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**BIMORAIC SYLLABLES
IN A LANGUAGE WITHOUT LENGTH CONTRAST
AND WITHOUT CONSONANTS IN CODA POSITION:
THE CASE OF SISWATI (S43)**

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1. Introduction

In many tone languages, contour tones can be analyzed as complex tones resulting from the association of several successive simple tones (i.e. level tones) with a single syllable. Moreover, there is often a correlation between the maximal complexity of the tone that can be associated with a given syllable and the segmental structure of the rhyme. In particular, in some African languages, contour tones are possible only in the case of ‘heavy’ syllables, i.e. syllables including a long vowel or a consonant in coda position.¹ A possible explanation of such a distribution is that ‘heavy’ (or bimoraic) syllables comprise two successive TBUs, whereas ‘light’ (or monomoraic) syllables comprise a single TBU, and that each TBU (or mora) is associated with at most one simple tone. Within the frame of autosegmental representations comprising a distinct skeletal tier, such a distribution of tonal modulations can be predicted by positing that each skeletal position belonging to a syllabic constituent ‘rhyme’ constitutes a TBU.

However, things are not always so simple. In this paper, I argue that, within the framework of the commonly admitted hypothesis according to which the tonal systems of the Nguni languages are based on a H vs. zero contrast (and not on a H vs. L contrast),² certain observations on the distribution of tonal modulations and on tone spreading in Siswati cannot be accounted for without assuming in one way or another that the syllables of this language may comprise two successive TBUs, in spite of the fact that no distinction between monomoraic and bimoraic syllables can be established at the segmental level.

2. Non-conditioned tonal modulations

In Siswati, the syllable nucleus never combines with a consonant in coda position. Siswati has no length contrast either, but only an automatic lengthening of the

1. See Creissels (1994), pp. 41-44.

2. According to this hypothesis, L tones can be accounted for, either as induced by the presence of a depressor consonant, or as default tones.

penultimate syllable of every word immediately followed by a pause; in the case of words ending in other contexts with a tonal sequence HL, the syllable affected by this demarcative lengthening is also characterized by a falling modulation.³ On the other hand, Siswati has rising modulations conditioned by the presence of a depressor consonant.

But there are also in Siswati falling modulations that cannot be explained by the influence of a pause on a H tone associated with the penultimate syllable of the preceding word,⁴ and rising modulations may be encountered in contexts where no depressor consonant is present. For example, *sîphó* ‘gift’ and *urîfăna* ‘boy’ are uttered in all contexts with tonal modulations.⁵ The falling modulation in *sîphó* cannot be explained as resulting from the influence of a pause, since it is observed in non-prepausal position too, and the rising modulation in *urîfăna* cannot be explained by the presence of a depressor consonant, since *f* is not a depressor⁶.

If we admit that the H tone of Siswati underlyingly contrasts with zero (and not with the L tone), then we cannot account for such modulations by simply positing that a single syllable nucleus can be associated with two successive tonal units. In this framework, the only simple treatment is to assume that syllables with non-conditioned tonal modulations comprise two successive TBUs, and that one TBU only is associated with a H tone, so that L tone spelling associates a L tone to the other.

Another possibility would be to assume that, at the stage in the phonological derivation when toneless syllables receive default L tones, the third syllable of *urîfăna* is a toneless syllable followed by a floating H tone, the first syllable of *sîphó* is a toneless syllable preceded by a floating H tone, and the floating H tones are associated only after default L spelling, as represented in (1).⁷

- (1) a. fa´ (L spelling) → fâ´ (floating H association) → fă
 b. ´si (L spelling) → ´sî (floating H association) → sî

However, it is easy to see that this is nothing more than a notational variant of the treatment which explicitly admits that Siswati syllables may comprise two TBUs. In fact, ‘floating’ tones posited as immediately preceding or following a given segment

3. Being entirely predictable, demarcative length need not be indicated in a phonological transcription of Siswati.

4. In this respect, the situation of the Nguni languages is very different from that of the neighboring Sotho-Tswana languages, in which the only case of tonal modulation is the falling modulation accompanying the automatic lengthening that affects H-toned syllables in penultimate position before a pause.

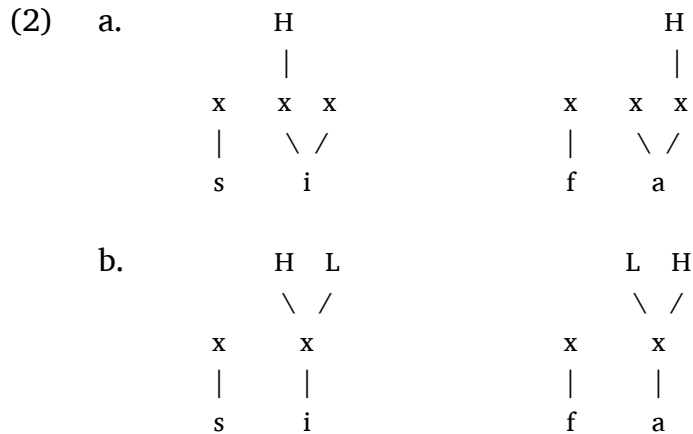
5. *sîphó* ‘the/a gift’ has in all contexts an invariable tonal melody; in the case of *urîfăna* ‘the/a boy’, the tones of the first syllable and of the last syllable may vary depending on the context, but these variations do not affect the H tone of *ŋ* or the rising modulation of *fă*.

6. Rycroft (1981) mentions this phenomenon, but misleadingly describes it in terms of ‘depression without depressor’. Traill (1990) shows that the rising modulation of *urîfăna* cannot be analyzed as a special case of depression, but constitutes an entirely different phenomenon.

7. Such a treatment was put forward in Creissels & Grégoire (1993) in order to account for the tonal modulations of languages analyzed as having tonal systems based on a L vs. zero contrast.

are not really floating: in multilinear phonological representations making fully explicit the relationship between units belonging to different tiers, they must be associated to skeletal positions, since units belonging to different tiers can be ordered only through skeletal positions to which they are associated.

Thus, within the framework of the currently admitted hypothesis according to which Nguni tone systems are based on a H vs. zero contrast, it is not possible to account for the tonal properties of *umfăna* ‘boy’ without recognizing in one way or another that the rhyme of the syllable *fa* consists of two successive timing units the second of which only is associated with a H tone, and it is not possible to account for the tonal properties of *siphó* ‘gift’ without recognizing that the rhyme of the syllable *si* consists of two successive timing units the first of which only is associated with a H tone, as represented in (2a). The only alternative treatment would be to abandon the hypothesis of an underlying H vs. zero contrast, which would make possible representations like those in (2b).



In the case of *umfăna* ‘boy’, the bimoraic syllable with a H tone associated to its second mora is part of the underlying representation of a lexeme. In the case of *siphó* ‘gift’, the bimoraic syllable with a H tone associated to its first mora constitutes the prefix of the definite form of the noun, which contrasts with the L-toned indefinite prefix *si-*. We shall return to this issue in section 4.

The observation of the tonal variations of the verb provides examples of contrasts between simple tones and tonal modulations that confirm the existence of tonal modulations that cannot be considered as conditioned by the phonetic context, as in ex. (3).⁸

- (3) a. *U-bă-ph-á* *lú-bîsi.*
 2SG-CL2-milk-FIN DEF.CL11-milk
 ‘You(sg) are giving them some milk.’

8. The following abbreviations are used in the glosses of the Siswati examples: APPL = applicative, CAUS = causative, CL = class, DEF = definite, DJT = disjoint, FIN = final (inflectional ending of verbs – a more specific gloss is used for the ending of the perfect positive only), NEG = negative, PL = plural, PRF = perfect, RECIP = reciprocal, SG = singular.

- b. *U-bá-ph-á* *lú-bísi*.
 CL1-CL2-give-FIN DEF.CL11-milk
 ‘(S)he is giving them some milk.’

But the existence of modulations that cannot be analyzed as conditioned by the phonetic context is not the only evidence supporting the hypothesis of bimoraic syllables in Siswati. Sometimes, H tones underlyingly belonging to two adjacent syllables do not interact in the way H tones associated with adjacent TBUs normally do in Siswati, and successive H tones apparently separated from each other by a single toneless TBU interact as if they were separated from each other by two or more toneless TBUs. Both phenomena can be explained by assuming that an additional toneless mora is underlyingly present.

