

Tone and Accent in the Xhosa Verbal System*

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1. Introduction. This paper presents work in progress involving the interaction of tone and metrical accent in Xhosa, a Bantu language of the Nguni group spoken in South Africa. Our data are taken almost exclusively from Claughton's (1983) monograph; our general approach is based on the idea that tone and accent exist in Xhosa and operate autonomously. To say that the tone and accent systems function autonomously is, to be sure, a fashionable position currently; we mean by it not that the two systems are independent (for it is their dependence -- or "interaction" -- that is the point of this paper) but rather that the two are formally distinct and that each behaves as students of tone and accent systems would expect.

For example, the most common locus for accent to fall is on the penult or antepenult; the familiar Latin stress rule, with its echo in so many related and unrelated languages, illustrates this point. Within the framework of metrical phonology, this is viewed as the combination of extrametricality assigned to the last syllable, together with a quantity-sensitive binary foot assigned to the end of the word. It is this pattern, distinct in several ways from the familiar character of tonal systems, that we find in the Xhosa verb.

At the same time, the Xhosa verb is possessed of a tonal system, straightforwardly analyzed with the tools of autosegmental phonology. This is hardly surprising, in light of our understanding of Bantu tone systems (as recently summarized in Clements and Goldsmith (1984), for example). The

difficulty of analyzing the Xhosa system, however, derives from the fact that it is 'perturbed', we might say, by the accentual system that we hinted at in the preceding paragraph. This, then, is the goal of this paper: to introduce and justify an accentual system whose existence is ultimately motivated by the way in which it modifies and affects the autosegmentalized tones. The analogy that springs immediately to mind may not be too trite to mention: although the planets of the Solar System function autonomously, they affect each other with their gravitational pull, and the astronomer may reasonably infer the existence of an unobserved planet on the basis of the perturbing effects on observed planets, more especially if the hypothesized perturbing planet is calculated to move in an elliptical orbit about the Sun, i.e., to behave just the way known planets do. This is the kind of case that we shall build for the accentual system of Xhosa.

2. The Xhosa verb. The structure of the Xhosa verb is as in (1):

$$(1) \begin{array}{c} \text{subject} \\ \text{marker} \end{array} - \begin{array}{c} \text{(tense)} \\ \text{(marker)} \end{array} - \begin{array}{c} \text{(object)} \\ \text{(marker)} \end{array} - [\text{radical} + (\text{extensions}) + \text{FV}]$$

The subject marker (SM) varies in form depending on the noun class of the subject; tense marker (TM) is absent in the Infinitive and absent in the Present Indicative when the focus is off the verb; the object marker (OM), like the SM, varies in form depending on the noun class of the object; verb radical and verbal extensions; and the Final Vowel (FV), which varies with tense. The radical, extensions (if present) and FV constitute the stem of the verb.

3. Present Indicative. In the Present Indicative forms presented in (2), there is no TM (i.e., focus is off the verb) and no OM. They therefore include the bare minimum necessary for a verb: SM - radical - FV. The SM

is toneless (third person animate (Class 1/2) SMs are High-toned, while first and second person SMs are toneless). (In the data presented here, as well as in our analysis, we will abstract away from a general rule that lowers sequences of High-toned syllables that result from a High tone spread over the vowels; we indicate the possible surface form in which all the vowels are High.)

(2) Present Indicative, no TM, no OM, toneless SM

a. toneless radical

1. ni-wis-a 'you drop'
2. ni-bal-a 'you count'
3. ni-balis-a 'you narrate'
4. ni-šukumis-a 'you shake'
5. ni-namatelis-a 'you cement'

b. High-toned radical

1. ni-bék-a 'you put'
2. ni-mém-a 'you invite'
3. ni-búlis-a 'you greet'
4. ni-bónís-a 'you show'
5. ni-bónísis-a 'you show clearly'
6. ni-ñíñitékis-a 'you make slippery'



The forms in (2.a) have no High tone, while those in (2.b) do, a difference directly ascribable to the fact that in (2.b), the verb radicals are underlyingly High-toned, while in (2.a) they are underlyingly toneless. In (2.b.4, 5, and 6), the High tone associated with the radical has spread to some syllable further to the right (associating with an intervening syllable, in the case of (2.b.6)). This spreading is the result of a rule which we will call Attraction to Accent. Looking for the moment only at the last two forms in column b, we see that the High tone has spread to the antepenultimate syllable of the word. (In (2.b.4), ni-bónís-a, a High tone appears on the penult. This and similar forms will be discussed below.) As will become clear later, when we examine more forms, accent (*) is generally assigned to the antepenultimate syllable of a verb. A subsequent rule,

Attraction to Accent, associates the nearest High tone to the left of the accent with the accented syllable, and with all intervening syllables, when the accented vowel is not already associated with a tone (indicated by the circle around the vowel). So far, then, we have the following rules:

(3) Accent Placement (first approximation)

$V V V] \rightarrow \overset{*}{V} V V$

(4) Attraction to Accent

a. $V X \overset{*}{V}$ (or, eventually, b. $\overset{*}{V}$)



(3), the Accent Placement rule, will need further modification, but it will suffice in order to illustrate Attraction to Accent in the following form, (2.b.5):

(5) ni-bonisis-a

H

ni-bonisis-a

Accent Placement

H

ni-bonisis-a

Attraction to Accent

H

In forms (2.b.1) and (2.b.2), the High tone is associated with the penultimate syllable, which is also the first syllable of the stem. These forms suggest a modification of the Accent Placement rule, to the effect that if the penultimate syllable of the verb is associated with a High tone, it will be assigned an accent. If not, accent will be assigned to the antepenultimate syllable. We will discuss the status of this observation in some detail below.

