MORPHOLOGICAL AND PHONOLOGICAL STRUCTURE IN ZULU REDUPLICATION

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I'm so proud of us for getting it done. There were times the path to completion was murky and difficult, but that makes joining her on the “Ph.D.” side of things that much sweeter. Thanks for helping me take myself both more and less seriously, for making sure my all-nighters were well-stocked with flaming hots and sour patch kids, and for standing beside me, unfailingly, every step of the way.
ABSTRACT

MORPHOLOGICAL AND PHONOLOGICAL STRUCTURE IN ZULU REDUPLICATION

Toni Cook

David Embick

This dissertation provides an account of Zulu reduplication within the derivational framework of Distributed Morphology (DM). New Zulu data challenge the idea of reified domains like the D(erivational)-Stem and Macrostem as relevant constituents for reduplication (Downing 1997, Hyman, Inkelas, and Sibanda 2009). Instead, a crucial distinction is made between morphemes that fall within the scope of reduplication, and those that are outside of it. Reduplication is assumed to be an operation that copies segmental material to a bare disyllabic template, and only has indirect access to morphosyntactic structure through phonological operations. I claim that reduplication can take place as soon as the RED morpheme undergoes Vocabulary Insertion and Linearization, or at a later point in the derivation. Chapter 1 introduces the material, and Chapter 2 presents an argument that the variation between the default Bantu verbal final vowel -a and the vowel from an extension suffix is related to the presence of two v heads in the structure. I show that the variation in the final vowel is absent with lexicalized causatives. Chapter 3 examines the behavior of prefixal material under reduplication, and proposes that the reduplication of prefixal material outside the scope of the RED morpheme is due to a process of local dislocation; this also explains the left-right asymmetry, or why the prefixal long form present marker -ya- is allowed to reduplicate but the suffixal long form perfect marker -il- cannot. Also included in Chapter 3 are data on negation that question the role of accidental syllabification in reduplication. In Chapter 4, I discuss three case studies that illustrate the advantages of the DM-approach. Chapter 5 focuses on the passive construction, principally on non-reduplication phenomena. Instead, the main topic is the phonotactics of glides and palatals, and how to best account for the non-local palatalization that applies in the passive. Chapter 6 looks at tone, the differences between Zululand Zulu and Durban Zulu (Downing 2001), and the implications of reduplicating non-Macrostem prefixal morphemes for domains of tonal spreading. In Chapter 7, I present data from reduplication of adjectives, and contrast it with the patterns seen in verbs.
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<th>Description</th>
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<tbody>
<tr>
<td>APPL</td>
<td>applicative</td>
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<tr>
<td>ASP</td>
<td>aspect</td>
</tr>
<tr>
<td>AUX</td>
<td>auxiliary</td>
</tr>
<tr>
<td>CAUS</td>
<td>causative</td>
</tr>
<tr>
<td>CL</td>
<td>noun class</td>
</tr>
<tr>
<td>CM</td>
<td>class marker/class prefix</td>
</tr>
<tr>
<td>D-STEM</td>
<td>derivational stem</td>
</tr>
<tr>
<td>DUR</td>
<td>durative</td>
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<tr>
<td>EXT</td>
<td>extension suffix</td>
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<tr>
<td>FUT</td>
<td>future</td>
</tr>
<tr>
<td>FV</td>
<td>final vowel</td>
</tr>
<tr>
<td>H</td>
<td>high tone</td>
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<tr>
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<tr>
<td>I-STEM</td>
<td>inflectional stem</td>
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<tr>
<td>LF</td>
<td>long form verb marker</td>
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<td>NEG</td>
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<td>OM</td>
<td>object marker</td>
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<tr>
<td>PASS</td>
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<tr>
<td>PERF</td>
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<td>PL</td>
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<tr>
<td>PRES</td>
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<tr>
<td>PST</td>
<td>past</td>
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<tr>
<td>RECIP</td>
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<tr>
<td>RED</td>
<td>reduplicant</td>
</tr>
<tr>
<td>REL</td>
<td>relative marker</td>
</tr>
<tr>
<td>SG</td>
<td>singular</td>
</tr>
<tr>
<td>SM</td>
<td>subject marker</td>
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Chapter 1: Introduction

1.1 Overview

The aim of this dissertation is twofold: 1) to present an analysis of Zulu reduplication within the derivational framework of Distributed Morphology (Halle and Marantz 1993, Embick 2010), and 2) introduce new data that make us rethink the constituents within the verb complex that are allowed to reduplicate. Although Zulu is a relatively well-documented language, the data collected in the course of carrying out this project demonstrate the need for ongoing fieldwork; even when the grammar has been thoroughly described, points of variation emerge that bring well-established principles up for debate.