This is in particular the case with the object markers, for example the object marker of class 2 occurring in ex. (3). It is easy to see that the object markers of Siswati are underlyingly H-toned, and the simplest hypothesis would be to posit for example |bá| as the underlying representation of the object marker of class 2.⁹ But the analysis of the way the H tone of an object marker interacts with a H tone belonging to the preceding syllables confirms the conclusion suggested by the non-conditioned rising modulation observed in ex. (3a): the syllables representing object markers are underlyingly bimoraic with a H tone associated with their second mora only. Therefore, I analyze the object marker of class 2 for example as underlyingly |baá|. ¹⁰ But before examining the spreading phenomena that support this conclusion it is necessary to give an overview of the main regularities to which the delimitation of H domains conforms in Siswati.

3. The tonal properties of the disjoint form of the present positive

The observation of the tone pattern of the disjoint form of the present positive makes apparent the basic regularities to which expansion and retraction of H tone domains conform in Siswati.¹¹

9. Vertical bars indicate the underlying representation of a morpheme.

10. *aá* must be understood as representing a single vowel associated to two successive skeletal positions the second of which only is associated with a H tone.

11. This tense is more commonly called ‘long form’ of the present positive. In two tenses (the present positive and the perfect positive of the indicative), the Nguni languages have a contrast between a ‘short form’ and a ‘long form’ which are better termed resp. ‘conjunct’ and ‘disjoint’ in order to make apparent their function:

– conjunct forms always precede a phrase belonging to the clause in which the verb in question fulfils the predicate function and bringing some new information about the event represented by the verb;

– disjoint forms always occur in final clause position; if a disjoint form is followed by a phrase which at first sight seems to belong to the clause in which the verb in question fulfils the predicate function, this phrase is not properly speaking a constituent of the clause, but rather a postclausal topic (or ‘antitopic’, ‘afterthought’).

For a more detailed analysis of a similar distinction in another southern Bantu language, see Creissels (1996).

In the approach to Siswati tone illustrated here, the tonal phenomena described in terms of multiply linked tones in classical autosegmental tonology are treated by means of rules shifting the edges of H tone domains. This approach agrees with some fundamental aspects of the analysis of Isixhosa tone put forward by Cassimjee & Kisseberth (1998), but it differs from it in some substantial respects too. The point is that in their article, Cassimjee and Kisseberth insist on aspects of Nguni tone that support the Optimal Tone Domains Theory they are elaborating, but they have very little to say about those aspects that so far have no obvious treatment within that theory, and in particular about the tonal phenomena examined here.

In the framework adopted here, every TBU in the underlying representations is either H-toned or toneless, but at an early stage of the tonal derivation, H domains are constituted according to the following definition: a H domain is a maximal sequence of H-toned TBUs that is interrupted neither by word boundaries nor by toneless TBUs. Once H domains are constituted according to this definition, expansion and retraction rules modify their delimitation without considering whether they have been generated by a single underlying H tone or by several underlying H tones associated to adjacent TBUs. Some of these rules operate within the limits of words, others operate at sentence level.

Ex. (4) shows that, in the disjoint form of the present positive, the subject markers of 1st or 2nd person and the formative *-ya-* are underlyingly toneless, and that the tonal structure of this tense involves no grammatical H tone added by a morphological rule to underlyingly toneless verb stems.¹²

(4) a. *Ngi-ya-lw-a.*
 1SG-DJT-fight-FIN
 ‘I am fighting.’

b. *U-ya-nats-a.*
 2SG-DJT-drink-FIN
 ‘You (sg) are drinking.’

c. *Si-ya-hlakul-a.*
 1PL-DJT-weed-FIN
 ‘We are weeding.’

d. *Ni-ya-hlakul-is-an-a.*
 2PL-DJT-weed-CAUS-RECIP-FIN
 ‘You (pl) are helping each other to weed.’

Ex. (5) shows that the subject markers of the 3rd person add a H tone to the tonal structure of the verb form, but in ex. (5b) to (5e), this H tone does not surface on the syllable representing the morpheme to which it underlyingly belongs.

12. A case of tone pattern involving a grammatical H tone added to underlyingly toneless verb stems will be examined in section 8.

- (5) a. *Í-yâ-w-a.* UR: *í-ya-w-a*
 CL9-DJT-fall-FIN
 ‘It is falling.’ (the house)
- b. *Li-yá-nats-a.* UR: *lí-ya-nats-a*
 CL5-DJT-drink-FIN
 ‘It is drinking.’ (the cat)
- c. *Ba-ya-hlákul-a.* UR: *bá-ya-hlakul-a*
 CL2-DJT-weed-FIN
 ‘They are weeding.’
- d. *Ba-ya-lim-él-an-a.* UR: *bá-ya-lim-el-an-a*
 CL2-DJT-cultivate-APPL-RECIP-FIN
 ‘They are cultivating for each other.’
- e. *Ba-ya-hlakul-ís-an-a.* UR: *bá-ya-hlakul-is-an-a*
 CL2-DJT-weed-CAUS-RECIP-FIN
 ‘They are helping each other to weed.’

At first sight, a possible solution would be to delink the H tone of the subject marker and to re-associate it directly to the antepenult. But this solution is not possible in the case of *í-yâ-w-a*, and more generally, the observations presented below lead to the conclusion that the shift of the H tone of the subject marker to the antepenult results from two successive processes, as shown in (6):

- at a first stage, the right edge of the domain generated by this H tone shifts to the right, and the H domain annexes the following toneless syllables as far as the antepenult;
- at a second stage, the left edge of the H domains shifts to the right, and the H domain is reduced to its last syllable.¹³

- (6) underlying representation: *báyahlakulisana*
- constitution of a H domain → [_Hba_H]yahlakulisana
 expansion of the H domain → [_Hbayahlakuli_H]sana
 retraction of the H domain → bayahlaku[_Hlí_H]sana
 H tone spelling → bayahlaku[_Hlí_H]sana
- surface form: *bayahlakulísana*

13. An alternative solution, proposed by Cassimjee & Kisseberth (1998) in the framework of Optimal Domains Theory, is to consider that there is no retraction, but that a H tone is not necessarily assigned to every syllable belonging to a H domain.

The case of monosyllabic stems – ex. (5a) – shows that it is necessary to state the conditioning of these expansion and retraction processes more precisely, since in this particular case, the penultimate syllable is annexed to the H domain generated by the subject marker, and no retraction occurs after this annexation, so that a form with a single underlying H tone surfaces with two successive H-toned syllables.

More detailed observations would confirm that in Siswati, as in the other Nguni languages, two distinct processes result in expanding H domains to the right: ‘local tone shift’ and ‘metrical tone shift’; local shift applies to H domains irrespective of their position within the limits of the word, whereas metrical shift does not apply to H domains followed by another H domain within the word. In ex. (5a) and (5b), the expansion results from local shift, the target of which is the following syllable, and metrical shift cannot apply, since the target of metrical shift is the antepenult, whereas in ex. (5c) to (5e), local shift is followed by metrical shift¹⁴. (7) presents in a more precise way the derivation already put forward in (6).

| | | |
|-----|----------------------------|------------------------------------|
| (7) | underlying representation: | báyahlakulisana |
| | constitution of a H domain | → [Hba _H]yhlakulisana |
| | local shift | → [Hbaya _H]hlakulisana |
| | metrical shift | → [Hbayahlakuli _H]sana |
| | retraction of the H domain | → bayahlaku[Hlí _H]sana |
| | H tone spelling | → bayahlaku[Hlí _H]sana |
| | surface form: | bayahlakulísana |

By contrast, the fact that no retraction affects a H domain generated by the first syllable of a three-syllable word – as in ex. (5a) – does not seem to conform to any general principle the effects of which would explain other aspects of Siswati tonology.

Note that in verb forms beginning with the subject marker of the 2nd person singular (underlyingly |u|) and of class 1 (underlyingly |ú|), the syllable representing the subject marker may equally be L-toned at surface level, the contrast relying on the tone of the antepenult – ex. (8).

| | | |
|-----|--------------------------|-------------------|
| (8) | a. <i>U-ya-hlakul-a.</i> | UR: u-ya-hlakul-a |
| | 2SG-DJT-weed-FIN | |
| | ‘You are weeding.’ | |

14. The necessity of such a treatment was demonstrated by Downing (1990). In this paper, she analyses data from Isixhosa, Isizulu and Isindebele only, but my observations confirm that her conclusions can be extended to Siswati, i.e. that Siswati has the same types of tonal processes as the other Nguni languages, with however some substantial differences in the conditioning of these processes.

- b. *U-ya-hlákul-a.* UR: *ú-ya-hlakul-a*
 2SG-DJT-weed-FIN
 ‘(S)he is weeding.’