(3') Accent Placement (second approximation)

- a. $\begin{array}{c} V \ V] \\ | \\ H \end{array} \rightarrow \begin{array}{c} \overset{*}{V} \ V] \\ | \\ H \end{array}$
- b. $V \ V \ V] \rightarrow \overset{*}{V} \ V \ V]$

In (2.b.1), then, accent is assigned to the penult, because it is associated with a High tone, and this blocks the application of (3'.b). Since the accented syllable is already associated with a High tone, Attraction to Accent will have no effect.

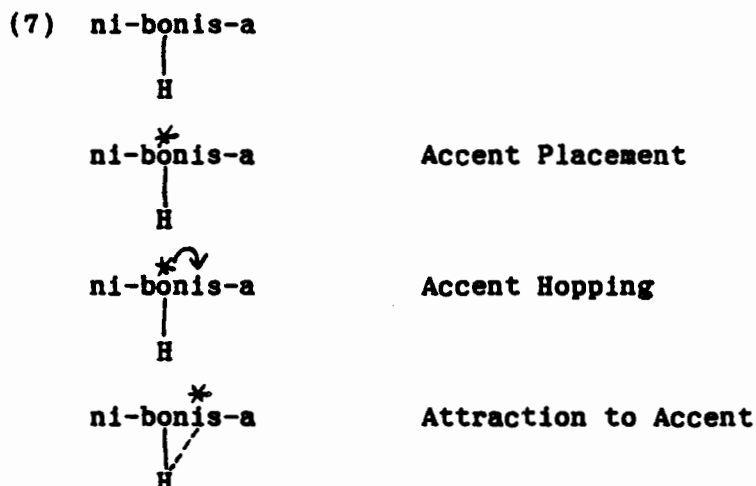
We return now to (2.b.4), ni-bónis-a, where the High tone of the radical has spread to the penult, rather than to the antepenult, as would be predicted from the rules which have been shown so far. The verb -bon- is one of a group of verbs which undergo a lexically-governed Accent Hopping rule, which, after placement of accent, shifts that accent one syllable to the right.

(6) Accent Hopping

$$\begin{array}{c} \overset{*}{V} \ V \\ \rightarrow \end{array} \begin{array}{c} V \ \overset{*}{V} \end{array}$$

As we will see, the stems that trigger Accent Hopping may come from either the High-toned class or the toneless class. It is the independence of the two characteristics that we take to be one of the major reasons not to view the Accent Hopping property (whatever one's theory of it is) from tone. Although Accent Hopping eventually has a surface effect on tone placement, the diacritic that triggers it is not technically or formally a tonal property, and our proposal to analyze it as an accentual property seems to us to be the most natural way to treat it in the grammar.

The derivation of (2.b.4) thus includes the following steps:



Looking ahead, we will see shortly that (2.b.2), -mem-, is also a member of the class of verbs which undergoes Accent Hopping. However, (b.1) and (b.2) are identical in their surface tones. This is because, in the Present Indicative, there is a restriction on the Accent Hopping rule that it cannot move an accent onto a FV. Therefore, if accent is already on the penult, it will stay there.

Up to this point, we have dealt only with the forms in (2.b). Since there are no High tones at all in (2.a), we cannot see the effects of Accent Placement, Accent Hopping and Attraction to Accent. Now let us look at the same forms, but with an OM. All OMs in Xhosa are underlyingly High-toned.

(8) Present Indicative with OM, no TM, toneless SM

a. toneless radical

1. ni-wa-wis-a
2. ni-wa-bál-a
3. ni-wa-bális-a
4. ni-wa-šúkúmis-a
5. ni-wa-námátélis-a

b. High-toned radical

1. ni-wa-bék-a
2. ni-wa-mém-a
3. ni-wa-búlis-a
4. ni-wa-bónís-a
5. ni-wa-bónísis-a
6. ni-wa-ñíñítekis-a

The forms in (8.a) show that the same accent rules which were posited for the High-toned verbs in (2.b) also apply in the toneless verbs. Accent Placement assigns accent to the antepenult (in none of these forms is the penult already associated with a High tone; therefore, (3'a) does not apply), and a High tone spreads to the accented syllable. (8.a.2), -bal-, like the High-toned verbs -mem- and -bonis-, is a member of the class of verbs which undergo Accent Hopping.