Reduplication consists of a disyllabic constituent prefixed to the verb stem (1a) - though we will see that there are situations in which the reduplicant can be misaligned with the stem (1b). The meaning conveyed by reduplication is that the action denoted by the verb is performed ‘here and there, without much skill’. It can be rendered in English as ‘kind of,’ or ‘do a bad job of’; in my analysis, it is considered to be an aspectual morpheme (as in Frampton 2009 and Skinner 2008). The stems below are -funda ‘study’ and -dla ‘eat’, containing the roots -fund- and -dl-:

(1) a. u-funda ‘you study’ → u-[funda+funda] ‘you do a bad job studying’
   b. u-sá-dlá ‘you still eat’ → u-[sá-dlá+sa-dlá] ‘you still do a bad job eating’

Several key components of the Distributed Morphology framework that are utilized in this analysis include:
1) The notion that the Zulu verb is a complex object built gradually over the course of a derivation, with the morpheme responsible for reduplication (RED) attaching relatively early.

2) The optionality of reduplication taking place as soon as the RED morpheme attaches, or being postponed until structure that is outside its scope is phonologically co-present with the bare [oo] template of RED, as shown with the durative morpheme -så- that is semantically outside the scope of reduplication in (1b) but part of the reduplicant phonologically.

3) Reduplication as a copying operation that only has indirect access to morphosyntactic structure through phonological representations.

1.2 Zulu and its relationship to other Nguni languages

Zulu (or isiZulu) is a Bantu language spoken primarily in South Africa, belonging to the Nguni sub-family of Southern Africa. It is largely mutually intelligible with the other main members of the Nguni group: Swati (spoken mainly in Swaziland), Ndebele (Zimbabwe), and Xhosa (South Africa). Along with South Africa, there are Zulu speaking communities throughout Southern Africa, in Botswana, Lesotho, Malawi, Mozambique, and Swaziland (Ethnologue). In South Africa, the bulk of Zulu speakers are found in the KwaZulu-Natal province (KZN), located in the Eastern portion of the country and on the coast of the Indian Ocean. Durban is the biggest metropolis in KZN, and (along with the Tugela River), is a point of geographic orientation for Zulu dialectal divisions.

Beyond KZN, Zulu is the de facto lingua franca for black South Africans. It is one of the 11 official languages named in the country’s 1996 constitution, and has a considerable media presence, in newspapers, television shows, and radio. Zulu-based
instruction in schools has been in place for decades, and there is a standardized orthography, which is used for all the examples in this dissertation.

A special note should be made of the relationship between Zulu and Ndebele. To an even greater extent than the other Nguni languages, Zulu and Ndebele are considered to be dialects of a single language. The Zulu and Ndebele constituted a single ethnic group until the early 1800s when a chiefdom headed by Mzilikazi split from King Shaka and his kingdom (Rasmussen 1978). Due to the extensive similarities between the languages, there are many places in the dissertation when an example holds for both Zulu and Ndebele and this is not noted, simply because the default situation is that an example is grammatical in both languages (with the significant exception of the prefixal material discussed in Chapter 3). Furthermore, since their paper is the most thorough discussion of reduplication in any Nguni language, the examples contained in Hyman et al.’s (2009) analysis of Ndebele reduplication present an important point of comparison for the analysis of Zulu laid out in this dissertation.

1.3 Data collection

The Zulu data presented in what follows are based on elicitation sessions with 34 native speakers of Zulu. My main informant is from Estcourt, KwaZulu-Natal, and I met with her over the course of 6 months from 2010-11 while she was working as an au pair and I was a visiting student at UC-Berkeley. Estcourt is a town in the Natal dialect region, west of Durban and Pietermaritzburg (labeled as Qwabe in Maho (2009)). In the US, I also solicited judgments from two Durban Zulu speakers in Philadelphia. The remaining sessions were conducted in South Africa in the summer of 2011, the majority in
Empangeni a town north of Durban and just outside Richards Bay, and two in Durban, with speakers of Durban Zulu.

