial syllable of the RED which has a depressor surfaces with L tone.

(57) Reduplication of High and Toneless verbs with -DVC-a stems.

- a. úkú-zǎla (H) ‘to give birth’ úkú-zalá-zala
b. úkú-bhala (TL) ‘to write’ úkú-bhalá-bhala

The rightward shift of the H tone caused by the depressor is not obvious because the second syllable also normally surfaces with H tone due to Metrical Tone Spread (and Local Tone Spread in H tone verbs).

Longer stems with three syllables and depressors in various positions also show nothing unexpected when they are reduplicated. In (58) we see that all reduplicated verbs have L tone REDs since H tone is normally expected to surface on the penult of the extended stem in H tone verbs and in the antepenult in L tone verbs.

(58) Reduplication of H and TL verbs with DVCVCV, CVDVCV and DVDVDV stems.

- | | | | | |
|--------|--------------|------|---------------------|------------------------------|
| a. (i) | úkú-zaléla | (H) | ‘to give birth for’ | úkú- zala -zaléla |
| (ii) | úkú-bhalêla | (TL) | ‘to write for/to’ | úkú- bhala -bhalêla |
| b. (i) | úkú-khwezêla | (H) | ‘to stoke the fire’ | úkú- khweze -khwezêla |
| (ii) | úkú-húdula | (TL) | ‘to drag along’ | úkú- hudu -húdula |
| c. (i) | úkú-gudûza | (H) | ‘to grope about’ | úkú- gudu -gudûza |
| (ii) | úkú-vôdloza | (TL) | ‘to smash’ | úkú- vodlo -vôdloza |

However, the presence of a depressor on the penult creates a rising tone in H tone verbs and the presence of a depressor on the antepenult gives rise to a falling tone on the penult except if the penult also has a depressor, in which case the antepenult gets a rising tone.

Depressor effects are also predictable in reduplicated verbs with sub-minimal roots. In (50) we saw that when unsuffixed verbs with sub-minimal roots are reduplicated in the infinitive H tone is realized on the root syllable in the reduplicant in both H and L tone verbs. Examples in (59) show that when the root syllable is a depressor H tone shifts to the next syllable, semantically empty -yi-.

(59) Reduplication of High and Toneless verbs with -D-a stems.

- (a) úkú-za (H) 'to come' úkú-**zayí**-za
 (b) úku-dla (L) 'to eat' úku-**dlayí**-dla

When the stem has one suffix the shift is not obvious as the second syllable of the RED also has a H tone. What is clear is that the syllable with a depressor surfaces with L tone as in (60).

(60) Reduplication of High and Toneless verbs with -D-VC-a stems.

- (a) úkú-zěla (H) 'to come for' úkú-**zelá**-zela
 úku-zela (L) úku-**zelá**-zela
 (b) úkú-dlěla (H) 'to eat for' úku-**dlelá**-dlela

In both H and TL verbs the base surfaces with L tone on both syllables just like in other four syllable reduplicated and unreduplicated stems we have seen. No further comment on these forms is necessary.

Verbs in which the object prefix is also reduplicated such as those in (61) also present nothing new as their tone pattern in the presence of depressors is predictable.

(61) Tone pattern when object prefix is also reduplicated

- (i) úkú-ží-mba (H/L) 'to dig them' úkú-**zimbă**-zimba
 (ii) úkú-ží-dla (H/L) 'to eat them' úkú-**zidlă**-zidla

Since they have four syllables only the RED is expected to be H tone. Also, H tone on the second syllable of the RED cannot be shifted to the next syllable as it also has a depressor. It therefore can only be shifted to the right within the same syllable so that the syllable surface with a rising tone.

As depressor effects are predictable, there is no need to consider more examples. Even in verbs with vowel initial stems the tone patterns are predictable as the depressor always shifts the H tone we saw in regular patterns to the right.

7.7.5 Morphological marking in reduplicated verbs.

Not much needs to be said about morphological marking in reduplicated forms. Examples in (62) show that in the Immediate Past tense (conjunctive) and in the Remote Past Tense reduplication does not change the patterns we saw in the corresponding unreduplicated verbs.