In (8.a.2-5) and in (8.b), the High tone has spread from the OM -wa- to the accented syllable, but is no longer associated with -wa-. In the forms of (2.b), when a High tone spreads to an accent, it remains associated with the syllable it was originally associated with. However, in those cases, the syllable originally associated with a High tone was the first syllable of the verb stem. We propose, therefore, a rule which disassociates a High from -wa- if that High is also associated with another syllable to the right.

(9) Disassociation from OM



Thus, after a High tone from -wa- has spread to the right by Attraction to Accent, it disassociates from -wa-.

(10) ni-wa-^Ysukumis-a

H

ni-wa-^{Y*}sukumis-a

Accent Placement

H

ni-wa-^{Y*}sukumis-a

Attraction to Accent

H

ni-wa-^{Y*}sukumis-a

Disassociation from OM

H

Rule (9) does not apply in (8.a.1), since the High tone from -wa- has not spread (i.e., is not associated with any other syllable), because an accent has been placed on -wa- (the antepenult).

(11) ni-wa-wis-a

H

ni-wa-^{*}wis-a

Accent Placement

H

The forms in (8.b) have two underlying High tones, the High tone from the radical and the High tone from the OM -wa-. However, it is likely that there is only one High tone on the surface. If there were two, then the High tone associated with the radical should spread to the accent, while the one associated with the OM should remain where it is, since as formulated, Disassociation from OM applies only when the High tone associated with the OM is also associated with some other syllable(s).

*(12) ni-wa-bon[́]sis-a

H H

ni-wa-bon[́]sis-a

H H

Accent Placement

ni-wa-bon[́]sis-a

H H

Attraction to Accent

*ni-wa-bon[́]sis-a

H H

However, if we suppose that one of the High tones is deleted, then this problem does not arise. It may appear from these data that it is the left-most High tone, the High tone from -wa-, which is deleted. However, if we look ahead briefly and examine a form with a third person SM (i.e., a High-toned SM), we will see that that approach will not work. Changing ni- to li-, we get li-wa-bon[́]sis-a. If deletion occurred from the left, then we would expect the surface form *li-wa-bon[́]sis-a, which is incorrect. However, if deletion is from the right, then the left-most High tone will remain, and will spread to the accent. We will call this rule Meeussen's Rule (cf. Goldsmith 1984a,b and elsewhere).

(13) Meeussen's Rule

V V
| |
H (H) → ∅

The derivations of ni-wa-bon[́]sis-a and li-wa-bon[́]sis-a are as follows:

(14)	ni-wa-bonisis-a	li-wa-bonisis-a	
	H H	H H H	
	ni-wa-bonisis-a*	li-wa-bonisis-a*	Accent Placement
	H H	H H H	
	ni-wa-bonisis-a*	li-wa-bonisis-a*	Meeussen's Rule
	H (H) → ∅	H (H) (H) → ∅	
	ni-wa-bonisis-a*	li-wa-bonisis-a*	Attraction to Accent
	H ↘	H ↘	
	ni-wa-bonisis-a*	-----	Disassociation from OM
	H ↗		

Disassociation from OM applies only if the OM is the left-most association of a High tone.

Below are examples of the remaining forms of the Present Indicative.

The tense Marker -ya- is underlyingly toneless.

(15) Present Indicative, no TM, no OM, High-toned SM

a. toneless radical

1. lí-wis-a
2. lí-bál-a
3. lí-bális-a
4. lí-šukúmis-a
5. lí-namatélis-a

b. High-toned radical

1. lí-bék-a
2. lí-mém-a
3. lí-búlis-a
4. lí-bónís-a
5. lí-bónisis-a
- b. lí-ñíñíćekis-a

(16) Present Indicative with OM, no TM, High-toned SM

a. toneless radical

1. lí-wá-wis-a
2. lí-wá-bál-a
3. lí-wá-bá-lis-a
4. lí-wá-šukú-mis-a
5. lí-wá-ná-má-té-lis-a

b. High-toned radical

1. lí-wá-bék-a
2. lí-wá-mém-a
3. lí-wá-bú-lis-a
4. lí-wá-bón-ís-a
5. lí-wá-bón-ís-sis-a
6. lí-wá-ńń-ń-tékis-a

(17) Present Indicative with TM, no OM, toneless SM

a. toneless radical

1. ní-ya-wis-a
2. ní-ya-bal-a
3. ní-ya-balis-a
4. ní-ya-šukú-mis-a
5. ní-ya-ná-má-té-lis-a

b. High-toned radical

1. ní-ya-bék-a
2. ní-ya-mém-a
3. ní-ya-bú-lis-a
4. ní-ya-bón-ís-a
5. ní-ya-bón-ís-sis-a
6. ní-ya-ńń-ń-tékis-a