Let us now observe forms of the present positive of lexically H-toned verbs with subject markers of the 1st or of the 2nd person (i.e. with toneless subject markers) – ex. (9).

- (9) a. *Ngí-ya-ph-á.*
 1SG-DJT-give-FIN
 ‘I am giving.’
- b. *U-ya-bôn-a.*
 2SG-DJT-see-FIN
 ‘You (sg) see.’
- c. *Si-ya-sebênt-a.*
 1PL-DJT-work-FIN
 ‘We are working.’
- d. *Ni-ya-bulál-an-a.*
 2PL-DJT-kill-RECIP-FIN
 ‘You (pl) are killing each other.’
- e. *Si-ya-sebent-él-an-a.*
 1PL-DJT-work-APPL-RECIP-FIN
 ‘We are working for each other.’
- f. *Si-ya-phekeletél-an-a.*
 1PL-DJT-accompany-RECIP-FIN
 ‘We are accompanying each other.’

Given our previous observations on the manifestations of H tones underlyingly belonging to the first syllable of verb forms including a single underlying H tone (see above), the simplest explanation of the tonal melodies observed in ex. (9) is that the lexical H tone is underlyingly associated with the first syllable of the stem and that, when this syllable is not the last or the penultimate syllable of the word, the domain generated by this H tone undergoes the same processes of local shift, metrical shift and retraction, as shown in (10).

- (10) a. underlying representation: *siyasébenta*
- constitution of a H domain → *siya[_Hse_H]benta*
 local shift → *siya[_Hsebe_H]nta*
 retraction of the H domain → *siyase[_Hbe_H]nta*

H tone spelling → siyase_[_Hbé_H]nta

surface form: siyasebênta¹⁵

b. underlying representation: siyasébentelana

constitution of a H domain → siya_[_Hse_H]bentelana

local shift → siya_[_Hsebe_H]ntelana

metrical shift → siya_[_Hsebente_H]llana

retraction of the H domain → siyasebe_[_Hnte_H]llana

H tone spelling → siyasebe_[_Hnté_H]llana

surface form: siyasebentélana

Note that no modification affects the H domain generated by the H tone of the root of dissyllabic stems – ex. (9b). In fact, this is a particular case of a very general constraint on tone shift in Siswati: in general, the last syllable of a word cannot be annexed to a H domain generated by another syllable of the same word.

Note also that in this tense, with stems comprising four syllables or more, the tonal melody of lexically toneless verbs with a H-toned subject marker is identical to the tonal melody of lexically H-toned verbs with a toneless subject marker – compare ex. (5d/e) and ex. (9d/e), repeated here as (11) & (12): as a result of tone shift, it may happen that the underlying location of a H tone cannot be retrieved without additional information about the structure of the form in question.

(11) a. *Ba-ya-lim-él-an-a.* UR: bá-ya-lim-el-an-a

CL2-DJT-cultivate-APPL-RECIP-FIN

‘They are cultivating for each other.’

b. *Ba-ya-hlakul-ís-an-a.* UR: bá-ya-hlakul-is-an-a

CL2-DJT-weed-CAUS-RECIP-FIN

‘They are helping each other to weed.’

(12) a. *Ni-ya-bulál-an-a.* UR: ni-ya-búlal-an-a

2PL-DJT-kill-RECIP

‘You (pl) are killing each other.’

b. *Si-ya-sebent-él-an-a.* UR: si-ya-sébent-el-an-a

1PL-DJT-work-APPL-RECIP-FIN

‘We are working for each other.’

15. The rule responsible for the falling modulation is not explicitly mentioned in the derivation presented here. This is a case of conditioned modulation correlated with penultimate lengthening. It can be accounted for by a postlexical rule adding a toneless mora to the penultimate syllable of every Siswati word immediately preceding a pause.

The tonal melody of the forms quoted in ex. (13b) to (13f) is characterized by a sequence of H-toned syllables. The first syllable in this sequence follows the one to which the first underlying H tone is originally associated, and precedes the one to which the second underlying H tone is originally associated. The last syllable in this sequence would be the only H-toned syllable in the surface form if only one of the two underlying H tones were present. The following explanation can therefore be put forward:

- The H domain generated by the H tone of the subject marker undergoes local shift, which brings it into contact with the H domain generated by the lexical H tone.
- The H domain generated by the lexical H tone undergoes local and metrical shift in the same way as the H domain generated by the lexical H tone when no other underlying H tone is present – compare ex. (13) with ex. (9) above.
- The H domain generated by the H tone of the subject marker undergoes a retraction process reducing it to its last syllable, whereas no retraction affects the H domain generated by the lexical H tone.

The derivation of (13f) according to this hypothesis is presented in (14).

| | |
|---------------------------------|---|
| (14) underlying representation: | báyaphékeletelana |
| constitution of H domains | → [_H ba _H]ya[_H phe _H]keletelana |
| local shift | → [_H baya _H][_H pheke _H]letelana |
| metrical shift | → [_H baya _H][_H phekelete _H]lana |
| retraction | → ba[_H ya _H][_H phekelete _H]lana |
| H tone spelling | → ba[_H yá _H][_H phékélété _H]lana |
| surface form: | bayáphékélétélana |

Additional observations show that the retraction of the first H domain and the absence of retraction of the second H domain in ex. (13b) to (13f) illustrate a very general rule: in Siswati, H domains the left edge of which coincides with the right edge of another H domain maintain their maximal extension, whereas H domains the left edge of which does not coincide with the right edge of another H domain are reduced to their last syllable, except in the particular case of H domains constituted by the first two syllables of a three-syllable word, as in ex. (5a).

Additional observations show also that the retraction rule is a postlexical rule, since it must be applied after certain expansion rules which are clearly postlexical.¹⁷

It is important to notice that in Siswati, no downstep indicates that two successive H-toned syllables do not belong to the same domain. But in spite of that, it is not possible to consider that the two adjacent H domains have fused, since if it were the

17. See footnote 25.

case, the single domain resulting from the fusion would undergo the retraction rule, and one syllable only would surface with a H tone.

From these observations we can thus conclude that:

- If a Siswati word has a single H-toned syllable, this syllable is the last syllable of a H domain, but in many cases nothing can be said about the original location of the H tone (or sequence of H tones) that has generated the H domain in question.
- If a Siswati word has a sequence of at least two H-toned syllables, it is generally possible to conclude that the syllable immediately preceding the first syllable of this sequence and the second syllable of the sequence are underlyingly associated with H tones.

These principles are illustrated by the comparison of ex. (9e), (5e) & (13e), repeated here as (15).

- (15) a. *Si-ya-sebent-él-an-a.* UR: si-ya-sébent-el-an-a
1PL-DJT-work-APPL-RECIP-FIN
 ‘We are working for each other.’
- b. *Ba-ya-hlakul-ís-an-a.* UR: bá-ya-hlakul-is-an-a
CL2-DJT-weed-CAUS-RECIP-FIN
 ‘They are helping each other to weed.’
- e. *Ba-yá-sébént-él-an-a.* UR: bá-ya-sébent-el-an-a
CL2-DJT-work-APPL-RECIP-FIN
 ‘They are working for each other.’

4. The tonal properties of the noun prefixes

In Siswati, as in the other Nguni languages, the unmarked form of nouns is the definite form. The indefinite form of the noun occurs only in very limited contexts, but these two forms clearly contrast at least in negative contexts – ex. (16) and (17).

- (16) a. *A-ngi-bón-i ba-ntfwana.*
NEG-1SG-see-FIN CL2-child
 ‘I do’nt see any children.’
- b. *A-ngi-bón-í bá-ntfwana.*
NEG-1SG-see-FIN DEF.CL2-child
 ‘I do’nt see the children.’
- (17) a. *A-ngi-bón-i m-făna.*
NEG-1SG-see-FIN CL1-boy
 ‘I do’nt see any boy.’

- b. *A-ngi-bón-í* *ú-rń-făna*.
 NEG-1SG-see-FIN DEF-CL1-boy
 ‘I do’nt see the boy.’

As illustrated by these examples, an obvious contrast between Siswati and the other Nguni languages is that in Siswati, the reflex of the Bantu augment (alias pre-prefix), characteristic of the definite form of the noun, has a segmental representation in some classes only.

In Siswati, the definite and the indefinite form of the noun are segmentally distinct in the classes the prefix of which is a nasal or a syllable beginning with a nasal (i.e. in classes 1, 3, 4, 6 and 9); in such cases, given the general shift rules established in section 3, the surface tones can be correctly predicted by positing an underlyingly H-toned pre-prefix followed by an underlyingly toneless prefix. In particular, when the noun is uttered in isolation, the H tone of the pre-prefix shifts exactly in the same way as the H tone of 3rd person subject markers in the disjoint form of the present positive, as in *urńntfwana* ‘the child’ (UR: *ú-mu-ntfwana*), *emăsélana* ‘the small thieves’ (UR: *é-ma-sélana*), etc.