(62) a. Reduplication in the Immediate Past tense (conjunctive)

- | | TONELESS | | HIGH TONE | |
|------|------------------------------|---------------------|--------------------------------|---------------|
| (i) | si-lim-ê | ‘we cultivated ...’ | si-thum-ê | ‘we sent ...’ |
| | si- lima +limê | | si- thume +thumê | |
| (ii) | si-yi-lim-el-an-ê | | si-yi-thum-el-an-ê | |
| | si-yi- lime +limelanê | | si-yi- thume +thumelanê | |

b. Remote Past Tense

- | | TONELESS | | HIGH TONE | |
|------|-------------------------------|-----------------|---------------------------------|-----------|
| (i) | s-á-lim-a | ‘we cultivated’ | s-á-thum-a | ‘we sent’ |
| | s-á- lima +lima | | s-á- thuma +thuma | |
| (ii) | s-á-yi-lim-el-an-a | | s-á-yi-thum-el-an-a | |
| | s-á-yi- lime +limelana | | s-á-yi- thume +thumelana | |

High tone which marks a tense in reduplicated verbs remains on the same syllable as in unreduplicated forms, the final and the initial in the Immediate Past tense and Remote Past Tense, respectively.

In the negative the tone patterns for reduplicated and unreduplicated forms are also the same. Examples in (63) illustrate this.

(63) Reduplication in the Negative Immediate and Remote Past Tenses

TONELESS

(k)a-si-lim-ang-a 'we did not cultivate'
(k)a-si-**lima**+limanga

(k)a-si-yi-lim-el-an-ang-a
(k)a-si-yi-**lime**+limelananga

HIGH TONE

(k)a-si-thum-ang-a 'we did not send'
(k)a-si-**thuma**+thumanga

(k)a-si-yi-thum-el-an-ang-a
(k)a-si-yi-**thume**+thumelananga

As can be seen, all syllables in both reduplicated and unreduplicated verbs are realized with L tone. Although only a few examples are provided in this subsection all other cases of morphological marking we saw in 2.5 show that tone patterns of unreduplicated verbs remain unchanged when the verbs are reduplicated.

7.7.6 Summary

This section has shown that tone patterns in reduplicated verbs are identical to those in unreduplicated ones except for one case where the H tone stem is five syllable long. A five syllable unreduplicated H tone stem cannot have a H tone on the penult because it has only one H tone sponsor, the initial syllable, and that H tone can only spread one syllable to the right. A reduplicated five syllable stem, on the other hand, can be realized with a H tone on the penult as it has two underlying H tones, one on the initial syllable of the RED (or of the extended stem) and another on the initial syllable of the base (the antepenult of the extended stem). The H tone on the antepenult can spread one syllable to the right and get to the penult. Reduplicated and unreduplicated stems longer than five syllables cannot differ in their tone patterns since the stem cannot have more than two H tone sponsors and in such cases H tone always gets to the antepenult only through Metrical Tone Spread.

Also shown in this section is that verbal reduplication copies tone, the copied tone being the underlying one, not the surface tone of the base since tone rules are post cyclic while suffixation and reduplication (or compounding) are cyclic. However, whether the copied tone surfaces or not depends on prosodic requirements being met. In many cases the base's underlying H tone may not surface if that base's initial syllable is in a metrically weak position in the new extended stem. Also, since tone rules are post cyclic they have access to all the syllables of the verb not just those in the base or in the RED. Thus the tone patterns in the RED and Base will not necessarily be identical as they are determined post cyclically by the rules we also saw in Chapter 6. Depressors and morphological marking may also determine where H and L tones eventually surface.

7.8 Summary

The discussion in this chapter has clearly demonstrated that the morpho-syntactic structure is very relevant to reduplication as reduplication is in fact a morphological process. This was made clear especially when reduplicated passive verbs were considered. As was noted above, like most morphological processes, there is obviously some interaction with phonology and hence some constraints on the RED are phonological. In fact it has been illustrated that reduplication is like compounding except that special phonological and morphological conditions are imposed on the RED. The base is compounded with itself but the part that forms the RED is then reduced due to both morphological and phonological constraints such as whether or not the base is underlyingly passive and the bi-syllabic prosodic minimality condition discussed above.