(18) Present Indicative with TM and OM, toneless SM

a. toneless radical

1. ní-ya-wá-wis-a
2. ní-ya-wa-bál-a
3. ní-ya-wa-bá-lis-a
4. ní-ya-wa-šukú-mis-a
5. ní-ya-wa-ná-má-té-lis-a

b. High-toned radical

1. ní-ya-wa-bék-a
2. ní-ya-wa-mém-a
3. ní-ya-wa-bú-lis-a
4. ní-ya-wa-bón-ís-a
5. ní-ya-wa-bón-ís-sis-a
6. ní-ya-wa-ńń-ń-tékis-a

(19) Present Indicative with TM, no OM, High-toned SM

a. toneless radical

1. lí-ya'-wis-a
2. lí-ya'-bál-a
3. lí-ya'-bális-a
4. lí-ya'-šukúmis-a
5. lí-ya'-námaté[✓]lis-a

b. High-toned radical

1. lí-ya-bék-a
2. lí-ya-mém-a
3. lí-ya-búlis-a
4. lí-ya-bónís-a
5. lí-ya-bónísis-a
6. lí-ya-ñíñí[✓]tékis-a

(20) Present Indicative with TM and OM, High-toned SM

a. toneless radical

1. lí-ya-wá-wis-a
2. lí-ya-wa-bál-a
3. lí-ya-wa-bális-a
4. lí-ya-wa-šukúmis-a
5. lí-ya-wa-námaté[✓]lis-a

b. High-toned radical

1. lí-ya-wa-bék-a
2. lí-ya-wa-mém-a
3. lí-ya-wa-búlis-a
4. lí-ya-wa-bónís-a
5. lí-ya-wa-bónísis-a
6. lí-ya-wa-ñíñí[✓]tékis-a

In (19.b) and in (20), it is only the High tone closest to the accent which is affected by Attraction to Accent. The High tones from the stem in (19.b) and the OM in (20.a) cannot undergo Meeussen's Rule, since they are separated from the preceding High tones by a toneless syllable. Similarly, in (20.b), the High tone associated with the SM is unaffected, because it is separated by the toneless syllable -ya- from the others, while those associated with the OM and stem undergo Meeussen's Rule, and it is the remaining High which spreads to the accented syllable. In (19.a), however, the High tone associated with the SM spreads to the accented syllable, since it is the only High tone in the verb.

(21)	a.	li-ya-balis-a	li-ya-wa-balis-a	
		$\begin{array}{c} \\ H \end{array}$	$\begin{array}{c} \quad \\ H \quad H \end{array}$	
		li-ya- [*] balis-a	li-ya-wa- [*] balis-a	Accent Placement
		$\begin{array}{c} \\ H \end{array}$	$\begin{array}{c} \quad \\ H \quad H \end{array}$	
		-----	-----	
		li-ya- [*] balis-a	li-ya-wa- [*] balis-a	Meeussen's Rule
		$\begin{array}{c} \quad \diagup \\ H \end{array}$	$\begin{array}{c} \quad \quad \diagup \\ H \quad H \end{array}$	Attraction to Accent
		-----	-----	
			li-ya-wa- [*] balis-a	Disassociation from OM
			$\begin{array}{c} \quad \\ H \quad H \end{array}$	
	b.	li-ya-bulis-a	li-ya-wa-bulis-a	
		$\begin{array}{c} \quad \\ H \quad H \end{array}$	$\begin{array}{c} \quad \quad \\ H \quad H \quad H \end{array}$	
		li-ya- [*] bulis-a	li-ya-wa- [*] bulis-a	Accent Placement
		$\begin{array}{c} \quad \\ H \quad H \end{array}$	$\begin{array}{c} \quad \quad \\ H \quad H \quad H \end{array}$	
		-----	-----	
			li-ya-wa- [*] bulis-a	Meeussen's Rule
			$\begin{array}{c} \quad \quad \textcircled{H} \\ H \quad H \end{array} \rightarrow \emptyset$	
		li-ya- [*] bulis-a	li-ya-wa- [*] bulis-a	Attraction to Accent
		$\begin{array}{c} \quad \\ H \quad H \end{array}$	$\begin{array}{c} \quad \quad \diagup \\ H \quad H \end{array}$	
		-----	-----	
			li-ya-wa- [*] bulis-a	Disassociation from OM
			$\begin{array}{c} \quad \\ H \quad H \end{array}$	

4. Further discussion of assignment of metrical structure. Our goal in this section is to show that there is a further parameter which accounts for variation across tenses, namely whether or not the Final Vowel is extrametrical for the purposes of Accent Placement. Current views of metrical phonology maintain that accent placement on the antepenultimate syllable must be the result of the Final Vowel being marked as extrametrical. Ac-

according to Hayes (1980), for example, metrical feet can be either bounded or unbounded. A bounded foot is maximally two syllables long, while an unbounded foot can extend indefinitely. There is thus no way to construct a metrical foot over exactly three syllables except to say that the last syllable is extrametrical and then to construct a bounded foot over the next two syllables. When a syllable is marked as extrametrical, it is invisible to the rules which construct metrical structure; this extrametricality assignment is accomplished by rule (22), a rule conditioned by the tense of the verb. (Extrametricality is indicated by parentheses around a vowel).