In the other classes, the reflex of the augment has no segmental representation, but the H-toned prefix of the definite form contrasts with the L-toned prefix of the indefinite form, as in *bántfwana* ‘the children’ (indefinite form: *bantfwana*) or *sítiba* ‘the pool’ (indefinite form: *sitiba*) – compare with Isizulu *abántwana* ‘the children’ (indefinite form: *bantwana*) or *isíziba* ‘the pool’ (indefinite form: *siziba*).

What is important to notice here is that the prefix of the definite form of the noun in the classes that have no segmental distinction between the definite and the indefinite form of the noun must not be analyzed as underlyingly constituted by a monomoraic H-toned syllable, since this would imply considering that the definite form of the noun does not conform to the general rules accounting for H tone spreading. By contrast, if we posit an underlying representation of the definite prefix constituted by a bimoraic syllable the first mora of which is associated with a H tone, we can predict the correct surface forms without adding any ad hoc rule.

For example, if the prefixes of *urńlimi* ‘the farmer’ and *bńlimi* ‘the farmers’ were underlyingly |*ú-mu*| and |*bń*|, the general rule of local shift would lead to the correct surface form for the singular only; according to this hypothesis, the plural form should be **bńlimi*. By contrast, the hypothesis of an underlying representation |*bńń*| enables one to predict the correct surface form without introducing an exception to an otherwise very general rule.

Moreover, such an underlying representation of the definite prefix in the classes that have no segmental distinction between the definite and the indefinite form of the noun directly accounts for the non conditioned falling modulation already observed in the definite form of nouns with a H-toned monosyllabic stem, such as *sńphó* ‘the gift’ – see section 2.

5. The tonal properties of the conjoint form of the present positive

The observation of the conjoint form of the present positive,¹⁸ which differs from the corresponding disjoint form by the absence of the formative *-ya-*, shows that two H tones underlyingly associated with adjacent syllables have a very different behavior from that of two successive underlying H tones associated with non-adjacent syllables.

In ex. (18), a H-toned subject marker combines with a lexically toneless stem, whereas in ex. (19), a toneless subject marker combines with a lexically H-toned stem. We observe that, at least when the verb form immediately follows a pause,¹⁹ the contrast in the underlying location of the H tone is neutralized: a single H tone belonging to the subject marker and a single H tone belonging to the root equally surface on the penult. Note also that in the conjoint form of the present positive, the target of metrical shift is the penult, and not the antepenult, as in the corresponding disjoint form.²⁰

- (18) a. *U-lím-a nge-lí-khuba.* UR: *ú-lim-a ...*
CL1-cultivate-FIN with-c5-hoe
 ‘(S)he is cultivating with a hoe.’
- b. *I-hlakúl-a kahlé.* UR: *í-hlakul-a ...*
CL9-weed-FIN properly
 ‘He is weeding properly.’ (the man)
- c. *Ba-hlakul-ís-a Siphó.* UR: *bá-hlakul-is-a ...*
CL2-weed-CAUS-FIN Sipho
 ‘They are helping Sipho to weed.’

18. See footnote 12.

19. We shall see later that, depending on the tonal structure of the preceding word, it may happen that H domains the left edge of which coincides with the beginning of the word do not retract, whereas H domains the left edge of which does not coincide with the beginning of the word retract regardless of the preceding context.

20. Downing’s explanation of similar facts in Isizulu and Isindebele is that this rule is a postlexical rule and does not apply in the same way to phrase-medial forms and to phrase-final forms. According to Cassimjee & Kisseberth (1998), this would be the consequence of a constraint ‘avoid prominence’. These explanations are suggested by the fact that disjoint verb forms most commonly occur in utterance final position, and that, more generally, the penultimate syllable of words in utterance final position receives a particular treatment in the Nguni languages. However, the observation of tenses other than the present positive does not confirm the validity of such hypotheses and suggests that the fact that the target of metrical shift is the penult or the antepenult obeys a morphological rather than phonological conditioning, which means that a comprehensive phonological treatment of this phenomenon is not possible without positing relatively abstract underlying representations. I shall not go further into this issue here, but I would like to emphasize that no theoretical proposal about Nguni tone can be considered definitive as long as its compatibility with the various tone patterns of the individual verb tenses has not been demonstrated. Unfortunately, most discussions about Nguni tone do not take into consideration the variety of tone patterns attested in the conjugation, which seriously undermines the generalizations they put forward.

- d. *Ba-hlakul-is-án-a kahlé.* UR: bá-hlakul-is-an-a ...
 CL2-weed-CAUS-RECIP-FIN properly
 ‘They help each other to weed properly.’
- (19) a. *Ngí-bón-a la-bá-ntfu.* UR: ngí-bón-a ...
 1SG-see-FIN DEM-CL2-person
 ‘I see those people.’
- b. *Ngí-loból-a Sibóngile.* UR: ngí-lóbol-a ...
 1SG-pay_lobolo-FIN Sibongile
 ‘I am paying *lobolo* for Sibongile.’²¹
- c. *Ngí-sebent-él-a Siphó.* UR: ngí-sébent-el-a ...
 1SG-work-APPL-FIN Sipho
 ‘I am working for Sipho.’
- d. *Ngí-phekeletél-a Sibóngile.* UR: ngí-phékeletel-a ...
 1SG-accompany-FIN Sibongile
 ‘I am accompanying Sibongile.’

In ex. (20) a H-toned subject marker combines with a lexically H-toned stem, so that the verb form underlyingly includes two H tones: the H tone of the subject marker and the lexical H tone, underlyingly associated with the first syllable of the stem, but the tonal melody of the verb remains the same, at least when the verb form immediately follows a pause.²²

- (20) a. *I-bút-a Siphó.* UR: í-bút-a ...
 CL9-ask-FIN Sipho
 ‘He is asking Sipho.’ (the man)
- b. *I-loból-a Sibóngile.* UR: í-lóbol-a ...
 CL9-pay_lobolo-FIN Sibongile
 ‘He is paying *lobolo* for Sibongile.’ (the man)
- c. *Ba-sebent-él-a Siphó.* UR: bá-sébent-el-a ...
 CL2-work-APPL-FIN Sipho
 ‘They are working for Sipho.’
- d. *Ba-sebent-el-án-a kahlé.* UR: bá-sébent-el-an-a ...
 CL2-work-APPL-RECIP-FIN properly
 ‘They are working for each other properly.’

21. *lobolo* = goods, cattle or money handed over by the bridegroom’s people to the father or guardian of the bride.

22. See footnote 19.

These observations suggest that in Siswati, two underlying H tones associated with adjacent syllables generate a single H domain.²³ They also confirm that the original location of the underlying H tones cannot always be retrieved from the location of the surface H tones:

- When a H domain undergoes metrical shift, there may remain no trace of the original location of its right edge.
- When a H domain is reduced to its rightmost syllable, there may remain no trace of the original location of its left edge.

Ex. (21) compares the derivations of (18c), (19c) & (20c). This comparison shows that the rules suggested by the preceding observations correctly predict that the same surface melody may indistinctly represent underlying representations with a H tone associated with the first syllable of the verb only, underlying representations with a H tone associated with the second syllable of the verb only or underlying representations with H tones associated with the first two syllables of the verb.