Bi-syllabicity and absence of inflectional material were in fact shown to be conditions that must be met by the RED. Total reduplication occurs when the stem is bi-syllabic and has no inflectional suffix. A neutral suffix such as default final vowel **-a** or stabilizer **-yi-** can, however, make its way into the RED. If the stem has inflectional material and/or is less or longer than two syllables there cannot be full copy but partial reduplication occurs instead.

The discussion above has also shown that tone is copied in reduplication but whether or not it remains linked (or associates) with the base's initial syllable depends on a specific prosodic requirement, namely, that H tone must be linked to (or must associate with) the initial syllable of the root in the base only if it is in a metrically strong position such as the antepenult. Although Ndebele tone can be treated as segmental as it is also reduplicated with the segment with which it occurs underlyingly, it does not always surface with the same segments as tone spreading and delinking rules apply after reduplication. It occurs with them only if they are in the right prosodic position as already explained. In fact where a H tone surfaces depends largely on the prosodic structure although the presence of depressors or morphological marking may affect the expected tone pattern. The analysis in this paper supports the approach in Hyman, Inkelas and Sibanda 1999 that reduplication copies the whole stem before some prosodic, morphological and other phonological requirements are imposed on the RED. A morphological doubling approach such as the one proposed by Inkelas and Zoll (ms) would also ensure that tone is copied. The underlying structure of the base must be available before copying as copying surface tones would derive incorrect forms.

CHAPTER 8: SUMMARY

This study of Ndebele verbal phonology and morphology has raised many interesting linguistic points which now need to be summarized. Issues highlighted in different chapters are considered in turn below.

In Chapter 2 we saw that the structure of the Ndebele verb which is also identifiable in other Bantu languages is **PI-SM-PS-OM-Root-Fr.Suffs-Ext.-FV** or **FS**. The default prefix orders are more specifically **N-SM-IP-TM-MP-OM** and **SM-N-IP-TM-MP-OM**, the first sequence being used with negative **ka-** and the second with negative **-nga-**. However, it may sometimes appear as if these default orders are not adhered to on the surface due mainly to compounding and subsequent reductions. The OM was shown to be privileged as it always immediately precedes the root when present, no prefix being allowed between it and the root. We also saw that the root takes various shapes although most verbs are CVC-. Non-productive or ‘frozen’ suffixes were shown to deserve a special position in the verb as they always occur immediately after the root when present. For derivational suffixes, it was established what each of them does to the meaning and argument structure of the verb.

Chapter 3 demonstrated that the ordering of derivational suffixes in Ndebele is determined by two competing constraints, one requiring suffixes to be spelled out compositionally and the other demanding that they follow a default morphological template. It was argued that there is an unmarked morphosyntactic order (the default template) which in many cases determines whether or not a given combination of suffixes will be acceptable and also the range of semantic interpretations the combination will

have. Generally, in the unmarked order suffixes that introduce a new argument come first, those that are neutral follow and those that take away an argument come last.

When two or more suffixes are combined, it was shown that a marked order that only conforms to compositionality or 'scope' is restricted in terms of semantic interpretation but a sequence which observes the unmarked order is open to a wider range of semantic interpretations as it can represent two different underlying compositional structures. Some constraints on suffix ordering were shown not to apply equally to all cases, for instance, the role of the Repeated Morph Constraint was shown to be restricted to sequences of productive suffixes as a non-productive suffix can be followed by an identical productive one. Also, some constraints which apply to CVC- roots were shown not to hold in cases involving sub-minimal C- roots. Problems associated with some disallowed sequences were resolved by doubling one of the morphs. For example, the disallowed compositional sequence **-an-el-* spells out as *-an-el-an-*. While some constraints such as **-w-isis-* hold only locally others like **-el-is-* were shown to hold even at a distance in cases involving CVC-roots.

Facts about the ordering of Ndebele suffixes in Chapter 3 made it clear that Barker's (1985) Mirror principle needs to be modified, at least, as syntactic operations are not always mirrored in the morphology. Different morphotactical constraints play a role in the ordering of suffixes and compositional suffix sequences are dispreferred in many cases in favor of non-compositional ones which comply with the unmarked morphosyntactic order.

