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A TONAL SPLIT IN BOUND ARGUMENT PRONOUNS IN IL-KEEKONYOKIE MAA

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This paper describes and accounts for the tonal split between bound argument prefixes of Il-Keekonyokie Maa verbs with (apparently) High and Low tone. Data with the tonal split are given, followed by an analysis showing that the apparent High tone must be lexically unspecified for these prefixes. This analysis is required because a lexical High prefix tone in certain verbs would cause downstep, where downstep is not observed. Neutralization of the tone split is then considered, with the data presented and accounted for by an analysis for each of the two verb root classes. The conclusion discusses the need for the apparent word initial High tone to be spread from the stem tone.

1. Introduction[1]

A tonal split between first and second person verb forms, on the one hand, and third person verb forms on the other, has been observed in all three branches (Western, Eastern, and Southern) of the Nilotic languages.[2] My intention here is not to prove such a split for all of Nilotic, but to show how that split is evidenced in Il-Keekonyokie Maa,[3] a dialect area of Maa, an Eastern Nilotic language spoken

[1] The data in this paper are from the Il-Keekonyokie dialect of Maa, from the Narok area of Kenya. Most of it is from Sarah Tuukwo, but often checked with Leonard Ole-Kotikash. Underlined data are from the Il-Wuasinkishu dialect, from Wilson Ole-Nayomah. While most of the data was collected by me, some of the data is from Doris Payne's field notes, and all of it was collected under her academic and financial support (NSF grant SBR-9616482). Fieldwork in Kenya was conducted under Kenya research permit #OP/13/001/23C28. I am grateful to Keith Snider for the initial brainstorming that led to this analysis, Doris Payne for comments on various versions of this paper, and to Gerrit Dimmendaal for some general perspec-tives on Nilotic tone.

[2] I thank Gerrit Dimmendaal for this observation; an overview of data showing this split is given in section 1.1.

[3] I use this term for the data I will describe, acknowledging an unknown variation among those that speak what has been referred to in the literature as *Maa*. I am confident that this analysis covers this dialect area, and probably more, but I would not want to speak for all Maa dialect areas (other dialect areas of the Maasai, Samburu, Chamus) at this time. I have already noticed consis-

...continued on next page

in Kenya and Tanzania. Describing this split in Il-Keekonyokie Maa and providing a coherent analysis are the purpose of this paper. I first show data that evidences the split. I then show several analyses with lexical forms that might account for the split, and show the superior one to be that which analyzes the apparently High prefixes (e.g., first person singular) to be lexically unspecified for tone. After showing data which evidences a neutralization of this split, I delimit the scope of the split, showing that the split is neutralized for two-mora words, though for at least two independent reasons.

1.1. A survey of the split in several Nilotic languages.[4] The Nilotic Languages can be broken up into three branches: Eastern, Southern, and Western [Grimes 2000, Greenberg 1963]. This section will show evidence for a split between the person markers in each of these three branches of Nilotic. I do not claim that this split is evidenced throughout the grammar of each of the three languages illustrated below, but that the split is present at least in the given data. Turkana (Eastern Nilotic) data, illustrated in (1)-(3), are as given in Dimmendaal [1983:121-122], with his glossing and abbreviations retained (He indicates that prefixes mark person, but not number). The tone over the root provides evidence of a tonal split, with the High tone pushed one mora to the right in the third person form; the non-subject morphology in the verb in each of (1)-(3) is the same.

Turkana

(1) *à-lós-ì á-yɔ̀ŋ*
I-go-A I(N)
'I will go'

(2) *ì-lós-ì í-yòŋ*
you-go-A you(N)
'you will go'

(3) *è-lòs-î ŋèsi*
3-go-A he(N)
'he/she/it will go'

A similar split is indicated for non-past verbs in Toposa, closely related to Turkana, in data presented in Schröder [1989:131-2]. Here again (Table 1), the split is seen in the tone over the root, pushing the High tone onto the suffix in the third person form. The non-subject morphology is again constant in each column, so the split in tone is again due to the subject.

Lango (Western Nilotic) also shows a tonal split as illustrated in Table 2, which gives paradigms for several of the tense/aspects, as given in Bavin [1980.91]. Again the tone for first and second person singular forms is the same, and different from third person singular. While there is more variety than in the Eastern Nilotic

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tent deviation from this data in a speaker of another Maa dialect area (Il-Purko), but I do not have sufficient data to describe those correspondences at this time. Therefore, this analysis may or may not cover data from other dialect areas, even among what is called *Maasai*.

[4] The orthography in this paper follows Tucker and Mpaayei [1955; hereafter TM], with three exceptions: 1) *ɪ, ɛ, ɔ*, and *ʊ* for the -ATR vowels; 2) tone marking on all vowels, with *ˈá* for TM's 'mid' or Downstepped High tone, and 3) *y* and *w* for non-moraic *i/ɪ* and *u/ʊ*. While the last convention loses ATR information, it preserves moraic structure, which is essential for understanding tone; ATR is generally predictable from surrounding vowels. Throughout the text, capitalized High/Low or H/L is used when referring to phonemic tones, lowercase high/low when referring to surface pitch patterns.

Table 1. Toposa non-past paradigms with 1, 2 vs. 3 person tone split

	ASPECT/VOICE		
	Imperfective	Perfective	"Reflexive-medial"
	'(to) weed'	'(to) herd'	'(to) shave'
1S	*à-cáp-ì*	*à-twár-ìt*	*à-bány-à*
2S	*ì-cáp-ì*	*ì-twár-ìt*	*ì-bány-à*
3S	*è-càp-ì*	*è-twàr-ìt*	*è-bàny-à*

Table 2. Lango paradigms with 1, 2 vs. 3 person tone split (with 'to read')

	TENSE/ASPECT			
	Past	Progressive		Future
		intr.	trans.	intr.
1S	*àkwánò*	*ákwàn*	*ákwànnò*	*ábínó kwàn*
2S	*ìkwánò*	*íkwàn*	*íkwànnò*	*íbínó kwàn*
3S	*òkwànò*	*àkwán*	*àkwànnò*	*àbínó kwàn*

data above, the difference generally amounts to High on first and second persons, and Low on third.

Nandi (Southern Nilotic) also shows this split, according to paradigm tables given in Creider and Creider [1989.77, 83]. Table 3 shows their indicative non-past tense forms for both classes of verbs, those with the *kèè-* prefix and those with the *kìì-* prefix. The table uses their tense/aspect labels. Like the Lango data, the contrast here may be more difficult to see because of the variety of tone patterns, but there is clearly an identity between the first and second person forms, and a distinction between these forms and the third person forms.

1.2. The split, and neutralization, in Il-Keekonyokie Maa. The same split seen in other Nilotic languages is also seen in Il-Keekonyokie Maa verb forms, as in (4)–(6).[5] In these data, the contrast is seen on the first mora, with High on the first

[5] The following abbreviations are used in this paper.

A	aspect	MS	masculine singular
APAS	anti-passive	MP	masculine plural
CAUS	class I causative	N	nominative
DAT	dative applicative	PF	perfect
FS	feminine sing.	RED	reduplication
FP	feminine plural	VENT	ventive/cis-locative
INST	instrumental applicative, class II causative	1S, 2S	1st person sing., 2nd, etc.
INTR	intransitive	1P	1st person plural
IT	itive (motion away)/trans-locative	2	2nd person subject
MID	middle	3	3rd person subject
1>2	1S subject acting on 2S	II	class II prefix

...continued on next page

Table 3. Nandi indicative non-past paradigms[6]

	Tense/aspect					
	perfective			imperfective		
	simple	perfect		simple	perfect	
kɛ̀ɛ̀-kás 'to listen'		non-simple	simple		non-simple	simple
1S	*ákàs*	*ààkàs*	*áàkàs*	*ákásé*	*ààkásé*	*áàkásé*
2S	*íkàs*	*ìɪ̀kàs*	*ɪ̂ɪ̀kàs*	*íkásé*	*ìɪ̀kásé*	*ɪ̂ɪ̀kásé*
3S	*kā̂s*	*kókâs*	*kókâs*	*káséy*	*kòkáséy*	*kókáséy*
kɪ̀ɪ̀-kât 'to greet'						
1S	*áàkàt*	*áā̂kàt*	*áàkàt*	*áàkàtíí*	*ààkátíí*	*áàkátíí*
2S	*ɪ̂ɪ̀kàt*	*íɪ̂kàt*	*ɪ̂ɪ̀kàt*	*ɪ̂ɪ̀kátíí*	*ìɪ̀kátíí*	*ɪ̂ɪ̀kátíí*
3S	*íkât*	*kóókât*	*kóókât*	*íkàtì*	*kòòkàtì*	*kóòkàtì*

(4) *á-gór-ˈíshó*
1S-strangle-APAS
'I strangle.'

(5) *í-gór-ˈíshó*
2-strangle-APAS
'You(S) strangle.'

(6) *è-gór-ˈíshó*
3-strangle-APAS
'He/she/it/they will strangle.'

person singular and second person forms, and Low on the third person form.

There is some difficulty, however, in observing this split in Il-Keekonyokie Maa because, in the simplest forms of almost all verbs, the split is neutralized. Tucker and Mpaayei [1955, hereafter TM.72] lay out the variety of bound argument pronouns for Il-Keekonyokie Maa, reproduced here in Table 4. Neutralization of the tonal contrast can be seen in the first, second, and third person singular forms with third person objects, all of which are High in tone on both syllables. However, TM gave no analysis of the bound argument prefixes given in Table 4 beyond the morpheme boundaries as shown. I will show in this paper that the pattern shown in Table 4 is not the unmarked tone pattern for Il-Keekonyokie Maa, but that it is a

3>1 3 subject acting on 1S
3>2>1 3 subject acting on 2S or 2 subject acting on 1S

Note: 2 & 3 are not sensitive to number.

[6] Here the low falling tone in Nandi is indicated with the following symbol: a̰, ɪ̰.

Table 4. *à-lám* 'to avoid'

		OBJECT: him, her, it, them	you (2S)	me (1S)
SUBJECT				
sing.	1	*á-lám*	*áá-lám*	—
	2	*í-lám*	—	*kí-lám*
	3	*ɛ́-lám*	*kí-lám*	*áà-lâm*
pl.	1	*kì-lâm*	*kì-lâm ìyíé*	—
	2	*í-lámílámà*	—	*kí-lámílámà*
	3	*ɛ́-lám*	*kí-lám*	*áà-lâm*

phonologically conditioned neutralization of a lexical split in tone between the first singular and second person bound argument pronouns and the third person bound argument pronouns.

In section 3, I provide an analysis for the split with consistent lexical representations that covers the data we have for Il-Keekonyokie Maa. Section 4 then describes the neutralization in detail, while section 5 provides an analysis accounting for the neutralization which covers all cases.

By way of further introduction to these bound argument pronouns, Table 4 shows the third person singular and plural forms to be identical, and this is true for all non-perfect forms. The second person forms have the same argument prefix, with number of subject only distinguished by reduplication in the plural stem. The first person forms, on the other hand, have an entirely different prefix for the plural. Also, the two rightmost columns of Table 4 compose an inverse system which is triggered whenever a speech act participant (1S or 2S) is the grammatical object of the clause (see Payne et. al. [1994] for a complete analysis).

1.3. Assumptions and scope of this paper. Il-Keekonyokie Maa has two tones and downstep that only occurs in phrase final position (TM.167). There is a falling tone which also occurs only phrase finally (TM), but which is likely compositional, rather than an independent toneme. The TBU in Maa is the mora [Levergood 1990], and the phrase-final High-Low falling tone is the only case where more than one tone associates to a given mora. I will assume that tone association and subsequent spreading (iterative to empty TBUs) operate from right to left.

I will focus on forms in a single aspect, which TM call "present tense". This aspect, which is morphologically unmarked, is called "non-perfective" by Christa König [1993] (see also Payne [1995]), but there is some indication that the aspect she calls "perfective" includes perfect readings as well. For the sake of having a consistent label, I will refer to the morphologically unmarked aspect as "non-perfect", and the marked aspect as "perfect".

The tonal split described in this paper likely includes several of the prefixes in Table 4; the prefixes with a second person singular object and first person (*áá-lám*) and third person (*kí-lám*) subjects appear to pattern just like the first person

singular and second person prefixes. However, this paper will focus on the contrast between the first person singular and third person prefixes, only occasionally including data with second person subjects and these inverse prefixes.[7]

A third category of prefix that will be ignored entirely in this paper includes the third person acting on first person singular (*áà-lâm*) and the first person plural (*kì-lâm*), which may eventually be shown to have an initial High-Low tone contrast on the prefix.

In Il-Keekonyokie Maa, as in other Nilotic languages, there are two morphological classes of verbs, with Class II distinguished by an obligatory *ɪ-* prefix. This Class II prefix is not synchronically analyzable in Il-Keekonyokie Maa. It is obligatory on Class II roots, is unacceptable on Class I roots, and does not have any transparent component of meaning (e.g., *à-súj* 'to follow' vs. *à-y-súj* 'to wash'). The two classes also take different tone patterns in certain derivations (see Rasmussen [in preparation] for details). Because there is a tonal distinction between the two morphological classes, and because the prefix devocalizes, one would expect a consistent effect on the tone of words with Class II stems. The effect is not as consistent as one might like in the data currently available, however, so I will save a fuller discussion until it has been worked out in detail.

Because this paper investigates the tonal split in argument prefixes, I take an admittedly naïve view of the tone in the lexical representations of non-argument verb morphology. I assume that prior to inflection of the verb stem with bound argument pronouns, underlying tones are contributed to the verb stem by the lexical forms of the derivational morphemes in the word. In addition, I assume that there is a contribution of a non-perfect/indicative High tone for verb forms that have no apparent lexical source of High tone, since every available non-perfect, indicative verb form has at least one High tone in the word, regardless of the stem morphology. I refer to the combination of Class prefix, root, and other non-argument morphology in a given aspect/mood as "the stem". I take the "stem tone" to be the portion of the surface form that does not vary between first person singular and third person forms and I use this stem tone as the input for my derivations. For example, in (7), the arguments are indicated by the prefixes *a-* (1S)

(7) a. *á-ytá-bɛ́l-ˈíshɔ́.* (HHHˈHH)
1S-CAUS-break-APAS
'I will make people break.'

b. *ɛ̀-ytɛ̀-bɛ́l-ˈíshɔ́.* (LLHˈHH)
3-CAUS-break-APAS
'He/she/it/they will make people break.'

[7] Unfortunately, I do not have carefully checked data available to prove this analysis for all these prefixes, though all the data I have with them is in accordance with the analysis presented in this paper, so it is likely a matter of collecting and presenting the data before they, too, will submit to this same analysis.

and *ɛ-* (3), so the non-argument (i.e., stem) morphology includes *yta-bɛl-ɪshɔ*. What I call the stem tone, then, would be the word final H^{l}HH, as the first two morae alternate HH/LL.

Regarding terminology, I use the term "morphologically complex" to cover those verb forms which have at least one morpheme which is not a root, bound subject pronoun, or class II prefix (*ɪ-*).

Because word tone patterns do not vary from one root to another, I assume that roots are toneless, though they may eventually prove to contribute to the tone of a verb form. One example of consistency across roots is seen in the derivation with the Antipassive suffix in (8)–(9). Here the data are consistently high over the last TBU of the root, and Downstepped High over the two suffixal morae. Morae to the left of the last TBU of the root alternate according to the "High/Low" split.

The data in (8)–(9), along with others like them, lead to the conclusion that if there is some contribution by the root to the tone of a verb, it is the same contribution from each root. Thus the only tone classes are associated with the morphological Class I and Class II as mentioned above. It is simplest, then, to say that roots are toneless, allowing for some minimal contribution of a High tone might come from aspect or mood, as well as some contribution from the Class II prefix *ɪ-*.

(8) Antipassive derivations with various roots with third person subject (initial Low)

	3-(II-)	root	-APAS	'He/she/it/they...
a.	*è-*	*dám*	*-ꜜɪshɔ́*	... will think.'
b.	*è-*	*dúŋ*	*-ꜜɪshó ènkèráy*	'The child is able to cut w/o using anything else.'
c.	*ɛ̀-*	*dás*	*-ꜜɪshɔ́*	... will milk by the mouth.'
d.	*è-*	*gór*	*-ꜜɪshó*	... will strangle.'
e.	*ɛ̀-*	*lɛ́j*	*-ꜜɪshɔ́*	... is/are (a) liar/s.'
f.	*è-y-*	*bón*	*-ꜜɪshó*	... will foretell.'
g.	*è-y-*	*dóŋ*	*-ꜜɪshó*	... pound/s.'
h.	*è-y-*	*gér*	*-ꜜɪshó*	... write/s.'
i.	*è-y-*	*kén*	*-ꜜɪshó*	... is/are closing.'
j.	*ɛ̀-y-*	*nɔ́s*	*-ꜜɪshɔ́*	... will eat.'
k.	*ɛ̀-y-*	*ŋɔ́l*	*-ꜜɪshɔ́*	... stir/s.'
l.	*ɛ̀-y-*	*ŋɔ́r*	*-ꜜɪshɔ́*	... will look.'
m.	*ɛ̀-y-*	*rrít*	*-ꜜɪshɔ́*	... is/are good at looking after cows.'
n.	*ɛ̀-y-*	*mán*	*-ꜜɪshɔ́*	... always walk/s around.'
o.	*è-*	*níŋ*	*-ꜜɪshó*	... can hear.' (... is/are awake.')
p.	*è-*	*rìkín*	*-ꜜɪshó*	... is/are forgettable.'

(9) First and second person forms (initial High)

	1S/2-	root	-APAS	
a.	*á-*	*ány*	*-ˈíshɔ́*	'I wait.'
b.	*á-*	*ányít*	*-ˈíshɔ́*	'I respect (people).'
c.	*á-*	*dás*	*-ˈíshɔ́*	'I am milking.'
d.	*á-*	*gór*	*-ˈíshó*	'I strangle.'
e.	*á-*	*níŋ*	*-ˈíshó*	'I can hear.' / 'I am awake.'
f.	*í*	*gór*	*-ˈíshó*	'You (S) strangle.'

2. The tonal split: morphologically complex forms

The morphologically complex forms in this section show a split between an initial High tone for first person singular (10)–(12) and an initial Low tone for third person (again recall that second person singular (13) and inverse prefixes 1>2 (14) and 3>2>1 (15) pattern like first person singular). This contrast is spread over a variable number of initial TBUs: over the first mora only, as in (10); the first two morae, as in (11); or the first several, as in (12).

(10) High/Low contrast on the first mora

a. *á-níŋ-ˈíshó*
1S-hear-APAS
'I can hear.'

b. *è-níŋ-ˈíshó*
3-hear-APAS
'He/she/it/they can hear.'

c. *á-y-súj-yè.*
1S-II-wash-INST
'I used/will use it to wash it.'

d. *è-y-súj-yè.*
3-II-wash-INST
'He/she/it/they will use it to wash it.'

e. *á-dúŋ-ò*
1S-cut-MID
'I am cut (in my flesh).'

f. *è-dúŋ-ò nínyè / níncè.*
3-cut-MID him.NOM / them.NOM
'He/they is/are cut.'(or each other)

g. *á-ytó-nìŋ*
1S-CAUS-cut
'I will make him hear it.'

h. *è-ytó-nìŋ*
3-CAUS-cut
'He/she/it/they will make him hear it.'

(11) High/Low contrast on the first two morae

a. *á-dúŋ-ókì*
1S-cut-DAT
'I will cut for him.'

b. *è-dùŋ-ókì*
3-cut-DAT
'He/she/it/they will cut it for him.'

c. *á-ytá-gól-ˡókí*
1S-CAUS-be.strong-DAT
'I will make it strong for him.'

d. *è-ytà-gól-ˡókí*
3-CAUS-be.strong-DAT
'He/she/it/they will make it strong for him.'

e. *á-y-dóŋ-ókìny-yé* or
á-y-dóŋ-òkíny-yè
1S-II-beat-DAT-INST
'I will use it to pound for him.'

f. *è-y-dòŋ-ókìny-yé* or
è-y-dòŋ-òkíny-yè
3-II-beat-DAT-INST
'He/she/it/they used/will use it to pound for them.'

g. *á-dúŋ-yé*
1S-cut-INST
'I will use it to cut.'

h. *è-dùŋ-yé*
3-cut-INST
'He/she/it/they will use it to cut.'

i. *á-ár-ú* *èn-kítéŋ àjí*
1S-beat-VENT FS-cow house
'I will beat the cow into the house.'

j. *è-àr-ú*
3-beat-VENT
'He/she/it/they will bargain.'

(12) High/Low contrast on the first several morae
(non-perfect minimal pairs unavailable)

a. *á-ytɔ́-rɔ́k-áˡká*
1S-CAUS-be.black-DAT.PF
'I made it black for him.'

b. *è-ytɔ̀-rɔ̀k-áˡká*
3-CAUS-be.black-DAT.PF
'He/she/it/they made it black for him.'

c. *á-tá-dám-íshˡé*
1S-PF-think-APAS.PF
'I thought.'

d. *è-tà-dàm-íshˡé*
3-PF-think-APAS.PF
'He/she/it/they thought.'

e. *á-tá-gór-ókín-è*
1S-PF-strangle-DAT-MID.PF
'I became angry at him.'

f. *è-tà-gòr-òkín-è*
3-PF-strangle-DAT-MID.PF
'He/she/it/they became angry at him/her.'

In (10)–(12), each pair (e.g., (10a) and (10b)) is minimally different for the bound argument pronoun. The column on the left has first person singular subject forms, and the column on the right has the third person subject forms. The contrast in tone, however, may extend beyond the mora of the bound argument prefix. The tonal contrast can spread to the second mora, either the root (e.g., (11a) and (11b)) or another prefix (e.g., (7a) and (7b)). The contrast can spread as far as the third or fourth mora, covering at least a prefix and the root (e.g., (12a) and (12b)), potentially including even a suffix mora (e.g., (12e) and (12f)). The spreading of a single tone over (potentially) several TBUs is strongly implied, since the tonal split can extend over several morae, though the two forms differ only by the single mono-moraic subject morpheme.

It should be noted that (10)–(12) include a large variety of verbal affix combinations. In fact, this tonal split holds true for all non-perfect morphologically complex verb forms. (The split also holds for most perfect verb forms, c.f. (12), but a complete description of the perfect aspect is beyond the scope of this paper.) The only verb forms in the non-perfect aspect that do not show this split are certain morphologically simple forms, such as those shown in Table 4, which will be dealt with in section 4. For the remainder of this paper, the tone split in (10)–(12) between first singular and third persons will be referred to as the "High/Low" split.

As mentioned earlier, the above split is likely between third person and several argument prefixes, rather than just the first person singular. The following data show the same pattern for the bound argument prefixes other than the first person singular prefix.

(13) 2S

a. *í-níŋ-ókì*
2-listen-DAT
'You will agree with him.'

b. *è-nìŋ-ókì*
3-listen-DAT
'He/she/it/they will agree with him.'

c. *í-ntɔ́-nyɔ̀r*
2-CAUS-love
'You will make him love it.'

d. *è-ytɔ́-nyɔ̀r*
3-CAUS-love
'He/she/it/they makes him love it.'

(14) 1 > 2

a. *áá-tá-gór-ókín-è*
1>2-PF-strangle-DAT-MID.PF
'I became angry at you(S).'

b. *è-tà-gòr-òkín-è*
3-PF-strangle-DAT-MID.PF
'He/she/it/they became angry at it.'

c. *k-áá-ytá-gòr*
DSCN-1>2-CAUS-strangle
'I will make you angry.'

d. *è-ytá-gòr*
3-CAUS-strangle
'He/she/it/they will make him angry.'

(15) 3 > 2 > 1

a. *kí-dúŋ-ókì*
3>2>1-cut-DAT
'You(S) will cut for me.'

b. *è-dùŋ-ókì*
3-cut-DAT
'He/she/it/they will cut it for him.'

c. *kí-n-túk-ù*
3>2>1-II-wash-VENT
'He/she/it/they will wash you.'

d. *è-y-túk-ù*
3>2>1-II-wash-VENT
'He/she/it/they will wash it.'

The data in (13)–(15), while not conclusive, do point toward the possibility of including these other bound argument prefixes in the analyis presented in this paper.

3. Possible analyses for the "High/Low" split

In the preceding section, I have shown that the Il-Keekonyokie Maa bound argument pronouns evidence a "High/Low" split. The question then arises as to the specific nature of that split. Is there a High tone on the first singular prefix and a Low tone on the third person prefix in the lexicon? Or is the contrast based on more complex lexical representations (e.g., HL for 1S vs. H for 3, H for 1S vs. LH for 3, etc.) or on simpler representations (e.g., H for 1S vs. ø for 3)? In this section, I outline three analyses that might be proposed to account for the contrast between first person singular and third person argument forms. These three analyses consider the contrast to be between 1) two fully specified lexical tones on the prefixes; 2) High tone on the first singular prefix vs. the third person tone underspecified and supplied by rule; and 3) Low tone on the third person prefix vs. the first person singular tone underspecified. The following sections lay out these possibilities, and explore their implications, showing the third to be the superior analysis.

Because the "High/Low" split is neutralized in all short forms (section 5), and because I have very few morphologically simple long forms, the following sections will show derivations with morphologically complex forms, though with only one derivational affix. The lexical entries given in the first step of the derivations (e.g., (17a) and (e)) show lexical forms before the application of certain phonological rules, such as vowel harmony (which includes /a/ → /o/ allomorphy for +ATR environments) and word-final affixal consonant loss [Levergood 1987, Wallace 1981, and Wallace-Gadsen 1983].

3.1. Full Specification Analysis. The full specification analysis assumes that the underlying representations for both first person singular and third person bear a tone which is fully specified in the lexical form of the prefix, as in (16). This would lead to a derivation like (17), which compares (11a) with (11b).

One variation of this analysis has the prefix tone associating at a later stage than suffix tones, and in a left to right manner, followed by left to right spreading. This would differ from (17), above, in that for b and f, the prefixal tone would associate to the leftmost TBU (i.e., the prefix) then spread rightward to the root in c and g.

(16) Lexical entries for bound argument prefixes
(full specification analysis)

H	L
a-	*ɛ-*
1S	3

(17) Full specification analysis of (11a) and (11b): 'I/He will cut for him.'

a. H H L
a- duŋ -akɪ(n)
1S cut DAT

b. H H L
a- duŋ -oki
1S cut DAT

c. H H L
a- duŋ -oki
1S cut DAT

d. á-dúŋ-ókì
'I will cut for him.'

e. L H L
e- duŋ -akɪ(n)
3 cut DAT

f. L H L
e- duŋ -oki
3 cut DAT

g. L H L
e- duŋ -oki
3 cut DAT

h. è-dùŋ-ókì
'He/she/it/they will cut for him.'

Lexical entries

Association (R to L)

Spreading (R to L)

Surface realization

Either variation of this analysis arrives at the same surface forms.

The primary difficulty of the full specification analysis is that for some first person singular forms it would predict downstep, when it is not actually in the surface form. In Rasmussen & Payne [2001], downstep in Il-Keekonyokie Maa is shown to operate when adjacent High tones are phrase final (]$_P$).

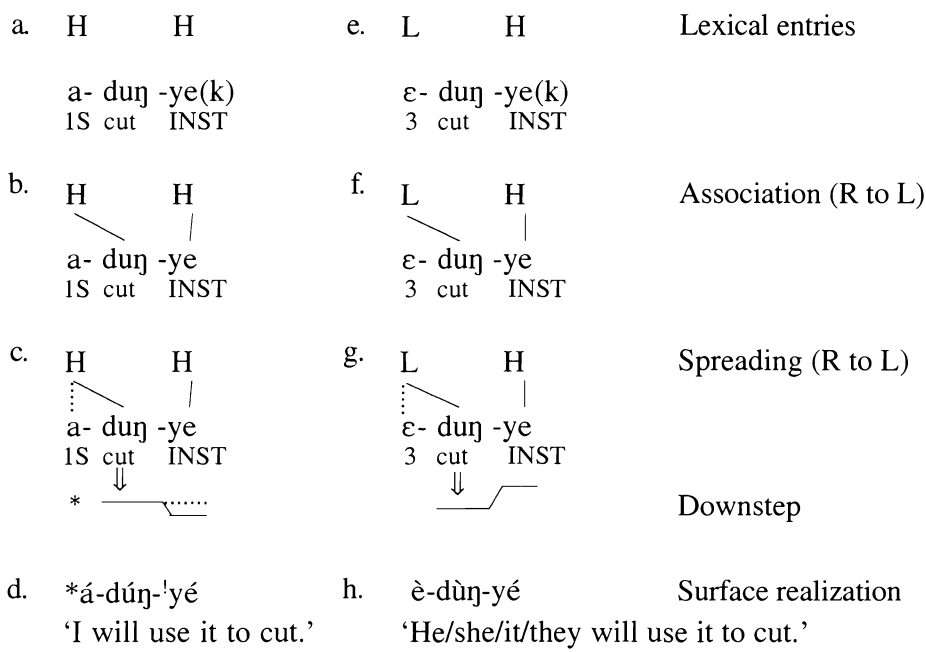
(18) Downstep

H → !H / H__]$_P$

There is no problem where the adjacent High tones are not word-final because the High tones would never be in the phrase final environment. Word-finally, however, one would expect downstep when the High tone of the first person is adjacent to the High tone of a suffix, as in the ungrammatical case in (19c), but this does not occur.