(21) a. underlying representation: báhlakulisa Siphó

| | |
|---------------------------|---|
| constitution of H domains | → [Hba _H]hlakulisa Si[_H pho _H] |
| local shift | → [Hbahla _H]kulisa Si[_H pho _H] |
| metrical shift | → [Hbahlakuli _H]sa Si[_H pho _H] |
| retraction | → bahlaku[_H li _H]sa Si[_H pho _H] |
| H tone spelling | → bahlaku[_H lí _H]sa Si[_H phó _H] |

surface form: bahlakulísa Siphó

b. underlying representation: ngisébentela Siphó

| | |
|---------------------------|--|
| constitution of H domains | → ngi[_H se _H]bentela Si[_H pho _H] |
| local shift | → ngi[_H sebe _H]ntela Si[_H pho _H] |
| metrical shift | → ngi[_H sebente _H]la Si[_H pho _H] |
| retraction | → ngisebe[_H nte _H]la Si[_H pho _H] |
| H tone spelling | → ngisebe[_H nté _H]la Si[_H phó _H] |

surface form: ngisebentéla Siphó

c. underlying representation: básébentela Siphó

| | |
|---------------------------|--|
| constitution of H domains | → [Hbase _H]bentela Si[_H pho _H] |
| local shift | → [Hbasebe _H]ntela Si[_H pho _H] |
| metrical shift | → [Hbasebente _H]la Si[_H pho _H] |

23. See Creissels (this volume) for the description of a similar phenomenon in Setswana.

retraction → basebe_[_Hn_{te}_H]la Si_[_Hpho_H]
 H tone spelling → basebe_[_Hnté_H]la Si_[_Hphó_H]

surface form: basebentéla Siphó

In the preceding examples, the word following the conjoint form of the present positive begins with a L-toned syllable, and the verb form ends with a tonal sequence HL. Let us now observe what happens in similar sentences, if the word following the verb begins with a H-toned syllable – ex. (22) to (24). We see that the last syllable of the verb takes a H tone (and it must be emphasized that no downstep occurs, neither between the verb and the following word, nor between the last two syllables of the verb).

- (22) a. *Li-náts-á lú-bísi.* UR: lí-nats-a ...
CL5-drink-FIN DEF.CL11-milk
 ‘It is drinking milk.’ (the cat)
- b. *I-hlakúl-á í-nsîmu.* UR: í-hlakul-a ...
CL9-weed-FIN DEF-CL9.field
 ‘He is weeding the field.’ (the man)
- c. *Ba-hlakul-ís-á Thêmba.* UR: bá-hlakul-is-a ...
CL2-weed-CAUS-FIN Themba
 ‘They are helping Themba to weed.’
- d. *Ba-hlakul-is-án-á síbili.* UR: bá-hlakul-is-an-a ...
CL2-weed-CAUS-RECIP-FIN really
 ‘They are really helping each other to weed.’
- (23) a. *Ngi-bón-á bâ-ntfu.* UR: ngi-bón-a ...
1SG-see-FIN CL2-person
 ‘I see some people.’
- b. *Ngi-loból-á síbili.* UR: ngi-lóbol-a ...
1SG-pay_lobolo-FIN really
 ‘I am really paying *lobolo*.’
- c. *Ngi-sebent-él-á Thêmba.* UR: ngi-sébent-el-a ...
1SG-work-APPL-FIN Themba
 ‘I am working for Themba.’
- d. *Ngi-phekeletél-á Hlóníphile.* UR: ngi-phékeletel-a ...
1SG-accompany-FIN Hloniphile
 ‘I am accompanying Hloniphile.’

- (24) a. *I-bút-á Thêmba.* UR: í-bút-a ...
CL9-ask-FIN Themba
 ‘He is asking Themba.’ (the man)
- b. *I-loból-á Hlóníphile.* UR: í-lóbol-a ...
CL9-pay_lobolo-FIN Hloniphile
 ‘He is paying *lobolo* for Hloniphile.’ (the man)
- c. *Ba-sebent-él-á Thêmba.* UR: bá-sébent-el-a ...
CL2-work-APPL-FIN Themba
 ‘They are working for Themba.’
- d. *Ba-sebent-el-án-á síbili.* UR: bá-sébent-el-an-a...
CL2-work-APPL-RECIP-FIN really
 ‘They are really working for each other.’

Additional observations would confirm that this ‘tonal bridge’ occurs in Siswati whenever a word otherwise ending with a tonal sequence HL is immediately followed by a word beginning with an underlyingly H-toned syllable.

The explanation according to which this would be the result of an additional rule shifting rightwards the right edge of a H domain ending with the penult in the configuration $[_H \dots \sigma_H] \sigma \# [_H \sigma \dots H]$ must be eliminated. The main reason follows from the existence of a rule reducing H domains not immediately preceded by another H domain to their last syllable: if the last syllable of the first word in the configuration $[_H \dots \sigma_H] \sigma \# [_H \sigma \dots H]$ were annexed to the preceding H domain, this H domain might subsequently be reduced to the last syllable of the verb form, which is not the case. It must be observed that, in ex. (22) to (24), the penultimate syllable of the verb form remains H-toned. The hypothesis of a fusion rule must be rejected for similar reasons. Thus, the hypothesis of a rule annexing the last syllable of the first word to the H domain beginning with the first syllable of the second word (i.e. of a regressive expansion rule operating across word boundaries) must be considered, and this hypothesis does not seem to raise any objection. I propose therefore to posit the ‘tonal bridge’ rule formulated in (25).

$$(25) \quad [_H \dots \sigma_H] \sigma \# [_H \sigma \dots H] \rightarrow [_H \dots \sigma_H][_H \sigma \# \sigma \dots H]$$

(26) shows the intervention of this rule in the derivation of ex. (22c), (23c) & (24c).

- (26) a. underlying representation: *báhlakulisa Thémba*
- constitution of H domains \rightarrow $[_Hba_H]hlakulisa [_HThem_H]ba$
 local shift \rightarrow $[_Hbahla_H]kulisa [_HThem_H]ba$
 metrical shift \rightarrow $[_Hbahlakuli_H]sa [_HThem_H]ba$
 tonal bridge \rightarrow $[_Hbahlakuli_H][_Hsa Them_H]ba$
 retraction \rightarrow $bahlaku[_Hli_H][_Hsa Them_H]ba$

| | |
|-------------------------------|--|
| H tone spelling | → bahlaku _{[H]lí_{H]}[_{H]sá Thém_{H]}ba}} |
| surface form: | bahlakulísá Thêmba ²⁴ |
| b. underlying representation: | ngisébentela Thémba |
| constitution of H domains | → ngi _{[H]se_{H]}bentela [_{H]Them_{H]}ba}} |
| local shift | → ngi _{[H]sebe_{H]}ntela [_{H]Them_{H]}ba}} |
| metrical shift | → ngi _{[H]sebente_{H]}la [_{H]Them_{H]}ba}} |
| tonal bridge | → ngi _{[H]sebente_{H]}[_{H]la Them_{H]}ba}} |
| retraction | → ngisebe _{[H]nte_{H]}[_{H]la Them_{H]}ba}} |
| H tone spelling | → ngisebe _{[H]nté_{H]}[_{H]lá Thém_{H]}ba}} |
| surface form: | ngisebenté _l á Thêmba |
| c. underlying representation: | básé _b entela Thémba |
| constitution of H domains | → [_{H]base_{H]}bentela [_{H]Them_{H]}ba}} |
| local shift | → [_{H]basebe_{H]}ntela [_{H]Them_{H]}ba}} |
| metrical shift | → [_{H]basebente_{H]}la [_{H]Them_{H]}ba}} |
| tonal bridge | → [_{H]basebente_{H]}[_{H]la Them_{H]}ba}} |
| retraction | → basebe _{[H]nte_{H]}[_{H]la Them_{H]}ba}} |
| H tone spelling | → basebe _{[H]nté_{H]}[_{H]lá Thém_{H]}ba}} |
| surface form: | basebenté _l á Thêmba |

Ex. (27) to (30) show that the rule creating this tonal bridge applies before the rule according to which a H domain not immediately preceded by another H domain is reduced to its last syllable.

- (27) a. *Ba-ya-hlakul-ís-an-a.* UR: bá-ya-hlakul-is-an-a
CL2-DJT-weed-CAUS-RECIP
 ‘They are helping each other to weed.’
- b. *Bá-limi ba-ya-hlakul-ís-an-a.* UR: báa-limi bá-ya-hlakul-is-an-a
DEF.CL2-farmer CL2-DJT-weed-CAUS-RECIP
 ‘The farmers are helping each other to weed.’
- c. *Bá-ntfú bá-yá-hlákúl-ís-an-a.* UR: báa-ntfu bá-ya-hlakul-is-a-na
DEF.CL2-person CL2-DJT-weed-CAUS-RECIP
 ‘The people are helping each other to weed.’