(22) Extrametricality

V] --> (V)]
 {present indicative}

A language-specific rule will then assign a left-headed binary foot to the two rightmost syllables, after the (real) Final Vowel has become extrametrical, with the result that accent is found on the (real) antepenultimate syllable. (23) thus shows our revised Accent Placement rule.

(23) Accent Placement (Revised)

Assign a left-headed binary foot to the last two syllables of a word.

Rule (23) is ordered after the Extrametricality rule so that in tenses where the Final Vowel is extrametrical, it is invisible to the Revised Accent Placement rule and the real penult is counted as the ultima.

(24) and (25) illustrate these rules.

(24) Present Indicative: toneless radicals with High Subject and Object Markers

- a. lí-wá-wis-a "he drops"
 b. lí-wá-bál-a "he counts"
 c. lí-wá-bá-lis-a "he narrates"
 d. lí-wá-šukúmis-a "he shakes"
 e. lí-wá-namaté-lis-a "he cements"

- (25) a. lí-wá-šukúmis-a "he shakes"
 H H
 b. lí-wá-šukúmis-(a) Extrametricality
 H H
 c. lí-wá-šukúmis-(a) Accent Placement
 H H
 d. lí-wá-šukúmis-(a) Meeussen's Rule
 H (H) → ∅
 e. lí-wá-šukúmis-(a) Attraction to Accent
 H

The forms in (24), repeating the data in (16.a), are toneless radicals with High-toned Subject and Object Markers in the Present Indicative. (25) presents a partial derivation of lí-wá-šukúmis-a, "he shakes". šukúmis is underlyingly toneless, while the Subject Marker lí and the Object Marker wá are associated with High tones. The Extrametricality rule marks the Final Vowel as extrametrical, and Accent Placement constructs a left-headed binary foot over the resulting two rightmost syllables. An asterisk is placed at the end of the Strong branch to represent accent. Although we have used an arboreal rather than a grid notation to represent metrical structure, either

would serve our purposes equally well. Meeussen's Rule (13) deletes all but the leftmost of a series of High tones associated with adjacent V-slots on the skeletal tier, and finally, Attraction to Accent then spreads the High tone from the Subject Marker li- to the accented syllable, ku, and to all intervening syllables. Meeussen's Rule must operate after Accent Placement and before Attraction to Accent, since Accent Placement makes reference to the position of underlying High tones, while Attraction to Accent must not. Further evidence concerning the ordering of Meeussen's Rule will be presented below.

These rules account for all of the forms in (24) except for b, li-wá-bal-a, where accent appears on the penultimate syllable. We argued above that the verb bal is one of a class of verbs which is lexically marked to undergo Accent Hopping (6), moving an accent one syllable to the right after it has been placed on the verb by the Accent Placement rule, but before Attraction to Accent. (24.b) thus falls into line; its derivation is given in (26). bal is underlyingly toneless, while the Subject Marker li- and the Object Marker -wa- are underlyingly associated with High tones. The Final Vowel becomes extrametrical, and a left-headed binary foot is constructed over the resulting two rightmost syllables. Since bal is lexically marked to undergo the Accent Hopping rule, the accent moves one V-slot to the right. Meeussen's Rule deletes the second of two adjacent High tones, and, finally, Attraction to Accent spreads the remaining High tone to the accented syllable, ba, and to the intervening syllable.

- (26) a. li-wa-bal-a "he counts"
 H H
- b. li-wa-bal-(a) Extrametricality
 H H
- c. li-wa-bal-(a) Accent Placement
 H H
- d. li-wa-bal-(a) Accent Hopping
 H H
- e. li-wa-bal-(a) Meeussen's Rule
 H (H) → ∅
- f. li-wa-bal-(a) Attraction to Accent
 H

In (26.a), accent has been placed on the Object Marker wa. This important example shows that segmental morphological structure is not relevant to the Accent Placement rule, which constructs metrical structure with reference to syllables and not to morphemes.

So far we have seen that the notion of extrametricality can be useful in accounting for the situation where accent is assigned to the antepenultimate syllable of a word. But what about the case in (3'.a), where accent is assigned to the penult if and only if the penult is associated with a High tone? Some of the forms which (3'.a) Accent Placement was intended to account for are given again in (27). These are High-toned verb stems with a High-toned Subject Marker and a High-toned Object Marker in the Present Indicative. (27.c, e, and f) are accounted for by the rules outlined above. Accent is found on the antepenultimate syllable, which is what we would

expect, since the Final Vowel is extrametrical in the Present Indicative. (27.d) is a member of the class of verbs which undergo Accent Hopping, and thus it also is accounted for. (27.a and b), however, have accent on the penultimate syllable. The Final Vowel in these forms must be extrametrical, since the Extrametricality Rule applies generally in the Present Indicative. Why, then, is the accent placed on the penultimate rather than the antepenultimate syllable?