The instrumental suffix is hypothesized to have a High tone due to the final High third person tone pattern, as in (11h). In (19c), the High tone from the instrumental suffix would be adjacent to the High tone from the first person singular

(19) Derivations with instrumental suffix: 'I/He will use it to cut.'



bound argument pronoun, as well as word final, causing downstep. However, the correct first person singular form, given in (11g), does not have downstep but, rather, is High and level in tone.

The ventive suffix, as in (11i) and (11j), would require an analysis tonally identical to that given in (19) for the instrumental. Both morphemes have a single High tone in the third person forms, and both have a high and level pitch, without downstep, in the first person forms. If the first person singular prefix adds any lexical tone to the word tone pattern, then the high and level pitch on the first person singular form would need to be seen as at least as complex tonally as the low-high pattern of the third person form. Given that the first person forms in (11g) and (11i) have fewer surface tonal contrasts than the third person forms in (11h) and (11j), it is perhaps simpler to admit the lack of lexical tone on the first person singular bound argument pronoun. Given these instrumental and ventive data, the full specification analysis cannot work. The only way to make such an analysis work would require a rule merging the adjacent High tones in phrase-final position, but such a rule is not otherwise needed and would undermine the understanding of downstep in Il-Keekonyokie Maa presented in Rasmussen & Payne [2001].

3.2. Third person underspecification with default Low. A second, "third person underspecification", analysis could be proposed for Il-Keekonyokie Maa. Such an analysis would assume lexical entries for Il-Keekonyokie Maa with the third person bound argument pronoun (*ɛ*-) lexically unspecified for tone and the

Low tone supplied by a default tone rule. This thesis has been put forth for particular Bantu languages, e.g., Chichewa [Meyers 1998] and Haya [Hyman & Byarushengo 1984] *inter alia*, and even for Bantu in general [Stevick 1969], however speculative that claim may be. A default tone has phonological validity, but is added by rule, rather than being lexically specified [Snider 1999, Clark 1989, *inter alia*]. The lexical representations of the prefixes would be as in (20), leading to a derivation something like either (21) or (22). As the derivations in (21)-(22) show, the need for both a default low assignment rule and spreading causes a conflict. The derivation in (21) assumes ordering of spreading before default tone association.

(20) Lexical entries for bound argument prefixes
(Low underspecification analysis)

H	
a-	*ɛ-*
1S	3

(21) Low underspecification analysis of 'I/He will cut for him.'
(spreading before default Low tone assignment)

a.	H H L a- duŋ -akɪ(n) 1S cut DAT	e.	H L e- duŋ -akɪ(n) 3 cut DAT	Lexical entries
b.	H H L \ | | a- duŋ -oki 1S cut DAT	f.	H L | | e- duŋ -oki 3 cut DAT	Association (R to L)
c.	H H L ⋰ | | a- duŋ -oki 1S cut DAT	g.	H L ⋰ | | e- duŋ -oki 3 cut DAT	Spreading (R to L)
d.	N.A.–no empty TBUs á-dúŋ-ókì 'I will cut for him.'	h.	N.A.–no empty TBUs *é-dúŋ-ókì 'He/she/it/they will cut for him.'	Default assignment Surface realization

This derivation gives the correct form for the first person, but not for the third person form, since spreading occurs before the default Low tone is assigned. The third person form can be derived correctly by reversing the order of default tone

(22) Third person underspecification analysis of 'I/He will cut for him.'
(default assignment before spreading)

a.	H H L a- duŋ -akɪ(n) 1S cut DAT	e.	H L e- duŋ -akɪ(n) 3 cut DAT	Lexical entries
b.	H H L \ | | a- duŋ -oki 1S cut DAT	f.	H L | | e- duŋ -oki 3 cut DAT	Association (R to L)
c.	L H H L ⋮ \ | | a- duŋ -oki 1S cut DAT	g.	L L H L ⋮ ⋮ | | e- duŋ -oki 3 cut DAT	Default assignment
d.	N.A.–no empty TBUs *à-dúŋ-ókì 'I will cut for him.'	h.	N.A.–no empty TBUs è-dùŋ-ókì 'He/she/it/they will cut for him.'	Spreading (R to L) Surface realization

assignment and spreading, giving the derivation in (22).

With this ordering the third person form is correct, but the first person form is not, because an empty TBU was available for a default tone to be assigned in (22c). This default tone assignment then doesn't allow the spreading of the High onto the leftmost TBU in (22d), leaving the initial TBU incorrectly Low. The problem for the default Low analysis is that the spreading rule and the default assignment rule use the same input (an unassociated TBU), but the two rules need to operate in different cases. For the first person forms, the correct surface form can only be achieved by ordering spreading first, leaving no unassociated TBUs for default tone assignment. The third person forms, however, would need the opposite ordering, with the default Low tone assigned before the suffix tone spread onto the empty TBUs.

We now turn to a third analysis, which also uses underspecification, but assumes no default tone assignment.

3.3. First person singular underspecification (with spreading). A third possibile analysis would have the tone of the first person singular prefix unspecified, assuming lexical representations as in (23). Such an analysis was has been proposed for Ciruri (Bantu) verb roots [Botne 1990], where a High/low contrast, or a High/unspecified contrast was not sufficient to account for the data.

(23) Lexical entries for bound argument prefixes
(High underspecification analysis)

	L
a-	*ɛ-*
1S	3

Under this analysis, the High tone in the first person singular forms (10)–(12) doesn't come from the prefix, but is spread from the stem. For third person forms, the Low tone from the prefix associates after the stem tones (24f), and spreads to empty TBU's on its left (because it is the last tone on the left—(24g)). The association of the Low tone from the third person prefix blocks the spreading from any suffixal Highs, which associated further to the right. For the first person singular forms, there is no prefix tone, so the suffix High tone is the leftmost, which then spreads to the empty TBU's on its left, as shown in (24c).

(24) High Underspecification analysis of 'I/He will cut for him.'

a.	H L	e.	L H L	Lexical entries
	a- duŋ -akɪ(n)		e- duŋ -akɪ(n)	
	1S cut DAT		3 cut DAT	
b.	H L	f.	L H L	Association (R to L)
	a- duŋ -oki		e- duŋ -oki	
	1S cut DAT		3 cut DAT	
c.	H L	g.	L H L	Spreading (R to L)
	a- duŋ -oki		e- duŋ -oki	
	1S cut DAT		3 cut DAT	
d.	á-dúŋ-ókì	h.	è-dùŋ-ókì	Surface realization
	'I will cut for him.'		'He/she/it/they will cut for him.'	

According to this analysis, the suffixal High spreads to the beginning of the word in the first person singular form, while the association of the prefixal Low tone in (24f) blocks spreading of the suffixal High tone in the third person form. It produces the correct forms for both first person singular and third person, and doesn't cause conflicts with other aspects of the analysis, unlike the full specification analysis (section 3.1).

Given the data in (10)–(12) then, the best analysis for the alternation between first person singular and third person forms is underspecification of the first person

singular prefix, as exemplified in this section. The initial High tone seen on the first person argument prefix is spread from the suffix leftward to the beginning of the word.

4. The exception: morphologically simple forms

The preceeding sections have shown data which evidence a tonal split between Il-Keekonyokie Maa bound argument pronouns. In this section, I present data which evidence a neutralization of that split, beginning with morphologically simple forms.

While Il-Keekonyokie Maa verbs may take a large amount of morphology, as shown, for example, in (10)–(12), they are minimally composed of a root preceded by a bound argument pronoun, which may compose an entire clause, as in (25)–(27). I use the term "morphologically simple" to refer to those inflected forms with only an argument pronoun and an unanalyzable stem, including the Class II prefix *i-* for Class II stems.

"High and level" tone patterns (Class I roots)

(25)	(26)	(27)
a. *á-ló* 1S-go 'I will go.'	a. *í-ló* 2-go 'You (S) will go.'	a. *é-ló* 3-go 'He/she/it/they will go.'
b. *á-nyɔ́r* 1S-love 'I love (him).'	b. *í-nyɔ́r* 2-love 'You (S) love it.'	b. *é-nyɔ́r* 3-love 'He/she/it/they loves.'
c. *á-bík* 1S-stay 'I'll stay here.'	c. *í-bík* 2-stay 'Will you (S) stay here?'	c. *é-bík* 3-stay 'He/she/it/they will stay.'

Unlike the data in sections 2 and 3, i.e., (10)–(15), the tone in (25)–(27) is the same for all listed word forms, regardless of which bound argument pronoun is prefixed to the root. This "High and level" tone pattern is seen with these bound argument pronouns on all morphologically simple Class I verb forms, except for nine forms to be given and addressed in section 5.1. The same tone patterns across the forms in (25)–(27) might imply that the bound arguments are tonally identical (though the data in section 2 clearly contradict it).

(28) Splitless Analysis
The first person singular, second person, and third person bound argument prefixes bear an identical (probably High) lexical tone.

This analysis would also account for the morphologically simple class II forms in (29)–(31), where the tone pattern is again the same for all word forms given,

regardless of bound argument pronoun. Here, however, the tone pattern is High-Low, as class II stems are involved, rather than the "High and level" tone pattern for short morphologically simple verbs with Class I stems.

"High-Low" tone patterns (Class II roots)[8]

(29) a. *á-y-kèn*
1S-II-shut
'I will shut it.'

b. *á-y-sùj*
1S-II-wash
'I will wash it.'

c. *k-á-y-bèl*
DSCN1S-II-rock
'I will rock from side to side.'

(30) a. *í-n-kèn*
2-II-shut
'You (S) will shut it.'

b. *í-ø-sùj*
2-II-wash
'You (S) will wash it.'

(31) a. *é-y-kèn*
3-II-shut
'He/she/it/they will shut it.'

b. *é-y-sùj*
3-II-wash
'He/she/it/they will wash it.'

c. *é-y-bèl*
3-II-rock
'He/she/it/they will rock from side to side.'

The data in (25)–(31), by itself, could be accounted for with the Splitless Analysis, along with the assumption that Class II stems, either in the Class II prefix or the root, bear a lexical Low tone. The data in (32)–(35) might suggest that this analysis works regardless of root shape, CVC, CV, or VC.

As mentioned previously, the data in (25)–(27) vs (29)–(31) exhibit a tonal distinction between Class I and Class II verb roots in the morphologically simple derivation. So, the Splitless Analysis (28) could account for the morphologically simple

(32) 1S subjects w/ Class I roots

a. *á-bɔ́l*
'I hold/twist the cow's mouth.'

b. *á-tɔ́n*
'I will stay/sit here'

c. *á-ár èn-kítéŋ*
'I will beat the cow.'

d. *á-yá ìn-kírí*
'I will take the meat.'

(33) 3 subjects w/ Class I roots

a. *é-bɔ́l*
'He/she/it/they will open the cow's mouth.'

b. *é-tɔ́n*
'He/she/it/they will sit.'

c. *é-ár*
'He/she/it/they beats/kills it.'

d. *é-yá èn-gárí*
'The car will take it.'

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[8] The second person forms in (30a) and (30b) show the regular phonological rules /i/ → /n/ / /i/+__ (dissimilating bimorphemic high front vowels) and /n/ → ø / __ /s/ (dropping a nasal before a sibilant).

(34) 1S subjects w/ Class II roots

a. *á-y-gìs*
'I will jump.'

b. *á-y-kàsh*
'I am better than him.'

(35) 3 subjects w/ Class II roots

a. *é-y-gìs*
'He/she/it/they will jump.'

b. *é-y-kàsh*
'He/she/it/they is/are better than him.'

forms in (25)–(35). But, with addition of any other morphology on a verb, the analysis fails. All of the morphological combinations given in section 2 showed a tonal contrast between first person singular and third person. Because the pairs of verbs that are minimally different for subject are also minimally different for tone, a hypothesis that first singular, second person, and third person are tonally identical is untenable.

Given then, that the Splitless Analysis cannot account for the tonal split observed in section 2, the next section will resolve these two bodies of data into a single analysis by showing how the split observed in section 2 is neutralized in the data in (25)–(35).

5. Resolving the split and neutralized data

In this section, I propose that the "High/Low" tone split from section 2 is a lexical tonal contrast, according to the analysis in section 3. That lexical contrast is neutralized in a specific environment, as found in both the "High and level" Class I and "High-Low" Class II tone patterns of (25)–(35).

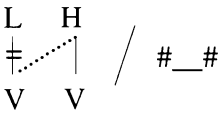
It has already been stated that the forms in (25)–(35) are morphologically simpler than those in (10)–(12); it should be noted that the forms in (25)–(35) are also words with only two morae. Either length or morphological complexity might prove useful in understanding a morphophonemically conditioned split. But I will show that the number of morae, rather than morphological simplicity, conditions the difference between the forms with the split, i.e., (10)–(12), and those without it, i.e., (25)–(35).

For reasons that will become clear, I address Class I and Class II roots independently. Section 5.1 considers a rule to account for the neutralization seen with Class I roots, making the initial assumption of length as the conditioning environment. In section 5.1.1, I give nine roots that are lexical exceptions to that rule, which also show the "High/Low" split. In section 5.1.2, I present further data which show that length, and not morphological simplicity, is the conditioning environment for neutralization. I treat the neutralization in verbs with Class II roots in section 5.2.

5.1. Class I roots. One could hypothesize that the first person singular and second person forms in (25)–(27) work the same as the first person singular forms in (10)–(12), with the first person singular prefix associated to a stem High in all cases. The simple third person forms in (27a-c) could then be accounted for by assuming the third person prefix is lexically Low, which would account for the third person

forms in (10)–(12), with the following delinking and spreading rule (36), shown with the data from (27)a.

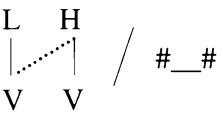
(36) Two-mora High Spread (TMHS)[9]



ex. /èlóʼ/ → [élóʼ] 'He will go.'

This rule claims that a High tone delinks a Low tone on a preceding vowel and is conditioned to apply when the only morae in the word are those two morae that are involved in the rule. Possible motivation for the delinking of the Low tone comes from the fact that rising tones are prohibited over a single mora in all environments. Thus, if spreading gave rise to the form in (37), the result would be what is seen in (36).

(37) Spreading, creating L-H rise over initial TBU



ex. /èlóʼ/ → *[ˋélóʼ] 'He will go.'

It could be said that TMHS is essentially the same spreading seen in sections 2 and 3, with a negative structure condition removing the rising tone. It should be noted, however, that this spreading is distinct from the spreading which causes the alternations seen in sections 2 and 3. In TMHS, a tone is spreading onto a TBU which is already associated to a tone, rather than to an empty TBU. TMHS is also bound by a particular phonological environment, as I will show in the following sections. If High tones regularly spread onto TBUs with Low tones, we would expect the data given in section 2 to include either spread High tones preceeded by Low tones (if the spreading is non-iterative) or no Low tones at all before High

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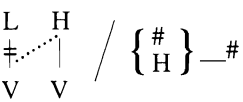
[9] This will probably ultimately be generalized to the following:



ex. /èdùŋákìníʼ/ → [èdùŋókᵏíníʼ] 'He will be cut for.'

tones (if the spreading was iterative). We see neither of these, giving evidence that the spreading in TMHS is unique to this environment.

Given these assumptions, then, TMHS (36) accounts for the neutralization of the split on the verb forms in (25)–(27) according to the derivations in (38). The tone associates and spreads normally (i.e., right to left) onto the first person argument prefix, which is lexically unspecified for tone. In the third person form, on the other hand, the stem High tone delinks the prefixal Low tone, giving a "high and level" tone pattern. The underlying forms are given according to the assumptions laid out in section 3.3, with the High tone coming from aspect/mood.

(38) Derivation of TMHS neutralization of tone patterns ('I/He will go.')

a.	H	f. L H	Lexical entries
	a- lo	ɛ- lo(t)	
	1S go	3 go	
b.	H	g. L H	Association (R to L)
	\	| |	
	a- lo	e- lo	
	1S go	3 go	
c.	H	h. — [no empty TBUs]	Spreading (R to L)
	⋰\		
	a- lo		
	1S go		
d.	— [NA]	i. L H	TMHS
		ǂ⋰˙˙|	
		e- lo	
		3 go	
e.	H	j. H	Surface realization
	/\	/\	
	a- lo	e- lo	
	1S go	3 go	
	á-ló	é-ló	
	'I will go.'	'He/she/it/they will go.'	

5.1.1. Lexical exceptions to TMHS. TMHS (36) predicts that there will not be a Low-High tone pattern on any 2-mora verb. It should be noted, however, that I

have found a few verbs that do not undergo this rule, and are pronounced low-high over only two morae. I list them exhaustively in (39).

With any additional morphology, the roots in these verbs behave tonally like other Il-Keekonyokie Maa verbs, for example, (11c) and (11d) for *gol* (39c) with the Class I causative (CAUS) and dative (DAT), repeated in (40) and (41).

(39) Lexical exceptions to Two-mora High Spread

a.	*è-dɔ́*	'The rock is red.'
b.	*è-dwá*	'He/she/it/they is/are bitter.'
c.	*è-gól ɔ-sòít*	'The stone is hard.'
d.	*è-ykó*	'He/she/it/they will do that.'
e.	*è-yrɔ́*	'He/she/it/they will speak.'
f.	*è-yshú*	'He/she/it/they is/are alive.'
g.	*è-ó ɔl-máysùrí láy*	'My banana has already ripened / is ready.'
h.	*è-pír ìn-tárè ínònó*	'Your sheep are fat.'
i.	*è-shá*	'It will rain.'/ 'It rains.'

(40) *á-ytá-gól-ˈókí*
1S-CAUS-be.strong-DAT
'I will make it strong for him.'

(41) *è-ytà-gól-ˈókí*
3-CAUS-be.strong-DAT
'He/she/it/they will make it strong for him.'

If the lexical representations of the roots in (39) bore different lexical tone from other roots, one would expect to see the impact of that tonal contrast throughout the derivations involving that root, or at least in several derivations. These roots, however, are only exceptions in the simplest form, given in (39). This lack of further exceptionality suggests that they are marked in the lexicon to disallow Two-mora High Spread (36), rather than being tonally distinct from other roots in the lexicon.

Further, the first person singular inflections for the verbs in (39) are High and level in (42), like the simple first person singular forms with all other roots–compare, for example, (25)a–(25)c.

(42) First person singular forms

a.	*á-gól*	'I am strong.'
b.	*á-yshú*	'I am alive.'
c.	*á-pír*	'I am fat.'

This means that the tonal distinction for these roots only affects the third person inflection, as the verbs in the first person singular inflection are tonally identical to verbs with other roots. Also, the forms in (39) and (42) show the same "High/Low" tonal split seen in (10)–(12).

The "exceptions" to Two-mora High Spread in (39) are thus further evidence for a regular "High/Low" split between first person singular and third person. These roots, being exceptions to the neutralization in (36), have the same argument prefix split as do the forms in (10)–(12). In other words, the forms in (39) are exceptions to Two-mora High Spread (36), but fall into the regular "High/Low" pattern, as in (10)–(12). This confirms that there really is just one pattern of High/Low split for 1S vs. 3 subjects, and that there is a specific rule (36), with a specific phonological context (two morae), with specific lexical exceptions (39), that accounts for all exceptions to that split.

5.1.2. Longer roots. TMHS (36) claims that length alone, and not morphological simplicity, is the environment that conditions the neutralization of argument prefixes in verbs with Class I stems. This is difficult to test with the available data, since most Il-Keekonyokie Maa verb roots in the available data have a (*ɪ*) CVC structure, and few are longer—so morphological simplicity and short length generally go together. To conclusively prove the environment for (36), we need (a) verbs which are longer than two morae, yet morphologically simple, as well as (b) verbs that are only two morae, yet morphologically complex. If we find both (a) and (b), we would expect only one of them to neutralize the split, and which one does would indicate the correct environment for (36).

(43) Longer morphologically simple Class I forms.

a. *á-ádɔ́*
1S-be.tall
'I am tall.'

b. *ɛ̀-àdɔ́*
3-be.tall
'He/she/it/they is/are tall.'

c. *á-dámʊ́*
1S-remember
'I remember.'

d. *ɛ̀-dàmʊ́*
3-remember
'He/she/they remember(s).'

e. *á-lálá*
1S-be.wide
'I am wide.'

f. *ɛ̀-làlá*
3-be.wide
'It is wide.'

g. *á-mʊ́rát*
1S-circumcise
'I will circumcise (him).'

h. *ɛ̀-mʊ̀rát*
3-circumcise
'He/she/it/they will circumcise him.'

i. *á-rrúgúm*
1S-vomit
'I will make him vomit.'

j. *ɛ̀-rrʊ̀gúm*
3-vomit
'He/she/it/they will make him vomit.'

While there are not many (b) verbs (short but complex), there are a few (a) verbs which are longer but not apparently more complex, as shown in (43). Those familiar with Nilotic morphology may question the morphological simplicity of some of these pairs, such as (c-d), which may historically have the ventive *-ʊ*, and (e-f), which looks like it has the middle form, though it has a different tone pattern from the normal middle form (which is High-Low on the final two morae—as in (10e-f)). At least (a-b), (g-h), and (i-j), however, have no apparent synchronic or diachronic analysis.

As (36) predicts, the "High and level" pattern in (25)–(27) breaks down for longer Class I roots, as seen in (b), (d), (f), (h), and (j). The tone pattern for longer simple third person forms is Low initially, then High on the final mora, while the first person forms are High and level. In fact, these longer roots show the same "High/Low" split found in (10)–(12), only here on morphologically simple roots. Since these roots have no evidence of morphological complexity and do not undergo neutralization, it cannot be maintained that morphological simplicity is the conditioning factor for the neutralization in (25)–(27).

In sum, the fact that the data in (43) show the same "High/Low" split as in (10)–(12) indicates that it is not morphological simplicity, but length, which is the environment that conditions the "High and level" neutralization in (25)–(27), and that there is, again, a single High/Low split pattern.

To establish length as the conditioning factor in (36) the only question left concerns the presence of (b) verbs: two-mora morphologically complex forms. Do these forms show neutralization of the split? The following data is at least diachronically morphologically complex, though the synchronic complexity is uncertain. But it is the only minimal pair of verbs avaliable with both no more than two morae and also (potentially) morphologically complex.

(44) a.	*á-bá-w*	b. *ɛ́-bá-w*
	1S-reach-VENT	3-reach-VENT
	'I will arrive.'	'He/she/it/they will arrive.'

The data in (44) show the neutralization of the "High/Low" split, unlike the ventive data in (11i-j), which has a Low-High contrast in the third person form. This neutralization of the expected contrast may provide evidence that morphological simplicity does not condition the neutralization of that split. It is not clear, however, whether what is clearly the ventive morpheme diachronically is synchronically distinct from the root, or if they have become lexicalized into a single morpheme. Unfortunately other short but complex forms are unavaliable at this time.

The data in (43), then, show that with more than two morae, morphologically simple verbs with Class I stems do not show neutralization, but rather the "High/Low" split. It is not entirely clear yet, but there is some evidence in (44) that morphological simplicity is not required for neutralization of the "High/Low" split. So, verbs with only two morae exibit neutralization of the "High/Low" split, with or without morphological simplicity, and verbs with more than two morae do not.

Thus, length, and not morphological complexity, is established as the conditioning factor for TMHS (36).

5.2. Class II roots. Section 5.1 showed that the "splitless" tone pattern for Class I roots in (25)–(27) can be seen as a neutralization of the "High/Low" split, conditioned by length. Similarly, the "High-Low" simple Class II pattern in (29)–(31) can be seen as a neutralization conditioned by length, though in a slightly different manner. Rather than a lexical phonological rule that eliminates the split, this neutralization would be the result of the association of one tone to each TBU.

Looking at the stem tones (i.e., those that don't alternate for argument prefix—recall section 1.3) in the data so far presented, one notices a fairly limited set of patterns. Depending on the derivation of the stem, the stem has a certain number of tones: either one (e.g., (11g) vs. (11h)), two (e.g., (10e) vs. (10f)), or three (e.g., (11c) vs. (11d)). These tones associate right to left, filling all TBUs, including the ultimate, penultimate, and antepenultimate, respectively. Assuming stem tones, being on the right, associate before argument tones, which are on the left, the number of stem tones will determine where the argument tones associate.

According to this way of looking at the data, the simple Class I roots (section 5.1) have one stem tone, so the High tone spreads from the ultimate mora in the first person singular forms, leftward to the beginning of the word. The third person Low tone, and thus the split in argument prefix tone, is realized on the penultimate mora, as in (43). The Penultimate mora is also the first mora on two mora words (39), though this is neutralized in most forms by TMHS (36), as in (25)–(27).

Class II roots, on the other hand, have two stem tones, so these tones associate with the ultimate and penultimate TBUs (29)–(31). Because the stem tones com-

(45) Analysis of simple Class II neutralization

a.	H L	e. L H L	Lexical entries
	a-ygɪs 1S-jump	ɛ-ygɪs 3-jump	
b.	H L / |	f. L H L / |	Association (R to L)
	a-ygɪs 1S-jump	ɛ-ygɪs 3-jump	
c.	— [no empty TBUs]	g. — [no empty TBUs]	Spreading (R to L)
d.	*áygìs*	h. *éygìs*	Surface form
	'I will jump.'	'He/she/it/they will jump.'	

pletely fill the TBUs, the third person argument prefix Low tone cannot associate (and is presumably deleted), so the "High/Low" split does not surface. The derivations are given in (45). With longer words, however, the antepenultimate tone associates to the antepenul-timate mora, so the "High/Low" split is again realized on the surface, as in (46).

(46) Simple Class II verb forms with three morae

a. *á-y-nínìŋ*
1S-II-listen.RED
'I will listen.'

b. *è-y-nínìŋ*
3-II-listen.RED
'He/she/it/they is/are listening.'

c. *á-y-rɔ́wùà*
1S-II-be.hot
'I am hot.'

d. *è-y-rɔ́wùà*
3-II-be.hot
'He/she/it/they is/are hot.'

e. *á-y-tɛ́rrɛ̀*
1S-II-faint
'I will faint.'

f. *è-y-tɛ́rrɛ̀*
3-II-faint
'He/she/it/they will faint.'

g. *á-y-rúrà*
1S-II-sleep
'I am asleep.'

h. *è-y-rúrà*
3-II-sleep
'He/she/it/they is/are asleep.'

The additional TBU allows the prefix tone to associate, allowing the "High/Low" split to surface, as in (47). This analysis neutralizes the "High/Low" split for verb forms with class II roots that have just two morae, but accounts for the split occurring on longer words.