24. See footnote15.

- (28) a. *Ba-yá-sébént-él-an-a.* UR: bá-ya-sébent-el-an-a
CL2-DJT-work-APPL-RECIP
 ‘They are working for each other.’
- b. *Bá-limi ba-yá-sébént-él-an-a.* UR: báa-limi bá-ya-sébent-el-an-a
DEF.CL2-farmer CL2-DJT-work-APPL-RECIP
 ‘The farmers are working for each other.’
- c. *Bá-ntfú bá-yá-sébént-él-an-a.* UR: báa-ntfu bá-ya-sébent-el-an-a
CL2-person CL2-DJT-work-APPL-RECIP
 ‘The people are working for each other.’
- (29) a. *Ba-hlakul-is-án-a kahlé.* UR: bá-hlakul-is-an-a ...
CL2-weed-CAUS-RECIP properly
 ‘They help each other to weed properly.’
- b. *Bá-limi ba-hlakul-is-án-a kahlé.* UR: báa-limi bá-hlakul-is-an-a ...
DEF.CL2-farmer CL2-weed-CAUS-RECIP properly
 ‘The farmers help each other to weed properly.’
- c. *Bá-ntfú bá-hlákúl-ís-án-a kahlé.* UR: báa-ntfu bá-hlakul-is-an-a ...
CL2-person CL2-weed-CAUS-RECIP properly
 ‘The people help each other to weed properly.’
- (30) a. *Ba-sebent-el-án-a kahlé.* UR: bá-sébent-el-an-a ...
CL2-work-APPL-RECIP properly
 ‘They are working for each other properly.’
- b. *Bá-limi ba-sebent-el-án-a kahlé.* UR: báa-limi bá-sébent-el-an-a ...
DEF.CL2-farmer CL2-work-APPL-RECIP properly
 ‘The farmers are working for each other properly.’
- c. *Bá-ntfú bá-sébéntélána kahlé.* UR: báa-ntfu bá-sébent-el-an-a ...
DEF.CL2-person CL2-work-APPL-RECIP properly
 ‘The people are working for each other properly.’

We observe that, when preceded by a word the basic tonal melody of which ends with ...LL (*bálimi*), the verb form has the same tonal melody as when immediately following a pause. But when the word preceding the verb form has a basic tonal melody ending with ...HL (*bántfu*), the verb form takes a different contour, characterized by a sequence of H-toned syllables beginning with the first syllable and ending with the syllable which in other contexts is the only one associated with a H tone, and the last syllable of the word preceding the verb form takes a H tone.

We already know that the first syllable of the verb forms in ex. (27) to (30) is underlyingly associated with a H tone, and that, when such a verb form is uttered

immediately after a pause, a retraction process affects the domain generated by this H tone. Therefore, the contour observed when the verb form follows a word with a basic tonal melody ending with HL is simply the result of the absence of retraction, and the reason why no retraction occurs is simply that, in the same way as in ex. (22) to (24), the H domain ending with the penultimate syllable of the word preceding the verb form and the H domain beginning with the first syllable of the verb are brought into contact by the tonal bridge rule (25), which blocks the retraction of the second H domain.²⁵

(31) makes explicit the derivation of (27b), in which the absence of tonal bridge makes possible the retraction of the H domain beginning with the first syllable of the verb, and of (27c), in which the tonal bridge prevents retraction.

| | |
|------------------------------------|--|
| (31) a. underlying representation: | báalimi báyahlakulisana |
| constitution of H domains | → [Hba _H]alimi [Hba _H]yahlakulisana |
| local shift | → [Hbaa _H]limi [Hbaya _H]hlakulisana |
| metrical shift | → [Hbaa _H]limi [Hbayahlakuli _H]sana |
| retraction | → [Hbaa _H]limi bayah laku _[H]li_H] sana |
| H tone spelling | → [Hbáá _H]limi bayah laku _[H]l_H] sana |
| surface form: | bálimi bayah lakulísana |
| b. underlying representation: | báantfu báyahlakulisana |
| constitution of H domains | → [Hba _H]antfu [Hba _H]yahlakulisana |
| local shift | → [Hbaa _H]ntfu [Hbaya _H]hlakulisana |
| metrical shift | → [Hbaa _H]ntfu [Hbayahlakuli _H]sana |
| tonal bridge | → [Hbaa _H][Hntfu bayah lakuli _H]sana |
| H tone spelling | → [Hbáá _H][Hntfú báyah lákul _H]sana |
| surface form: | bántfú báyah lákulísana |

6. The tonal properties of the object markers

Ex. (32) shows that object markers add a H tone to the tonal structure of verb forms: the verbs quoted in ex. (32) are lexically toneless, the subject markers in ex. (32) are toneless too, and we know that in the absence of an object marker, lexically toneless verbs in the present positive have, in combination with toneless subject markers, an entirely L tonal melody – see ex. (4).

25. This shows that the retraction rule is a postlexical rule, since its application must follow the application of a rule applying only at word boundaries.

- (32) a. *Ngi-ya-bu-nâts-a.*
 1SG-DJT-CL14-drink-FIN
 ‘I am drinking it.’ (the beer)
- b. *Ngi-ya-ba-múkel-a.*
 1SG-DJT-CL2-receive-FIN
 ‘I am receiving them.’
- c. *Si-ya-ba-hlakúl-is-a.*
 2SG-DJT-CL2-weed-CAUS-FIN
 ‘We are helping them to weed.’

The simplest hypothesis compatible with these observations is that the H tone of the object marker is underlyingly associated with the only TBU of a monomoraic syllable representing the object marker: |bú| (object marker of cl. 14), |bá| (object marker of cl. 2) etc. In some cases, this hypothesis correctly predicts the tonal melody of verb forms including an object marker without adding anything to the rules posited above; this is always the case in the conjoint form of the present positive – ex. (33).

- (33) a. *Ngi-ku-hlakul-él-a kahlé.*
 1SG-2SG-weed-APPL-FIN properly
 ‘I am weeding for you properly.’
- b. *Ngi-ba-sebent-él-a kahlé.*
 1SG-CL2-work-APPL-FIN properly
 ‘I am working for you properly.’
- c. *Bá-ntfú bá-kú-hlákúl-ís-á í-nsîmu.*
 DEF.CL2-person CL2-2SG-weed-CAUS-FIN DEF-CL9.field
 ‘The people are helping you to weed the field.’
- d. *Ba-ku-hlakul-ísá í-nsîmu.*
 CL2-2SG-weed-CAUS-FIN DEF-CL9-field
 ‘They are helping you to weed the field.’
- e. *Bá-ntfú bá-sí-sébént-él-a kahlé.*
 CL2-person CL2-1PL-work-APPL-FIN properly
 ‘The people are working for us properly.’
- f. *Ba-si-sebent-él-a kahlé.*
 CL2-1PL-work-APPL-FIN properly
 ‘They are working for us properly.’

The tonal contours of the verb forms quoted in ex. (33) would be correctly predicted by positing the following underlying forms: *ngi-kú-hlakulisa*, *ngi-bá-sébentela*, *bá-kú-hlakulisa*, *bá-sí-sébentela*.

However, in certain configurations, the hypothesis according to which object markers are underlyingly monomoraic syllables the only TBU of which is associated with a H tone leads to wrong predictions, as in ex. (34):

(34) a. *Li-yá-lu-nâts-a*.
 CL5-DJT-CLL11-drink-FIN
 ‘It is drinking it.’ (the cat, the milk)

b. *Ba-yá-si-múkel-a*.
 CL2-DJT-2PL-receive-FIN
 ‘They are receiving us.’

c. *Ba-yá-ku-hlakúl-is-a*.
 CL2-DJT-2SG-weed-CAUS-FIN
 ‘They are helping you to weed.’

d. *Ba-yá-ku-sebént-el-a*.
 CL2-DJT-2SG-work-APPL-FIN
 ‘They are working for you.’

For example, the underlying structure of *ba-yá-ku-sebént-el-a* cannot be *bá-ya-kú-sébent-el-a*, since this underlying structure would predict a surface form **ba-yá-kú-sébent-el-a*: local shift would bring the H domain generated by the H tone of the subject marker into contact with the H domain generated by the H tone of the object marker and the lexical H tone, and therefore this H domain would not be retracted, as shown in (35).

| | | |
|------|----------------------------|---|
| (35) | underlying representation: | <i>*báyakúsébéntelana</i> |
| | constitution of H domains | → [_H ba _H]ya[_H kuse _H]bentela |
| | local shift | → [_H baya _H][_H kusebe _H]ntela |
| | retraction | → ba[_H ya _H][_H kusebe _H]ntela |
| | H tone spelling | → ba[_H yá _H][_H kúsébé _H]ntela |
| | predicted surface form: | <i>*bayákúsébéntela</i> |
| | correct surface form: | <i>bayákusebéntela</i> |

In this particular case, the correct surface form could be predicted by positing, before the constitution of H domains, a special rule delinking the H tone of object markers not preceded by a H-toned syllable and deleting it (in the case of lexically H-toned verbs) or associating it to the following syllable (in the case of lexically toneless verbs). However, certain observations require a different explanation. We

must return here to observations already made in section 2. The point is that, in combination with monosyllabic verb stems, the object marker may surface with a rising modulation, as in ex. (36). A deletion rule affecting the H tone of the object markers in certain contexts can explain the tonal melodies observed in ex. (34), but it cannot account for the modulation observed in ex. (36).