The socioeconomic situation of Empangeni is an interesting one; under apartheid, it was exclusively white, and the town contains many grand homes. With the growth of a black middle class, the area has become increasingly integrated, but except for a couple of young speakers under the age of 15 (who were not interviewed independently, but chimed in during interviews with their parents and/or siblings), none of the people I interviewed were born in Empangeni. Instead, there is a large Zulu township very nearby, Esikhawini, and there is a well-established link between the two areas, with Zulus from Esikhawini who have “made it” and been successful in the post-apartheid era moving to Empangeni. All of the people/families I interviewed in Empangeni had family still living in the township, and most attended church there as well. Consequently, the interviews with residents of Empangeni are likely best treated as examples of speech characteristic of Esikhawini.

In addition to residents of Empangeni, I also had access to speakers who were students and employees at the University of Zululand, a university about 20 minutes away from Empangeni. The vast majority of the students there were from rural Zululand, or emakhaya “the rural areas” as it is referred to in Zulu. Large portions of these areas have seen little change since the end of apartheid in 1994, and these students represented the least urbanized population that I interviewed. How this was reflected in their judgments is discussed in the following section.
1.4 Variation and dialectal divisions

Dialectal differences are mentioned throughout the dissertation, and they constitute a sizeable amount of the discussion in Chapter 6 on tone. The variation between different Zulu dialects has long been recognized, and Khumalo (1981, 1982), and Downing (2001b) describe in considerable detail the difference between the tonal patterns of Zululand Zulu and Durban Zulu. From Downing’s analysis, it is clear that Durban Zulu is the innovative variety. Zeller (2006) and Halpert (2012) also identify innovative variants in the syntactic domain.

One of the interesting sociolinguistic findings uncovered in this research is the clear distinction between innovative and conservative reduplications. What it means to “reduplicate conservatively” is to include only material from the “extended root” (Odden 1996, shown in (18) in chapter 2) with default verb final -a, and to augment reduplications of sub-minimal roots only with augmentative -yi- or -y-. However, there are two dimensions to “innovative reduplication”, one being the (un)availability of word-internal -yi- and the other being the number of morphemes to the left of the root that are available to be reduplicated. It is innovative *not* to allow for reduplications containing -yi-, even if this leads to ineffability, and it is innovative to be permissive in allowing many morphemes to the left of the root to reduplicate (discussed in sections 3.4 and 3.7).
Given the wide range of judgments encountered during my fieldwork, it was somewhat difficult to assess what constituted a “consensus” grammar of reduplication.\(^1\)

My consultant in Berkeley who I worked with most extensively had one of the most innovative grammars of reduplication, and it would have been misleading to portray hers as the standard. Basically, all of the judgments reported here held for more than half of the speakers consulted, and any relevant caveats are noted where they apply. Familiar patterns from variationist sociolinguistics emerged, especially with the students at the University of Zululand (Labov 2001).

The University has a program to train Zulu schoolteachers that is heavily influenced by Zulu traditionalism; the department is named *Isizulu samagugu* ‘Zulu of the ancestors’ (on Zulu modern vs. traditional identities, see Carton et al. 2008). There was a contingent of students who held a conservative ethos that matched strikingly with conservative judgments. This correlation was especially prominent among the women, who were more likely to wear skirts than pants, and keep their hair natural and

\(^1\) It is clear that this phenomenon is well-suited for future quantitative sociolinguistic analysis, but it was beyond the scope of this study due to ongoing modifications of the elicitation prompts, and a sample that was not appropriately structured for this sort of statistical analysis.
The flipside of the effect of social factors on language change was also evident, with more women more likely to give innovative judgments than men.

1.5 General issues: Distributed Morphology vs. Optimality Theory

This dissertation relies crucially on earlier work on Nguni reduplication undertaken by Hyman et al. (2009), Sibanda (2004), Inkelas and Zoll (2005), and Downing (2001a, 2003, 2006, 2009). These other analyses are carried out within the framework of Optimality Theory (Prince and Smolensky 1993). My goal is not to convince dedicated practitioners of OT that the Distributed Morphology analysis is the right one, but to demonstrate that there are insights and advantages available within DM that are not available within OT.

As we will see, there is an important distinction between morphemes that are within the scope of reduplication and those that are outside of it. In DM, the serial aspect of the derivation is built into the theory, and not all morphemes are available to appear in the reduplicant at the time that reduplication takes place. In OT, all “bracketings” dividing morphemes into the various sub-constituents of the verb complex are assumed to be present in the surface structure, but this does not imply a structure built gradually in the course of a derivation. The notion of bracketing is somewhat problematic in a non-serial theory, in that it essentially requires that morphosyntactic structure be represented in the candidates when they are evaluated by the grammar. Phonology and morphology are interleaved in OT, and reduplication is a morphological operation that has direct

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2 Of course there is the possibility that prescriptivist tendencies were stronger in this group.
access to phonological representations that index morphosyntactic constituency. This is not the case in DM, in which all syntactic operations take place prior to phonology.