The analysis presented in this section for verbs with Class II stems accounts for the neutralization of the "High/Low" split in an entirely different way than the Two-mora High Spread (36), which accounted for the neutralization in verbs with Class I stems (25)–(27). Because the analyses for verbs with each of these two classes of stems differ, we might expect the neutralizations to have different properties. And this is what we find: unlike Two-mora High Spread (36), which is a phonological rule with several lexical exceptions, i.e., the roots in (39), the analysis in (47) has no room for lexical exceptions, as there is no rule which might be susceptible to lexical specification. The neutralization analysis in (47) is merely a matter of the relationship of the number of tones to the number of TBUs in a given verb. This prediction of an exceptionless split is met by the lack of exceptions (so far) to the simple class II High-Low tone pattern over two morae verbs, regardless of root.[10]

[10] The roots in (39d) and (39e) above, however, may prove to be Class II, in which case they would seem exceptional. However, I don't have data with these roots in other derivations, so I am not sure if they are Class II stems. There is data indicating that (39f) is not a class II root. It is an

...continued on next page

(47) Analysis of simple Class II non-neutralization

a.	H L a-yrʊra 1S-sleep	d.	L H L ɛ-yrʊra 3-sleep	Lexical entries
b.	H L \ | a-yrʊra 1S-sleep	e.	L H L \ \ | ɛ-yrʊra 3-sleep	Association (R to L)
c.	H L ⋰\ | a-yrʊra 1S-sleep	f.	— [no empty TBUs]	Spreading (R to L)
d.	*áyrʊ́rà* 'I will sleep.'	i.	*èyrʊ́rà* 'He/she/it/they will sleep.'	Surface form

6. Conclusion

The first person singular underspecification analysis may or may not match analyses proposed for other Nilotic person marking systems. The only published analysis including a bound-pronominal split, for any Nilotic language, is Dimmendaal's [1983] analysis of Turkana. His analysis for Turkana seems essentially the same as my Full Specification Analysis as given in 3.1 above.[11] While Full Specification may work for Turkana (and perhaps for other Nilotic languages), claiming a lexically specified High tone for the first person singular bound argument pronoun is not ideal for a synchronic analysis of Il-Keekonyokie Maa.

The analysis presented in this paper claims that every tone after (and including) the first High tone on the third person forms is due to the stem, indicating that the same tones are also due to the stem in the first person singular forms. Consider the first pronunciation given for (11e) and (11f), presented here in (48). The stem tones are viewed as the same, since the pair of words is minimally different for subject,

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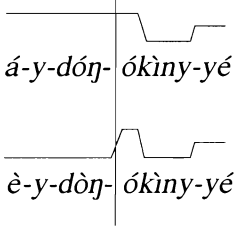
interesting coincidence that these three roots have ıCV stem structure, unlike the ıCVC forms in (29)–(31) and (46).

[11] While a fully specified pronominal tone split is given in Dimmendaal [1983], it is clearly not a focal point of the 1983 work, and it is not clear whether underspecification of any of those pronouns was considered. Thus, it may be of little consequence if Maasai requires a different analysis.

and identical in stem. The initial High tone in the first person singular form, then, is contiguous with a High tone from the stem. One could claim that there are two distinct High tones in the first person singular forms, which are not distinguished on the surface, but it would be simpler just to say that there are no more High tones in the first person singular forms than in the third person forms, with adjacent high morae considered to be associated to the same High tone (49), in accordance with the OCP.

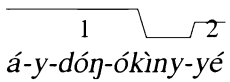
(48) argument tones | stem tones



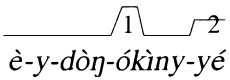
1S-II-beat-DAT-INST
'I will use it to pound for him.'

3-II-beat-DAT-INST
'He/she/it/they will use it to pound for him.'

(49)



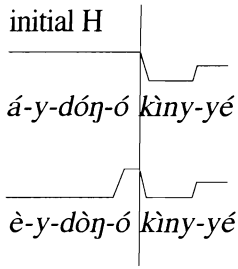
= two high tones



= two high tones

Thus, if one were to claim that there is a lexical High tone on the first person singular prefix, one would also need to claim that there is merger of adjacent Highs in each and every verb with an initial High tone. This would be the case because the initial surface tone is not distinguished phonetically from the stem High tone; the word tone is high and level from the beginning of the word to the mora which is the leftmost High tone in the third person form (i.e., the first stem tone). Put differently, the domain of morae associated to the initial High tone in the first person singular forms always includes one mora (the rightmost—before the verticle line in (50)) which is also High in the same derivation with a third person subject, as throughout (10)–(12).

(50)



In other words, the first and third person forms share at least one High-toned mora, which is contiguous with the word initial High tone in the first person singular forms of (10)–(12). If one were to claim that the tone to the left of the vertical line in (50) were due to the argument prefix for first person singular, one would also need to say that the third person tone is Low-High—unless there is some reason that the high tone on *-ókì* should come from the argument prefix in the first person singular form, but from the stem in the third person form.

Alternatively, one might defend full specification by saying that the stems exibit tonal allomorphy for each of the argument prefixes, with one fewer High tone after first person singular forms, though this gains nothing over the analysis in section 3.3, but only adds complexity.

Thus, there is no clear empirical evidence that the High tone on first person singular, second person, etc. forms comes from those prefixes, as opposed to being spread from the stem. Requiring full specification of tone also increases the complexity of the analysis unnecessarily and without any apparent benefit. Beyond considerations of economy and unnecessary complexity, when the instrumental and ventive data discussed in section 3.1 are considered, it is clear that a lexically independent tone on the first person singular prefix is untenable.

Finally, we have seen that for both Class I and Class II roots, the tonal alternation between first and third person is neutralized over only two morae. I propose that this neutralization occurs, on the one hand, by a spreading rule (36) that delinks the third person Low tone in most two-mora words with Class I roots, and, on the other hand, by having fewer TBUs in the word than tones in the word tonal melody for Class II roots, as in (47).

Given this analysis, then, we can say that there is a lexical split between first and third persons. Surface "High" prefixes (1S, 2, etc.) are lexically unmarked for tone and the "Low" prefix (3) is lexically marked Low. Lexically toneless morae then receive tone by spreading from the stem on the right. All deviations from this split have been accounted for in Section 5.

While this paper has focused on the contrast between the first person singular an the third person bound argument prefixes, it is likely that the the first person singular prefix is tonally identical to the second person prefix (i.e., *í-lám* from Table 4), as well as to the first person singular acting on second person singular prefix (i.e., *áá-lám* from Table 4), and to the third person acting on second person singular or second person acting on first person singular prefix (i.e., *kí-lám* from Table 4).

This analysis now sets the stage for a comprehensive analysis of the whole verb argument prefix system of Il-Keekonyokie Maa, allowing the interactions between the rest of the morphology on verbs to be studied.

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UNGENERALIZABLE MINIMALITY IN NDEBELE*

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ZAS

A body of work in Prosodic Morphology clearly establishes the importance of prosodic constituents like the foot as templates conditioning morpheme size. A striking finding of this research is that morphological footing is independent of metrical footing in many languages, as the footing required for particular morphological processes is often not identical to that required for phonological processes like stress assignment. However, recent OT research on Prosodic Morphology has made the opposite claim. Within this theory, the Generalized Template Hypothesis (GTH) proposes that no morpheme-particular templates defining minimal and maximal size are necessary. Instead, templates are always derivable from general principles of the grammar, like independently motivated metrical footing. This paper presents evidence from Ndebele showing that the GTH is too strong. In Ndebele, several different verb forms are subject to a minimality condition. In some cases, the minimality condition can be derived through independent metrical footing, as the GTH predicts. However, in several cases it cannot, showing that morpheme-particular size constraints are still a necessary part of the grammar.

1. Introduction

The goal of this paper is to make both a descriptive and a theoretical contribution to the understanding of the phonology-morphology interface in Ndebele, a Nguni Bantu language spoken primarily in Zimbabwe. The descriptive goal is to examine the role of minimality in motivating morpho-phonological alternations in five verb forms of Ndebele: the imperative, future, reduplicative, participial and passive. I will

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An earlier version of this paper was published as Downing [2000b]. This version supercedes and, I trust, improves on that version.

show that more than one minimality condition is necessary to account for the Ndebele facts. The theoretical goal is to examine how best to formalize these distinct minimality conditions in the Optimality Theoretic (OT) framework of current phonological theory. Formalizing minimality is an issue because most recent work on prosodic morphology within Optimality Theory (see, for example, McCarthy [2000]; McCarthy & Prince [1994, 1995a,b, 1999]; Spaelti [1997]; Urbanczyk [1995, 1996]; Walker [2000]) argues that there are no morpheme-particular templates, like distinct minimality constraints for different verb constructions. Instead, a disyllabic (foot size) minimality constraint on a morpheme, for example, should universally follow from defining that morpheme as a Stem. As McCarthy [2000] argues, morphological Stems are universally parsed as PhWords. (This correlation is called the Stem → PrWord Homology [McCarthy 2000]; note that PrWord and PhWord are equivalent terms.) Further, PhWords necessarily contain a metrical foot since they dominate a foot in the Prosodic Hierarchy [McCarthy & Prince 1986]. As a result, Stem morphemes are necessarily minimally bisyllabic since they are parsed as PhWords, and PhWords must contain a minimally bisyllabic metrical foot. There is no need for a templatic minimality constraint on morphemes, like Stem=Foot (or RED=Foot, etc.).

In this paper, I will show that minimality in Ndebele cannot easily be accommodated in the proposal that all disyllabic minimality effects can be derived by the Stem → PrWord Homology. Even though the five different verbs forms of Ndebele all roughly take the verb stem as their base and are all subject to a disyllabic minimality condition, in only two cases, the imperative and future, can the minimality condition be derived by the Stem → PrWord Homology. In the other cases, it cannot, and the minimality condition must be formalized as a morpheme-particular template. The argument is structured as follows. In section 2, I provide some phonological and morphological background on Ndebele. In sections 3-6, I discuss each of the verbal forms in turn, showing why each is subject to a distinct minimality constraint. In section 7, I discuss the theoretical implications of the analysis.

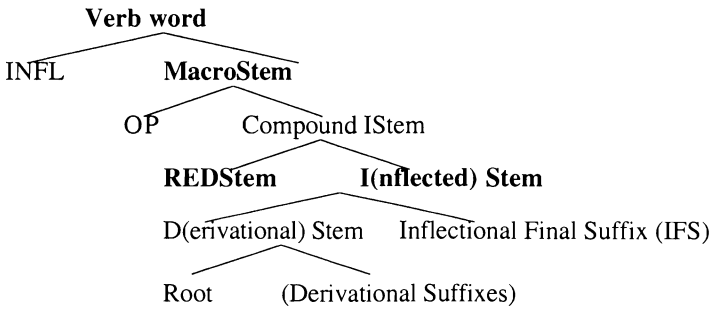
2. Background

2.1 Phonological background. All of the Ndebele data is cited in the orthography (except where clearly indicated otherwise). It is important to note that all consonant sequences in Ndebele orthography are phonetically single sounds—e.g., 'kh' = [k^h]; 'hl' = [ɬ]; 'dl' [ɮ]; mb = [^{m}b]; etc.—and syllable structure is strictly (C)V. Also, in Ndebele orthography 'y' is the palatal glide; 'j' is a palatal affricate and 'c', 'q', 'x' are the dental, retroflex, and lateral clicks, respectively. Note that acute accents indicate high tone (unaccented vowels have a low tone) in the data below, while a colon following a vowel indicates length. (As will be discussed in more detail below, penultimate syllables are always lengthened.)

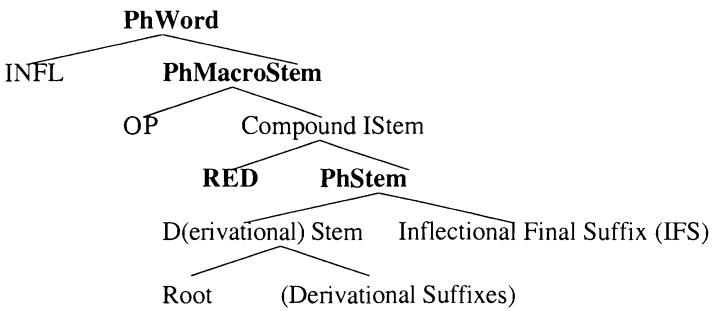
2.2. Bantu verb structure: morpho-syntactic and morpho-prosodic. As background to the analyses presented below, it is important to note that I am assuming,

as shown in (1a), that Bantu verb words consist of two distinct constituents: the inflectional prefixes (INFL) and the Stem (Inflected Stem). Work by Barrett-Keach [1986], Hyman [1993], Hyman & Mtenje [1999], Mchombo [1993], Myers [1987, 1998] and Mutaka [1994], among others, shows there is both phonological and morphological evidence for this structure in numerous Bantu languages. (This is also the traditional view of Bantu verb structure presented in work like that of Doke [1943, 1954] and Meeussen [1967].)

(1) a. The morpho-syntactic structure of verb words in Bantu (adapted from Myers [1987]; Hyman & Mtenje [1999])



b. The morpho-prosodic structure of verb words in Ndebele



The constituents of the verb word which are important for this paper are: the verb word itself, the Macro-Stem, consisting of the Object Prefixes (OP) plus the Inflected Stem [Kisseberth 1984; Odden 1996]; the reduplicant (REDStem); and the I(nflected) Stem, consisting of the D(erivational) Stem (the Root, followed by optional derivational suffixes) plus an obligatory Inflectional Final Suffix (IFS). I argue below that these four morpho-syntactic constituents are parsed into the four distinct morpho-prosodic constituents shown in (1b). This proposal assumes, following work like Inkelas [1989, 1993] and Selkirk [1986], that all phonological rules apply within morpho-prosodic domains, rather than domains defined directly on morpho-syntactic structure. As a result, every morphological constituent (M-constituent) which serves as a domain for phonological or prosodic rules must

have a corresponding morpho-prosodic constituent (Ph-constituent), and it is this Ph-constituent which interacts with the phonology. Following work like that of Czaykowska-Higgins [1996, 1998], Downing [1999b] and Inkelas [1989, 1993], I assume that sublexical morphological constituents also have corresponding Ph-constituents. In the default case, the Ph-constituent is coextensive with the corresponding M-constituent. However, the two may be misaligned, for example, by constraints requiring the Ph-constituent to be of minimal size. I shall show that PhWord, PhMacroStem, RED, and PhStem (bolded in (1b)) are all subject to distinct minimality constraints in Ndebele.

3. PhWord

3.1. Imperative. Work like that of Brandon [1975], Herman [1995], Mutaka [1994] and Myers [1987, 1995] has established the importance of PhWord as a phonological domain in many Bantu languages. The motivation for the PhWord as a constituent in much of this work comes from examining the imperative form of verb stems, since the imperative is the only context where verb stems may occur unprefixed in most Bantu languages. As shown in (2a), Ndebele follows this general pattern: the imperative form of most verbs consists of the bare verb stem. But in (2b) we see that monosyllabic stems are augmented by epenthesizing a syllable in the imperative. And in (2c) we see that vowel-initial stems are (optionally) augmented by epenthesizing an onset in the imperative.

(2) Imperative verbs in Ndebele (Downing field notes; Rycroft [1983]; source of the H tone is underlined; '=' indicates the INFL=MacroStem juncture)

	Infinitive	Imperative	
a. C-initial, Multisyllabic	*úkú=do:nsa*	*do:nsa*	'to pull'
	úkú=bhukú:tsha	*bhukú:tsha*	'to swim'
	úkú=khi:pha	*khi:pha*	'to put out'
	úkú=búthéle:la	*buthelé:la*	'to heap up'
b. C-initial, Monosyllabic	*úkú:=lwa*	*yí:-lwa*	'to fight'
	úku:=phá	*yi:-phá*	'to give'
	úku:=zwá	*yí:-zwa*	'to hear'
	úkú:=fa	*yí:-fa*	'to die'
c. V-initial	*úkw=á:la*	*(y-)á:la*	'to refuse'
	úkw=éla:pha	*(y-)elá:pha*	'to cure'
	úkw=éthu:la	*(y-)ethú:la*	'to go down'
	úkw=ábi:sa	*(y-)abí:sa*	'to help divide'

Optional epenthesis in the vowel-initial stems can be motivated by the Onset Principle [Itô 1986; Downing 1999b]. The best motivation for syllable epenthesis in the imperative form of monosyllabic stems is that, as argued by Myers [1987] for Shona, another Bantu language, PhWords are cross-linguistically required to be minimally bisyllabic. As work like McCarthy & Prince [1986, 1994, 1995b] and Selkirk [1995] has argued, this follows from the prosodic hierarchy. PhWord dominates Foot in the hierarchy, so by the Headedness Principle of the Strict Layer Hypothesis [Selkirk 1984, 1995; Nespor & Vogel 1986], PhWord must dominate a Foot. Since Feet are minimally bisyllabic, then PhWords must be, too. As we can see in the data in (2), Ndebele words are, in fact, stressed on the penultimate syllable (this is indicated by lengthening the penult vowel), as is typical in Southern Bantu languages [Doke 1954; Myers 1987]. It is plausible to propose that in Ndebele, too, the minimality requirement on PhWords falls out from a requirement that they dominate a bisyllabic foot.

The minimality and Onset conditions on PhWord can be formalized by the constraints listed in (3). These constraints and ranking optimize misaligning the MWord (in this case the bare verb stem) with PhWord by epenthesis in order to satisfy minimality and Onset. The analysis is exemplified in (4).[1] Note that in this tableau, '[' indicates a PhWord edge,'(' a foot parse. As shown in this tableau, it is not optimal to misalign MWord and PhWord by epenthesis when MWord satisfies prosodic well formedness (compare (4a) with (4b)). However, when MWord is subminimal (as in (4d)) or lacks an onset (as in (4f)), it is optimal to misalign

(3) Constraints on minimality and onset conditions on PhWord

a. **Headedness** (adapted from Selkirk [1995], fig (4ii)):
A PhWord must dominate a metrical Foot.[2]

b. **FtMin:** Feet are minimally bisyllabic.

c. **Onset:** *AlignL(σ, μ_s)

OUTRANK

d. **PhWord≈MWord**: PhWord is coextensive with MWord

e. **DEP-IO**: Output segments must have input correspondents.

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[1] To complete the analysis, one must explain why [yi] is the epenthesized syllable, rather than some other. It is actually not surprising that [yi] should be epenthesized since [i] is a common epenthetic vowel, probably due to its inherent shortness and resulting inherent lack of sonority [Steriade 1995; Pulleyblank 1998]. This generalization can be formalized, following Pulleyblank (1998), by a harmonic ranking placing DEP[+hi,-back] below other featural faithfulness constraints. To account for why only a single trochaic foot is parsed at the right edge of the word in Ndebele, I propose that **AllFtR** (a constraint requiring all feet to be aligned at the right edge of the word) outranks **Parseσ** (a constraint requiring all syllables to be parsed into feet). Since none of these constraints are ever violated, they will not be included in the tableaux.

[2] By metrical foot, I mean a foot that has a head which is more prominent than the other elements of the foot (through stress, length, pitch). See Crowhurst [1992] for detailed discussion of this distinction between the morphological and metrical foot.

(4)

	Headedness	FtMin	Onset	PhWord≈ MWord	DEP-IO
/donsa/					
☞ (a) [({do:nsa})]					
(b) [YI{(do:nsa})]				*!	**
/lwa/					
☞ (c) [(YI:{lwa})]				*	**
(d) [({lwa})]		*!			
/ala/					
☞ (e) [(Y{a:la})]				*	*
(f) [({a:la})]			*!		

MWord and PhWord by epenthesizing enough material to satisfy prosodic well-formedness constraints (as shown in (4c,e)).

To sum up this section, imperatives provide our first evidence that morpho-prosodic constituents in Ndebele are subject to a bisyllabic minimality constraint. Imperatives are PhWords. Since PhWord is the domain for stress assignment in Ndebele, the minimality requirement on imperatives falls out from the requirement that PhWord dominate a stress foot. For comparison with cases to be discussed later, it is also important to note that epenthesis of phonologically unmarked material before the morphological base is the strategy used to satisfy minimality in the imperative.

3.2. Future. The imperatives illustrate one sort of mismatch between morphological and morpho-prosodic constituency, namely, the PhWord in this case contains material not found in the morphological word to satisfy minimality. In this section, I argue for another sort of mismatch between PhWord and morphological word, namely when a single morphological word is parsed into two PhWords. The evidence for this comes from the Future construction in Ndebele, and we will see that both PhWords that make up a Future morphological word are subject to minimality.

As shown in (5a), the future prefix in Ndebele is *-za-*. The data in (5b, c) show that when monosyllabic verbs and V-initial stems occur in the future tense, they are augmented by /ku/ (which alternates with [kw] before non-round vowels and [k] before round vowels). However, /ku/ does not occur with these same verb stems if they are preceded by an object prefix (OP), as shown in (5d).[3]

(5) Future verb forms in Ndebele (Downing field notes); future prefix is *-za-*

a. C-initial, Multisyllabic

si:-za=thí:ya	'we will fish'
bá:-za=phendu:lwa	'they are being turned around'
bá:-za=tshele:la	'they will slip'
si:-za=khanzí:nga	'we will fry'

b. C-initial, Monosyllabic

si:-za=ku:-lwa	'we will fight'
bá:-za=ku:-zwa	'they will hear'
bá:-za=ku:-pha	'they will give'

c. V-initial

si:-za=kw-ehli:sa	'we will bring down'
bá:-za=kw-e:qa	'they will jump'
bá:-za=kw-a:kha	'they will build'
ngi:-za=k-o:ndla	'I will raise; rear'
bá:-za=kw-abela:na	'they will divide for each other'

d. V-initial, Monosyllabic + OP

bá:-za=m-éqi:sa	'they will make him/her jump'
si:-za=m-esabí:sa	'we will frighten him/her'
si:-za=bá:-pha	'we will give them'
ú:-za=bé:-zwa	's/he will hear them'[4]

Since /ku-/ only surfaces with monosyllabic and vowel-initial MacroStems (OP+Stem), its occurrence clearly has a prosodic motivation: it allows these MacroStems to be minimally bisyllabic and begin with onsets.

In order to formalize the minimality constraint on the MacroStem, we must first determine which morpho-prosodic constituent it is parsed into. Notice, first, that the penult vowel of both the INFL and the MacroStem are lengthened. As

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[3] An identical alternation pattern in the future tense has been identified in Kirundi, a Bantu language spoken mainly in Burundi. See Aronoff [1988], Downing [1998b], Goldsmith & Sabimana [1986], and Myers [1998] for discussion.

[4] The verb stem /-zwa/ 'to hear' has a "latent" initial 'i' which occasionally affects the vowel quality of some preceding prefixes. In most respects, however, verbs like /-zwa/ pattern with monosyllabic verbs, not vowel-initial ones.

noted in discussing the imperatives, penult length is the correlate of stress assignment to the word in Ndebele. Normally, we do not expect to find more than one long vowel per word.[5] Since we find two long vowels, /ku-/ plausibly begins a distinct PhWord from the preceding Future INFL, so that words like those in (5) have the following morpho-prosodic parse:

(6) a. [bá:za]$_{PhWd}$[ku:pha]$_{PhWd}$ 'they will give'
b. [bá:za]$_{PhWd}$[kwa:kha]$_{PhWd}$ 'they will build'
c. [bá:za]$_{PhWd}$[tshele:la]$_{PhWd}$ 'they will slip'

Further evidence that the MacroStem following the Future INFL begins a new PhWord comes from the tone patterns of these forms. In Ndebele, as in other Nguni languages (see Cassimjee [1998]; Downing [1990, 1996]; Rycroft [1980, 1983] and references cited therein), high tones shift rightwards. The rightmost high tone generally surfaces on the antepenult of the word, even if the syllable which contributes the high tone is several syllables to the left of the antepenult and must cross a MacroStem boundary to reach the antepenult. This is illustrated in (7) where we see the H tone from the H-toned subject prefixes (underlined) spreads across the stem boundary to the antepenult syllable. Note that *ya-* is the present affirmative focus prefix and *-ile* is the past tense suffix; both are underlyingly low-toned.

(7) a. *ú-yá=vódlo:za* 's/he is crushing'
b. *bá-yá=tshéle:la* 'they are slipping'
c. *bá=lím-i:le* 'they farmed'
d. *ú-yá=búthéle:la* 's/he is heaping up'
e. *bá-yá=phéfúmu:la* 'they are breathing'

These data show that the prefixal H tone crosses the morphological stem boundary (=) to reach the antepenult when the stem has no H tone. However, as shown in the data in (8), H tones do not shift long distance across word boundaries. In these data (taken from Rycroft [1983]), notice that H tones of the first word do not spread to the following word even when it is all low-toned. I conclude from this that long distance tone spread is word-bound. In terms of the theory adopted here, that means it takes PhWord as its domain. Notice that the H tone of the SP *bá-* 'they' does not spread rightwards to the MacroStem in the Future forms. This

[5] While /ku/ resembles the infinitive prefix (and historically, the Future in Ndebele, as in many Bantu languages, may well be derived from the verb 'to come' (*-za* in Ndebele) plus an infinitive complement [Nurse & Muzale 1999]), synchronically, the future tense forms cited in (5) are single verb words. That /ku/ is distinct from the infinitive prefix can be seen from comparing the data in (5) with true infinitival complements, where /úku-/ is obligatorily present no matter how long the verb is and whether or not the verb has an OP: e.g., *si:-za=za:ma úkú=ba-lwí:sa* 'we will try to fight them'. Notice the infinitival complement has an OP (bá- 'them') and the stem itself (*-lwisa* 'cause to fight') is bisyllabic, yet /úku-/ obligatorily occurs on the infinitive.

(8)	*akú:kho bantwa:na*	'there are no children'
	akú:kho zikhwa:ma	'there are no bags'
	akú:kho ndlwanya:na	'there is no small house'
	ábáfá:na be:thu	'our boys'
	ízi:nto za:khe	'his/her things'

tone pattern is expected if the INFL and MacroStem are distinct PhWords; it is totally unexpected otherwise.

The empty morph /ku/ surfaces, then, to satisfy minimality conditions on PhWord.[6] To explain why there is a correlation between the form of the base stem and the occurrence of this empty morph, I propose that the Future must be constrained to affix only to a prosodically well-formed base, PhWord. This requirement can be formalized with the constraint in (9a) which outranks the general alignment constraint (9b) defining the optimal position of INFL as adjacent to the MacroStem.

(9) (a) **AlignFut**: Align(R, Future INFL; L, PhWord)
Align the right edge of the Future INFL with the left edge of a PhWord.

OUTRANKS

(b) **AlignINFL**: Align(R, INFL; L, MacroStem)
Align the right edge of INFL with the left edge of a MacroStem.

What remains to be explained is why /ku/ does not surface when not needed to satisfy prosodic well-formedness. I propose this can be accounted for by ranking constraint AlignINFL (9b) above MAX-IO and below the prosodic constraints: Onset, Minimality>> AlignINFL>>MAX-IO. As shown in (10), this optimizes not realizing /ku/ when the morphological MacroStem is prosodically well-formed. /ku/ optimally surfaces when the MacroStem is monosyllabic or V-initial. Even though maintaining /ku/ in the output violates AlignINFL (9b), deleting it leads to violations of the higher ranked prosodic well-formedness conditions (Onset, Minimality) on PhWord. However, as shown in (10e), when the morphological MacroStem satisfies the prosodic well-formedness constraints (Minimality and Onset), it is optimal for /ku-/ not to surface.

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6 What is less clear is /ku-/'s morpho-syntactic status, since it is an empty morph with no identifiable morpho-syntactic function. As its occurrence correlates with a particular tense/aspect (Future), it is plausible to propose it is a daughter of INFL. However, since it cannot co-occur with OPs and occurs in order to satisfy prosodic well-formedness constraints on the MacroStem, it is just as plausibly a daughter of the MacroStem. To resolve this ambiguity, I propose that /ku/ is morpho-syntactically unaffiliated (and so unpositioned in the input). See Booij & Lieber [1993] and Downing [1998b] for discussion and analysis of other cases of prosodically positioned morphemes, and reference to other work on this topic. And see Downing [2000b] for an analysis of how /ku-/'s surface position and morpho-prosodic parse can be determined solely by constraint interaction.

(10)[7]

	Align Fut	Align /ku/	Onset	FtMin	DEP-IO	Align INFL	MAX-IO
/si-za=(ku)-lwa/							
☞ (a) si:za=[ku:-{lwa						*	
(b) si:za=[{lwa				*!			**
/ba-za=(ku)-eqa/							
☞ (c) ba:za=[kw-{e:qa						*	
(d) ba:za=[{e:qa			*!				**
/si-za=(ku)-thiya/							
☞ (e) si:za=[{thi:ya							**
(f) si:za=[ku-{thi:ya						*!	

To sum up this section, I have shown that the Future takes a morpho-prosodic constituent, PhWord, as its base for affixation, as well as a morphological base, the MacroStem. This best explains why the base of the Future INFL is subject to minimality: (morpho-)prosodic constituents are typically required to be prosodically well-formed. As in the imperative, the minimality condition on the base (and on the Future INFL) falls out from the requirement that a PhWord must be parsable into a metrical foot.