- (36) a. *U-bǎ-ph-á* *lú-bǐsi*.
 2SG-CL2-give-FIN DEF.CL11-milk
 ‘You are giving them some milk.’
- b. *Ngí-ya-yǐ-kh-a*.
 1SG-DJT-CL9-pluck-FIN
 ‘I am plucking it.’ (the flower)
- c. *Ba-yá-yǐ-kh-a*.
 CL2-DJT-CL9-pluck-FIN
 ‘They are plucking it.’ (the flower)

In ex. (37) the underlying contrast between a H-toned subject marker and a toneless subject marker surfaces as a contrast between a H tone and a rising modulation on the syllable representing the object marker.

- (37) a. *U-yǐ-kh-a* *kahlé*.
 2SG-CL9-pluck-FIN properly
 ‘You are plucking it properly.’ (the flower)
- b. *U-yí-kh-a* *kahlé*.
 CL1-CL9-pluck-FIN properly
 ‘(S)he is plucking it properly.’ (the flower)

An underlying form of the object markers consisting of a bimoraic syllable the second mora of which is associated with a H tone is necessary in order to account for these modulations, and moreover it correctly predicts tonal contours such as those of the verb forms in ex. (34), as shown in (38):

- (38) underlying representation: *báyakuúsébéntela*
- constitution of H domains → [_Hba_H]yaku[_Huse_H]béntela
- local shift → [_Hbaya_H]ku[_Husebe_H]ntela
- retraction → ba[_Hya_H]kuuse[_Hbe_H]ntela
- H tone spelling → ba[_Hyá_H]kuuse[_Hbé_H]ntela
- surface form: *bayákusebéntela*

The only complication with this solution is that it implies positing an additional rule in order to account for certain verb forms including object markers the tonal melody of which cannot be directly predicted from an underlying form in which the object marker is represented by a bimoraic syllable the second mora of which is associated with a H tone. This is the case of some of the verb forms in ex. (33), for example *ba-si-sebent-él-a*: if the rules posited above applied directly to the underlying structure *bá-sií-sébent-el-a*, the surface form should be **ba-sí-sébént-él-a*. The simplest solution is to posit the rule formulated in (39). This rule operates before the constitution of H domains; it deletes a toneless mora immediately followed by a H-toned mora belonging to the same syllable and immediately preceded by another H-toned mora.²⁶ (40) illustrates the action of this rule in the derivation of *ba-si-sebent-él-a*.

| | | | | | | | |
|------|---|---|-----|---|---|---|---|
| (39) | H | | H | | H | | H |
| | | | | | | | |
| | x | x | x | x | x | x | x |
| | | | \ / | | | | |
| | V | C | V | → | V | C | V |

(40) underlying representation: *básiísébentela ...*

- toneless mora deletion → *básísébentela ...*
- constitution of H domains → *[_Hbasise_H]bentela ...*
- local shift → *[_Hbasisebe_H]ntela ...*
- metrical shift → *[_Hbasisebente_H]la ...*
- retraction → *basisebe[_Hnte_H]la ...*
- H tone spelling → *basisebe[_Hnté_H]la ...*

surface form: *basisebentéla ...*

7. The tonal properties of the disjoint form of the perfect positive

The analysis of the tonal properties of the disjoint form of the perfect positive provides additional evidence supporting the hypothesis according to which Siswati syllables may comprise two successive TBUs.

In this tense, just as in the present positive, subject markers are underlyingly toneless in the 1st and 2nd persons, H-toned in the 3rd person. With lexically toneless verbs, if the subject marker too is underlyingly toneless, no H tone appears – ex. (41).

26. This particular specification of the context is important, since the data examined in the following section shows that a toneless mora immediately *preceded* by a H-toned mora belonging to the same syllable and followed by a H-toned mora from which it is separated by a syllable boundary is not deleted.

(41) a. *Si-nats-ile.*

1PL-drink-PRF

‘We have drunk.’

b. *Si-hlakul-is-en-e.*

1PL-weed-CAUS-RECIP-PRF

‘We have helped each other to weed.’

When a single H tone is introduced, either by the subject marker – ex. (42a), by the root – ex. (42b) – or by an object marker – ex. (42c), the rules previously established correctly predict its realization. Note in particular that in the disjoint form of the perfect positive, in the same way as in the disjoint form of the present positive, the target of metrical shift is the antepenult.

(42) a. *Ba-hlakul-ís-en-e.*

CL2-weed-CAUS-RECIP-PRF

‘They have helped each other to weed.’

b. *Si-sebént-ile.*

1PL-work-PRF

‘We have worked.’

c. *Ngí-ba-hlakúl-el-e.*

1SG-CL2-weed-APPL-PRF

‘I have weeded for them.’

However, in cases when a lexically H-toned stem is immediately preceded by a H-toned subject marker, we observe an apparent exception to the retraction rule – ex. (43).

(43) a. *Bá-sébént-él-en-e.*

CL2-work-APPL-RECIP-PRF

‘They have worked for each other.’

b. *Bá-limi bá-sébént-él-en-e.*

DEF.CL2-farmer CL2-work-APPL-RECIP-PRF

‘The farmers have worked for each other.’

c. *Bá-ntfú bá-sébént-él-en-e.*

DEF.CL2-person CL2-work-APPL-RECIP-PRF

‘The people have worked for each other.’

If the underlying tonal structure of *bá-sébént-él-en-e* were *bá-sébent-el-en-e*, the two underlying H tones would generate a single H domain, and in configurations such as those illustrated by ex. (43a) and (43b), the retraction rule would reduce it to the

antepenult, in the same way as in the conjoint form of the present positive when a H-toned subject marker immediately precedes a H-toned root, as shown in (44).

| | | |
|------|----------------------------|----------------------------------|
| (44) | underlying representation: | *básébentelene |
| | constitution of H domains | → [Hbase _H]bentelene |
| | local shift | → [Hbasebe _H]ntelene |
| | metrical shift | → [Hbasebente _H]lene |
| | retraction | → basebe[Hnte _H]lene |
| | H tone spelling | → basebe[Hnté _H]lene |
| | predicted surface form: | *basebentélene |
| | correct surface form: | básébéntélene |

The absence of retraction shows that in fact, two adjacent H domains are present, which implies that, in the underlying structure, the two H tones are separated from each other by at least one toneless mora. The simplest analysis is therefore that, in this tense, the subject marker is bimoraic, and the H tone of the 3rd person subject markers is associated with the first mora, as shown in (45). In order to predict the correct surface forms, all we have to add to the previously established rules is that domains constituted by a bimoraic syllable do not undergo retraction, which can be interpreted as reflecting an alignment constraint according to which the edges of H tone domains tend to coincide with syllable boundaries.

| | | |
|------|----------------------------|--|
| (45) | underlying representation: | báasébentelene |
| | constitution of H domains | → [Hba _H]a[Hse _H]bentelene |
| | local shift | → [Hbaa _H][Hsebe _H]ntelene |
| | metrical shift | → [Hbaa _H][Hsebente _H]lene |
| | H tone spelling | → [Hbáá _H][Hsébénté _H]lene |
| | surface form: | básébéntélene |

8. The tonal properties of the conjoint form of the perfect positive

The data we are going to examine in this section show that, in the conjoint form of the perfect positive, the subject markers are devoid of the additional mora characteristic of the subject markers of the corresponding disjoint form. Nothing similar occurs in the present positive, which shows that the tonal variations observed in the conjugation of Siswati may reflect differences in the morphological structure of the verb forms that are not immediately apparent from the observation of their segmental structure, an important consequence being that such tonal variations are not likely to receive a simple explanation in purely phonological terms.

Ex. (46a) to (46d) illustrate every possible combination of underlyingly H-toned / toneless subject markers with underlyingly H-toned / toneless roots in the disjoint form of the perfect positive. Ex. (46e) shows that the neutralization observed in (46b) & (46d) disappears in contexts preventing the retraction of a H domain beginning with the first syllable of the verb form.

