

The status of the macrostem in reduplication in Ndebele and Zulu

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The Status of the Macrostem in Reduplication in Ndebele and Zulu*

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Introduction

In Bantu languages, the Macrostem is the portion of the verb complex that begins with the object marker (if present) and extends rightward to the end of the complex. Along with the verb stem, it has been seen as a privileged domain for a variety of processes, reduplication among them. In the mutually intelligible Nguni languages Zulu and Ndebele, reduplication is argued to be restricted to draw exclusively on non-inflectional Macrostem material (Downing 2001, 2009; Hyman et al. 2009; Sibanda 2004). However, data presented here show that, under certain conditions, inflectional non-Macrostem material may be included in the reduplicant as well. Crucially, all such material comes at the left edge of the stem; the requirement that inflectional material *within* the Macrostem be excluded from the domain of reduplication goes unviolated. Additionally, when material at the left edge is included, the reduplicant+base complex no longer behaves as a single tonal domain, challenging the notion that RED+base is a compound verb stem (Downing 2003, 2006; Inkelas and Zoll 2005).

1 The Macrostem and the Domain of Reduplication in Zulu and Ndebele

The examples in (1) show that the Macrostem begins with the initial segment of the verb root, or object marker if one is present, and continues to the end of the verb complex. It is bold below, the constructions are grammatical in both Zulu and Ndebele:

- (1) a. i. *u-ya-sí-théng-a* 'You are buying it'

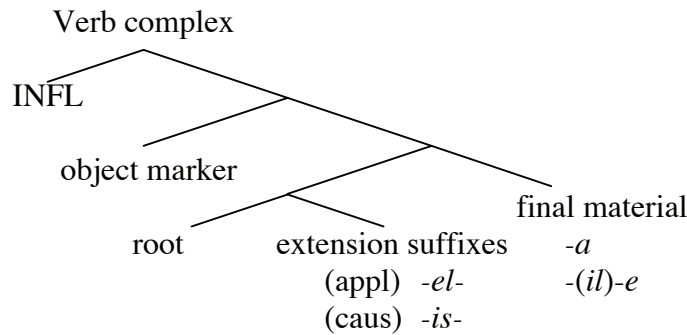
* Thanks to Nosipho Khumalo for providing the Zulu judgments described in this paper, and for generously sharing her language with me.

The Status of the Macrostem in Reduplication in Ndebele and Zulu

- ii. *u-ya-théng-a* ‘You are shopping’
- b. i. *u-sí-théng-il-e* ‘You bought it’
- ii. *u-théng-il-e* ‘You shopped’

According to Downing (2001), the Macrostem encompasses everything from (and inclusive of) the object marker to the final vowel— an *-a* or *-e* in (1). This conception of the Macrostem has its origins in Kisseberth (1984), but the key aspect of the Macrostem is that it is part of a hierarchical, binary structure— a sub-part of the full verb complex whose internal structure is outlined in Meeussen (1967) and detailed in Myers (1987), Hyman and Mtenje (1999), Downing (2001) and others. This structure is shown below:

(2) Internal Structure of Bantu Verbs



We see in (2) that the Macrostem neatly matches with a portion of the morpho-syntactic structure of the full verb complex (everything below INFL). When the verb root is fully syllabic (minimally CVC), such as *-theng-* ‘buy’ in (1), reduplication must pull exclusively from Macrostem material in both Zulu and Ndebele. In both languages, the reduplicant is a disyllabic constituent that is prefixed to the verb stem, with the meaning that the action denoted by the verb is performed carelessly and/or without skill. For CVC roots, the object marker is excluded, and for roots of this size and bigger, reduplication in these languages is nearly identical (tone marked is underlying, following convention, the RED+base complex is bracketed):

- (3) a. i. *u-ya-sí-théng-a* → *u-ya-sí-[théng-a+theng-a]*
- ii. *u-ya-théng-a* → *u-ya-[théng-a+theng-a]*
- b. i. *u-sí-théng-il-e* → *u-sí-[théng-a+théng-il-e]*
- ii. *u-théng-il-e* → *u-[théng-a+theng-il-e]*

The first requirement on the reduplicant is that it must fully parse the root from L → R; we assume that the RED morpheme is a bare [σσ] template. After the root *-theng-* is parsed into the reduplicant, there remains one vowel slot that needs to be

been discussed in detail elsewhere (van der Spuy 1993, Buell 2007); some have claimed it is an aspectual distinction (Botne and Kershner 2000), and others that it is a matter of focus— that when no other element is focused, default focus is assigned to the verb.