4. PhMacroStem

A similar pattern of alternations to those found in the Future is found in the Participial form of the verb (used, for example, in subordinate clauses introduced by the complementizer úmá 'if'). As I will show in this section, though, the Participial takes a different morpho-syntactic Base from the Future and so requires a different minimality constraint.

As shown in (11a), there is no independent tense/aspect marker in the Participial form of the verb in Ndebele (or other Nguni languages; see Cassimjee [1998] for discussion of the participial in closely-related IsiXhosa). However, some of the subject prefixes (*bé-* 'they'; *é-* 's/he') are distinct from those used in other affirmative tenses (*bá-* 'they'; *ú-* 's/he'). The data in (11b,c) show that when monosyllabic and V-initial stems occur in the participial, they are augmented by /si/ (which alternates with [s] before vowels). However, /si/ does not occur with these same verb stems if they are preceded by an object prefix (OP), as shown in (11d). Since /si/ only surfaces with monosyllabic and V-initial MacroStems, its occurrence

[7] In this tableau, '=' indicates the right edge of INFL, '[' indicates PhWord edge, '{' indicates the MacroStem edge. Even though the empty morphs are necessarily ordered in the input for typographic reasons, the parentheses around them serve as a reminder that they are actually ordered only in the output by alignment constraints.

(11) Participial verb forms in Ndebele (Downing field notes)

(a) Multisyllabic, C-initial

é=qá:nsa	'...s/he is climbing...'	*é=qá:nsa-qá:nsa* 'reduplicated'
é=ngení:sa	'...s/he is putting in...'	
bé=bó:na	'...they see...'	
bé=lí:ma	'...they are farming...'	

(b) Monosyllabic

bé=si:-dla	'...they are eating...'
ngi=si:-pha	'...I am giving...'
ngi=sí:-wa	'...I am falling...'

(c) V-initial

bé=s-éhli:sa	'...they are bringing someone down'
bé=s-éhlí-y-éhli:sa	reduplicated form of 'they are bringing s.o. down'
é=s-á:kha	'...s/he is building...'
u=s-o:ma	'...you are thirsty...'

(d) Monosyllabic and V-initial + OP

e=b-ákhé:la	'...s/he is building for them...'
ngi=kú:-pha	'...I am giving you...'

clearly has the same prosodic motivation as for the empty morph /ku-/ occurring in the Future: it allows these MacroStems to be bisyllabic and begin with onsets.

In the preceding section it was argued that the MacroStem following the Future INFL is a PhWord since stress is assigned to both the Future INFL and the MacroStem, and tone from a prefix in INFL does not spread into the MacroStem. These same tests show that /si/ does not begin a distinct PhWord from the preceding Participial INFL. Notice in (11) that only a single vowel in the participial verb word is lengthened: the penult vowel of the MacroStem. Further, the H tone of the Subject Prefix spreads to the MacroStem. This is expected if the MacroStem and INFL are part of the same PhWord, but unexpected if they are distinct PhWords. Finally, notice the participial INFL consists of a single syllable, and so is too short to constitute a distinct PhWord. I propose instead that /si/ is parsed into PhMacroStem (the morpho-prosodic constituent based on the MacroStem). Since PhMacroStem is a subconstituent of PhWord, as shown in (1b), it correctly is contained within the same tone and stress assignment domain as the Participial INFL.

PhMacroStem must further be subject to a minimality constraint particular to that constituent:

(12) **PhMacro(Stem) = Foot**: PhMacroStem is coextensive with a Foot.

PhMacroStem minimality (12) cannot fall out from Headedness (3a), since PhMacroStems, unlike PhWords, are not required to dominate a metrical foot. Further,

PhMacroStem, unlike PhWord, is only required to satisfy minimality in certain morphological contexts, like the Participial. Monosyllabic and V-initial MacroStems occur unaugmented in other morphological contexts, like the infinitive (e.g., *ukú:=pha* 'to give'; *úkw=á:kha* 'to build'; /úku-/ is the infinitive prefix) and the *-ya-* tense in the data in (13), below. (Notice that the stress falls outside the MacroStem in the monosyllabic examples, confirming PhMacroStem does not necessarily dominate a metrical foot.)

(13) No augmentation of monosyllabic and V-initial stems in other contexts

(a) Monosyllabic

si-ya:=lwa	'we are fighting'
kṵ-ya:=tsha	'it is burning'
bą́-ya:=dla	'they are eating'
si-ya:=pha	'we are giving'

(b) V-initial

si-y=e:hla	'we are going down'
si-y=a:kha	'we are building'
bą́-yá=m-éhli:sa	'they are making him/her go down'
si-y=o:tha	'we are basking'

(c) Multisyllabic, C-initial

si-ya=khwę́:la	'we are climbing'
si-ya=ngęní:sa	'we are putting in'
bą́-yá=do:nsa	'they are pulling'

Although the Participial takes a different morpho-prosodic constituent as its Base than the Future—the PhMacroStem rather than the PhWord—the rest of the analysis of this form is identical to that of the Future. An alignment constraint particular to the Participial (14a) outranks the usual alignment constraint (14b) requiring INFL and the MacroStem to be adjacent:

(14) (a) **AlignPart**: Align(R, Participial INFL; L, PhStem)
Align the right edge of the Participial INFL with the left edge of a PhStem.

OUTRANKS

(b) **AlignINFL**: Align(R, INFL; L, MacroStem)
Align the right edge of INFL with the left edge of a MacroStem.

Ranking AlignINFL (14b) above MAX-IO and below the prosodic constraints (Onset, Minimality>> AlignINFL>>MAX-IO) accounts for why /s(i)-/ only surfaces when required to satisfy the prosodic constraints. As shown in (15), this optimizes

(15)[8]

	Align Part	Align /si/	Onset	PhMacro, FtMin	DEP -IO	Align INFL	MAX-IO
/be=(si)-pha/							
☞ (a) be=[si-{pha						*	
(b) be=[{pha				*!			**
/be=(si)-akha/							
☞ (c) be=[s{akha						*	*
(d) be=[{akha			*!				**
/be=(si)-bona/							
☞ (e) be=[{bona							**
(f) be=[si-{bona						*!	

deleting the empty morphs when the morphological MacroStem is prosodically well-formed.

As shown in (15a,c), the /si/ optimally surfaces when the MacroStem is monosyllabic or V-initial. Even though maintaining /si-/ in the output violates AlignINFL (14b), deleting it leads to violations of the higher ranked prosodic well-formedness conditions (Onset, Minimality) on PhMacroStem. However, as shown in (15e), when the morphological MacroStem satisfies Onset and Minimality, it is optimal to delete /s(i)-/ to satisfy AlignINFL (14b).

To sum up this section, I have shown that the Participial, like the Future, takes the MacroStem as its morphological base for affixation. Like the Future, it also takes a morpho-prosodic base. This best explains why the base of the Participial INFL is subject to minimality: (morpho-)prosodic constituents are typically required to be prosodically well-formed. I have shown that the Future and Participial do not take the same morpho-prosodic constituent as their base, however. The Future takes the PhWord, while the Participial takes the PhMacroStem. As a result, the Participial minimality requirement does not fall out from the general principal of Headedness (3a) that accounts for minimality in PhWords.

5. RED

In Ndebele, as in many other Bantu languages (see Downing [2000a] and references cited therein), verb stems can be reduplicated to indicate that the action of the verb is done for a short period of time or in a careless fashion. As shown by the data in (16a), RED is maximally bisyllabic: no matter how long the Base verb stem is, RED never exceeds two syllables. The data in (16b) show that RED is also

[8] In this tableau, '=' indicates the right edge of INFL, '[' indicates PhStem edge, '{' indicates the MStem edge. Even though the empty morphs are necessarily ordered in the input for typographic reasons, the parentheses around them serve as a reminder that they are actually ordered only in the output by alignment constraints.

minimally bisyllabic. Monosyllabic stems are augmented by [yi], just as in the imperatives. The only difference is that [yi] follows the RED segments corresponding to the Base stem, while in the imperative [yi] preceded the segments corresponding to the input stem.

(16) Ndebele reduplication (Downing field notes)
(RED is bolded; source of the H tone is underlined; '=' indicates the INFL = MacroStem juncture)[9]

	Infinitive	Reduplicated	Gloss
(a) *Multisyllabic, C-initial*			
	úkú=do:nsa	*úkú=**donsá**-do:nsa*	to pull
	úkú=há:mba	*úkú=**hamba**-há:mba*	to go
	úkú=hambí:sa	*úkú=**hambi**-hambí:sa*	to cause to go
	úkú=khanzí:nga	*úkú=**khanzi**-khanzí:nga*	to fry
	úkú=límísa:na	*úkú=**límí**-límísa:na*	to help ea. other farm
(b) *Monosyllabic*			
	úkú:=lwa	*úkú=**lwayí:**-lwa*	to fight
	úku:=dlá	*úkú=**dlayí:**-dla*	to eat
	úku:=zwá	*úkú=**zwayí:**-zwa*	to hear
	úkú:=za	*úkú=**zayí:**-za*	to come
	úkú:=fa	*úkú=**fáyi:**-fa*	to die

Since REDs, like imperatives, are minimally bisyllabic and minimality is satisfied in a similar way for REDs and imperatives, one might assume that REDs are also PhWords. If this were so, then the minimality condition on REDs could also fall out from the requirement that PhWords must dominate stress feet. However, there are two important arguments why REDs are not PhWords. The first is that, if RED were a separate PhWord, we would expect its penult vowel to be lengthened under stress. However, as is clear from the data in (16), REDs are not assigned stress. Only the penult vowel of the entire reduplicated form (INFL=RED+Base stem) is lengthened, showing that both RED and the Base stem are contained within a single PhWord to which stress is assigned. The second is that, as argued above, if RED were a separate PhWord from the Stem, we would expect High tones to be blocked from shifting into the Stem. Since H tones clearly shift to RED and its Base from the preceding prefixes, as shown in (16), they must be within the same PhWord as the prefixes and cannot be separate PhWords themselves.

Since RED is not a PhWord, then the minimality restriction on REDs cannot follow from the same general constraints on metrical footing defining PhWord

[9] See Hyman, Inkelas & Sibanda (1999) for discussion of reduplication in a different dialect of Ndebele.

minimality that apply in the imperative and Future. (It is clear that RED is also a distinct morpho-prosodic constituent from the MacroStem, as it forms a subconstituent of the MacroStem.) Instead, I propose that RED minimality is accounted for by the constraints and ranking given in (17).[10]

(17) (a) **RED=Ft**
i. The RED string is coextensive with a foot.
ii. The RED string is associated with the weight-bearing elements of a foot.

(b) **FtBin**
i. FtMin: Feet are minimally bisyllabic (see (3b)).
ii. FtMax: Feet are maximally bisyllabic.

(c) **SMAX-BR**: Every segment of the Base (B) has a correspondent in the RED (R).

(d) **Ranking**: RED=Ft, FtBin >> SMAX-BR, DEP-IO

Note that the Foot defining the RED size cannot be a metrical foot, unlike the foot defining the minimal PhWord, since RED is not stressed. Instead, the feet in (18) are purely prosodic, non-headed feet, parsing the RED string into a binary constituent. The analysis is exemplified in (18).

(18)

	RED=Ft	FtMin, FtMax	Onset	SMAX-BR	DEP-IO
/RED-hambisa/					
☞ (a) (hambi)-hambi:sa				**	
(b) (hambisa)-hambi:sa		*! (Max)			
/RED-lwa/					
☞ (c) (lwaYI:)-lwa					**
(d) (lwa)-lwa		*! (Min)			

10 See Downing [2000a] for detailed arguments in favor of this approach. Crowhurst[1992] and Mutaka & Hyman[1990] present arguments for distinguishing morphological feet (like those used to define RED size) from stress feet, showing minimality effects cannot always be derived from independently motivated footing in other languages.

The analysis given here does not explain why the epenthetic /y/ that separates the RED and the Base of V-initial stems is not copied, as predicted by work like that of McCarthy & Prince [1993a]. Downing [1998b] accounts for this by proposing that the REd in these words corresponds to the input base, not the output (by high ranking DEP-IR). This problem becomes moot in Pulleyblank's [to appear] approach which eliminates BR correspondence in favor of IR correspondence.

As shown in (18a), it is optimal to partially reduplicate longer Base stems in order to satisfy FtMax. It is also optimal to augment monosyllabic Base stems by epenthesis, as shown in (18c), to satisfy FtMin.

To sum up this section, while REDs, like PhWords and PhMacroStems, are minimally bisyllabic, this condition cannot be accounted for by parsing REDs as PhWords or PhMacroStems. The lack of stress on REDs and their ability to be a target for prefixal H tones shows that they are not themselves PhWords, but rather subconstituents of PhWord. RED is also clearly a subconstituent of PhMacroStem. As a result, RED is subject to a distinct minimality condition from the other verb constructions discussed so far.

6. PhStem

The final verb construction I will discuss is the Passive. As shown in (19a), the passive suffix is *-w-*, occurring after the final consonant of the IStem. The data in (19b,c) show that when monosyllabic (C-V) verbs and minimal vowel-initial (VC-V) stems occur in the passive, they are augmented by an epenthetic [i] before the passive glide /-w-/. Note in (19d), the epenthetic [i] does not occur with these same stems if another derivational suffix precedes the passive /-w-/.

(19) Passive verbs in Ndebele (Downing field notes)
(source of the H tone is underlined; '=' indicates the INFL=MacroStem juncture)

	Infinitive	Passive	Gloss of Infinitive
(a) *Multisyllabic, C-initial stems*			
	úkú=hleːk-a	*úkú=hleːk-w-a*	to laugh (at)
	úkú=linganíːs-a	*úkú=linganíːs-w-a*	to measure
	úkú=cé:l-a	*úkú=cé:l-w-a*	to request
(b) *Monosyllabic*			
	úkuː=ph-á	*úkúː=ph-íː-w-a*	to give
	úkuː=dl-á	*úkúː=dl-íː-w-a*	to eat
(c) *V-initial* (VC-V)			
	úkw=áːkh-a	*úkw=ákh-iːw-a*	to build
	úkw=éːnz-a	*úkw=énz-iːw-a*	to do
	úkw=ó-sa	*úkw=ós-iːw-a*	to roast

(d) *Derived stems*

úkúː=lw-a	*úkúː=lwiːs-a*	*úkúː=lwiːs-w-a*
'to fight'	'to fight (tr.)'	'passive'
úkw=éːnz-a	*úkw=énziːs-a*	*úkw=énziːs-w-a*
'to do'	'to cause to do'	'passive'

Since the epenthetic [i] only surfaces with underived monosyllabic and vowel initial (VC-V) stems, its occurrence clearly has the by now familiar prosodic motivation: it allows these IStems to be minimally bisyllabic. As argued in detail in Downing [1998a, b; 1999b], VC-V stems pattern with C-V stems because the initial vowel is extraprosodic. Excluding the initial vowel from the stem improves the well-formedness of the stem by allowing it to begin with an onsetful syllable. However, once the initial vowel is excluded from these stems, they are subminimal, and so predictably pattern with CV stems in triggering [i] epenthesis.

In order to complete the analysis of [i] epenthesis in the passive, we must determine which morpho-prosodic constituent is evaluated for minimality in this morphological construction. Using our usual tests of stress and tone placement, we can see in (19) that the passive stem is not a separate PhWord. Notice that H tones from the prefixes surface within the passive stem. This would not be expected if a PhWord boundary separated the passive stem from the prefixes. The passive stem is also distinct from PhMacroStem. As shown in (19) and by the additional data in (20), not only INFL prefixes but also prefixes within the MacroStem like RED and the empty morph /ku/ co-occur with the epenthetic [i], showing they do not count to satisfy minimality.

(20) Only IStem material (following '[') counts for passive stem minimality in Ndebele

	Passive infinitive	Gloss	
(a)	úk=ó[s-i:-w-a	to be roasted	úk=**osí**-y-ó[s-i:-w-a 'reduplicated'
(b)	úku=[ph-i:-w-a	to be given	úku=**phiwá**-[ph-i:-w-a 'reduplicated'
(c)	kú-ya=[dl-í:w-a	it is being eaten	
(d)	í-y=á[kh-i:w-a	it is being built	
(e)	kú:za=[dl-í:w-a	it will be eaten	* kú:za=[ku:-dl-w-a
(f)	kú:za=k-o[s-í:w-a	it will be roasted	

I propose that the relevant constituent for Ndebele passive minimality is the passive PhStem, the morpho-prosodic constituent corresponding to the morphological I-Stem. The minimality condition on this constituent is formalized in (21):[11]

(21) **PhStem = Foot**: PhStem (passive) is coextensive with a Foot.

The analysis is exemplified in (22), where we see that ranking the minimality constraints PhStem (21) and FtMin (3a) above DEP-IO optimizes epenthesizing [i] when the passive stem would otherwise be subminimal, as in (22c, e). However,

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[11] See Downing [1999] and Herman [1996] for a similar analysis of related facts in SiSwati, a closely related Nguni Bantu language.

the same constraint ranking penalizes epenthesizing [i] when the input passive stem is two syllables or longer.

(22)

	PhStem, FtMin	DEP-IO
/úku=hlek-w-a/		
☞ (a) uku=[hlek-w-a		
(b) uku=[hlek-iw-a		*!
/uku=ph-w-a/		
☞ (c) uku=[ph-iw-a		*
(d) uku=[ph-w-a	*!	
/uku=akh-w-a		
☞ (e) uku=a[kh-iw-a		*
(f) uku=a[kh-w-a	*!	

7. Implications for the Generalized Template Hypothesis

In the analyses in the preceding sections, I have shown that five different verbal constructions in Ndebele—the imperative, future, participial, reduplicative, and passive—are subject to minimality. Even though the same minimal size (a bisyllabic Foot) is imposed on all these constructions, it is not possible to formalize this shared minimality restriction as a single, general constraint. We instead need four constraints, one for each morpho-prosodic constituent motivated by these verb forms. As I have shown, the imperative and future provide evidence for PhWord minimality. However, the minimality constraints active in the participial, reduplicative and passive forms are imposed on subconstituents of PhWord. The participial motivates a minimality condition on its prosodic base, the PhMacroStem. The reduplicative morpheme (RED) is subject to a minimality condition on its own size (but imposes no active minimality condition on its base). The Passive PhStem must be distinct from the PhMacroStem, as MacroStem material is ignored in determining the satisfaction of Passive PhStem minimality.

The proposal that we need four distinct minimality constraints in Ndebele is at odds with recent OT work on prosodic morphology [McCarthy 2000, McCarthy & Prince 1994, 1995, 1999; Spaelti 1997; Urbanczyk 1995, 1996; and Walker 2000; among others] which argues that constraints on morpheme shape should fall out from generalized "templates" rather than morpheme-particular size restrictors like PhStem=Ft (20) or RED=Ft (8a). McCarthy [2000:169] summarizes the Generalized Template Hypothesis (GTH) especially concisely:

"According to the GTH, there are no prosodic templates or other morpheme-specific structural constraints. Instead, the descriptive effects of prosodic templates are to be obtained from the following premises, each of which is independently motivated:
"*Stem → PrWord homology*. The principal, and perhaps only, morphology-prosody interface constraint is Align-Stem [with PhWord].
"*Markedness constraints*. Universal grammar supplies phonological markedness constraints which are not sensitive to morphology.
"*Correspondence theory* [McCarthy & Prince 1993a, 1994a, 1995, 1999]. Correspondence theory extends the original OT conception of faithfulness into a general way of relating representations. This allows certain seemingly templatic effects to be obtained from general markedneess constraints [C] ranked so as to allow emergence of the unmarked[:...] MAX-IO >> C >> MAX-BR."

Morpheme-particular minimality conditions can be subsumed by the Stem → PrWord Homology as follows.[12] Any morpheme that is subject to a minimality condition is to be considered a Stem morphologically. Since Stems are aligned with PhWords by the Stem → PrWord Homology and PhWords minimally dominate one bisyllabic metrical foot by the Strict Layering Hypothesis (see section 3, above), defining a morpheme as a Stem indirectly enforces minimality by these independently needed constraints. This is what makes this theory of minimality general: only a small set of universal morpheme categories (Stem, Root, Affix) is recognized by the theory. Stress is universally assumed to take the PhWord (which in the default case must contain a stem) as its domain. As a result, universal constraints on minimal foot size can be generalized to enforce minimal bisyllabicity for any morphological constituent parsed as a PhWord.

As McCarthy & Prince [1994] make clear, defining minimality indirectly by these general constraints has the important advantage of explaining other phonological properties of morphemes besides the fixed size. For example, in Diyari, the reduplicant is a bisyllabic prefix and the second syllable always ends in a vowel, even if the corresponding base syllable is closed, as shown in (22).

(22) Diyari reduplication [McCarthy & Prince 1994: 250, fig. (29))

wíl̪a	***wíl̪a***-*wíl̪a*	'woman'
kánku	***kánku***-*kánku*	'boy'
kúɭkuɲa	***kúɭku***-*kúɭkuɲa*	'to jump'
tʲílparku	***tʲílpa***-*tʲílparku*	'bird sp.'
ɲánkan̪̈ti	***ɲánka***-*ɲánkan̪̈ti*	'catfish'

[12] The interaction of markedness and faithfulness constraints are most important for enforcing a maximality condition on morphemes. See Downing [2000a] for discussion. And see Urbanczyk [1996] for discussion of how general constraints on Root and Affix size can account for other size constraints on reduplicants.

As McCarthy & Prince [1994] argue, labelling the reduplicant a Stem (=PhWord=Foot) correctly predicts not only the bisyllabic minimal size condition on the reduplicant, but also accounts for the fact that the reduplicant is stressed. And it also accounts for why the reduplicant is vowel-final, even though syllables (and feet) can end in consonants. Consonant-final syllables can only occur word-medially in Diyari; all words must end with vowels. All of these properties—the minimal size, stress assignment, ending with a vowel—fall out from defining the reduplicants as stems, given the Stem → PrWord Homology. Accounting for the bisyllabic minimality condition with a morpheme-specific constraint like RED= Foot, in contrast, would make no predictions about stress and would wrongly predict that the reduplicant foot, like other feet, can end with a consonant.

Similarly, in Ndebele, defining the imperative and the Future's base as PhWords accounts not only for their minimally bisyllabic size, but also accounts for tone and stress assignment in these forms. Morpheme-particular minimality constraints, like "Imperative=Foot" or "Future subcategorizes for Foot," would not. However, the other Ndebele verb forms discussed here show it is too strong to claim that all bisyllabic minimality effects fall out from the Stem → PrWord Homology. RED, the PhMacroStem, and the Passive PhStem are all subject to a disyllabic minimality condition, yet they fail the independent phonological tests for PhWords. This shows that morpheme-particular size constraints are still a necessary part of universal grammar. And, in fact, this should not be a surprising result. An important contribution of the theory of Prosodic Morphology [McCarthy & Prince 1986, and others] has been to establish that morphology as well as phonology can provide evidence about the prosodic structure of a language. While this work shows that prosodic morphology and phonology draw on the same repertoire of foot types, numerous papers show that different principles can define the morphological and phonological (or metrical) footing in the same language. For example, McCarthy & Prince [1990] argue that while metrical feet in Classical Arabic are moraic trochees assigned from the right edge of the word, the fixed shape defining broken plurals and diminutives is an iambic foot whose segmentism corresponds to a moraic trochee parsed at the left edge of the related base form. Likewise Spring [1990] (see, too, McCarthy & Prince [1993a,b]; Crowhurst [1992]) argues that in Axininca Campa minimal words are quantity-insensitive bisyllabic feet: words consisting of a single bimoraic syllable are quite rare. However, metrical feet defining stress assignment are quantity sensitive iambs: stress feet consisting of a single bimoraic syllable are quite common. (See Crowhurst [1992] for detailed analysis of several examples like this.) And as Poser [1990] shows, languages like Japanese require a bimoraic foot to define minimality conditions on hypocoristic formation and other morphological processes even though Japanese is not a stress language (and, Poser argues, the footing required for these morphological processes is distinct from that proposed in metrical accounts of Japanese pitch-accent). Ndebele confirms this distinction between metrical footing and the footing required to define morphological processes like minimality, since some verb constructions are subject to minimality even though they are not parsed into metrical feet.

8. Conclusion

In sum, all bisyllabic minimality conditions on verb constructions in Ndebele cannot be accounted for by the Stem → PrWord Homology. It is most likely to be valid, in fact, for languages where Stem and morphological word are generally coextensive, and stems are not typically distinct phonological domains from words. However, in Bantu languages like Ndebele, and in other agglutinative and polysynthetic languages (see, e.g., Czaykowska-Higgins [1996, 1998]), unaffixed stems are not morphological words. Instead, stems are distinct morphological and phonological domains from words. As a result, it is not surprising that the Stem (and other major sublexical constituents) within Ndebele words turn out to be subject to size constraints distinct from those applying to words.

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EVIDENCE FOR HEAD RAISING IN KISWAHILI RELATIVE CLAUSES*

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The author presents evidence from Kiswahili supporting a head-raising analysis recently proposed in Kayne (1994) and Bianchi (1999), in which the relative clause is generated as a complement of the determiner. Three kinds of evidence are presented: (1) selectional relations between demonstratives and some relative clauses; (2) quantified noun phrase-pronoun binding, in which the bound pronoun appears inside the head of the relative clause while its binder is located in the relative clause; and (3) relativization of objects comprising part of idiomatic expressions. The evidence supports both the head-raising hypothesis and the determiner complementation hypothesis.

1. Introduction

Analyses of Bantu relative clauses within the Principles and Parameters framework have assumed the existence of a null wh-operator binding the variable inside the relative clause [Demuth & Harford 1999; Harford & Demuth 1999; Ngonyani 1999; Kinyalolo 1991; Barrett-Keach 1985]. In this structure, represented in (1), the relative clause (the complementizer phrase or CP) appears adjoined to the right of the head NP. The head of the relative clause is base-generated in a position outside the relative clause. The wh-phrase moves from a position inside the relative clause. This analysis is based on the assumption that the relative clause is a modifier of the head. It is consistent with the standard adjunction analysis of relative clause constructions [Chomsky 1977].

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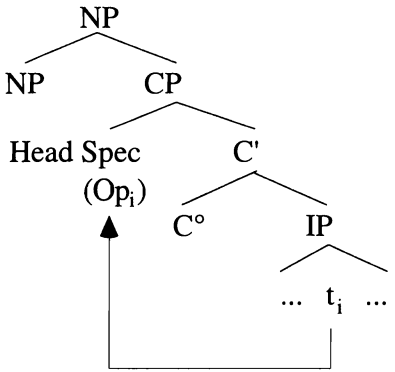
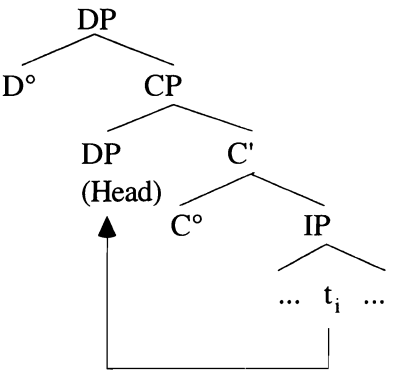
(1)



Recently, the adjunction analysis of relative clauses has been called into question and an alternative has been advanced. Kayne [1994] proposes to analyze the relative clause as complement of the determiner (D°). The head of the relative clause occupies the specifier of the CP position. The head of the relative clause is base-generated inside the relative clause. In some languages, the head raises to a position outside the relative clause. This analysis is shown in (2). This head raising analysis shows that the relative clause is a sister to D°, head of the Determiner Phrase (DP) and, therefore, a complement.

(2)



In this paper, I present evidence from Kiswahili that favors the head-raising analysis. Using examples similar to those of Bianchi [1999], I show that some relative clauses exhibit selectional relations with demonstratives. More evidence comes from binding and scope reconstruction and from idiom chunks. Before examining the evidence, a brief overview of relative clause constructions in Kiswahili is presented.

2. Kiswahili Relative Clauses

Kiswahili has four relative clause constructions that are illustrated below (from Ngonyani [1999]). All relative clause verbs contain a relative marker (REL) made up of */-o-/* and an agreement marker attached before it.[1] The constructions are exemplified below with the relative clauses in square brackets.