(27) Present Indicative: High-toned radicals with High Subject and Object Markers

- | | | |
|----|--------------------------------|---------------------|
| a. | lí-wá-bék-a | "he puts" |
| b. | lí-wá-mém-a | "he invites" |
| c. | lí-wá-búlis-a | "he greets" |
| d. | lí-wá-bónís-a | "he shows" |
| e. | lí-wá-bónísís-a | "he shows clearly" |
| f. | lí-wá- níní tekis-a | "he makes slippery" |

In the terms discussed earlier, this is because the radical bears a High, thus triggering (3'.a). From our present perspective, we can appeal to a general principle of metrical phonology, that the Weak branch of a binary foot cannot dominate a heavy syllable. The rules which construct metrical structure are sensitive to the weight, or quantity, of syllables. In most of the familiar cases which have been looked at in metrical phonology, heavy syllables are those with a branching rhyme (cf. Anderson (1984). See also Hyman (1985)). In these cases, the internal structure of the syllable is relevant to the determination of metrical structure. For example, a syllable with a long vowel or a vowel and a consonant in the rhyme would count as heavy, while a syllable with just a short vowel in the rhyme

would count as light. In other cases, involving languages with a contrast between reduced and full vowels, syllables with full vowel quality are metrically heavy, and those with reduced vowel quality, or schwa, are light. As yet another case, Hayes (1980) cites two languages and suggests that in tone languages, syllables which are associated with a tone can act as heavy syllables. While the data available in the analyses Hayes cites are limited in their coverage (involving the languages Fore and Golin), we believe that his general claim is correct, and we propose that in Xhosa, a heavy syllable is one which is associated with a tone. The heavy status of these syllables may be a reflection of the greater structural complexity of a syllable associated with an element on the tonal tier over an unassociated syllable. We thus make our Accent Placement Rule sensitive to the quantity of the syllables on which it constructs binary feet, with a heavy syllable being defined as one which is associated with a tone. Since the Weak branch of a binary foot cannot dominate a heavy syllable, if the Accent Placement Rule operates on a structure where the rightmost syllable is associated with a tone, or heavy, it must construct a degenerate foot over that one syllable.

In the forms in (27.a, b), we observe that the syllables be and me in lí-wá-bék-a and lí-wá-mém-a are underlyingly associated with a High tone and are thus heavy syllables. (28) shows derivations for these two forms.

- (28) a. $\begin{array}{c} \text{li-wa-bek-a} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ $\begin{array}{c} \text{li-wa-mem-a} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
- b. $\begin{array}{c} \text{li-wa-bek-(a)} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ $\begin{array}{c} \text{li-wa-mem-(a)} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ Extrametricality
- c. $\begin{array}{c} \text{li-wa-bek}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ $\begin{array}{c} \text{li-wa-mem}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ Accent Placement
- d. ----- cannot apply Accent Hopping
- e. $\begin{array}{c} \text{li-wa-bek}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ $\begin{array}{c} \text{li-wa-mem}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ Meeussen's Rule
- f. $\begin{array}{c} \text{li-wa-bek}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ $\begin{array}{c} \text{li-wa-mem}^*(\text{a}) \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ Attraction to Accent

The Extrametricality Rule applies, marking the Final Vowel as extrametrical. The Accent Placement Rule then applies, but since the rightmost syllable after Extrametricality is associated with a High tone, a left-headed binary foot cannot be constructed; instead a degenerate foot is constructed over the syllable associated with the High tone. The Accent Hopping Rule would then apply to mem, a member of the Accent Hopping class of verbs. However, Final Vowels which are extrametrical can also vary as to whether they allow accent to hop onto them. In the Present Indicative, an accent may not hop onto a Final Vowel. Therefore, the Accent Hopping Rule is blocked, even though the verb radical mem is lexically marked to undergo this rule. (28.e) shows the effect of Meeussen's Rule, deleting all but the leftmost in a series of adjacent High tones. Finally, Attraction to Accent associates the High tone of the Subject Marker li with the accented syllable and with all intervening syllables, giving lí-wá-bék-a and lí-wá-mém-a.

Note here that there is an ordered relationship, referred to earlier, between Accent Placement and Meeussen's Rule. Meeussen's Rule must be ordered after Accent Placement, since Accent Placement is sensitive to the underlying quantity of the syllables on which it builds metrical structure. If Meeussen's Rule had applied prior to Accent Placement, then the syllables me and be would no longer be associated with a tone, and Accent Placement would have been able to construct left-headed binary feet with those syllables at their Weak nodes. But clearly, the tones are still present when Accent Placement applies, providing evidence that Meeussen's Rule is ordered after Accent Placement.

To sum up, we have seen that by appealing to extrametricality and to the quantity-sensitivity of the rule which constructs metrical structure, we can restate the Accent Placement Rule of (3') in order to account more insightfully for the data in the Present Indicative.

5. Extension to other tenses.

In the remainder of this paper, we will show that the notion of extrametricality can be usefully extended to other tenses. In general, a Final Vowel can be either underlyingly High-toned or toneless. When it is High, it is never extrametrical; when it is toneless, then tenses vary as to whether it is extrametrical or non-extrametrical, i.e., whether or not the Extrametricality Rule applies is a property of an individual tense.