The main points discussed in Chapter 4. are that at word level a verb must be at least a Minimal Default Stem (Root-a) and be at least two syllables long. In addition the first

syllable of a verb with a vowel initial-root must have an onset in the imperative mood. It was shown that there are many restrictions in the way morphemes combine in Ndebele. The shape of the morpheme, particularly whether it is a V or CV- affix, a consonant or vowel initial root, is important in determining the surface realization of a verb. Glide formation, coalescence and deletion were the main processes discussed. We saw that imbrication which occurs in perfective usually takes the form $aC+ile \rightarrow eCe$ and occurs obligatorily mainly in forms longer than $CaC-$. In some verbs imbrication is optional and in others it fails to occur altogether. When it fails to occur there is sometimes truncation of the perfective suffix **-il-e** so that only **-e** surfaces. Imbrication also occurs obligatorily in reciprocalized and passivized verbs where, in the latter, there can also be a $CaC-w-ile \rightarrow CaCiwe$ change. The discussion also revealed that the internal structure of a morpheme, particularly a root, cannot be ignored as some restrictions are imposed on some segments and syllables. High Vowels were also shown not to occur root initial. Also discussed was the fact that C_1 and C_2 stops in a root harmonize in terms of laryngeal features and velar stops only occur root initial unless they are reduplicated. Labialized consonants were also shown to occur in C_1 position except in cases where the initial consonant is reduplicated or when labialization is a result of passivization.

In Chapter 5 it was argued that palatalization of bilabials in Ndebele is a dissimilatory process arising due to the incompatibility between **bilabial** plus **w** (or the constraint ***Bw**). If it is not treated as dissimilatory then it becomes difficult to explain why palatalization affects only labials when the literature support mainly palatalization of velars and coronals. When labials are palatalized the expected environment is that of a palatal glide or high front vowel but many Ndebele examples show no consistence with

this 'standard' view. Besides taking palatalization to be dissimilatory, it was shown that a reasonable generalization could be captured by positing that the passive is marked by a floating autosegmental feature complex in addition to non-floating /-w-/. Also, it was demonstrated that there are exceptions in palatalization because morpheme initial bilabials are not affected by the palatalization rule, highlighting the fact that phonology can be sensitive to morpheme boundaries.

Chapter 6 focused on tone. We saw that tone contrast in Ndebele is essentially between High and Toneless and that Low, Rising and falling tones are predictable from the interaction of H tones with different types of syllables and consonants. Adding various prefixes and suffixes to a H or TL stem may result in different tone patterns depending on whether the affix is TL or H tone, the number of syllables a verb has and whether the consonants involved are depressors or non-depressors. It was shown that the tone system of Ndebele could be described in terms of ordered rules although there are exceptions as some tenses are marked by specific tone patterns which cannot be derived by rule.

The discussion in Chapter 7 clearly demonstrated that the morpho-syntactic structure is very relevant to reduplication as this process is in fact morphological. This was made clear especially when reduplicated passive verbs were considered. Like many morphological processes, there is obviously some interaction with phonology and hence some constraints on the RED are phonological. It was illustrated that reduplication is like compounding except that special phonological and morphological conditions are imposed on the RED. The base is compounded with itself but the part that forms the RED is then reduced due to both morphological and phonological constraints such as whether or not

the base is underlyingly passive and the bi-syllabic prosodic minimality condition imposed on the RED. Bi-syllabicity and absence of inflectional material were in fact shown to be conditions that must be met by the RED, total reduplication occurring when the base is bi-syllabic and free of inflectional material. It was illustrated that a neutral suffix such as default final vowel -a or stabilizer -yi- can also make its way into the RED. If the stem has inflectional material and/or is less or longer than two syllables there cannot be full copy but partial reduplication occurs instead. Tone is copied in reduplication but whether or not it remains linked to (or associates with) the base's initial syllable depends on a specific prosodic requirement, namely, that H tone must be linked to (or must associate with) the initial syllable of the root in the base only if it is in a metrically strong position such as the antepenult. The underlying structure of the base must be available before reduplication occurs since copying surface tones would derive incorrect forms. Tone spreading and delinking rules apply after reduplication. Where a H tone surfaces depends largely on the prosodic structure but the presence of depressors or morphological marking may affect the expected tone pattern.