(3) a. *vi-tabu [amba-vyo Juma a-li-nunu-a] ni ghali* C1
8-book amba-8.REL Juma 1-PST-buy-FV COP expensive
'The books Juma bought are expensive.'

b. *vi-tabu [a-li-vyo-nunu-a Juma] ni ghali* C2i
8-book 3S-PST-8.REL-buy-FV Juma COP expensive
'The books Juma bought are expensive.'

c. *vi-tabu [a-si-vyo-som-a Juma] ni-ta-vi-uz-a* C2ii
8-book 3S-NEG-8.REL-read-FV Juma 1S-FUT-8-sell-FV
'The books that Juma does not read I will sell.'

d. *vi-tabu [a-nunu-a-vyo Juma] ni ghali* C3
8-book 3S-buy-FV-8.REL Juma be expensive
'The books Juma buys are expensive.'

The first construction (C1 in (3a)) has REL affixed to *amba-*, marking the left edge of the relative clause. The second construction (C2i) has REL following the tense marker.[2] In the third construction (C2ii), REL appears after the negative marker *-si-*, a negation marker different from that found in main clauses.[3] Finally, in the fourth construction (C3), non-tensed verbs may take REL as a suffix, as shown in (3d).

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[1] Abbreviations:

APP	applicative	INF	infinitive prefix	PST	past tense
CAUS	causative	NEG	negative	REL	relative
CON	connective	P	plural	RFL	reflexive
FUT	future tense	POSS	possessive	S	singular
FV	final vowel	PR	present tense	SP	subject prefix
HAB	habitual	PASS	passive	T	tense marker

Numbers alone in the glosses identify noun classes, and follow the traditional numbering system for Bantu languages. Numbers with S or P identify person.

[2] The only relevant tenses are past *–li-*, present *–na-*, and future *–ta-/-taka-*. Other tense markers do not co-occur with this construction.

[3] Negation in the main clause is marked twice on the verb as the contrast between the affirmative and negative sentences shows in the following.

i. Watoto walinunua vitabu 'The children bought books.'
ii. Watoto hawakununua vitabu 'The children did not buy books.'

The verb in sentence (ii) carries the negative prefix *ha-* followed by the subject marker and the negative form of the past tense.

There are four features of interest with respect to relative clauses. The first feature is the existence of a gap in an argument position (an A-position), clearly seen when the object is relativized, as shown in (4). The relative clause enclosed in square brackets does not have an object in the canonical post-verbal position.

(4) *tu-ta-nunu-a vi-tabu [amba-vyo bondia a-ta-andik-a ---]*
we-FUT-buy-FV 8-book [amba-8.REL1.boxer 1-FUT-write-FV]
'we will buy the books that the boxer will write'

The second feature, island effects, such as the Complex NP Constraint, can be observed in (5). The object of *-nunua* 'buy' in (5b) is *gari* 'car.' However, this noun is a constituent of a complex NP, *mgeni aliyeuza gari* 'the guest who sold the car.' This NP is complex because it is made up of a head and a relative clause. Relativization of constituents of such NPs is prohibited—the Complex NP Constraint. Relativization of *gari* 'the car' has extracted the NP from inside the complex NP, thereby violating the subjacency constraint. These effects were first noted in Kiswahili by Barrett-Keach [1985]. The gap and subjacency effects suggest the existence of wh-movement in Kiswahili relative clause constructions (see also Ngonyani [1999]).

(5) a. *m-geni a-li-ye-uz-a gari*
1-guest 1-PST-1.REL-sell-FV 5.car
'the guest who sold a car'

b. **gari wa-li-lo-nunu-a m-geni a-li-ye-uz-a*
5.car 3P-PST-5.REL-buy-FV 1-guest 1-PST-1REL-sell-FV
'the car they bought the guest who sold'

The third feature is the complex morphological structure of REL as found in many Bantu languages. For example, Kiswahili REL is made up of two parts: (i) agreement that co-varies with the head of the relative clause; (ii) a constant, (for example, in Kiswahili *-o* (dubbed as "-o of reference" Ashton [1947])). The examples in (6) illustrate some of the Swahili RELs.

(6) a. *m-toto ni-li-ye-mw-ona* → *niliyemwona*
1-child 1S-PST-1.REL-1-see
'the child whom I saw'

b. *wa-toto ni-li-w+o-wa-ona* → *niliowaona*
2-child 1S-PST- 2+REL-2-see
'the children whom I saw'

c. *m-ti ni-li-u+o-u-ona* → *niliouona*
3-tree 1S-PST-3+REL-3-see
'the tree which I saw'

d. *mi-ti ni-li-i+o-i-ona* → *niliyoiona*
4-tree 1S-PST-4+REL-4-see
'the trees which I saw'

e. *ki-tabu ni-li-ki+o-ki-ona* → *nilichokiona*
7-book 1S-PST-7+REL-7-see
'the book which I saw'

Let us take (6b), for instance. The head of the relative clause is a Class 2 noun. The relative marker combines Class 2 agreement *-wa-* and *-o-* to derive *-o-*. The relative marker is made up of a single syllable. The two parts of REL always coalesce into one syllable. Ngonyani [1999] analyzes the relative marker as the head of the CP to which a verbal element incorporates. The verbal elements are: (a) *amba-* which is diachronically derived from a verb *kuamba* 'to say/speak'; (b) tenses and negation (Inflection heads or INFL); and (c) the verb stem. I shall come back to the status of REL as the head of the complementizer projection in §6 below.

The fourth feature is verb movement, from verb to inflection to complementizer (V-to-I-to-C). Using VP ellipsis and VP adverbs, Ngonyani [1998, 1996] suggests that, in Kiswahili tensed clauses, the verb moves from its base-generated position inside the VP to incorporate into an Inflection head (INFL). Furthermore, Demuth and Harford [1999] and Harford and Demuth [1999] suggest that what appears to be subject-verb inversion in object relative clauses in some Bantu languages, including Kiswahili, is a result of the verb raising to C. Their evidence is the prevalent correlation between the affixal REL and inversion as in Kiswahili, while languages with a disjunctive REL lack this phenomenon. Kiswahili has both, as shown in (7).

(7) a. *vi-tabu a-li-vyo-nunu-a Juma ni ghali*
8-book 3S-PST-8.REL-buy-FV Juma COP expensive
'The books Juma bought are expensive.'

b. **vi-tabu Juma a-li-vyo-nunu-a ni ghali*
8-book Juma 3S-PST-8.REL-buy-FV COP expensive
'The books Juma bought are expensive.'

c. *vi-tabu amba-vyo Juma a-li-nunu-a ni ghali*
8-book amba-8.REL J. 3S-PST-buy-FV COP expensive
'The books Juma bought are expensive.'

Subject-verb inversion is obligatory for object relativization with affixal REL as the ungrammatical sentence in (7b) shows. In addition to subject-verb inversion, Kiswahili has an alternate form using an independent form *amba*-REL (7c). This is comparable to what is found in other Bantu languages, such as Sesotho, in which only the independent word REL is found and subject-verb inversion is not permitted.

Having sketched out a description of the relative clause construction, I shall now present evidence, first, to show selectional relations between the determiner and the relative clause, and subsequently, to demonstrate that reconstruction effects and idiom chunks suggest that the head is generated inside the relative clause.

3. Selectional Effects

In certain constructions we find relative clauses exhibiting features consistent with selection by demonstratives. Consider the relationship between the demonstrative and the relative clause in these common expressions. In (8a) and (8b), the relative clauses are complements of the demonstratives *kile* and *yule*, respectively.[4] The use of the demonstrative with a clause that is not marked for relativization results in ungrammatical constructions, as demonstrated by the examples in (9).

(8) a. *ki-le [wa-li-cho-ki-it-a u-chokozi]*
7-that 3P-PST-7.REL-7-call-FV 14-provocation
'that which they called provocation'

b. *yu-le [a-na-ye-m-tak-a] h-a-j-i*
1-that 3S-PR-1.REL-1-want-FV NEG-1-come-NEG
'That one whom she/he wants is not coming.'

(9) a. **ki-le wa-li-ki-it-a u-chokozi*
7-that 3P-PST-7-call-FV 14-provocation
'what they called provocation.'

b. **yu-le [a-na-m-tak-a] h-a-j-i*
1-that 3S-PR-1-want-FV NEG-1-come-NEG
'the one she/he I wants is not coming.'

In the two examples in (9), the clause that appears after the demonstrative does not have a relative marker. These ungrammatical sentences show that the relative clause is selected by the demonstrative. That is, the relative clause is the complement of the demonstrative. There is agreement between the head noun, the determiner and the relative marker (REL). The determiner selects an NP or a relative clause. These facts suggest that the determiner is generated outside the relative

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[4] Kiswahili has three demonstratives: (a) proximate, (b) medial, and (c) distal, illustrated below. Notice the agreement between the noun and the demonstrative. All three demonstratives can occur in the relative construction incoprorating the demonstrative.

	Proximate	Medial	Distal
a.	*kitabu hiki* 'this book'	*kitabu hicho* 'that book'	*kitabu kile* 'that book'
b.	*mtu huyu* 'this person'	*mtu huyo* 'that person'	*mtu yule* 'that person'
c.	*miti hii* 'these trees'	*miti hiyo* 'those trees'	*miti ile* 'those trees'
d.	*mawe haya* 'these rocks'	*mawe hayo* 'those rocks'	*mawe yale* 'those rocks'

clause. This is further supported by the interpretation of the distributivity of a universal quantifier in its relation with determiners presented in the next section.

4. Binding and Scope Reconstruction

Further evidence in support of the head raising analysis is found in the interpretation of pronouns bound by quantified noun phrases (QNP) found lower in the relative clause, as the example in (10) shows.

(10) *ki-tabu ch-ake$_i$ ch-a kwanza [amba-cho kila mw-andishi$_i$*
7-book 7-3S.POSS 7-CON first amba-7.REL every 1-writer

hu-ji-vun-i-a t] hu-w-a ki-zuri sana]
HAB-RFL-be proud-APP-FV HAB-be-FV 7-good very
'Her/his first book for which the writer is very proud is very good.'

The possessive pronoun *chake* 'her/his' is inside the head of the relative clause. It is interpreted as a variable bound by QNP *kila mwandishi* 'every writer' located inside the relative clause. It is generally assumed that the scope of a quantifier is determined by the c-command relation at the level of Logical Form (LF), the level of syntactic representation at which the logical meaning of the sentence is represented. On the surface, the universal quantifier phrase does not seem to c-command the pronoun. For the QNP to take scope over the pronoun, the head must be reconstructed at LF to the position inside the relative clause where it is c-commanded by the QNP.

The scope effects of quantifiers inside the head and in the relative clause provide further evidence that the head is raised. First, notice the interaction of the universal quantifier in the subject and the definite/indefinite quantified phrase in the object position. Kiswahili has a general tendency of marking the human object on the verb. In some cases, though, plural indefinite objects may remain unmarked. However, demonstratives can be used to test definite determiner effects resulting in examples similar to Italian sentences provided by Bianchi [1999:46-47].

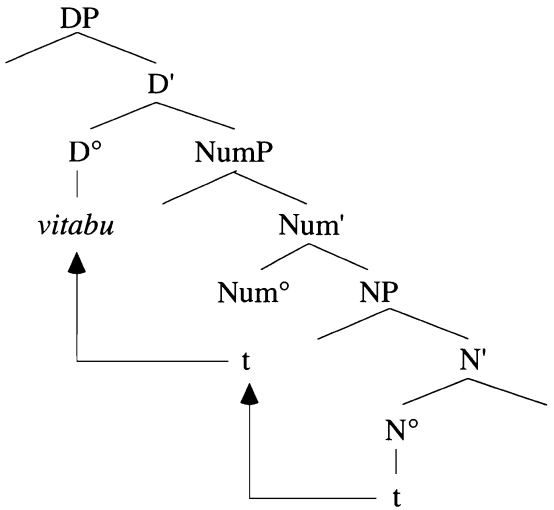
(11) a. *kila daktari a-ta-wa-pim-a wa-gonjwa wa-wili.*
each 1.doctor 1-FUT-2-examine-FV 2-patient 2-two
'Each doctor will examine two patients.'

b. *kila daktari a-ta-wa-pim-a wa-le wa-gonjwa wa-wili.*
each 1.doctor 1-FUT-2-examine-FV 2-that 2-patient 2-two
'Each doctor will examine those two patients.'

The universal quantifier in subject position takes scope over the object, which is presumably indefinite in (11a). The resulting interpretation allows for a reading in which every doctor may examine two different patients—a distributive reading. When a demonstrative is used with the object, as in (11b), the distributive reading

is not available. That is, each doctor will examine the same two patients. I will assume the Kiswahili DP structure proposed by Carstens [1991], shown in (12), in which the noun in (11a) occupies the D° position, having been raised from a position lower than Number Phrase (NumP). According to Carstens, the noun in Kiswahili is base generated in the NP, and raises to the Number Phrase and ultimately to the Determiner Phrase. In (11b), however, D° is occupied by the demonstrative *wale* 'those'.

(12)



Object relative clauses corresponding to (11) above provide a reversal of the scope of the universal quantifier, as shown in the sentences in (13). In these examples, it appears that the readings are now reversed. In sentence (13a), the relativized object is not introduced by a demonstrative. The reading available here does not allow distributivity. There are only two patients, and every doctor will examine

(13) a. *ni-li-wa-it-a wa-gonjwa wa-wili a-taka-o-wa-pim-a*
1S-PST-2-call-FV 2-patient 2-two 3S-FUT-2.REL-2-examine-FV

kila daktari.
each doctor
'I called two patients that every doctor will see.'

b. *ni-li-wa-it-a wa-le wa-gonjwa wa-wili a-taka-o-wa-pim-a*
1S-PST-2-call-FV 2-that 2-patient 2-two 3S-FUT-2.REL-2-examine-FV

kila daktari.
each doctor
'I called those two patients that every doctor will see.'

them. A distributive reading is available in (13b) where the relativized object is introduced by the demonstrative. It is possible that each doctor will see two different patients. This follows automatically if we assume that the determiner is generated outside the relative clause and is therefore not reconstructed to relative clause. In both cases the raised head is indefinite.

5. Idiom Chunks

It is commonly assumed that the nominal part of an idiomatic expression is generated as a complement of the verb of the idiom, and not independently [Schachter 1973]. Therefore, it cannot be expected to be base-generated in the head position. If we find the nominal part occupying the head position, we must conclude that it has been moved from the idiom chunk inside the relative clause. Two different examples of idioms yield the same results. The first example of an idiom is *kupaka matope* (14), which literally means 'to smear with mud' but whose idiomatic meaning is 'to defame'. Without the verbal part of the expression, the nominal cannot maintain the idiomatic sense, as (14b) shows. However, the nominal can appear separate from the verb in relative clause constructions, as the examples in (15) show.

(14) a. *nungu wa-li-m-pak-a ma-tope sungura*
2.porcupine 2-PST-1-smear-FV 6-mud 1.hare
'Porcupine defamed Hare.'

b. **ma-tope ya-li-mu-um-iz-a sungura*
6-mud 6-PST-1-hurt-CAUS-FV 1.hare
'The mud hurt Hare.'

(15) a. *tu-li-sikit-ishw-a na ma-tope*
1P-PST-be sad-CAUS-FV by 6-mud

[a-li-yo-pak-w-a sungura].
1-PST-6.REL-smear-PASS-FV 1.hare
'We were saddened by the defaming of Hare.'

b. *nungu a-li-m-pak-a ma-tope sungura*
1.porcupine 1-PST-1-smear-FV 6-mud 1.hare

[amba-yo ya-li-sikit-ish-a.]
amba-6.REL 6-PST-be sad-CAUS-FV
'Porcupine defamed Hare, which was sad.'

The verb 'smear' appears in the relative clause, but its nominal is the head of the relative clause, located outside the relative clause. Similar effects are derived

with another idiom, *kupiga maji*, which means 'to drink alcohol'. *Kupiga* 'to hit' is combined with *maji* 'water' to derive a non-compositional VP, as shown in (16).

(16) a. *komba a-li-pig-a ma-ji sana.*
1.bushbaby 1-PST-hit-FV 6-water much[5]
'Bushbaby drank much beer.'

b. **ma-ji ya-li-ku-w-a ma-kali.*
6-water 6-PST-INF-be-FV 6-fierce
'The beer was strong.'

In (16a), normal usage of the idiom is exemplified. Without the verb, the object *maji* 'water' does not acquire the idiomatic reading, as (16b) shows. This indicates that the two words are generated as one item. In relative clause constructions, however, it is possible to get the object outside of the idiom VP. Consider the examples in (17).

(17) a. *ma-ji amba-yo komba a-li-ya-pig-a ya-li-ku-w-a*
6-water amba-6.REL 1.bushbaby 1-PST-1-hit-FV 6-PST-INF-be-FV

ma-kali.
6-fierce
'The beer that Bushbaby drank was very strong.'

b. *ma-ji amba-yo komba a-li-pig-a ya-li-ku-w-a ma-kali.*
6-water amba-6.REL 1.bushbaby 1-PST-hit-FV 6-PST-INF-be-FV 6-fierce
'The beer that the bushbaby drank was very strong.'

The idiom chunk *maji* 'water' is the head that appears outside of the relative clause. Since it is base-generated inside the embedded clause, its surface location must be due to movement from the subordinate clause. The two examples of idioms show that, in isolation, the nominal cannot derive the idiomatic meaning. However, in displaced contexts of relative clauses, the separation between the verb and the nominal does not result in a loss of meaning. Assuming that the idiom is generated as a unit, it must be concluded that heads of relative clauses are moved from inside of the embedded clause to the head position.

As in the cases discovered by Schachter [1973], the raising point can be made using idiomatic expressions with indefinite objects. Let us look at the 'defame' example. First, I shall establish that the object in this case is obligatorily indefinite, which I will demonstrate through the use of a demonstrative. Consider the contrast between the two sentences in (18). In the grammatical sentence (18a), the idiom contains an indefinite nominal. When the object is definite as in (18b), we get an ungrammatical sentence. Therefore, this direct object must be indefinite for the

[5] A bushbaby is a small, nocturnal primate of the genera *Galago* or *Euoticus* having large, round eyes and prominent ears, famous for its love of palm or bamboo wine.

idiom. In relative clause constructions, however, as shown in (19), the relativized idiomatic object can be introduced by the demonstrative.

(18) a. *nungu wa-li-m-pak-a ma-tope sungura.*
2.porcupine 2-PST-1-smear-FV 6-mud 1.hare
'Porcupine defamed Hare.'

b. **nungu wa-li-m-pak-a ya-le ma-tope sungura.*
2.porcupine 2-PST-1-smear-FV 6-that 6-mud 1.hare
'Porcupine defamed that Hare.'

(19) *ya-le ma-tope wa-li-yo-m-pak-a sungura ya-li-tu-kasirish-a.*
6-that 6-mud 6-PST-6.REL-1-smear-FV 1.hare 6-PST-us-anger-FV
'That defaming of Hare angered us.'

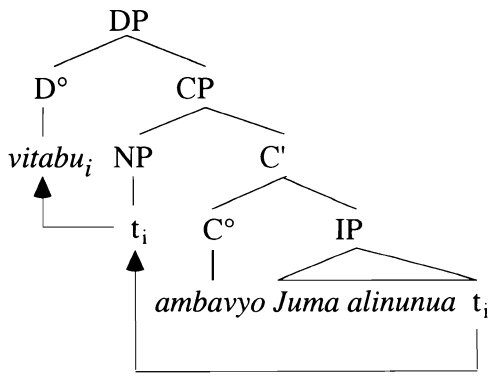
The relativized idiomatic object *matope* 'mud' is introduced by the demonstrative. Since it was established that this object is base-generated as indefinite, its definiteness in this example must be due to an external determiner.

6. Analysis

The foregoing discussion has presented evidence for twin hypotheses of head-raising, the head raising hypothesis and the determiner complement hypothesis. This section presents an analysis of relative clauses that is consistent with the evidence. It also outlines some relevant aspects of the verbal morphology in relative clauses. The tree diagram in (20b) represents the head-raising analysis of the Kiswahili relative clause presented in (20a). The head of the relative clause is base-generated as a complement of the verb in the embedded clause, raised to Spec,CP and finally to D°.

(20) a. *vi-tabu [amba-vyo Juma a- li-nunu-a] ni ghali*
8-book amba-8.REL 1.Juma 1-PST-buy-FV COP expensive
'The books Juma bought are expensive.'

b.



This analysis has not addressed the question of the status of the relative marker (REL) that appears as *-vyo* attached to *amba-* in this example. Following Ngonyani [1999], I analyze the relative marker as the C. This analysis is based on two considerations: (a) the distribution of REL, and (b) the internal structure of REL which consists of an invariant *-o-* and an agreement marker before it (see §2). The table in (21) summarizes the distribution of the relative marker. The relative marker appears on the right edge of (i) *amba-*, (ii) the tense/negation marker, or (iii) the verb stem. These have one characteristic in common, namely, REL consistently follows what is or was a verb. Synchronically, this is the verb stem. Diachronically, tense markers are derived from verbs (e.g., *-li-* < *-li* 'be', *-ta-* < *-taka* 'want) while *amba-* is from the verb 'to speak'.

(21) Distribution of REL in Ḳiswahili [Ngonyani 1999]

					Examples cited
(C1)	*amba*-**REL**	N	SP-T/NEG-	STEM	(3a) → (23a)
(C2)		N	SP-T/NEG- **REL**-	STEM	(3b, c) → (23b)
(C3)		N	SP-T/NEG-	STEM- **REL**	(3d) → (23c)

The relative marker is the head of CP to which an agreement marker is attached.[6] This head attracts the highest verbal element to incorporate at its left, as shown in (22b,c). When such incorporation is prevented, *amba-* is inserted (22a).

(22) a. $[_{CP}\ [_{C}$ ***amba***-REL$]\ [_{IP}$ INFL-$[_{VP}$V $]]]$ (C1)

b. $[_{CP}\ [_{C}$ INFL-REL$]\ [_{IP}$ -t- $[_{VP}$V $]]]$ (C2)

c. $[_{CP}\ [_{C}$ V-REL$]\ [_{IP}\ [_{VP}$ t $]]]$ (C3)

In (22b), REL attracts tense or negation, which are the highest verbal heads. When there is no inflectional head, REL attracts the verb stem (22c). When, for some reason, these are not available, REL acquires *amba-* (22a). These give us the relative clause constructions in (23), which we saw in (3) in §2 and which are repeated here for convenience.

Since subject marking and object marking do not interfere or alter this distribution, Ngonyani [1999] concludes that they are not syntactic heads. This is consistent with Chomsky's [1995] proposal for IP structure that does not have Agreement heads. An analysis of REL as a pronoun cannot provide an elegant account for its distribution.

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[6] Other Bantuists have also suggested that the relative marker occupies C° [Demuth & Harford 1999; Kinyalolo 1991].

(23) a. *vi-tabu [amba-vyo Juma a-li-nunu-a] ni ghali* (C1)
8-book amba-8.REL Juma 1-PST-buy-FV COP expensive
'The books Juma bought are expensive.'

b. *vi-tabu [a-li-vyo-nunu-a Juma] ni ghali* (C2)
8-book 3S-PST-8.REL-buy-FV Juma COP expensive
'The books Juma bought are expensive.'

c. *vi-tabu [a-nunu-a-vyo Juma] ni ghali* (C3)
8-book 3S-buy-FV-8.REL Juma COP expensive
'The books Juma buys are expensive.'

There is some evidence suggesting that this analysis may be extended to other Bantu languages. From the author's field notes on Kindendeule and Kingoni, Bantu languages spoken in southern Tanzania, the test examples of idiom chunks and QNP-pronoun binding can be replicated with the same results as in Kiswahili. In (24), we see that an idiomatic expression in Kindendeule can be relativized.

(24) a. *akanahota ba-ki-lapil-a mbamba*
2.elders 2-PST-vow-FV 10.thunder/lightning
'The elders cursed.'

b. *mbamba [hya-ba-ki-lapil-a akanahota]*
10.thunder 10.REL-2-RP-vow-FV 2.elders
'the cursing that the elders did'

The nominal of the idiom, *mbamba* 'thunder, lightning', is the head of the relative clause in (24b). If the nominal is generated together with the verb, its position outside the relative clause must be the result of movement from within the relative clause. This example is similar to the Kiswahili examples in (15) and (17) above. Further research is needed to see whether these characteristics of relative clause constructions are related to other typological features.

5. Conclusion

This paper set out to provide evidence in support of the head raising analysis of relative clauses. This analysis subsumes two hypotheses: (a) the raising hypothesis and (b) the determiner complementation hypothesis. Evidence for the former is found in the interaction observed between the head nominal and constituents of the relative clause. The reconstruction effects and relativization of idiom chunks are explained by a raising analysis and not by an adjunction analysis. Evidence for the complementation effects is derived from selectional relation between the determiner and its complement, the relative clause. An adjunction analysis fails to explain the selectional relations between the determiner and the adjunct relative clause.

The raising analysis has several other advantages over the adjunction analysis. One advantage is that it provides a very simple account for the typology of relative clauses, as Kayne [1994] and Bianchi [1999] note. Externally headed relative clauses, such as those found in English and Kiswahili, involve head raising. However, internally headed relative clauses, such as those found in Quechua, Navajo, Bambara, and Japanese, involve no head raising.

One crucial consequence of this analysis of relative clauses regards the status of relative pronouns. If the analysis of the relative marker by Kinyalolo [1991], Demuth and Harford [1999], and Ngonyani [1999] is correct, there is no relative pronoun in Kiswahili. The relative marker is analyzed as occupying C°. In English, however, there are relative pronous such as *who* and *which* and there is the complementizer *that*. In the raising analysis, the relative pronoun cannot be a full pronominal DP, as noted by Kayne [1994] and Bianchi [1999]. It must be an indefinite determiner which does not raise with the head out of the relative clause. It is possible that absence of relative pronouns in Kiswahili and other Bantu languages is related to the type of indefinite determiners found in those languages. Future research is necessary to evaluate this proposal.

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TONE SHIFT AND SPREAD IN TAITA I*

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Numerous Bantu languages have processes of rightward shift or spread of H tone. Sometimes the process is quite simple: every H shifts once to the right (as in Cijita) or spreads once to the right (as in Kikerewe). The tonal system of Taita is more complex in that both shifting and spreading are found in the language. Furthermore, the extent of tone shift or spread is not just one syllable; sometimes, H tone can shift or spread by two syllables. An analysis of the tonal system of the Dembwa dialect of Taita is given here. It is argued that the facts of the language are best described in terms of two rules of rightward spreading and a third rule of tone delinking. The argument for analyzing the tone system in terms of three interacting rules rather than one unified rightward movement process resides in the fact that the environments for the three processes only overlap partially. On the theoretical front, these results support a general decomposition of the process of tone shift into tone spread interacting with tonal delinking, rather than including the operation of shift in the formal repertoire of primitive phonological operations.

1. Introduction

The goal of this paper is to describe tone in the Dembwa dialect of the Bantu language Taita (Dabida), which is spoken in south central Kenya. A future paper will analyze the Mbololo dialect. The core problem of Taita tonology is summed up

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in (1). The nouns *baandu* and *baaka* appear to be tonally identical, judging from their citation forms, but when an adjective follows either noun, tonal differences emerge. After *baandu* the adjective *balaacha* has no H tone, but after *baaka* the penultimate syllable of the same adjective takes a level H tone. A similar difference is seen when these nouns appear after the (imperative) verb *taala*, which has no H tone in its citation form. The verb has a final H and the following noun has an initial falling tone when the noun is *baandu*, but, before *baaka*, the same verb lacks any H and *baaka* itself has a level H tone. The explanation for these differences lies in the fact that the nouns themselves have tonally different underlying representations, /ba-ndu/ versus /ba-ká/. The appearance of H tone after the verb *taala* is due to the fact that there is an underlying H on the verb /talá/.

(1)	*baa-ndu*	'people'	*baa-ka*	'women'
	ba-ndu ba-laacha	'tall people'	*ba-ka ba-láácha*	'tall women'
	taala	'count!'		
	talá báa-ndu	'count people!'	*tala báá-ka*	'count women!'

The surface tonal opacity of these examples derives from two factors. First, H tone shifts rightwards by one or two syllables, so the surface location of a H is indirectly related to its underlying location. Second, final H is deleted, but such a surface-absent H still affects how tones spread into a word from the left, and underlying but surface-absent H also explains why some words which have no H tones in citation forms induce H on following words. The primary challenge in understanding Taita tonology is, then, that the recovery of underlying representations is not a simple matter of inspecting the surface form of simple words.