(29) Imperative

a. Toneless Radicals

1. wís-a "drop!"
2. bal-á "count!"
3. balís-a "narrate!"
4. šukumís-a "shake!"
5. namatélís-a "cement!"

b. High-toned Radicals

1. bék-a "put!"
2. mem-á "invite!"
3. búlís-a "greet!"
4. bónís-á "show!"
5. bónísís-a "show clearly!"
6. hínítékís-a "make slippery!"

(29) shows both toneless and High-toned stems in the Imperative. The Imperative "floats" a High tone; that is, in the Imperative a High tone is added to the tonal tier to the right of any lexical tone associated with the stem but it is not underlyingly associated with any V-slot. If the stem is toneless, as in (29.a), this High will become associated with the accented syllable. We observe that in (29.a.1, 3, 4 and 5), the High tone appears on the penultimate syllable, showing that accent has been placed there. The reader will recall that the stem in (29.a.2), bal, is an Accent Hopping stem, which is why the High tone falls on the ultima. But the Final Vowel is not underlyingly associated with a High tone in the Imperative. The fact that the Accent Placement Rule puts accent on the penult is accounted for by the fact that the Extrametricality Rule does not apply in the Imperative, and therefore a Final Vowel is never extrametrical in the Imperative. Accent Placement can then construct a left-headed binary foot over the real two rightmost syllables, with the result that the penult bears accent. The derivation of šukumís-a, "shake!", is shown in (30). šukumis is underlyingly toneless, and a floating High tone is added to the tonal tier in the Imperative. Accent Placement places accent on the penult, which is subse-

it is heavy, Accent Placement will construct a degenerate foot over it. It thus follows from what we have said so far that whenever a Final Vowel is underlyingly associated with a High tone, it will be assigned accent. The derivation of ni-šukumis-é, "you shook" is shown in (32). The Final Vowel is associated with a High tone, and, as we know, the Extrametricality Rule does not apply in this tense. The Accent Placement Rule constructs a degenerate foot over the Final Vowel, because it is heavy, and since the accented syllable is already associated with a High tone, Attraction to Accent does not apply.

(31) Perfect Indicative, toneless Subject Marker, without Object Marker

a. Toneless Radicals

1. ni-wis-é "you dropped"
2. ni-bal-é "you counted"
3. ni-balis-é "you narrated"
4. ni-šukumis-é "you shook"
5. ni-namatélis-é "you cemented"
- 6.

b. High-toned Radicals

- ni-bék-é "you put"
- ni-mém-é "you invited"
- ni-búlís-é "you greeted"
- ni-bónís-é "you showed"
- ni-bónísís-é "you showed clearly"
- ni-ñíñitékís-é "you made slippery"

(32) a. ni-šukumis-e "you shook"