Regardless of any semantic or TAM effects, a verb receiving long form morphology is most closely tied to the syntactic frame in which the verb appears. If the verb is final in some XP constituent, long-form, also called disjunctive, morphology is required. The *-ya-* morpheme that marks present verb forms as ‘long’ is outside the Macrostem; it occurs when the verb is *not* followed by a (non-object-marked) complement, or an adjunct belonging to a particular class.

- (9) a. *u-ya-dl-á* “You are eating” vs. *u-dl-á kahle* “... well.”
 b. *u-ya-fúnd-a* “You are reading” vs. *u-fúnd-a kahle* “... well.”

However, in the recent past (perfective), long form marking is realized by the morpheme *-il-* which occurs between the verb root and the final vowel, an *-e* for this tense (as seen in (1) and (3)).

- (10) a. *u-dl-il-e* “You ate” vs. *u-dl-e kahle* “... well.”
 b. *u-fund-il-e* “You read” vs. *u-fúnd-e kahle*. “... well”

It seems then that *-ya-* and *-il-* are serving the same function; they mark long form morphology signaling that the verb is final in an XP; *-ya-* is the long form marker for the present, and *-il-* for the recent past.

Since we saw that *-ya-* can be included in reduplications of sub-minimal roots, it would be logical to expect the same of *-il-*, in Zulu at least. But, this isn’t the case— *-il-* is never permitted on reduplicants. Just as it was unacceptable with reduplications of the fully CVC root *-theng-* in (3), it is equally bad with a sub-minimal consonantal root like *-dl-*.

- (11) a. *u-dl-il-e* “you ate” → i. * *u[dl-il-e+dl-il-e]* (Z & N)
 ii. * *[u-dl-i+u-dl-il-e]* (Z & N)
 iii. *u-[dl-a-yi+dl-il-e]* (N)
 reduplication is impossible (Z)

While both languages prioritize the Macrostem in reduplication, Zulu “opts” to go to prefixal non-Macrostem material rather than recruit Macrostem material at the right edge of the construction.

Given that *-ya-* and *-il-* are both morphemes that mark long form verbs, indicating that they are final in some XP, we may presume that these morphemes are introduced at the same point in the derivation and should be equally accessible for prosodic circumscription into the reduplicant. The constraint *INFLECTIONAL which is used in work by Downing, Hyman, Inkelas, and Sibanda should rule out

-ya- in the reduplicant by the same token that it rules out -il-. The grammaticality of Zulu reduplications containing -ya- shows that instead of penalizing the inclusion of “inflectional” morphemes, we need to instead formulate an analysis that addresses the question of why material at the left edge is more accessible than material at the right.

4 Reduplication of VC Roots

The behavior of the other class of sub-minimal roots, those with a prosodic shape of VC, is in many ways similar to roots consisting of a single consonantal segment. In Ndebele C and VC roots are alike in excluding any Macrostem material from the reduplicant, meaning that nothing to the left of the object marker is ever permitted in. This contrasts with how VC roots behave in Zulu, where they show more freedom than their consonantal counterparts in permitting non-Macrostem material into reduplications. The fact that they *do* behave differently is interesting, seeing that the initial V in VC roots has been argued to be extra-metrical, so we would predict that the two types of sub-minimal roots would show identical patterns (Downing 1998).

The differences between Zulu and Ndebele regarding patterns of reduplication in VC roots is, in some ways, similar to what we observed for consonantal roots, but not identical. This shows that the V in VC roots is not extra-prosodic (or at least, not extra-prosodic at every level of phonological processes), since certain reduplications that were impossible with C (consonantal) roots are acceptable with VC roots. We saw in (4) that a syllabic subject marker may not be pulled into the reduplicant, but subject markers that occur before vowel-initial roots become glides, and may be recruited to fill out the [σσ] template in Zulu. In Ndebele, a y- is used to break up the vowel hiatus that would otherwise obtain between the final vowel of the reduplicant and the initial vowel of the root (Sibanda, 2004), a strategy that is disallowed in Zulu.²

- | | | | | | | |
|---------|-----------------|---|----------------|-----|----------------------------|------------|
| (12) a. | <i>u-enz-a</i> | → | <i>w-enz-a</i> | i. | [<i>w-enz-a+w-enz-a</i>] | (✓ Z, * N) |
| | ‘you make...’ | | | ii. | <i>w-[enz-a+y-enz-a]</i> | (* Z, ✓ N) |
| b. | <i>sí-akh-a</i> | → | <i>s-akh-a</i> | i. | [<i>s-akh-a+s-akh-a</i>] | (✓ Z, * N) |
| | ‘we build...’ | | | ii. | <i>s-[akh-a+y-akh-a]</i> | (* Z, ✓ N) |

However, it’s important to note that in (12), the contrast is not in the reduplicant (the lefthand constituent), but rather on the base. So, even in constructions where it is not appearing in RED per se, -yi- may not appear verb-internally in Zulu.