Taita tonology is reminiscent of Sukuma tonology [Richardson 1959, Goldsmith 1985, Sietsema 1989, Yukawa 1989, Batibo 1991, Roberts 1992] of western Tanzania, where H can shift rightward by two or more syllables, and deletes prepausally. Many Bantu languages in the region extending from south central Kenya to western Tanzania exhibit rightward spreading by one syllable (Kerewe [Odden 1998a] spoken in Lake Victoria) or more (Shambaa [Odden 1982], Mgonja Pare [Odden 1985] both of northern Tanzania), as well as shifting by one syllable found in Nyamwesi [Schadeberg & Maganga 1992] of western Tanzania, Kikuyu [Clements & Ford 1979] of south central Kenya, Ruri [Massamba 1982] and Jita [Downing 1990] of Lake Victoria, and especially Chaga [Nurse & Phillipson 1977, McHugh 1990] of north central Tanzania, which is most closely related to Taita among those languages with documentation of the tonal system. Both shifting and spreading are found in Holoholo [Coupez 1955] of western Tanzania and eastern Congo. While rightward spread and shift of H are phonetically natural processes in human languages, tone shift and spreading, and especially processes of shift and spread by only one or two syllables, enjoy a frequency of occurrence in the Bantu languages of this area well in excess of that found in other areas of Bantu or outside of Bantu. It is interesting that Sukuma happens to be the Bantu language which is typologically most like Taita, since Sukuma is not particularly closely related to Taita within Bantu (being members of the West Tanzania and Taita-

Chaga subgroups, respectively) and spoken at nearly the opposite end of this geographical continuum which favors tone shift.

The treatment of shift versus spread in Bantu has not been consistent in the tonal literature, nor is there uniformity in the analysis of shifting and spreading by two syllables. As far as the distinction between shift versus spread is concerned, one strategy is to treat these as separate operations, where shifting moves a tone from one syllable to another in one step.[1] On the other hand, shifting could be decomposed into multiple steps of spreading and delinking. Batibo [1991] presents Sukuma tone shift as a direct shift operation, whereby /kubónela/ 'to see for' maps to *kubonelá* and /kubóna mahalage/ 'to see some beans' maps to *kubona mahálage* in one step. Schadeberg [1991] treats Nyamwesi tone shift as involving direct movement of tone from one vowel to another, and Sietsema [1989] provides a one-step treatment of rightward shift in Ciruri. In the analysis of Kang [1997], the mapping from /kubóna mahalage/ maps to *kubona mahálage* in one step, but this is due to the author's particular theoretical approach, Optimality Theory, in which the entire mapping from underlying to surface forms take place in one step. In contrast, Downing [1990] treats Jita tone shift as the effect of a rule of Rightward Spread followed by Leftward Delinking of a multiply linked tone. Authors may offer both types of analysis—for example, Kenstowicz & Kisseberth [1988] posit an unbounded rule of direct tone shifting, but also note that the process might be decomposed into spreading followed by delinking. Sietsema [1989] presents a one-step account of tone shift (by one syllable) in Ciruri, but a two-step spread and delink account for Sukuma. Downing [1990] posits a two-step treatment of righward shift by one syllable, but a single rule Reassociation to Accent which shifts H directly to the final syllable when two object prefixes are present.

There is even less uniformity of precedent in the treatment of shift or spread by two syllables in Bantu, largely because such processes are quite uncommon. The reason why the treatment of such a process might be of theoretical importance is that two-syllable shift is generally held to violate theoretical strictures such as locality conditions on rules. A rule such as (2), which could be employed in describing Sukuma, would require the explicit inclusion of an intermediate vowel which is skipped over.

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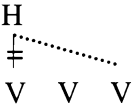
[1] A further analytic variable which has come into play in the analysis of tone spread and shift is "accent", construed either as some variety of metrical structure or as an autosegmental diacritic marker which controls initial associations. The latter concept of "accent" enjoyed popularity in the initial development of autosegmental phonology beginning with Goldsmith [1976]. Beginning with Pulleyblank [1983], "accent" was later theoretically reinterpreted as being a strong position in a metrical grid. Accordingly, some analyses of H shift involve H tones being directly attracted to accented positions (Nguni, in the analysis of Peterson [1989]), and others involve spreading H up to an accented position (Sukuma, in the analysis of Sietsema [1989], Kang [1997]). Idsardi & Purnell [1995] take this progression to its logical end, claiming that Sukuma "tone" is purely metrical structure, not tone.

(2) 

As observed by Kang [1997: 55], "It is a sacred tenet of current phonological theories that phonological processes observe a strict locality condition." This consideration has inspired a considerable number of responses. Goldsmith [1985] solves the problem in an autosegmental accent account by "precompiling" part of tone shift by selecting an underlying tone melody LH (not just H) which associates to accented syllables, combined with a rule which directly shifts H once to the right. In other words, apparent shift by two syllables is decomposed into a special feature of underlying forms plus one tone shift rule. Roberts [1992] posits three separate tone spreading rules, each spreading tone once to the right. Sietsema [1989], in contrast, posits metrical structure which, given certain assumptions allows spreading by two or three syllables, without violating any locality conditions.

This paper will present data from Taita which may be useful in resolving some of these controversies. One of the reasons why previous treatments of spread versus shift and especially double shift have been inconclusive is that the languages studied do not provide evidence to choose between competing analyses, so adjudication of analytical disputes is left to theoretical assumptions which themselves are in dispute. It will be argued here that the best analysis of Taita tone is one which admits two separate rules spreading tone by one syllable to the right, and a separate delinking rule. The crux of the argument for treating Taita tonology with these separate rules, rather than one rule, is simply that the rules do not have the exact same conditions (in contrast to, for example, Jita, where the forms which undergo Downing's rule Rightward Spread are exactly the forms that undergo Leftward Delinking, and therefore no fact of Jita compels a two-step treatment of shift rather than a one-step treatment), and especially that it is possible to find a context where one can observe the effect of tone spreading, free of the effects of tone delinking, which argues for the independence of these two processes.

2. Verbal Tone

We begin by looking at alternations in the verb, which reveal most of the essentials of the Dembwa tone system. As in most Bantu languages, Dembwa verb stems fall into two classes, one having no H tone, the other having an underlying H tone on the first syllable of the stem. The actual surface realization of the underlying H varies as a function of the number of syllables in the stem. The realization of a H verb, as a function of the number of syllables in the stem, is summarized in (3), with two tones for the penult because that vowel is long and has two tone bearing units.

(3)

1 syllable:						L
2 syllables:				-	HH	- H
3 syllables:			H	-	HL	- L
4 syllables:		L	- H	-	LL	- L
5 syllables:	L	- H	- L	-	LL	- L

If the stem contains only a single syllable, as in (4), the underlying H simply does not surface (in citation forms). The underlying H in monosyllabic H roots can be recovered by adding a suffix, thereby making the stem longer than monosyllabic. The examples in (4a) represent stems lacking H tone, those in (4b) H toned stems.

(4)

a.	*kuu-gw-a*	'to fall'	(cf. *ku-gw-ii-a*	'to fall for')
	kuu-sh-a	'to grind'	(cf. *ku-sh-aan-a*	'to grind each other')
b.	*kuu-f-a*	'to die'	(cf. *ku-f-íí-á*	'to die on')
	kuu-j-a	'to eat'	(cf. *ku-j-áán-á*	'to eat each other')

The roots in the second group would be expected to have a surface final H since they have an underlying H. The surface lack of H in the bare form of those verbs is due to a general rule (5) which deletes final single H tones. This rule explains why phrase-final H is phonetically lacking in the language except when the penult is also H toned (a phrase boundary is notated here as ##). This deletion of final H tones is ubiquitous, and will be abundantly documented in the discussion of nouns in section 4.

(5) **Final H Deletion**

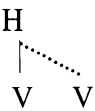
H → ∅
|
V ##

Disyllabic H toned verbs have the surface tone pattern HH-H, as shown in (6). This is the result of a rightward spreading rule (7), which turns underlying final H-L into HH-H.

(6)

ku-bóón-á	'to see'	*ku-táál-á*	'to count'
ku-láál-á	'to sleep'	*ku-lúúm-á*	'to bite'
ku-óóm-á	'to be dry'	*ku-déék-á*	'to cook'

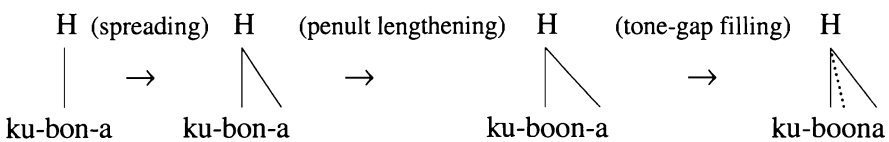
(7) **Spreading**



Questions may arise as to the formal analysis of the tone system but will not be considered in depth because the facts of the language and. especially, the theoretical tools at our disposal often fail to converge at a unique formal account. While focusing on the fine-grained details of a formal account will be eschewed, certain quasi-theoretical questions naturally arise and will be mentioned as appropriate. One such question regards the exact mode of tone spreading. The underlying form of [*ku-bóón-á*] is /ku-bón-a/. The shortness of the penult is motivated by two facts; first, vowel length appears predictably—and only—on the phrasal penult, and second, the length of the vowel [oo] alternates depending on position, hence *kubón-áan-a* 'to see each other', *ku-bon-á báandu* 'to see people'. The underlying tone of the final inflectional suffix is demonstrated by the fact that it bears H only in a highly restricted set of contexts—cf. *kubón-áan-a* and *ku-liima-a* 'to culti-vate', the latter being a verb stem which has no H tones. In the surface form *kubóóná*, we end up with three H toned moras on the surface, starting with one. How can this be explained?

One explanation is that the penultimate vowel has already become long by the time Spreading applies. In that case, Spreading may be stated as operating from syllable to syllable, resulting in spread of H to as many moras as are required to get continuous association between the source and target syllables. Thus, (7) iterates throughout the syllable which initially contains the H, until the next syllable is reached. Another way to get the requisite output is to order Spreading before lengthening of the phrase-penult vowel. Thus, the output of Spreading would be *kubóná*. When an additional mora is added to the penult (assuming that the added mora is at the right edge of the syllable), that mora bears H tone, since otherwise a universally disallowed "gapped" configuration would result, that is, a H linked to a discontinuous sequence of TBU's. There being no compelling theoretical or factual basis for preferring one of these accounts over the other, we leave the matter open.

(8)



If the verb stem is trisyllabic, as in (9), the stem initial H spreads to the following syllable, where it appears as a falling tone.

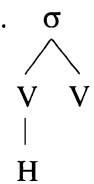
(9) *ku-dáfúun-a* 'to chew' *ku-tésíi-a* 'to help'
ku-bón-áan-a 'to see each other' *ku-síkíir-a* 'to hear'

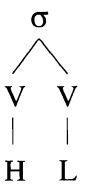
This surface pattern is the result of the same rightward spreading found in disyllabic stems. The data reveal that the spreading is bounded—H does not spread to the end of the word—and, furthermore, when H spreads to a penult, it is realized as a falling tone. The penult falling tone can be explained in various ways. As discussed in Kisseberth & Odden [to appear], many Bantu languages exhibit

tonal phenomena within the last two syllables of the phrase pertaining to lowering of pitch, such as the fact that prepausal tones may be automatically realized as falling tones (e.g. Kimatuumbi [Odden 1996]), that final Hs shift to the left (e.g., Runyankore [Poletto 1998]), and especially that penultimate syllables tend to be phonetically falling-toned rather than level in languages which do not otherwise have falling tones (e.g., Yao [Odden 1998b], Runyankore). Numerous formal explanations for this pattern in the synchronic phonology can be proposed, and the one which will be adopted here is that a L tone—a so-called boundary tone—is introduced in phrase-final position and associates with the last two syllables. The extragrammatical origin of the phenomena seems to be the well-known lowering of pitch at the end of the utterance found in numerous languages.

Dembwa is like Yao and Runyankore, where, as a first approximation, one might simply say "penult H tones are phonetically pronounced with falling pitch before final L tones". But like the situation in Yao and Runyankore, this statement is not surface true, and in Dembwa we find forms such as *nadáája* 'I just ate', with a level penult H before a final surface L. Thus, the realization of penult H as a fall is not due to simple phonetic interpretation. It is, however, entirely explicable: in *nadáája*, the final syllable also has an underlying H, as will be discussed later.

Whether or not this falling tone should be formally represented as (10a) or (10b) is largely a theoretical matter, hinging on the status of surface underspecification. It is controversial whether non-H TBU's in Bantu languages are phonologically specified as L or simply lack tone where their lower pitch is assigned by a rule of phonetic implementation. The only context in Dembwa where L tone would have phonological utility is precisely in the penult, as a means of identifying a falling tone as distinct from a level H. It will be shown that this distinction is important in the phonology, because the fall/level H distinction allows us to understand the conditions for tone spread versus shift. The representation (10b) will therefore be assumed for the penult fall; a boundary L spreads from a prepausal syllable (the boundary L tone only associates to an unoccupied syllable), overriding the linkage of the H to the second mora of the syllable. Representation (10b) provides a "positive" means of referring to falling tones, whereas (10a) allows falling tone to be referred to only by dint of referring to lack of association, and a desideratum in phonological theory has been to eliminate explicit references to the lack of entities.

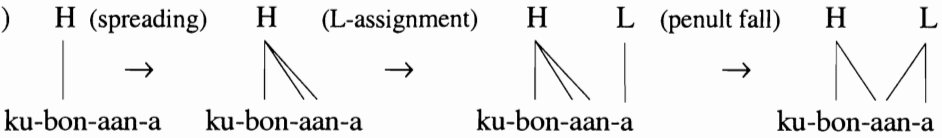
(10) a. 

b. 

Assuming that Spreading extends the lexical H to the penult, the phrasal L is assigned to the unoccupied final syllable. No more than one tone can appear on a single mora in the language, hence contour tones only appear on the penult, which

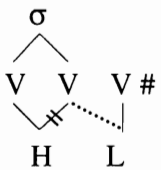
is the only bimoraic syllable. In *kubóóná*, the final syllable has a H, which prevents the phrasal L from associating; thus, we do not get *[kubóónâ]. In *kubónáana*, the final syllable can receive the phrasal L since it has no other tone. That L then spreads leftward to the penult and any association between the penult H and the second mora of the long vowel is eliminated. A derivation is given in (11).

(11)



Spreading of the final L to the penult is the result of the following rule.

(12) **Penult Fall**



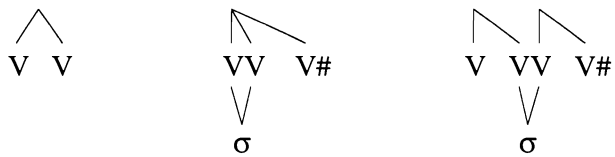
When the stem has four syllables or more, a rather different realization of the H is found. In that case, the H shifts to the following syllable, shown in (13).

(13)	*ku-dek-í-aan-a*	'to cook for each other'
	ku-duk-í-aan-a	'to carry for each other'
	ku-sikír-aan-a	'to hear each other'
	ku-chemúsh-ii-a	'to boil for'
	ku-chemúsh-i-aan-a	'to boil for each other'

The pattern for stems having four or more syllables might seem to be markedly different from that of shorter stems, where the H remains on its original syllable, but here the stem initial syllable has no surface H. The pattern of longer stems involves just one further complication compared to the previously motivated pattern of spreading seen in shorter verbs, namely delinking of the H from its original position. The difference between the shifting pattern of longer verbs and the spreading pattern of shorter verbs can be understood in terms of the contexts where strings of adjacent H tones occur on the surface in the language. Strings of Hs, analyzed as a single H autosegment associated to multiple vowels, have a restricted distribution in the language, and are only found in three positions. The first context, spelled out in (14a), arises especially at the phrasal level in examples like *tala sáb'úuni* 'count soap!', where a sequence of H tones is preceded by a downstepped H. It will be assumed here that surface downsteps are due to a process of phonetic implementation, whereby the second of two adjacent H tone autosegments is produced with lower pitch (see [Odden 1982]). Thus, in representation

(14a), the second H tone is pronounced at a lower pitch and is conventionally transcribed with a raised exclamation marker to notate that pitch lowering. The second context where multiply-linked H is found is when the Hs are on the last two syllables of the utterance, as we have seen in disyllabic H verbs such as *kutáálá*. The third is when the H is on both the antepenult and the penult syllables, and on the penult specifically as a falling tone, as in *kudáfúuna*.

(14) a. H H b. H c. H L



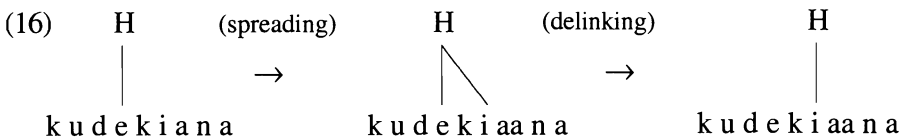
These are the only contexts where double-H sequences are found. Otherwise, whenever a string of Hs would be created by spreading over a number of syllables, the H delinks on the left, resulting in a surface pattern of tone shifting rather than tone spreading. This does not mean that a rule with such a condition is part of a formal grammar—this is a strictly descriptive statement. Deeper investigation of the proper mechanism for stating the conditions on Delinking would take us too far afield and would ultimately prove inconclusive.

(15) **Delinking**

(except in contexts (14a-c))

Given Spreading, the first two syllables of a four syllable H verb such as found in (13) should be H toned. But in that context, the second H is not part of a falling tone on the penult (case (14c)) and the left branch of the H is not part of a falling tone (case (14b)), so nothing blocks delinking of the left branch of the lexical H. Thus, the apparent shift of H to the right can be decomposed into independent processes of rightward spreading and delinking with partially overlapping environments.

(16)



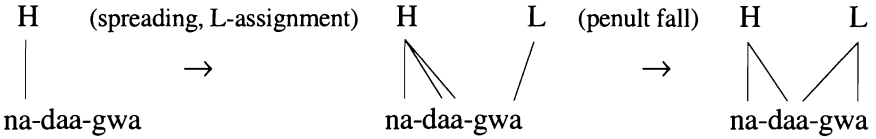
These tonal processes operate throughout the language, and we now illustrate them further with one inflected tense. This will not only provide further examples of spreading and shifting of H tone, but will also show that there is a second spreading process which spreads H by an additional syllable, across the stem-prefix juncture and other contexts. The subject prefix *na-* in the immediate past tense is

underlyingly H toned, and when the verb stem (*-gw-a* "fall", *-sh-a* "grind") lacks underlying H and is monosyllabic, the prefixal H spreads to the right where it is realized on the tense prefix *-da-* as a falling tone.

(17) *ná-dáa-gwa* 'I just fell' *ná-dáa-sha* 'I just ground'

The derivation of these forms is the same as that given for trisyllabic H toned stems in the infinitive such as *ku-dáfúuna*. The H of the subject prefix spreads to the right and a boundary L is assigned to the final vowel. The boundary L spreads to the penult by virtue of the rule in (12) so that syllable has a falling tone. Since the antepenult H is immediately before a falling tone, the antepenult linkage of the H is retained and, consequently, the surface result is spreading and not shifting of the prefix H.

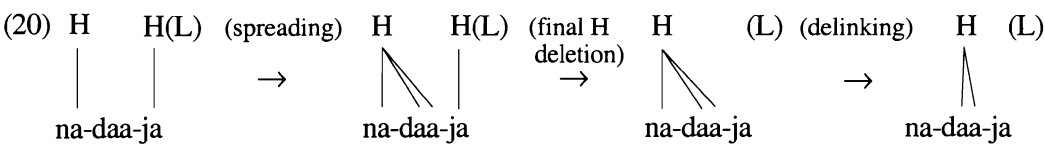
(18)



In contrast, when the verb has a monosyllabic H toned stem (*-j-a* 'eat', *-nyw-a* 'drink'), the prefixal H appears as a level H on the penult, as in (19). This too is the result of spreading the prefixal H to the penult. However, in this case, the H is not realized as a falling tone, since it is followed by the underlying root H. Because of the underlying final H, the boundary L cannot be associated (we therefore cannot tell if it is inserted and remains unassociated or is not inserted at all), so there is no falling tone—this despite the fact that the stem H which prevents linking the boundary L is eventually deleted by Final H Deletion (5). The consequence of the penult level H is that the leftmost branch of the H is not in one of the "protected" contexts of (14), so the H delinks from the subject prefix in the antepenult, as shown in (20).

(19) *na-dáá-ja* 'I just ate' *na-dáá-nywa* 'I just drank'

(20)



With polysyllabic H verbs, as in (21), the H spreads to the prefix *-da-*, and no further, since the following root initial syllable has a H tone. The prefixal H is separated from the H of the root by a downstep, since in Dembwa, when one H spreads to meet another, the two Hs are always separated by a downstep.

(21)

na-dá-ˈláálá	'I just slept'	*na-dá-ˈtáálá*	'I just counted'
na-dá-ˈbúúná	'I just saw'	*na-dá-ˈb'óórá*	'I just sang'
na-dá-ˈdéégá	'I just trapped'	*na-dá-ˈlúúmá*	'I just bit'

Here, both Hs spread one syllable to the right. The second H simply spreads without delinking, since the linkage that might be affected by (15) is the one to the long penultimate syllable; additionally, the left branch of the second H is preceded by a H, which is another context where delinking does not apply. In the case of the first H, that H spreads from the subject prefix, then delinks, because the syllable that it is delinked from is not immune to delinking, per (14).

(22)

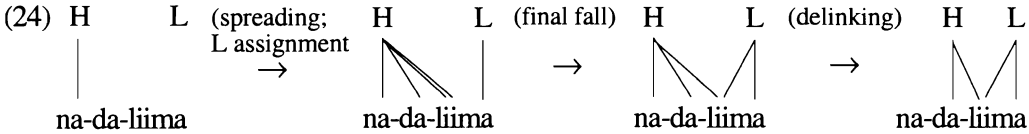
Spreading of H two syllables to the right, not just one as in all previous examples, can be seen in (23) in data involving a disyllabic stem. Here we can see that the H of the prefix /ná/ spreads from the subject prefix to both the prefix *-da-* and the root initial syllable, which is the penult. The verb stem itself has no underlying H.

(23)

na-dá-líima	'I just cultivated'
na-dá-líipa	'I just paid'
na-dá-séeka	'I just laughed'
na-dá-chíimba	'I just dug'
na-dá-rúua	'I just dug up'

Spreading of H from /ná/ to *da* is expected given Spreading (7). Unlike previous examples, H spreads two syllables to the right, targeting the root initial syllable as well. Spreading by two syllables would result in intermediate *nádálíima*, and this is then subject to Delinking (15). That rule delinks prefixal H from the initial syllable *na*, but does not affect the linking between H and *-da-*, because the syllable immediately following -dá- has a falling tone.

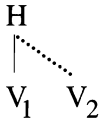
(24)



This pattern of double-spreading can be explained in terms of a second rule, ordered after Spreading (7), which spreads H by one more syllable. More data are needed to properly understand the context where this second spreading rule

applies, in particular at the phrasal level, so we will anticipate the results of the next section, in order to allow discussion of the context for this spreading process. Note, in light of forms such as *ku-dekíaana* 'to cook for each other' or *ku-dafúniaana* 'to chew for each other' where H spreads only to the syllable immediately following the underlyingly H syllable, that Spreading (7) cannot be restated as unbounded spreading. Yet spreading processes in the language are not limited to just spread by one syllable. The rule which accomplishes spread to a second syllable on the right is formalized in (25).

(25) **Cross-junctural Spreading**



provided: V2 not final; the configuration must be brought about crucially by combination of a verbal prefix with a verb stem, or by concatenation of words.

This rule applies to the output of Spreading (7), and since (7) is more general—(25) is essentially (7) with restrictions—anything which undergoes (25) necessarily has also undergone (7); thus, (25) results in double spreading/shifting. The distinction being drawn via the condition on (25) is that only a subset of forms containing a H followed by a toneless nonfinal vowel actually undergoes the rule, namely those where the requisite configuration is created by the concatenation of prefixes and stems, or words. Hence /ná-da-lima/ undergoes (7), becoming intermediate *nádá-liima*, then undergoes (25) to become *nádálíima* (eventually [nadálíima] by Delinking) because the target vowel *ii* comes to stand after a H toned vowel only by concatenation of the prefix *da* with the stem *liima*. Similarly (as discussed in section 3), /ku-dáfuna nyama/ undergoes (7) to become *kudáfúna nyaama*, and the H can spread again to give *kudáfúná nyaama* (ultimately [kudafuná nyaama] 'to chew meat'), because the conditions for (25)—a toneless non-final vowel—are present. Crucially, that condition is only satisfied because /kudáfuna/ and /nyama/ have been combined at the sentence level. Were these words not concatenated, the final vowel of the verb would fail the non-finality condition. In contrast, /ku-dáfuniana/, which surfaces as [kudafúniaana] 'to chew for each other', undergoes (7) to become *kudáfúniaana*, but the sequence [fúni] does not undergo (25), because the vowel *i* is not put within the reach of *ú* by combination of prefix and stem, or word plus word. Similarly, in /kudáfuniana nyama/, even though the verb stands in phrase-medial position, the addition of the object *nyaama* is in no way relevant in determining the applicability of (25). In the intermediate form *kudáfúniana nyaama* (surface [kudafúniana nyaama] 'to chew meat for each other') the vowel which might undergo that rule is present and is nonfinal even without considering prefixes or other words, and therefore applicability of the rule in this case would not crucially involve the addition of a separate word.

The last examples of citation forms from verbs which we will consider involve a stem which is toneless and has more than two syllables. In such examples, the tone of the subject prefix shifts two syllables to the right, as in (26).

(26) *na-da-búduuka* 'I just fell'
na-da-víviira 'I just smiled'
na-da-zígaana 'I just looked at'
na-da-rúgudiisha 'I just warmed up (fluids)'

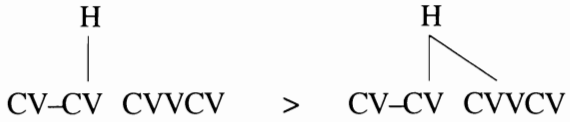
These forms result from the same spreading mechanism which operates in the derivation of *nadálíima*, where H spreads two syllables to the right. Such spreading would result in the intermediate form *ná-dá-búduuka*, with a multiply-linked H tone. The two leftmost branches of that H are deleted. Considering the substring [nádá...], none of the factors which block delinking are present, so one application of delinking would give intermediate *nadábúduuka*. The conditions for delinking are still satisfied in this output, so delinking applies again this time to the substring [...dábú...], giving the surface form [nadabúduuka]. The net result is a rightward shift by two syllables, not just shift by one syllable and spreading by an additional syllable as was the case in [nadálíima]. The unity behind these forms is that the rightmost edge of the H extends two syllables to the right and the leftward edge of the H moves rightward at least once. The difference, then, lies in exactly how far to the right delinking operates.

Given that H can spread two syllables to the right, we must ask why in *ná-dáasha* from /ná-da-sha/ the prefixal H does not spread two syllables to the right, giving incorrect **nadáásha*. The answer is that there is a positional asymmetry in the two spreading processes. The initial process spreading H one syllable to the right, rule (7), is insensitive to the positional properties of the target, and will spread H into a pre-pausal syllable as in *kutáálá*. The cross-junctural spreading process (25) which is responsible for the second spreading of H, in contrast, never spreads H into a prepausal syllable.

3. Phrasal Tone Spreading

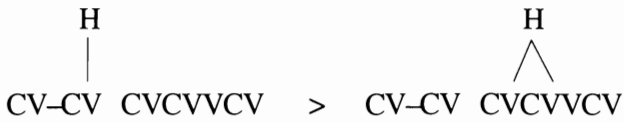
Phrasal combinations of verb plus noun are also subject to these rules of tone spreading and delinking. As seen in (27), if a monosyllabic H verb stem stands before a disyllabic noun, the H in the verb spreads once into the noun, where it results in a falling tone. Spreading (7) targets only one vowel, and since the second vowel of a disyllabic noun is pre-pausal and Cross-Junctural Spreading (25) does not target a prepausal syllable, no further spreading occurs. In these examples, Spreading (7) links the H to the initial syllable of the noun, and Cross-Junctural Spreading (25) spreads the H one syllable further to the right. Then, H delinks from the original syllable of the verb, because within the verb it does not precede a falling tone. No further delinking takes place, because the noun-initial H is followed by a falling tone. If the noun is trisyllabic, the H spreads twice, and delinks from the verb, as in (28).