H

b. -----

Extrametricality

c. ni-šukumis-é*

Accent Placement

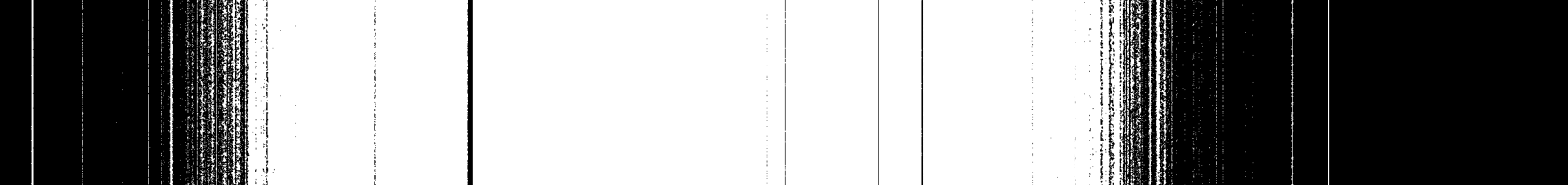
H

d. ni-šukumis-é*

Attraction to Accent

H

The forms in (31.b), with High-toned stems and High-toned Final Vowels,



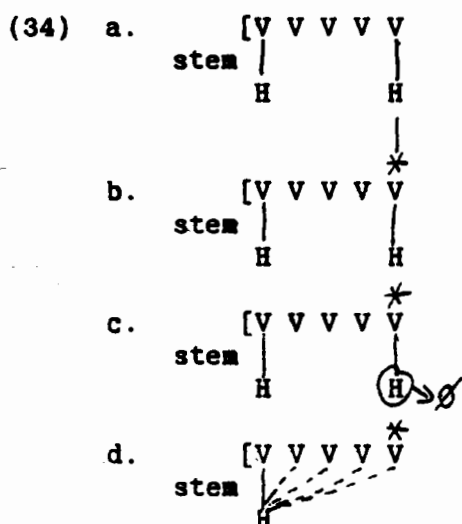
show spreading of a High tone from the first syllable of the stem to the accented Final Vowel. If the Final Vowel is already associated with a High tone, Attraction to Accent should not be able to spread another High tone to the accented syllable. As we have seen, the Final Vowel is High-toned in the Perfect. We may ask, then, how it is that Attraction to Accent is able to spread the High tone from the stem to the Final Vowel. We offer here one possible account, somewhat tentatively. It is suggested in Goldsmith (in press, a) that in the Lacustrine languages there is a rule which applies at Layer One (comprising the radical, extensions, and Final Vowel) which deletes all but the leftmost of a series of High tones on the tonal tier. This rule is similar to Meeussen's Rule, which operates at Layer Two, in that both delete all but the leftmost in a series of High tones. However, while Meeussen's Rule deletes High tones that are associated with adjacent V-slots on the skeletal tier, the rule currently under consideration refers only to the tonal tier, and deletes a High to the right of another High, regardless of what it is associated with. The structural description of our previous Meeussen's Rule includes the skeletal tier, the tonal tier, and the association lines between the two. The structural description of this version of Meeussen's Rule refers only to the tonal tier. For lack of a better name at this point, we will call this rule "Layer One Meeussen's Rule," to remind ourselves that it is similar to Meeussen's Rule in its effect, but that it operates only on Layer One; it is given in (33).

(33) Layer One Meeussen's Rule

$H \text{ (H)} \rightarrow \emptyset$

The structure of the Xhosa verb was given in (1) above. The radical,

extensions, and Final Vowel make up the stem. The Subject Marker, Tense Marker, and Object Marker are added at Layer Two. In the forms in (31.a), Layer One Meeussen's Rule could not apply, since in those forms there was only one High tone in Layer One (the stem), i.e., the High tone associated with the Final Vowel. However, the forms in (31.b) have two High tones on Layer One, the High tone associated with the first syllable of the stem, and the one associated with the Final Vowel, as shown in (34). Accent Placement assigns a degenerate foot to the Final Vowel. Layer One Meeussen's Rule then applies, deleting the High tone associated with the Final Vowel, since, even though the two High tones are not associated with adjacent V-slots on the skeletal tier, they are adjacent on the tonal tier. The High tone from the first syllable of the stem is then available to spread to the accented syllable via Attraction to Accent. Layer One Meeussen's Rule must be ordered after Accent Placement, since in order for accent to be placed on the Final Vowel, the Final Vowel must be heavy, i.e., associated with a tone. This supports the principle that all accent rules precede all tone rules, even Layer One tone rules.



Accent Placement

Layer One Meeussen's Rule

Attraction to Accent

The derivation of ni-bónísis-é, "you showed clearly" is given in (35). The radical and Final Vowel are underlyingly associated with High tones. We have seen that Final Vowels are not extrametrical in the Perfect. Accent Placement will place a degenerate foot over the Final Vowel, because it is associated with a tone and is therefore Strong. Layer One Meeussen's Rule then applies, deleting the High tone which was associated with the Final Vowel, because it is the second of two High tones on Layer One on the tonal tier. Finally, Attraction to Accent spreads the remaining High tone to the accented Final Vowel and to all intervening syllables, resulting in ni-bónísis-é.

- (35) a. ni-bonisis-e "you show clearly"
- H H
- b. ----- Extrametricality
- |
- c. ni-bonisis-e* Accent Placement
- H H
- d. ni-bonisis-e* Layer One Meeussen's Rule
- H (H) → ∅
- e. ni-bonisis-e* Attraction to Accent
- H /-----\

6. Discussion and Conclusions. In conclusion, we would like to mention certain questions concerning historical and comparative issues in Bantu that have already been discussed in the literature. The most important and recent paper is perhaps Rycroft (1980). Rycroft begins by recapitulating Westphal's (1951) observation that a tonal split of Proto-Bantu *H-toned verb radicals has occurred in Xhosa, a split that corresponds to what we

have called the radicals triggering Accent Hop and those that do not. Those that do trigger Accent Hop are derived from radicals with short vowels in Proto-Bantu, while those that do not derive from radicals with long vowels (see Goldsmith (in press,b) for a brief discussion of this point in a more general Bantu context). Rycroft goes on to note that this split occurs more widely in Nguni, including the more conservative (as he argues) Zululand dialects of Zulu.

To our knowledge, Claughton's observation regarding the additional split in Low tone radicals in Xhosa has not been discussed in the literature. We do not have enough data presently to determine whether the split within the toneless (Proto-Bantu *L-tone) radicals that we have described (Accent Hoppers versus Accent non-Hoppers) also reflects an etymological length contrast.

It is our intention to develop in future work a historical scenario which could serve as a model for the evolution of the Nguni tone/accent system as we see it today. Our current hypothesis, which limitations of space prevent us from justifying here in detail, is that the reanalysis of etymological length into a shifting/non-shifting tonal distinction occurred before the rise of a metrical system in Nguni. Much work remains to be done, however, before a clear picture of the relation of tone-shifting systems of the Eastern Bantu languages emerges.

Notes

* The first part of this paper is a revision of Peterson (1985).

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