It is hoped that this work will provide a foundation for further studies on the Ndebele verb and the Ndebele language in general and that similar studies on other Bantu languages may also benefit in some ways. A number of issues raised here may also help in understanding some current linguistic problems especially on reduplication.

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APPENDIX

POSSIBLE COMBINATIONS OF THREE SUFFIXES

a.	AIP	sik-el-isis-w-	'be cut well for'
	AIR	sik-el-isis-an-	'cut well for each other'
	AIS	sik-el-isis-ek-	'be possible to cut for /at well'
	APR	sik-el-w-an-	'be cut for each other'
	ARA	sik-el-an-el-	'cut for each other at/for(reason)' ~ 'cut each other at/for (reason)'
	*ARC	sik-el-an-is-	'cause to cut for each other' [expressed by CAR] ?
	ARI	sik-el-an-isis-	'cut for each other well'
	ARP	sik-el-an-w-	'be cut for each other'
	ASI	sik-el-ek-isis-	'(be possible to) be cut for /at well'
b.	CAI	sik-is-el-isis-	'cause to be cut for well'
	CAP	sik-is-el-w-	'cause to be cut for'
	CAR	sik-is-el-an-	'cause to be cut for each other'
	CAS	sik-is-el-ek	'be possible to cause (something) to be cut for/at'
	CPR	sik-is-w-an-	'be caused (each other) to cut' [sp. constr.]
	CRA	sik-is-an-el-	'cause each other to cut at/for (reason)'
	CRC	sik-is-an-isis-	'cause to cut each other' [expressed by RCI] ?
	CRI	sik-is-an-isis-	'cause each other to cut well'
	CRP	sik-is-an-w-	'be caused (each other) to cut' [sp. constr.]
	CSI	sik-is-ek-isis-	'be caused to be cut well' / 'be possible to be caused to cut well'
c.	IPR	sik-isis-w-an-	'be cut well (each other)' [sp. constr.]
	IRA	sik-isis-an-el-	'cut well each other at/for (reason)'
	IRC	sik-isis-an-is-	'cause to cut well each other' ? (/-is-/ normally closest to Root)
	*IRI	sik-isis-an-isis-	[intensive always applied once]
	IRP	sik-isis-an-w-	'be cut (each other) well' [sp. constr.]
	*ISI	sik-isis-ek-isis-	[intensive always applied once]
	PRA	sik-w-an-el-(an)	'(There was) cutting for each other' [sp. constr.]
	PRI	sik-w-an-isis-	'(There was) cutting of each other well' [sp. constr.]
	*PRC	sik-w-an-is-	*PC

	PRP	sik-w-an-w-	[passivized twice - possible in special construction and where the root is -C- e.g. ph-iw-an-w-]
d.	RAI	sik-an-el-isis-	'cut each other well for/at' ? [missing-an-]
	RAP	sik-an-el-w-	'be cut for each other at/for' [sp. constr.] ?
		[missing -an-]	
	RAR	sik-an-el-an-	'cut each other for/at'
	RAS	sik-an-el-ek-	'be possible to cut each other for/at' ? [missing -an-]
	RCA	sik-an-is-el-	'cause to cut each other for/at'
	RCP	sik-an-is-w-	'be caused to cut each other'
	RCR	sik-an-is-an-	'cause to cut each other or cause each other to cut'
	RCS	sik-an-is-ek-	'be possible to cause to cut each other'
	RIP	sik-an-isis-w-	'be cut (each other) well' [sp. constr.]
	RIR	sik-an-isis-an-	'be caused to caused to cut each other well'
	RIS	sik-an-isis-ek-	'cut each other well'
	*RPR	sik-an-w-an-	'be possible to cut each other well'
e.	*SIP	sik-ek-isis-w-	*SP
	*SIR	sik-ek-isis-an-	*SR
	SIS	sik-ek-isis-ek-	[same as sik-ek-isis-] ?