As was the case with the absence of -yi-, the lack of y- word-internally appears innovative (or dialectal) as well, as Doke (1943:150) gives:

² In the closely related and mutually intelligible language, Swati, a glided subject marker may also be included in reduplication (Hyman 2009).

nantal, *-dla* ‘eat’, *-ma* ‘stand’, *-fa* ‘die’, then the *u-* subject marker is not allowed within the domain of reduplication, and reduplication is in fact impossible. However, if the stem is sub-minimal but vowel-initial *-enza* ‘do’, *-akha* ‘build’, *-ehla* ‘descend’ then the *u-* subject marker (which becomes a *w-* glide when in hiatus with another vowel) is permitted and reduplication goes through.

With *-ya-*, object markers, and glided subject markers, we have seen that what seems to matter is not whether a morpheme is inflectional, but on what side of the structure it occurs. If it is to the left of the verb root, it is permitted into the reduplicant, but if to the right of the root, it is barred.³

(15) Macrostem material and reduplication in Zulu & Ndebele

	Zulu	Ndebele
Macrostem, non-inflectional	✓	✓
Macrostem, suffixal inflectional	*	*
non-Macrostem, prefixal inflectional	✓	*

6 The Macrostem, Reduplication, and Domains within the Nguni Verb

If Macrostem constituency can be violated in Zulu to include prefixal, non-Macrostem inflectional material (as in the last row in the table above), what is the basis for recognizing the Macrostem as a constituent in the first place?

In the Nguni languages (a family of closely related and mutually intelligible Southern Bantu languages which consists of Xhosa and Swati along with Ndebele and Zulu), the Macrostem is a domain relevant for tonal spreading. It has been shown that a high tone from within the Macrostem will spread to the antepenultimate syllable of the Macrostem, which is basically just the antepenultimate syllable of the full verb complex (Khumalo 1987 on Zulu).

- (16) a. i. *u-ya-dóndólázela* ‘you are walking with a cane’
and when it combines with a high-toned subject marker:
b. ii. *bá-yá-dóndólázela* ‘they are walking with a cane’

The reduplicant is argued to form a tonal domain with the base, i.e. it is part of the Macrostem tonal domain (Downing 2001, Sibanda 2004). For CVC roots, the fact that the RED+base complex forms a tonal domain independent of prefixal material doesn’t interact with the tonal specification of prefixal material, since such morphemes are outside the domain of reduplication for fully syllabic and larger roots. For Ndebele and Zulu, then, we have:

³ More accurately, to the right of the “extended root” (Odden 1996), the causative *-is-* and applicative *-el-* are allowed in the reduplicant (if room in the template remains once root material proper is exhausted).

- (17) *u-ya-théng-a* → *u-ya-[théng-á+theng-a]*
 ‘you are shopping’

The question that then arises is, what if a low-toned prefixal morpheme (like *-ya-*) is pulled in to the reduplicant in order to satisfy disyllabicity?

There are several different hypotheses we might formulate regarding what we predict to see in a reduplicated form with the input morphemes: *u*, *ya*, *dl-á*.⁴ Will the high tone of the root ‘scope over’ the Macrostem and appear on the initial *-ya-*? Is tone assigned prior or subsequent to reduplication? What we find is:

- (18) a. *u-ya-dlá* → *u-[ya-dl-á+yá-dl-a]*
 contrast with a low-toned root:
 b. *u-ya-akh* → *u-[y-akh-a+y-akh-a]*

In (18a) the first occurrence of *-ya-* is realized with a low tone— since both the morpheme itself and the preceding subject marker are lexically toneless, this is not surprising. Neither is it a surprise that the second occurrence of *-ya-* bears a high tone, spreading from the high-toned verb root *-dlá* (following the rule of local tone spread detailed in Downing 1990). From (18), it looks like tone association must happen subsequent to reduplication, otherwise we would expect both occurrences of *-ya-* to surface with low tone.

Since the data in (18) behave largely in accordance with our expectations, it may be more fruitful to examine examples where a high-toned prefix (rather than a low-toned one like *-ya-*) is pulled into the reduplicant. In non-reduplicated forms, if the high-toned progressive prefix *-sá-* immediately precedes the verb root, the high does *not* spread onto the root, apparently respecting the boundary that blocks high tones from spreading from prefixal material into the Macrostem domain. The data from *non*-reduplicated forms lend empirical justification to the Macrostem as a meaningful morphophonological constituent in the Nguni verb complex.