(27)



kuu-dwa	'to carry' (/ku-dwá/)		
kuu-ja	'to eat' (/ku-já/)		
nyaama	'meat'	*ku-dwá nyáama*	'to carry meat'
muu-ndu	'person'	*ku-dwá múu-ndu*	'to carry a person'
ndaaga	'knife'	*ku-dwá ndáaga*	'to carry a knife'
maanga	'cassava'	*ku-já máanga*	'to eat cassava'
mbooga	'vegetable'	*ku-já mbóoga*	'to eat vegetable'

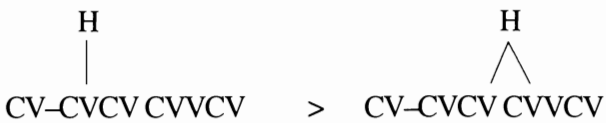
(28)



ma-baanu	'arrows'	*ku-dwa má-báanu*	'to carry arrows'
mu-nyaango	'door'	*ku-dwa mú-nyáango*	'to carry a door'
ma-geembe	'hoes'	*ku-dwa má-géembe*	'to carry hoes'
ma-eembe	'mangoes'	*ku-ja má-éembe*	'to eat mangoes'
ki-laambo	'thing'	*ku-ja kí-láambo*	'to eat a thing'
njogoolo	'rooster'	*ku-ja njógóolo*	'to eat a rooster'

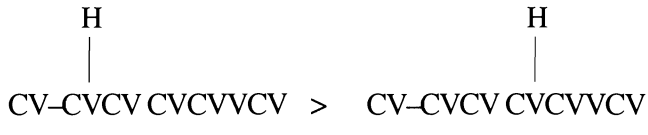
The data in (29) show that with a disyllabic H toned verb, there is rightward spreading by one syllable inside the verb, and Cross-Junctural Spreading also applies between words to put a H on the first vowel of the noun, with the expected pattern of H delinking from the first syllable of the verb. In these data, the object is disyllabic, so only the initial linkage is lost, and the second syllable of the verb retains its H since it comes before a falling tone. However, if the following noun is trisyllabic or longer, as in (30), the only surface H appears on the initial syllable of the noun.

(29)



ku-táálá	'to count' (/ku-tála/)		
ku-óócha	'to roast' (/ku-ócha/)		
baa-ndu	'people'	*ku-talá báa-ndu*	'to count people'
maanga	'cassava'	*ku-talá máanga*	'to count cassava'
nyaama	'meat'	*ku-ochá nyáama*	'to roast meat'

(30)

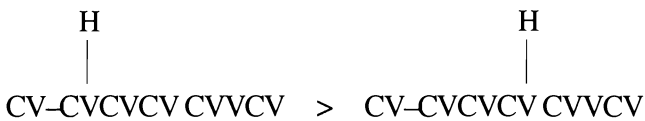


ma-baanu	'knives'	*ku-tala má-baanu*	'to count knives'
sufuriia	'pans'	*ku-tala súfuriia*	'to count pans'
mu-sangaaga	'sand'	*ku-tala mú-sangaaga*	'to count sand'

The total delinking of H from the verb is due to the fact that the final H in the verb, in intermediate *kutalá ʃúfuriia*, is followed by a level H, thus delinking of the H affects both syllables in the verb.

If the verb stem is trisyllabic, as it is in (31), then the H cannot spread into the noun, since the two-syllable window for tone spreading occurs exclusively within the verb. Still, the presence of a following noun results in a significant change in the tone of the verb. Because there is a following noun, the final vowel of the verb which is targeted by Cross-Junctural Spreading is no longer in phrase-final position. The H can thus spread to the last syllable of the verb, on the grounds that it is not final (a determination which crucially involves the following word). Phrase medially, the H spreads twice then delinks twice, resulting in a surface shift of the tone by two syllables.

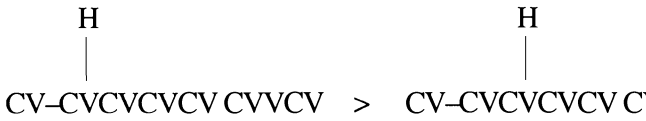
(31)



ku-dáfúuna	'to chew" (/ku-dáfuna/)
ku-dafuná nyaama	'to chew meat'
ku-chémúusha	'to boil" (/ku-chémusha/)
ku-chemushá choofi	'to boil beer'
ku-dék-íi-a	'to cook for' (/ku-dék-i-a/)
ku-dekiá baa-ndu	'to cook for people'

Finally, when the verb is quadrisyllabic or longer, there are no cross-juncture effects: the verbal H spreads and delinks once.

(32)



ku-talíaana	'to count for each other' (/ku-táliana/)
ku-talíana baa-ndu	'to count people for each other'
ku-dafúniia	'to chew for' (/ku-dáfunia/)
ku-dafúnia maanga	'to chew cassava for'

In comparing the data in (31) and (32), note should be taken of the fact that with trisyllabic verbs, H spreads twice in phrase-medial position, even though the H does not spread outside of the verb stem itself, whereas in longer verbs, in citation and phrase-medial contexts alike, spreading applies only once. This is because with longer verbs, the non-final status of the third stem vowel does not depend on the presence of a following word, and as discussed in the previous section, being in that kind of "derived environment" is one of the two conditions that has to be satisfied for Cross-Junctural Spreading to apply.

4. Noun Tonology

The remainder of the analysis concentrates on nouns, especially in phrasal contexts. Because Cross-Junctural Spreading occurs at the phrasal level, we will encounter a predominance of the pattern of spreading and shifting by two syllables.

Nouns in Bantu languages typically have more freedom in lexical tone contrasts, so while there are only two tonal categories of verbs irrespective of length, there are more underlying tonal contrasts in nouns. Deducing the underlying tone is harder in nouns, compared to verbs, because there are no morphological suffixation patterns that move underlying tones in and out of final position (where underlying tonal contrasts are opaque, due to Final H Deletion). Thus a major requirement for analysis of nominal tone is a clear means of identifying underlying tone. Fortunately, underlying tone can be deduced based on phrasal tone behavior. In citation forms, virtually all nouns fall into one of two classes: all-L, and nouns with final HH (there are a very few trisyllabic nouns like *sáb'úuni* 'soap', *mlézéeni* 'sp. of tree' with H-HL-L as their citation tone pattern, which derive from underlying HLL). The citation LL class must itself be further divided into a "neutral" class and a "H-inducing" class, a distinction not evident from the citation form alone. The underlying tone of a noun can easily be recovered by considering a phrase of the form "8 N's". Some citation LL nouns remain as such phrase-medially, having no effect on the following numeral "eight", as the data in (33) show.

(33)

N	eight N	gloss
baandu	*bandu bunyaanya*	'people'
meeda	*meda bunyaanya*	'rivers'
mabiingu	*mabingu bunyaanya*	'clouds'
mageembe	*magembe bunyaanya*	'hoes'
mab'aata	*mab'ata bunyaanya*	'ducks'
mageego	*magego bunyaanya*	'teeth'
vikooto	*vikoto bunyaanya*	'hands'
mbeeba	*mbeba bunyaanya*	'rats'
ndaaga	*ndaga bunyaanya*	'knives'
ng'oombe	*ng'ombe bunyaanya*	'cows'
njogoolo	*njogolo bunyaanya*	'roosters'

Other nouns, which also have the final LL pattern in citation, do have a tonal effect on the following *bunyaanya* in that they induce the addition of a level H tone on the penultimate syllable of the numeral. It is assumed that these nouns have an underlying final H.

(34)	N	eight N	gloss
	bag'oosi	*bag'osi bunyáánya*	'old men'
	baaka	*baka bunyáánya*	'women'
	miidi	*midi bunyáánya*	'trees'
	milaamba	*milamba bunyáánya*	'baobabs'
	mikaate	*mikate bunyáánya*	'breads'
	vikaapu	*vikapu bunyáánya*	'palm baskets'
	virereende	*virerende bunyáánya*	'shadows'
	voongo	*vongo bunyáánya*	'heads'
	masooka	*masoka bunyáánya*	'axes'
	nyuumba	*nyumba bunyáánya*	'houses'
	mbuuba	*mbuba bunyáánya*	'gardens'
	ndaana	*ndana bunyáánya*	'bows'
	taago	*tago bunyáánya*	'hens'
	nyuungu	*nyungu bunyáánya*	'pots'

There is, from the point of view of the citation noun, an abstract contrast between nouns with no underlying H, as in (33), versus nouns with final H that shifts from the noun to the following word, as in (34). The data from monosyllabic H verbs like *ja* have shown that an underlying final H is deleted prepausally, but the final H can be detected at the phrasal level by the fact that it conditions appearance of H on a following word. Given the hypothesis that the nouns have underlying final H (hence the underlying forms for (34) are /ba-g'osí/, /ba-ká/, /mi-lambá/ and so on), it is expected that this H should shift two syllables from the final syllable. The hypothesized final H then explains why H appears on the numeral, after select nouns. Further and more direct evidence will be considered later in this section to show that such nouns have word-final H, because in some cases the H can be directly observed in its underlying position. Finally, the H on the penult of the number appears as a level H, which can be explained by positing final H on /bunyanyá/: this H prevents penultimate falling tone, thus resulting in maximal delinking of the H after it has spread.

The third class of nouns are those with HH in their citation form, which changes to LH before *bunyaanya*, as in (35). These nouns underlyingly have a H on their penultimate syllable; thus, the underlying form of *mizáátá* is /mi-záta/, and this H undergoes Spreading. The process spreading H from the penult to the final syllable is the same as the one which operates in disyllabic infinitives such as *kutáálá*. In nouns as well, H spreads from the penult to the final syllable in the citation form. Since the left branch of the H is on a long vowel in the citation form *mizáátá*, it does not delink. However, when the noun is in phrase medial position,

(35)

N	eight N	gloss
mizáátá	*mizatá bunyaanya*	'sticks'
miséénge	*misengé bunyaanya*	'walking sticks'
misíídú	*misidú bunyaanya*	'forests'
váálá	*valá bunyaanya*	'hands'
mafúúmú	*mafumú bunyaanya*	'spears'
matúúkú	*matukú bunyaanya*	'days'
kóóshí	*koshí bunyaanya*	'dogs'
chóóká	*choká bunyaanya*	'snakes'
mbúúrí	*mburí bunyaanya*	'goats'
ng'óóndí	*ng'ondí bunyaanya*	'sheep'
ngáángá	*ngangá bunyaanya*	'guinea fowl'
tííndí	*tindí bunyaanya*	'tomatoes'
ngúúkú	*ngukú bunyaanya*	'chickens'

the vowel is short so delinking of H is allowed, as in *mizatá bunyaanya*. What remains unexplained at the moment, and ultimately remains a lexically exceptional property of the numeral *bunyaanya*, is why the penult H spreads only once, not twice, as is the general pattern. Parallel to the alternation *kutáálá* 'to count', *kutala mábaanu* 'to count arrows', one would expect **mizata búnyaanya*. This restriction on Cross-Junctural Spreading, that it does not spread H across a word boundary into *bunyaanya*, has no phonological basis, and other nominal modifiers will be shown to behave differently. Nevertheless, combinations of noun plus *bunyaanya* have value in unambiguously revealing the underlying tone of nouns; and, furthermore, the non-conformity of this modifier reduces to one fact.

Apart from the tonal parallel with verbs that have underlying final HL and surface as HH, a distributional fact further argues that nouns with final HH underlyingly have the tone pattern HL. There are no nouns made from monosyllabic roots which have the HH pattern, although monosyllabic stems appear in the LH (*baa-ka*) and LL (*baa-ndu*) classes. Since noun class prefixes do not have underlying H, it would be impossible to combine a monosyllabic root with a noun class prefix and have a H on the penultimate syllable, since the penult would be the syllable of the class prefix. Therefore, there can be no surface HH nouns with monosyllabic roots.[2]

Supporting evidence for this tripartite division of nouns into three underlying tone classes, where only two are evident from citation forms, comes from the combination of noun plus adjective. If the noun is of the LL type (as determined from the tonal behavior of the noun before *bunyaanya*), then when followed by

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[2] Nouns such as *báánáá* 'children' have a disyllabic vowel-initial stem, e.g. /*ba-ánaa*/; compare the singular *mwáánáá* 'child', from /mu-ánaa/. Thus such nouns are not counterexamples to the statement that monosyllabic stems cannot have the surface pattern HH: these stems are not monosyllabic.

adjectives such as *-laacha* or *-b'aaha*, the noun remains LL and has no effect on the following adjective.

(36) Toneless noun plus adjective

bandu balaacha	'tall people'
meda milaacha	'long rivers'
mabingu mab'aaha	'big clouds'
magembe malaacha	'long hoes'
mab'ata mab'aaha	'big ducks'
magego malaacha	'long teeth'
vikoto vib'aaha	'big hands'
mbeba mbaaha	'big rats'
ndaga ndaacha	'long knives'
ng'ombe mbaaha	'big cows'
njogolo mbaaha	'big roosters'

On the other hand, if a noun such as one of those in (37) has an underlying final H, as diagnosed by the appearance of H on the penultimate syllable of *bunyaanya* in (34), then a level H appears on the penultimate syllable of the adjective. The same tone pattern is found on nouns with underlying final H before an adjective in gender 9-10, whose prefix is a non-syllabic nasal on the surface, shown in (38).

(37) Final H noun plus adjective

bag'osi baláácha	'tall old men'
baka bab'ááha	'big women'
midi miláácha	'tall trees'
milamba miláácha	'tall baobabs'
mikate mib'ááha	'big breads'
vikapu vib'ááha	'big palm baskets'
virerende viláácha	'long shadows'
vongo vib'ááha	'big heads'
masoka maláácha	'long axes'

(38)

nyumba mbááha	'big houses'
mbuba mbááha	'big gardens'
ndana ndáácha	'long bows'
tago mbááha	'big hens'
nyungu mbááha	'big pots'

In other words, the tonal behavior of *bunyaanya* and of adjectives is identical so far; final H shifts up to two syllables to the right. The data in (38), in particular the fact that the H does not appear on the final syllable, are consistent with three

interpretations. First, they may show that the class prefix is an underlying syllabic nasal, thus H shifts two syllables to the right. Second, if the prefix is underlyingly nonsyllabic they can still be explained by the fact that Cross-junctural spreading does not spread H to a final syllable, as we have seen previously. Finally, as will be shown later, the adjective stems /bahá/ and /lachá/ have underlying final Hs, which would block spreading to the final syllable.[3]

Adjectives differ from the numeral *bunyaanya* in terms of tonal behavior after a noun with an underlying penult H (phrase-final HH). A noun with a penult H loses its H tone completely, and a H appears on the first vowel of the following adjective. With nouns outside gender 9-10, this means that the H appears on the noun class prefix, as in (39). With adjectives in gender 9-10, having the nonsyllabic prefix N-, this means that the underlyingly penult H appears on the stem initial syllable, as in (40).

(39) Penult H noun plus adjective

mi-zata mí-laacha	'long sticks'
mi-senge mí-laacha	'long walking sticks'
mi-sidu mí-b'aaha	'big forests'
v-ala ví-b'aaha	'big hands'
ma-fumu má-laacha	'long spears'
ma-tuku má-laacha	'long days'

(40)

koshi mbááha	'big dogs'
choka ndáácha	'long snakes'
mburi mbááha	'big goats'
ng'ondi mbááha	'big sheep'
nganga mbááha	'big guinea fowl'
tindi mbááha	'big tomatoes'
nguku mbááha	'big chickens'

In other words, H tone shifts two syllables to the right, the pattern which is found elsewhere for an underlying penult H, phrase-medially. The form *mizata mílaacha* is thus parallel to *kutala mábaanu* 'to count arrows'. The only difference between these various nominal complements is that Spreading does not spread H from the second to the third vowel across a word if the following word is *bunyaanya*.

Some adjectives have a penult H which spreads to the final syllable. Examples standing after a toneless noun are given in (41a). When such an adjective comes after a H-final noun, the H from the noun spreads to the class prefix of the adjective, as in (41b). The H can spread only once, because once the H is on the prefix syllable it abutts the stem initial H, which blocks further spreading. The H

[3] The final H is evident even from these data, and explains why the penult has a level H: compare these examples and forms like *nadáája* 'I just ate' from /ná-da-já/.

then delinks from the last syllable of the noun. With nouns having a penult H as in (41c), Spreading (7) and Cross-Junctural Spreading (25) link the H to the following two syllables, and then the H undergoes delinking from the noun. The contrast between final and penult H is thus obliterated before adjectives having a penult H.

(41) a.	*bandu bavúúí*	'short people'	*bandu batííní*	'small people'
	ndaga vúúí	'short knife'	*ndaga ndííní*	'small knife'
b.	*baka bá'vúúí*	'short women'	*baka bá'tííní*	'small women'
	masoka má'vúúí	'short axes'	*masoka má'tííní*	'small axes'
c.	*bana bá'vúúí*	'short children'	*bana bá'tííní*	'small children'
	mafumu má'vúúí	'short spears'	*mafumu má'tííní*	'small spears'

In gender 9-10, the adjective prefix is nonsyllabic (or may be lacking, before a fricative) so there is no place for the H to spread. As seen in the examples in (42), using a final-H noun (42a) and a penult-H noun (42b), the final syllable of the noun surfaces as H. In the first case, the final H cannot spread since the following syllable is H. Since the H remains singly-linked, it also cannot undergo Delinking; therefore, the underlying tone is unaffected. Such data then confirm the hypothesis that these nouns have an underlying final H tone, a conclusion arrived at on the basis of the fact that they induce the addition of a H on a following modifier. The presence of a downstep between the Hs is due to the fact that two H autosegments concatenated at the surface are always separated by a downstep. In the second case, the underlyingly penult H spreads to the final syllable, but no further, and delinking removes the H from its underlying position.

(42) a.	*ndaná 'vúúí*	'short bow'	*ndaná 'ndííní*	'small bow'
b.	*choká 'vúúí*	'short snake'	*choká 'ndííní*	'small snake'

Apart from the numeral "8" as noted above and "2" and "4" which have special properties and will be discussed in the final section, numerals behave tonally like adjectives. After LL-final nouns, the basic tone of the numeral is revealed, as in (43).

(43)	*mundu gumwéérí*	'one person'	*bandu badáádú*	'three people'
	bandu basáánú	'five people'	*bandu barandáádú*	'six people'
	bandu mfungáádé	'seven people'	*bandu ikeenda*	'nine people'
	bandu ikúúmí	'ten people'		

The H of a H-final noun shifts at least to the following syllable and shifts to a following syllable if that syllable is toneless (as in the numerals "6", "9"), shown in (44).

(44)

ndana íˈmwéérí	'one bow'	*ndana íˈdáádú*	'three bows'
ndana íˈsáánú	'five bows'	*ndana iráˈndáádú*	'six bows'
ndana mfúˈngáádé	'seven bows'	*ndana ikéénda*	'nine bows'
ndana íˈkúúmí	'ten bows'		

If the preceding noun has H underlyingly on the penult, the H shifts to first syllable of the numeral, as in (45).

(45)

choka íˈmwéérí	'one snake'	*choka íˈdáádú*	'three snakes'
choka íˈsáánú	'five snakes'	*choka írandáádú*	'six snakes'
choka mfungáádé	'seven snakes'	*choka íkeenda*	'nine snakes'
choka íˈkúúmí	'ten snakes'		

In some cases (*ndana íˈmwéérí*, *choka íˈmwéérí*) it is impossible to reconstruct the location of the underlying tone from the phrasal tone, because a H in the modifier blocks shift of H (the extent of shifting generally reveals the underlying location of the H), but in other cases where the stem does not begin with a H tone (*ndana iráˈndáádú*, *choka írandáádú*) the extent of H shift reveals whether the tone is underlyingly on the penult or final syllable. When the H tone shifts from the noun to the stem of the numeral, the H must have originated from the final syllable of the noun (/ndaná/), and when the H shifts only to the numeral's prefix the H must have originated from the penultimate syllable of the noun (/chóka/).

The underlying distinction between the three lexical tone classes of nouns is further motivated by the tonology of nouns which are preceded by the H toned copula *ni*. A H tone appears on a noun which stands after the copula, and in many cases, the copula itself also has a H. The underlying tone of the noun can be determined by inspecting the form of the noun before *bunyaanya*, so "8 N's" is given to motivate the underlying tone in the examples below. First we consider nouns of the LL class. If the noun is disyllabic, a H appears on *ni-* and on the following syllable, where it is realized as a falling tone.

(46)

N	'8 Ns'	'it is N'	gloss
baandu	*bandu bunyaanya*	*ní báandu*	'people'
miizi	*mizi bunyaanya*	*ní míizi*	'villages'
ndaaga	*ndaga bunyaanya*	*ní ndáaga*	'knives'
ng'oombe	*ng'ombe bunyaanya*	*ní ng'óombe*	'cows'

This is parallel to the pattern of spreading in other contexts. The H does not delink from the copula, since the following syllable has a falling tone. The H spreads only to the penult, not two syllables rightward to the final syllable, since spreading to a second vowel by Cross-Junctural Spreading cannot target a prepausal syllable.

If the noun is trisyllabic, as in (47), there is no H on *ni*, but there is a H on the following two syllables, with the H being realized as a falling tone on the penult. Based on analogous examples of final H plus a trisyllabic span drawn from combinations of noun plus adjective or *bunyaanya*, one would expect H to spread to the following two syllables, as it does. The H does delink from the copula, but since the antepenult is followed by a falling tone, the antepenultimate H linkage is retained, yielding a mixed pattern of shifting and spreading that is analogous to word-internal examples such as *nadálima* 'I just cultivated' from /nádalima/.

(47)	N	'8 Ns'	'it is N'	gloss
	mageembe	*magembe bunyaanya*	*ni mágéembe*	'hoes'
	mabiingu	*mabingu bunyaanya*	*ni mábíingu*	'clouds'
	njogoolo	*njogolo bunyaanya*	*ni njógóolo*	'roosters'

Finally, if the noun after the copula is longer than trisyllabic, the H spreads from the copula two syllables to the right, to a syllable which precedes the penult. Thus even with spreading by two syllables, the H tone does not form part of a contour. Therefore nothing blocks Delinking, and the surface pattern is shifting rather than spreading.

(48)	N	'8 Ns'	'it is N'	gloss
	musangaaga	*musangaga bunyaanya*	*ni musángaaga*	'sands'
	viambaaza	*viambaza bunyaanya*	*ni viámbaaza*	'walls'

Now we consider nouns of the final-H group after the copula. With these nouns a H appears on the first syllable of the noun if it is disyllabic, as in (49). Note that the H from the copula appears on the phrasal penult as a level H, not a falling tone, in contrast to analogous nouns with no underlying final H in (46). The level H is due to the fact that underlyingly, the final syllable has a H, and therefore a falling tone cannot be created on the penult—an analogous situation arises strictly within the word in the recent past tense of monosyllabic H stems, such as [nadáája] from /nádajá/. Given that the penult has a level H, not a fall (explained by the underlying H on the final syllable), then the condition for delinking the H from the copula's syllable is satisfied, so we have surface shifting, and not just spreading. Thus, /ní midí/ becomes *ní míí'dí* by Spreading, *ní-míidi* by Final H Deletion, and surface [ni míidi] by Delinking.

(49)	N	'8 Ns'	'it is N'	gloss
	miidi	*midi bunyáánya*	*ni míídi*	'trees'
	voongo	*vongo bunyáánya*	*ni vóóngo*	'heads'
	nyuumba	*nyumba bunyáánya*	*ni nyúúmba*	'houses'

If a final-H noun after the copula has more than two syllables as in (50), the H from the copula spreads two syllables to the right, and the left branches of the H tone are delinked. In the case of underlying /ní masoká/, Spreading results in *ní másooká*, Cross-Junctural Spreading gives *ní másóó'ká*, and Final H Deletion gives *ní másóóka*. Because the penult does not fall, Delinking applies maximally, and the surface form that emerges is [*ni masóóka*]. Similar derivations obtain for polysyllabic stems as in *ni viréreende*.

(50)	N	'8 Ns'	'it is N'	gloss
	masooka	*masoka bunyáánya*	*ni masóóka*	'axes'
	nyamaandu	*nyamandu bunyáánya*	*ni nyamáándu*	'animals'
	virereende	*virerende bunyáánya*	*ni viréreende*	'shadows'
	sufuriia	*sufuria bunyáánya*	*ni sufúriia*	'pan'

Finally, if the noun is in the penult-H class (final HH prepausally), the H from *ni* is separated from the lexical H of the noun by a downstep. If the noun is disyllabic, the H remains on the copula, since the following syllable already bears a H tone, as shown in (51).

(51)	N	'8 Ns'	'it is N'	gloss
	méérí	*merí bunyaanya*	*ní! méérí*	'moons'
	ngóóló	*ngoló bunyaanya*	*ní! ngóóló*	'hearts'
	mbúúrí	*mburí bunyaanya*	*ní! mbúúrí*	'goat'
	chóóká	*choká bunyaanya*	*ní! chóóká*	'snake'

On the other hand, if the noun is longer than two syllables, the H spreads to the right and delinks from the copula.

(52)	N	'8 Ns'	'it is N'	gloss
	mafúúmú	*mafumú bunyaanya*	*ni má'fúúmú*	'spears'
	mikóónú	*mikonú bunyaanya*	*ni mí'kóónú*	'arms'
	marúúbá	*marubá bunyaanya*	*ni má'rúúbá*	'days'

The same patterns are found in nouns which follow verbs that have a final grammatical H, such as verbs in the imperative. This melodic H deletes prepausally as in (53a), but its presence can be recovered phrasally. Before a toneless disyllabic noun as in (b), the H spreads to the phrasal penult in the noun, and before a trisyllabic toneless noun as in (c), the H delinks from the verb, but not the prepenult syllable, due to the falling tone on the penult.

(53)	a.	*taala*	'count!'
	b.	*talá báandu*	'count people!'
		talá míizi	'count villages!'
		talá máago	'count stones!'
	c.	*tala bálíimi*	'count farmers!'
		tala mínyáango	'count doors!'
		tala mágéembe	'count hoes!'
		tala njógóolo	'count roosters!'

When followed by a disyllabic or trisyllabic noun that has an underlying final H as in (54a), the H appears on the penult as a level H, and, since the penult does not fall, the H can delink from the vowels on the left. If the following noun has more than three syllables, as in (b), H spreads a maximum of two syllables to the right and delinks on the left, since no falling tone is created. If the noun has a phonetically realized H on the first syllable, as in (c), the H from the verb cannot spread, so the underlying final H surfaces as such on the verb. Finally, in (d) the second syllable of the noun has a H, so the verbal H spreads to the first syllable of the noun and delinks from the verb. In both (c) and (d), the H of the verb (whether it is realized within the verb or shifts to the noun) is separated from the noun's lexical H by a downstep.

(54)	a.	*tala bááka*	'count women!'
		tala míídi	'count trees!'
		tala masóóka	'count axes!'
	b.	*tala sufúriia*	'count pans!'
		tala viréreende	'count shadows!'
	c.	*talá ꜜbáánáá*	'count children!'
		talá ꜜváálá	'count fingers!'
		talá ꜜsáb'úuni	'count soap!'
	d.	*tala máꜜtúúkú*	'count days!'
		tala sáꜜmáákí	'count fish!'

As observed earlier in discussing the data of (39)-(40), when a noun with a penult H is followed by an adjective, the H spreads into the adjective and delinks from the noun (e.g., *kamba ndáácha* 'long rope', *mi-zata mí-laacha* 'long sticks'). It is predicted that if the H of such a noun were also immediately preceded by a H in the previous word, that H would block delinking. The data in (55) show that this prediction is correct.

(55) *ní ˈkóshí mbááha* 'it is big dogs'
ní ˈchóká ndáácha 'it is long snakes'
ni mí-ˈzátá mí-laacha 'it is long sticks'
tala má-ˈfúmú má-laacha 'count long spears!'
talá ˈmbúrí mbááha 'count big goats!'

Beginning with /ní kóshi mbahá/, the two spreading rules apply, assigning H to the second syllable of the noun and to the first syllable of the adjective. Because the multiply-linked H happens to be preceded by a H, delinking does not apply and the form surfaces as [ní ˈkóshí mbááha], after deletion of the final H from the adjective.