- (46) a. *Si-hlakul-is-en-é kahlé.* (toneless subject marker, toneless root)
 1PL-weed-CAUS-RECIP-PRF properly
 ‘We have helped each other to weed properly.’
- b. *Si-sebent-el-an-é kahlé.* (toneless subject marker, H-toned root)
 1PL-work-APPL-RECIP-PRF properly
 ‘We have worked for each other properly.’
- c. *Bá-hlakul-is-en-é kahlé.* (H-toned subject marker, toneless root)
 CL2-weed-CAUS-RECIP-PRF properly
 ‘They have helped each other to weed properly.’
- d. *Ba-sebent-el-an-é kahlé.* (H-toned subject marker, H-toned root)
 CL2-work-APPL-RECIP-PRF properly
 ‘They have worked for each other properly.’
- e. *Bántfú bá-sébént-él-án-é kahlé.*
 DEF.CL2-person CL2-work-APPL-RECIP-PRF properly
 ‘The people have worked for each other properly.’

Ex. (46a) shows that the structure of the conjoint form of the perfect positive includes a grammatical H tone: the subject marker and the root are both underlyingly toneless, and the H tone of the last syllable of the verb cannot result from the influence of the following word, since nothing similar occurs in the present – ex. (47a). The comparison with the present – ex. (47b) – shows also that, in the configuration illustrated by ex. (46c), the presence of this grammatical H tone prevents the H tone of the subject marker from shifting to the right. We shall return to this below.

- (47) a. *Si-hlakul-is-an-a kahlé.*
 1PL-weed-CAUS-RECIP-FIN properly
 ‘We help each other to weed properly.’
- b. *Ba-hlakul-is-án-a kahlé.*
 CL2-weed-CAUS-RECIP-FIN properly
 ‘They help each other to weed properly.’

Ex. (46a) suggests positing the grammatical H tone surfacing on the last syllable as underlyingly belonging to the final. However, this hypothesis must be abandoned,

since in the case of lexically H-toned stems – ex. (46b), the presence of a single H-toned syllable in the surface form implies considering that the underlying H tones constitute a single H domain, and therefore that they underlyingly belong to adjacent TBUs. This leads to the conclusion that this grammatical H tone is associated by a morphological rule to the second syllable of the stem, and the fact that it systematically surfaces on the last syllable of the verb form necessitates positing that the general shift rules are preceded by a special rule affecting the right edge of H domains the last syllable of which is the second syllable of a verb stem and shifting it up to the end of the word, as shown in (48).²⁷

| | |
|------------------------------------|---|
| (48) a. underlying representation: | sihlakúlisene ... |
| constitution of H domains | → sihla _[Hku_H] lisene |
| ‘special’ shift | → sihla _[Hkulisene_H] |
| retraction | → sihlakulise _[Hne_H] |
| H tone spelling | → sihlakulise _[Hné_H] |
| surface form: | sihlakulisené |
| b. underlying representation: | sisébéntelane ... |
| constitution of H domains | → si _[Hsebe_H] ntelane |
| ‘special’ shift | → si _[Hsebentelane_H] |
| retraction | → sisebentela _[Hne_H] |
| H tone spelling | → sisebentela _[Hné_H] |
| surface form: | sisebentelané |

If we now turn to ex. (46d), we observe that here again, several underlying H tones are represented by a single surface H tone, which means that they co-generate a single H domain. Therefore, the subject marker in the conjoint form of the perfect positive cannot have the same underlying form |báa| as in the disjoint form of the same tense: an underlying representation like **báa-sébént-el-an-e* would predict the constitution of two distinct but adjacent H domains, which would lead in all contexts to the surface form *bá-sébént-él-án-é* and would exclude the possibility of having *ba-sebent-el-an-é* in contexts making possible the retraction of a H domain including the first syllable of the word. By contrast, an underlying representation like *bá-sébént-el-an-e* predicts in all contexts the correct surface form.

Although this is not directly relevant to the issues discussed here, it is interesting to observe that a precise description of the tone pattern of the conjoint form of the perfect positive must account for the fact that, in this tense, when a H-toned subject marker combines with a toneless root, the right edge of the H domain generated by the H tone of the subject marker does not undergo local shift: if it were the case, the

27. See Creissels (this volume) for the description of a similar phenomenon in Setswana.

underlying representation *bá-hlakúl-is-en-e* would correspond to the incorrect surface form **ba-hlákúl-ís-én-é*, and not to *bá-hlakul-is-en-é* – ex. (46c). This suggests positing that local shift does not operate in the configuration ... σ_{H}] \neq σ [H σ ... (where \neq represents the left boundary of a stem). Such a rule seems reasonable, since we have already encountered a similar limitation in the configuration ... σ_{H}] σ [H σ_{H}] # (where # represents a word boundary): everybody familiar with the phonological particularities of the Bantu languages will agree that in many Bantu languages, the penultimate syllable of words and the first syllable of stems have a particular behaviour that can be explained as manifestations of a general property of prominence. In other words, the exceptions to local shift in Siswati can be summarized by positing that local shift does not operate in cases when its possible target is a prominent syllable.

7. Historical implications

In the preceding sections, I have tried to show first that, if one accepts the commonly accepted hypothesis according to which the Nguni tone systems are based on a underlying H vs. zero contrast, one must accept the hypothesis of bimoraic syllables in Siswati in order to account for cases of non-conditioned modulations. I have then tried to show that the analysis of tone spreading provides further evidence supporting this hypothesis.

From the point of view of a synchronic analysis of Siswati, an alternative account of the unconditioned modulations would be to abandon the hypothesis of an underlying H vs. zero contrast in Siswati. However, this would not solve the problem raised by the spreading phenomena examined in sections 4 to 6. In fact, it seems difficult to account for these phenomena without accepting at least some degree of abstractness in the phonological representations.

What I would like to emphasize now is that, whatever opinion one may have on this matter, from a historical point of view, the tonal phenomena I propose to account for by positing bimoraic syllables in Siswati are certainly the reflex of ancient L-toned segments that have no segmental reflex in the modern Nguni languages.

A crucial observation is that facts that can receive very similar explanations are observed in languages the tonal system of which is at first sight very different from that of the Nguni languages, for example in the Sotho-Tswana languages. Let us for example compare Siswati ex. (49) with its Setswana equivalent – ex. (50).²⁸

- (49) a. *Ba-sebent-el-an-é kahlé.* (conjoint form of the perfect positive)
CL2-work-APPL-RECIP-PRF properly
 ‘They have worked for each other properly.’

28. The Setswana and Siswati verbs ‘work’ are not cognate (the explanation being that the Setswana verb ‘work’ has been borrowed from Dutch), but both are lexically H-toned.

b. *Bá-sébént-él-en-e.* (disjoint form of the perfect positive)
 CL2-work-APPL-RECIP-PRF
 ‘They have worked for each other.’

(50) a. *Ba berekelanye sentle.* (conjoint form of the perfect positive)
 bá-bérék-él-áŋ-í síntlɛ
 CL2-work-APPL-RECIP-PRF properly
 ‘They have worked for each other properly.’

b. *Ba berekelanye.* (disjoint form of the perfect positive)
 bá-bérék-él-áŋ-ɪ
 CL2-work-APPL-RECIP-PRF
 ‘They have worked for each other.’

The surface melodies are at first sight very different, and the interpretation cannot be the same in Setswana as in Siswati, since the non-conditioned modulations that strongly support the hypothesis of bimoraic syllables in Siswati do not exist in Setswana, but both languages have a tonal distinction between the disjoint form and the conjoint form of the perfect positive, and, given the overall organization of the tonal systems of Siswati and of Setswana, the hypothesis of an abstract toneless TBU separating the H tone of the subject marker from the lexical H tone provides a very simple explanation both for the absence of retraction in Siswati ex. (49b) and for the L tone on the first syllable of the stem in Setswana ex. (50b).²⁹

A reasonable conclusion is that, at some stage of its history, the common ancestor of the Nguni languages and of the Sotho-Tswana languages distinguished the disjoint form of the perfect positive from the conjoint form of the same tense by the presence vs. absence of a L-toned formative inserted immediately after the subject marker. This formative has disappeared as a segmental morpheme, but it survives in the fact that a H tone belonging to the subject marker and a lexical H tone do not interact in the same way in the disjoint form and in the conjoint form of the perfect positive.

In a similar way, I have argued in this article that the object markers of Siswati are best analysed as having an underlying form consisting of a bimoraic syllable the second mora of which is associated with a H tone. Here again, it is interesting to observe that the object markers of Setswana have tonal properties that cannot be predicted by positing in their underlying structure a single TBU associated with a H tone, but that can be predicted in a very simple way by positing an underlying structure in which a H-toned syllable is preceded by an abstract toneless TBU. This suggests that, at some stage of its history, the common ancestor of the Nguni languages and of the Sotho-Tswana languages had bimoraic object markers with the tone pattern LH.

29. See the discussion of the role of tone in the conjugation of Setswana in Creissels (this volume).

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