- (19) *u-sá-phek-a* ‘you are still cooking’

However, whatever force is keeping the H from *-sá-* in non-reduplicated forms from spreading to the root is not in effect in reduplication (the root *-lwa* ‘fight’ is low-toned).

- (20) *u-[sá-lwá+sá-lwa]* ‘you are still doing a bad job of fighting’

⁴ A high tone on a verb root typically doesn’t surface on the final syllable. However, with sub-syllabic consonantal roots, the only TBU available is the final vowel, so in such cases, the final vowel will bear a high tone.

What we see in (18) is simply that low-toned prefixal morphemes are subject to rightward high tone spreading, the contrast between (19) and (20) shows that pulling a morpheme into the reduplicant affects whether its tone may spread or not. In (19), when *-sá-* is part of the chunk of prefixal morphemes to the left of the Macrostem, its H is blocked from spreading to the verb root, but when the morpheme is part of the reduplicant, the H is permitted to spread to the penult. While the distinction between Macrostem and non-Macrostem material appears to be valid for non-reduplicated forms, it is erased under reduplication.

While the H carried by *-sá-* must be marked lexically— and must be present throughout the derivation (though not necessarily realized)— the rules governing tonal spreading must apply late, after the establishment of the relevant morphophonological domains. The data put forward here are not intended to argue that the Macrostem is an ‘ad hoc’ constituent, but rather to question its relevance in reduplication. The key points here are concerned with issues of morphological and phonological affiliation, and the flexibility of the boundaries between certain domains in the verb.

A related question has to do with the implications of these data for the theory that the RED+base complex is a compound verb stem (first proposed in Downing 2003, and taken up as well in Inkelas & Zoll 2005). The example in (20) shows that, tonally, the RED+base complex behaves like a single verb stem, in that the high tone of the first syllable is permitted to spread to the penult of the full form. However, the underlying morphological affiliation of *-sá-* is outside the verb stem, and it seems somehow misleading to characterize such prefixal material as part of the verb stem. A more accurate description of the phenomenon is that the morphophonological boundary (likely that of the Macrostem) that blocks the H of *-sá-* from spreading onto the stem is voided under reduplication. In other words, the Macrostem and reduplication domains cannot co-exist in reduplications of sub-minimal roots.

7 The Left-Right Asymmetry in Penalizing Inclusion of Inflectional Material in Reduplication

We have seen that, in many cases, identifying the domain of reduplication as the (Macro)stem combined with a constraint *INFL picks out the right constituent to undergo reduplication. *INFL is never violated at the right edge— the perfective ending *-il-e* is never allowed in the reduplicant, but on the left edge, a number of inflectional morphemes may be included in reduplications of sub-minimal roots (long form present *-ya-*, progressive *-sá-*, and glided subject markers). Focusing on Bantu, Hyman (2008) gives a number of examples where the left edge of a phonological object is “stronger” than the right edge; that is, more clearly demarcated, and able serve as a locus of contrasts that are either neutralized or not permitted in later syllables.

There seem to then be at least two different ways of analyzing the mismatch in the requirement that inflectional morphemes be excluded from the right, but may be permitted on the left: 1) the asymmetry is due to the underlying morphosyntactic structure (Embick 2010), i.e. the (lefthand) morphemes that may be pulled into the reduplicant are merged earlier than those which are excluded (on the right), or 2) the asymmetry is due to the phonology prioritizing RED-base alignment on the left edge.

Both analyses have some appealing aspects— the structural account forces us to rethink what the constraint *INFLECTIONAL really means, and the more surface-oriented account gives another example of left » right asymmetries in Bantu morphophonology. Although the Bantu verb complex typically begins with a subject marker, the left in “left » right asymmetries” does not refer to the subject marker, but rather to the left edge of the stem.

In Zulu in particular, one such example comes from palatalization in the passive, first mentioned in Doke, but analyzed more recently in Beckman (1993). When the passive suffix *-(i)w-* is added to a verb stem, all labials will palatalize, except if the labial is the first segment in the root (or the first consonant in the root, in the case of vowel-initial roots):

- (21) a. *-saba* → *-saj-wa*
 ‘to be afraid’ ‘to be feared’
 b. *-phupha* → *-phutsh-wa*
 ‘to dream’ ‘to be dreamed’

In (b), we see that the *ph* (an aspirated [p^h]) which occurs in the C₂ position in the stem palatalizes to [č], but when this segment is in the C₁ slot, it is immune. The failure of stem-initial segments to undergo palatalization is a classic example of the importance of the left boundary of the stem in Zulu. The left edge being stronger or more important than the right may be related to why perfect alignment on the left is necessary, but correspondence mismatches may be permitted on the right, or in the C₂ position of the reduplicant and the base.