5. Complications with non-adjectival modifiers

The behavior of certain nominal modifiers poses complications, centering around what happens when Hs come together underlyingly. In some cases within the noun phrase, one of the Hs deletes. One context where dissimilative H deletion occurs is before possessive pronouns. Nouns followed by the 1 sg. possessive pronoun fall into two behavioral tone groups. When nouns of either the LL or final H tone classes are followed by "my", the noun is toneless and the possessive pro-noun has a surface HH tone pattern.

(56) LL nouns

igembe jáápó	'my hoe'	*magembe gáápó*	'my hoes'
kijiko cháápó	'my spoon'	*vijoko váápó*	'my spoons'

LH nouns

isoka jáápó	'my axe'	*masoka gáápó*	'my axes'
kirerende cháápó	'my shadow'	*virerende váápó*	'my shadows'

In this context, it is impossible to determine whether the final vowel of the noun has a H: no H surfaces on the noun, and the tone of the following modifier does not change as a function of the underlying tone of the preceding noun. However, we know from other evidence, such as the appearance of H on following words viz. *masoka maláácha* 'long axes' (vs. *magembe malaacha* 'long hoes') that the second set of nouns has an underlying final H.

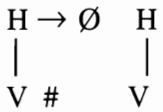
Partial disambiguation of the tone classes is seen with nouns having a penult H tone, as in (57); these nouns surface with a final H separated from the H of the possessive pronoun by a downstep. Since the pronoun has H, one would not expect the H on the noun to spread into the pronoun.

(57) HH nouns

chalá ˈcháápó	'my hand'	*valá ˈváápó*	'my hands'
ifumú ˈjáápó	'my spear'	*mafumú ˈgáápó*	'my spears'

We must now explain the loss of the final H from underlying *masoká gáápó*. Most previous examples of adjacent Hs have involved Spreading, for example *ni máˈfúúmú* 'they are spears' from /ní mafúmu/. Combinations of H+H created at the underlying level are also found, for example involving the copula /ní/ or a verb in the imperative plus a H-initial noun, cf. *ní ˈsáb'úuni* 'it is soap', *talá ˈsáb'úuni* 'count soap!'. These data show that there is no general deletion of H next to H. Data in (42b) such as *ndaná ˈvúúí* 'short bow' from /ndaná vúí/ show that even between noun and adjective, adjacent Hs that arise from phrasal concatenation are not subject to any H tone deletion. Such reduction of multiple underlying Hs is limited to combinations of noun plus certain modifiers, whose nature we discuss later. For now, we note that loss of H in *masoka gáápó* (**masoká ˈgáápó*) is one such instance of regressive deletion of H, a process which will be documented further in this section. In light of the fact that there is no regressive deletion of H before H in *mafumú ˈgáápó* 'my spears' from /mafúmu gáápó/, we also conclude that this deletion process only operates on underlyingly adjacent H tone sequences. We tenatively formulate this process as in (58).

(58) **Noun-Phrasal Dissimilation**



There are two surface tonal patterns in the 1 sg. possessive pronoun, governed by the noun class of the agreement prefix. The 1 sg. possessive pronoun is composed of a class prefix which agrees with the head noun (e.g., *j-* in cl. 5, *g-* in cl. 6) plus the possessive stem (*-apo* for 1 sg.). If the agreeing pronoun is in class 1 or 9, a tone pattern different from the preceding is encountered.[4] When preceded by a noun with final LL, a possessive pronoun in classes 1 or 9 surfaces with the tone pattern LL. In contrast, the same noun stems in the plural, which are in classes 2 and 10, exhibit the surface pattern HH as above.

(59)

Cl. 1,9 after LL noun		Cl. 2,10 after LL noun	
mundu waapo	'my person'	*bandu báápó*	'my people'
mdabana waapo	'my youth'	*badabana báápó*	'my youths'
ng'ombe yaapo	'my cow'	*ng'ombe ráápó*	'my cows'
njogolo yaapo	'my rooster'	*njogolo ráápó*	'my roosters'

[4] This patterning in the tone of non-adjectival modifiers is found in many Bantu languages, and often includes cl. 4. In Taita (as well as some other Bantu languages) cl. 4 in the agreement system has been replaced with cl. 10.

Possessive pronouns in classes other than 1 or 9 have underlying H on the penult, which spreads to the final syllable, accounting for the surface HH pattern. At this point, we cannot be certain of the underlying tone of *po*, which could be underlyingly toneless and take its H from Spreading, but other evidence will show that it has H. Assuming final H, the H would be expected to delete prepausally in *mundu waapo*. In data such as *bandu báápó*, the H could delete by a tonal dissimilation process, Meeussen's Rule, where underlying HH → HØ; the penult H would then spread to the final syllable, just as /kutála/ → [*kutáálá*] 'to count'. Another interpretation of *báápó* is that the penult and final Hs fuse into one, i.e., deletion of final H after H and association of the penult H to the final derives from a single fusion operation.

We now consider evidence that the final tone is H. If the noun preceding a cl. 1 or 9 possessive pronoun has underlying final H, then the H of the noun shifts once to the right, to the initial syllable of the pronoun, as seen in (60). The level H in the first column is explained if *po* has underlying H, thus [ndana yáápo] derives from /ndaná ya-pó/. Spreading operates as expected, and because of the underlying final H, the penult H cannot be realized as a falling tone. This allows delinking of the H from the final syllable of the noun; deletion of the prepausal H gives the surface form.

(60)

LH noun before cl. 1,9		LH noun before other classes	
mg'osi wáápo	'my elder'	*bag'osi báápó*	'my elders'
ndana yáápo	'my bow'	*ndana ráápó*	'my bows'
mbuba yáápo	'my garden'	*mbuba ráápó*	'my gardens'
muka wáápo	'my wife'	*baka báápó*	'my wives'

Postulating a final H on the syllable *po* also explains why a following adjective receives H tone after that possessive pronoun.

(61)

kaamba	'rope'	*kamba ndaacha*	'long rope'
kamba yaapo	'my rope'	*kamba yapo ndáácha*	'my long rope'
muundu	'person'	*mundu mlaacha*	'tall person'
mundu waapo	'my person'	*mundu wapo mláácha*	'my tall person'

From this evidence, we conclude that both syllables of *báápó* are underlyingly H toned and, consequently, the final H deletes by Meeussen's Rule; alternatively the Hs fuse.

The same analysis holds for nouns with penult H (citation HH): penult H shifts two syllables to the right, as in (62). Spreading and Cross-Junctural Spreading give intermediate *mwáná wáá'pó*, delinking results in *mwana wáá'pó*, and the surface form comes from deletion of the prepausal H.

(62)	HH noun before cl. 1,9		HH noun before other classes	
	mwana wáápo	'my child'	*baná ˈbáápó*	'my children'
	koshi yáápo	'my dog'	*koshí ˈráápó*	'my dogs'
	nganga yáápo	'my guinea fowl'	*ngangá ˈyáápo*	'my guinea fowls'

Two other modifiers have the same tonal behavior, the numeral "four" and the quantifier "some". We first consider the numeral "four". When the preceding noun is of the LL or LH class, as in (63a,b), no H appears on the noun and the numeral has the tone pattern HH.

(63) a. LL nouns

bandu b'ááná	'four people'
miri íínyá	'four roots'
ng'ombe íínyá	'four cows'

b. LH nouns

baka b'ááná	'four women'
bag'osi b'ááná	'four elders'
vongo vííná	'four heads'

Given the phrasal dissimilation rule (58), underlying */baká b'ána/* undergoes regressive dissimilation so the two tone classes are neutralized in (63). If the preceding noun has an underlying penultimate H tone, that H shifts to the final syllable of the noun and is separated from the H of the numeral by a downstep. H is not deleted in (64) because it is underlyingly on the penult and thus not adjacent to the initial H of the modifier.

(64)		
	mesó ˈááná	'four eyes'
	koshí ˈíínyá	'four dogs'
	ngoló ˈíínyá	'four hearts'

This pattern is also found before the quantifier "some", where the example in (65a) illustrates LL nouns, (65b) gives LH nouns, and (65c) gives HH nouns.

(65) a.

bandu báámí	'some people'
magembe gáámí	'some hoes'
ng'ombe ríímí	'some cows'
mizi ríímí	'some villages'

b.

baka báámí	'some women'
masoka gáámí	'some axes'
midi ríímí	'some trees'

c.	*mikonú ˈríímˊ*	'some arms'
	marinˊá ˈgáámˊ	'some names'
	valˊá ˈvíímˊ	'some hands'

The quantifiers "how many" exhibit special tonal behavior. After a toneless noun, the modifier *-liinga* is toneless, as in (66). Surprisingly, it remains toneless after a H-final noun, as in (67). It is expected that the final H should shift into the modifier, but it does not, and instead it disappears entirely.

(66)	*bandu baliinga*	'how many people?'
	vijiko viliinga	'how many spoons?'
	ng'ombe iliinga	'how many cows'
	miri iliinga	'how many roots'
(67)	*baka baliinga*	'how many women?'
	masoka aliinga	'how many axes?'
	midi iliinga	'how many trees?'
	vikapu viliinga	'how many baskets?'

A noun with an underlying penult H surfaces with the final tone pattern LH before this modifier. Note that Cross-junctural Spread does not apply to *-liinga*.

(68)	*merˊí iliinga*	'how many months?'
	marinˊá aliinga	'how many names?'
	valˊá viliinga	'how many fingers?'
	koshˊí iliinga	'how many dogs?'

The quantifiers "many" and "all" also have anomalous tone paterns. The underlying tone of these quantifiers is best revealed in (69) when preceded by a toneless noun. The modifier stems have a penult H. As expected, the penultimate H of HH nouns shifts to the final syllable of the noun, shown in (70).

(69)	*bandu bééngˊí*	'many people'	*bandu bóósé*	'all people'
	miri nyˊííngˊí	'many roots'	*miri yóósé*	'all roots'
	ndaga nyˊííngˊí	'many knives'	*ndaga róósé*	'all knives'
	magembe mééngi	'many knives'	*magembe góosé*	'all hoes'
(70)	*mizatˊá ˈnyííngˊí*	'many sticks'	*mizatˊá ˈyóósé*	'all sticks'
	valˊá ˈvííngˊí	'many fingers'	*valˊá ˈvóósé*	'all fingers'
	koshˊí ˈnyííngˊí	'many dogs'	*koshˊí ˈróósé*	'all dogs'

Unexpectedly, nouns with final H tone retain that H, and the H tone of the following quantifier is deleted.

(71)	*baká beengi*	'many women'	*baká boose*	'all girls'
	midá nyiingi	'many trees'	*midí yoose*	'all trees'
	masoká meengi	'many axes'	*masoká goose*	'all axes'
	vongó viingi	'many heads'	*vongó voose*	'all heads'
	mbubá nyiingi	'many gardens'	*mbubá roose*	'all gardens'

The final tonal complication in noun phrasal tonology concerns the behavior of the numeral "two", which interacts with the tone of the preceding noun in a special way. When it is preceded by a LL-final noun, as in (72), it surfaces with no H tones, as expected. If the preceding noun is of the HH class, i.e., has an underlying penultimate H tone, as in (73), then that H shifts from the noun and appears on the penultimate syllable of the numeral.

(72) LL nouns

bandu baabi	'two people'
miri iibi	'two roots'
magembe aabi	'two hoes'
vijoko viibi	'two spoons'
ng'ombe iibi	'two cows'

(73) HH nouns

bana báábi	'two children'
meri ííbi	'two months'
mikonu ííbi	'two arms'
marina áábi	'two names'
vala vííbi	'two fingers'
koshi ííbi	'two dogs'

Unexpectedly, an underlyingly final H on the preceding noun disappears entirely and does not shift to the modifier, as in (74).

(74) LH nouns

baka baabi	'two women'
bai baabi	'two girls'
midi iibi	'two trees'
minazi iibi	'two coconut trees'
masoka aabi	'two axes'

The anomalous modifier patterns are summarized as follows. An underlying final H deletes before a H-initial possessive pronoun, the numeral "4", and "some". Nouns have the same behavior before "how many", even though that modifier does not have a surface H. The quantifiers "all" and "many" also have an underlying initial H tone, but rather than causing deletion of the preceding H, the H of the modifier deletes (additionally, the final H of the noun does not shift into the quantifier). Finally, a final H deletes before the numeral "2", rather than shifting into the numeral (even though a penult H does shift into that numeral).

The main anomaly in the data is deletion of underlying final H before a modifier H. Such dissimilation is not in itself puzzling, but the restriction of the triggering class is. Some surface H-inital nominal modifiers are not in the triggering class, so examples such as *ndaná ˈvúúí* 'short bow' in (42) do not show deletion of the final H. Underlyingly, this comes from /ndaná n-vúi/, with a noun class prefix composed of a preconsonantal nasal; this nasal is deleted before a stem-initial fricative. If this prefix were underlyingly syllabic, then the two Hs would not be in adjacent syllables at that level, and the lack of dissimilative lowering could be explained on the basis of the non-adjacency of the tones. There is one factor which might seem to weigh against that analysis, in the form of evidence that this noun class prefix does not behave phonologically as though it were syllabic. We have previously observed the behavioral contrast in penult-H nouns with respect to the location of the shifted H in data such as *ma-fumu má-laacha* 'long spears' from (39) versus *choka ndáácha* 'long snakes' from (40), where the nonsyllabicity of the class prefix in *ndáácha* explains why the tone appears on the penult. This argues that the nasal is not syllabic at the stage where Cross Junctural spreading applies. However, if preconsonantal nasals are syllabic only at the stage where dissimilation takes place, and desyllabify after dissimilation of H, then there is no obstacle to appealing to the underlying syllabicity of the nasal in explaining the difference between *ndaná ˈvúúí* and *ndana yáápo*.

One of the modifiers which exhibits an exceptional pattern is "many", whose stem is underlying /ingi/. A noun class paradigm of this modifier is given in (75). The class 10 form contains the same prefix N- found in adjectives such as *ndáácha* and *nd̆ííní* and as we have seen, that nasal blocks tonal dissimilation. The important difference between *ndííní* which does not participate in dissimilation and *nyííngí* which does, is that the nasal is preconsonantal in *ndííní* and prevocalic in *nyííngí*. This indicates that, if syllabicity of the nasal is the explanation for the fact that *ndííní* does not participate in dissimilation, syllabicity is only assigned to a preconsonantal nasal and not to a prevocalic one.

(75)

cl. 2	*bééngí*		cl. 4	*mííngí*
cl. 6	*mééngí*		cl. 8	*vííngí*
cl. 10	*nyííngí*			

As noted above, the modifier *-liinga* 'how many' behaves like the numeral "4" and we could explain its behavior by presuming that the agreement prefix has an underlying H tone which is deleted, but there is no other motivation for positing a H on the agreement prefix. If we suppose that the underlying form of *masoka aliinga* 'how many axes?' is /masoká áliinga/ and the underlying form of *mariná aliinga* 'how many names?' is /marína áliinga/, then by applying rules which are independently motivated, plus a rule deleting the H from the agreement prefix, we can trigger the deletion of final H in *masoka* and limit the extent of Spreading in *masoká*; whether this is sufficient motivation for positing an abstract H tone on the prefix is a broader issue which cannot be resolved here.

As for the behavior of the quantifiers "many" and "all", the irregularity can be captured in the generalization that the underlying phrasal HH sequence is resolved in this case by deletion of the H of the modifier, not that of the noun (*masoká meengi* 'many axes', *masoká goose* 'all axes', cf. *masoka gáápó* 'my axes', *masoka gáámí* 'some axes'). This fact has no phonetic explanation, but may relate to the fact that they are quantifiers, and quantifiers sometimes have unexpected patterns of behavior in the phrasal tone sandhi of Bantu languages (see Odden [1994]).

Finally, the best explanation of the behavior of "2"—the fact that H shifts from the penult of a noun to the prefix (*marina áábi* 'two names') but deletes when the H is underlyingly on the final noun syllable (*masoka aabi* 'two axes')—is historical. The numeral stem was originally disyllabic *bili, but deletion of *l*, resolution of vowel hiatus, and shortening of final vowels resulted in the loss of the final syllable. Originally, one would have encountered alternations such as **masoka abíli* from /masoká abili/ and **marina ábili* from /marína abili/. After loss of the final syllable, these forms would surface as **masoka abí* and **marina ábi*, which would be subject to deletion of final H, a process that would give *masoka abi* and *marina ábi*, the surface forms of the actual language, once penultimate lengthening is factored in.

6. Summary

The preceding analysis of the tonal system of the Dembwa dialect of Taita has revealed that the bulk of tonal alternations in the language can be understood in terms of two simple operations, tone spreading and tone delinking. Tone spreading is manifested in the form of two separate rules, one a rather general rightward spread rule and the other a more restricted one which applies only in what might be called a "morphosyntactically derived" environment. Delinking eliminates the left branch of a multiply-linked H, subject to three phonological restrictions—delinking does not apply after another H, it does not target a long vowel, and it does not apply if the result would be a simple falling tone. It is not obvious how these conditions should be expressed in a formal theory of phonological operations; thus, the analysis of Taita tone potentially bears on important theoretical questions, in particular whether output conditions are necessary on rules and, if so, what constitutes a possible output condition on a rule. Detailed discussion of that issue is

orthogonal to the purpose of this paper, which is to state what the facts of Taita are that an adequate theory must account for.

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Notes and Queries

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NOTES ON TENSE AND ASPECT IN THE IJẸṢA DIALECT OF YORUBA

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Ijẹṣa is a dialect of Yoruba in which there are three aspect markings—progressive, habitual, and perfective—and one tense marking—future. Tense/aspect marking in the Ijẹṣa dialect differs from that found in Standard Yoruba. Consider first aspectual marking. The progressive in Ijẹṣa is marked by *mí* rather than the *ń* of Standard Yoruba, as shown in (1).

(1)	Ijẹṣa	Standard Yoruba
a.	*Mọ mí lọ́ọ́ roko.*[1] I PROG go farm 'I am going to the farm.'	*Mo ń lọ sí roko.* to
b.	*Adé mí jẹun.* Ade PROG eat 'Ade is eating.'	*Adé ń jẹun.*
c.	*Mọ ti mí ṣusẹ́.* I PF PROG do_work 'I have been working.'	*Mo ti ń ṣiṣẹ́.*

In imperative constructions, such as those shown in (2), Ijẹṣa allows either the bare verb (2a) or progressive marker *a* plus verb (2b-c). Standard Yoruba, on the other hand, requires the auxiliary *máa* and does not permit use of either the bare verb or the progressive form. Ijẹṣa *a* is a reduced form of *máa*, which no longer occurs as a progressive marker in this form in Ijẹṣa.

The habitual is marked by a vowel that assimilates to the preceding vowel in Ijẹsa, but by *máa ń* in Standard Yoruba, as in (3).

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[1] Abbreviations are as follows:
HAB habitual FUT future PF perfect PROG progressive

(2)

Ijẹṣa	Standard Yoruba
a. *Bọ* 'come'	**bọ̀*
b. *A bọ̀.* PROG come 'Come.'	*Máa bọ̀.* be come 'Come.' cf. *A bọ̀.* we come 'We arrived.'
Ijẹṣa	Standard Yoruba
c. *A jẹun.* PROG eat 'Eat.'	*Máa jẹun.* be eat 'Eat.' cf. *A jẹun.* we eat 'We ate.'

(3)

Ijẹṣa	Standard Yoruba
a. *Bọ́lá á tù wé.* Bola HAB sell book 'Bola is always selling books.'	*Bọ́lá máa ń ta ìwé.* HAB sell
b. *Ẹ́ ẹ́ á.* he HAB come 'He always comes here.'	*Á máa ń wá.* he HAB come
c. *Ọ̀títọ́ nùkàn lẹ́ ẹ́ sọ.* truth only is_he HAB speak 'He speaks only the truth.'	*Ọ̀títọ́ nìkan ni ó máa ń sọ.* is he HAB

Future tense marking also differs in the two dialects. In Ijẹṣa, it is marked by either *a* or *á*, in contrast to the variant forms *yóò*, *yó*, *ó*, or *máa* in Standard Yoruba.

(4)

Ijẹṣa	Standard Yoruba
a. *Mà a ga.* I FUT tall 'I will become tall.'	*Olú yóò/yó/ó sọ̀rọ̀.* Olu FUT talk 'Olu will talk.'
b. *Ṣupọ á lọ.* Supo FUT go 'Supo will go.'	*Olú máa sọ̀rọ̀.* Olu FUT talk 'Olu will talk.'

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PUBLICATIONS RECEIVED

Vydrine, Valentin. *Esquisse contrastive de kagoro (Manding)* (Mande Languages and Linguistics, vol. 4). Köln: Rüdiger Köppe Verlag. 2001. Pp. 280. ISBN 3-89645-073-5. Paper.

This volume presents a grammatical description of the phonology and morphosyntax of various dialects of Kagoro, a samll Mande group comprising approximately 30,000 speakers located in six or seven "zones" north of the Niger River. A prefatory chapter (pp. 7-29) discusses the history and current status of the Kagoro language. The main body of the book consists of three sections: "Le système phonologique", "La morphosyntaxe", and a "Liste comparative des formes par dialectes". The phonological description consists of three chapters that describe vowels (pp. 30-42), consonants (pp. 43-52), and tones (pp. 53-86), respectively. Morphosyntax is described in two chapters. Chapter 4 (pp. 87-98) describes the nominal and verbal systems, Chapter 5 the influence of Bambara. The final section (pp. 100-145) provides an extensive listing comparing across dialects the various features discussed in the preceding sections. Included are an appendix (pp. 146-200), comprising three interlinearized texts, a Kagoro-French lexicon (pp. 201-274), and a colored map of the Kagoro villages and their neighbors.

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UPCOMING MEETINGS ON AFRICAN LANGUAGES/LINGUISTICS

2001

June 21-22

TONOLOGY MEETING. University of Toulouse le Mirail. (Contact: Elsa Gomez-Imbert, ERSS Equipe de Recherche en Syntaxe et Semantique UMR 5610, CNRS & U. Toulouse-Le Mirail, Maison de la Recherche, 5 allees Antonio Machado 31058 Toulouse, France; Tel.: 33 (0)5 61 50 36 67; fax: 33 (0)5 61 50 46 77; e-mail: Gomezimb@univ-tlse2.fr)

July 5-8

BIENNIAL INTERNATIONAL COLLOQUIUM ON THE CHADIC LANGUAGES. University of Leipzig, Germany. (Contact: Prof. Dr. H. Ekkehard Wolff, Institut für Afrikanistik, Universität Leipzig, Burgstrasse 21, D-04109 Leipzig, Germany; Tel. (+49) (0)341 - 97 37031; Fax: (+49) (0)341 - 97 37048; e-mail: wolff@rz.uni-leipzig.de; website: http://www.uni-leipzig.de/afrikanistik/)

July 11-13

INTERNATIONAL BIENNIAL AFRICAN LANGUAGE ASSOCIATION OF SOUTH AFRICA (ALASA) CONFERENCE, 11TH. University of Port Elizabeth, South Africa. (Contact: Prof. Henry Thipa; e-mail: ngahmt@upe.ac.za; fax +27 41 5042827)

August 22-25

NILO-SAHARAN LINGUISTICS COLLOQUIUM, 8TH. Hamburg University, Hamburg, Germany. (Contact: 8th NSLC, Institute of African and Ethiopian Studies, Rothenbaumchausee 67/69, Hamburg University, D-20148 Hamburg, Germany; Tel.: 0049-40/42838-4874; fax: 0049-40/42838-5675; e-mail: nilosah@uni-hamburg.de)

August 27-29

COLLOQUIUM ON AFRICAN LANGUAGES AND LINGUISTICS, 31ST. Leiden, The Netherlands. (Contact: The Organizer, CALL, Dept. of African Linguistics, Leiden University, P. O. Box 9515, 2300 RA Leiden, The Netherlands; e-mail: CALL@let.leidenuniv.nl; website: http://www.let.leidenuniv.nl/tca/atk/call.html)

September 25-28
INTERNATIONAL CONFERENCE ON THE LANGUAGES OF THE FAR EAST, SOUTHEAST ASIA AND WEST AFRICA, 6TH. University of St. Petersburg, Russia. (Contact: Mr. Nikolai Frolov, e-mail: posia@NF8060.spb.edu; or e-mail: sein@newmail.ru)

October 18-20
TEXT IN CONTEXT: AFRICAN LANGUAGES BETWEEN ORALITY AND SCRIPTURALITY. University of Zurich, Switzerland. (Contact: Dept. of General Linguistics, African Symposium, Plattenstr. 54, CH-8032 Zurich, Switzerland; fax: 0041-1-634 43 57; e-mail: afrosympo@access.unizh.ch; website: http://www.unizh.ch/spw)

2002

February 6-8
COLLOQUE INTERNATIONAL: THÉORIES LINGUISTIQUES ET LANGUES SUBSAHARIENNES, Université Paris VIII, France.

March 21-23
ANNUAL CONFERENCE OF THE AFRICAN LANGUAGE TEACHERS ASSOCIATION (ALTA), 6TH. Ohio University, Athens, Ohio. (Contact: John Mugane, ALTA Conference Chair, Gordy Hall 349, Ohio University, Athens, OH 45701; Tel: 740-597-2595/740-593-4564; Fax: 740-593-2967; e-mail: mugane@ohio.edu; website: http://www.ohiou.edu/alta/ACAL_2002conf.htm)

March 22-24
ANNUAL CONFERENCE ON AFRICAN LINGUISTICS (ACAL), 33RD. Ohio University, Athens, Ohio. (Contact: John Mugane, 33rd ACAL Conference Chair, Gordy Hall 349, Ohio University, Athens, OH 45701; Tel: 740-597-2595/740-593-4564; Fax: 740-593-2967; e-mail: mugane@ohio.edu; website: http://www.ohiou.edu/alta/ACAL_2002conf.htm)

JUNE 12-15
INTERDISCIPLINARY SYMPOSIUM ON FIELDWORK IN AFRICA. West African Research Center, Dakar, Senegal.
(Contact: In Africa: Wendy Wilson Fall, WARC Director, Rue E x Leon G. Damas, Fann Residence, BP 5456, Dakar, Senegal; Tel.: (221) 8-24-20-62; Fax: (221) 8-24-20-58; e-mail: assist@ucad.sn
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June 16-21
MANDE STUDIES ASSOCIATION (MANSA) CONFERENCE, University of Leiden, The Netherlands.

August 7-10
WEST AFRICAN LINGUISTICS SOCIETY CONGRESS, 23rd. University of Buea, Yaounde, Cameroon. (Contact: Ngessimo Mutaka, Department of Linguistics, University of Yaounde 1, Cameroon; e-mail: pmutaka@yahoo.com)

August 26-28
COLLOQUIUM ON AFRICAN LANGUAGES AND LINGUISTICS, 32nd. Leiden, The Netherlands. (Contact: The Organizer, CALL, Dept. of African Linguistics, Leiden University, P. O. Box 9515, 2300 RA Leiden, The Netherlands; e-mail: CALL@let.leidenuniv.nl; website: http://www.let.leidenuniv.nl/tca/atk/call.html)

September 30-October 2
AFRIKANISTENTAG, 15TH. Frankfurt, Germany. (Contact: Dr. Anne Storch, Institut für Afrikanische Sprachwissenschaften, J. W. Goethe University, Frankfurt, Germany; Tel: 069-79828263; Fax: 069-79825133; e-mail: ifas@uni-frankfurt.de)

2003

April 10-12
INTERNATIONAL CONFERENCE OF CUSHITIC AND OMOTIC LANGUAGES, 4TH. Leiden University, The Netherlands. (Contact: Dept. of African Linguistics, Leiden University, P. O. Box 9515, 2300 RA Leiden, The Netherlands)

June 17-22
WORLD CONGRESS OF AFRICAN LINGUISTICS, 4TH. Rutgers University, New Brunswick, New Jersey. (Contact: WOCAL4, Department of Linguistics, Rutgers University, 18 Seminary Place, New Brunswick, NJ 08901; Website: www.wocal4.rutgers.edu/)

June 17-22
ANNUAL CONFERENCE ON AFRICAN LINGUISTICS, 34TH. Rutgers University, New Brunswick, New Jersey. (Contact: WOCAL4, Department of Linguistics, Rutgers University, 18 Seminary Place, New Brunswick, NJ 08901; Website: www.wocal4.rutgers.edu/acal34)

June 17-22
INTERNATIONAL SYMPOSIUM ON THE MARGINALIZED LANGUAGES OF AFRICA. Rutgers University, New Brunswick, New Jersey. (Contact: e-mail: Matthias.Brenzinger@uni-koeln.de)