8 The Macrostem vs. the Stem = Prosodic vs. Segmental Phonology?

We have seen that the domain of the Macrostem —to the extent that it is a valid and meaningful domain— is principally relevant for tonal spreading. For non-reduplicated constructions, where a high tone from a prefixal morpheme, like *-sá-* (in (20)), is not permitted to spread into the stem/Macrostem; a high originating *within* the Macrostem may spread to the penult or antepenult of the Macrostem, depending on the number of syllables. (22a) shows a verb complex where all morphemes, including the verb root, are low-toned; in (22b), a high-toned object marker is added. In both, the Macrostem is bracketed.

The Status of the Macrostem in Reduplication in Ndebele and Zulu

- (22) a. *u-ya-[bhobhoz-a]*
 ‘you are piercing’
 b. *u-ya-[zí-bhóbhoz-a]*
 ‘you are piercing them’

This example shows that a high tone from an object marker may spread through the verb stem, while highs from prefixal, non-Macrostem morphemes are blocked from doing so. Since the Macrostem appears to interact with the tonal properties of the language, the role it plays is concerned with the prosodic phonology of the language.

If the Macrostem was relevant for Zulu’s segmental phonology, we would predict that it would interact with the application of the palatalization rule that affects labials in the passive. Since stem-initial labials are not subject to palatalization, if the Macrostem interacted with processes in the segmental phonology, we could hypothesize that adding a labial object marker would then render this segment initial in the domain of palatalization, and a root-initial labial would then be subject to palatalization. However, this is not the case; root-/stem-initial labials may never palatalize, regardless of the features of the preceding object marker:

- (23) a. *-bamb-a* → *-banj-w-a*
 ‘catch’ ‘be caught’
 b. *-bamb-el-a* → *-banj-el-w-a*⁵
 ‘catch for’ ‘be caught for’
 c. *-mu-bamb-el-a* → i. *-mu-banj-el-w-a*
 ‘catch for him’ ‘be caught for him’
 ii.* *-mu-janj-el-w-a*

As (ii) in (23c) shows, having a labial object marker does not make a root-initial labial available for palatalization. The relevant domain for palatalization in the passive is that stem; the Macrostem is not relevant for the application of this phonological rule.

Preliminarily, it seems like the Macrostem is a meaningful constituent for processes that are more closely tied to prosodic, rather than segmental, aspects of Zulu’s phonology. It plays a role in H-tone spreading, and in reduplication (though arguably not any more meaningful a role than non-Macrostem prefixal morphemes) which is linked with a bare prosodic template [σσ]. It contrasts with the stem proper, a constituent that begins with the first segment of the root, and excludes any object marking. The stem is relevant for segmental processes, like the palatalization that takes place when the passive suffix attaches, but the stem is also part of the Macrostem domain for the spreading of H-tones from the object

⁵ It is not possible to add an object marker to a passive without also adding an extension suffix (causative *-is-* or applicative *-el-*) to introduce another argument.

marker. Rather than simply claim that one is the domain for tone spreading and the other for segmental processes, the distinction between the two may be that palatalization happens before the object marker is introduced, so it's not a question of overlapping domains, but of correctly ordering the processes at work.

9 Conclusion

Although the Macrostem is prioritized in reduplication in both Ndebele and Zulu, Ndebele reduplicants are permitted to pull material only from the Macrostem, while in Zulu, the unavailability of the augmentative morpheme *-yi-* verb-internally forces the reduplicant to go up to prefixal, non-Macrostem material in order to fill out the $[\sigma\sigma]$ template. For both Ndebele and Zulu, suffixal inflectional Macrostem material is barred from appearing in the reduplicant, but the prefixal morphemes Zulu permits are inflectional, so the constraint *INFLECTIONAL does not account for the full range of Zulu data.

The tonal behavior of Zulu reduplications compared with non-reduplicated forms shows that prefixal morphemes can lose their “prefixal” affiliation by virtue of being pulled into RED. The data and analysis presented here are a first attempt at addressing important questions regarding the derivational timing of reduplication, tone spreading, and the formation of domains within the Nguni verb.

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The Status of the Macrostem in Reduplication in Ndebele and Zulu

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Toni Cook

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