One of DM’s strengths is that it is a relatively restrictive theory, and there are certain phenomena in reduplication that it explains well—such as the inclusion of prefixal material, the left-right asymmetry, and the distinction between how “inflectional” and “derivational” material behave under reduplication. However, there are also areas in which it is difficult to see how DM can account for the wide range of judgments, while they receive a straightforward account in the more-permissive OT. Ultimately, I hope to show that analyzing these data from a derivational perspective allows for insights that are obscured within an OT framework, and demonstrate the utility of bringing different perspectives to bear on an intriguing set of judgments.

1.6 Note on pronunciation

Although Zulu orthography is fairly straightforward, in order to correctly pronounce the examples it is important to be aware of a couple of points. First, an [h] following a voiceless consonant indicates aspiration, as in th, ph, and kh, but breathiness for bh. The combinations hl and dl are, respectively [ɬ], and [ɮ], the voiceless and voiced lateral fricatives. Zulu also has clicks at three places of articulation, c is a dental click, x is lateral, and q is post-alveolar, and these can all be prenasalized, voiced, aspirated, or voiced and prenasalized.

1.7 Note on noun class

One of the distinguishing features of the Bantu languages is the highly articulated noun class agreement system. Zulu has 14 noun classes, numbering from 1 to 17 with some
gaps along the way due to the loss of a class, or merging of multiple classes. The noun class is marked on both the noun itself and through agreement morphology on the verb; both subject and object agreement morphemes are given in the table below. On the noun, the prefix is composed of two morphemes, an augment (or “pre-prefix”) that consists of a single vowel, and is followed by the class prefix—typically CV, but some exceptions are shown in the table.

For noun classes 1 and 2, there is a distinction between 1 and 1a, and 2 and 2a. The difference is in the morphology on the noun itself, but the agreement triggered is identical. In the remainder of the dissertation, both class 1 and 1a will be glossed as 1, both 2 and 2a as 2. The majority of the classes are given in pairs, with the odd number being the singular, and its even counterpart the plural. While the syntax of augmentless nominals presents an interesting set of problems, only augmented nouns are discussed here, meaning the class prefix on the nominal will never occur without a preceding augment. All the augments and subject and object markers are high-toned, while all the class prefixes are low.

<table>
<thead>
<tr>
<th>Class Number</th>
<th>Augment</th>
<th>Class Prefix</th>
<th>Subject Marker</th>
<th>Object Marker</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2</td>
<td>u-a</td>
<td>m(u)-ba-</td>
<td>u-ba-</td>
<td>-mu-ba-</td>
<td>umuntu</td>
<td>‘person’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>abantu</td>
<td>‘people’</td>
</tr>
<tr>
<td>1a 2a</td>
<td>u-o</td>
<td>Ø</td>
<td>u-ba-</td>
<td>-mu-ba-</td>
<td>uthisha</td>
<td>‘teacher’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>othisha</td>
<td>‘teachers’</td>
</tr>
<tr>
<td>3 4</td>
<td>u-i</td>
<td>m(u)-mi-</td>
<td>u-i-</td>
<td>-u-i-</td>
<td>umuthi</td>
<td>‘plant’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>imithi</td>
<td>‘plants’</td>
</tr>
<tr>
<td>5 6</td>
<td>i-a</td>
<td>(li)-ma-</td>
<td>li-a-</td>
<td>-li-a-</td>
<td>ikhanda</td>
<td>‘head’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>amakhanda</td>
<td>‘heads’</td>
</tr>
<tr>
<td>7 8</td>
<td>i-i</td>
<td>si-zi-</td>
<td>si-zi-</td>
<td>-si-zi-</td>
<td>isibonelo</td>
<td>‘example’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>izibonelo</td>
<td>‘examples’</td>
</tr>
</tbody>
</table>
Personal noun morphology is in the table below—classes 1 and 2 are the 3rd singular and plural, respectively, since all human nouns fall into one of these classes.

Table 1.2 Personal pronoun morphology

<table>
<thead>
<tr>
<th></th>
<th>Subject Markers</th>
<th>Object Markers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Singular</td>
<td>Plural</td>
</tr>
<tr>
<td>1st Person</td>
<td>ngi-</td>
<td>si-</td>
</tr>
<tr>
<td>2nd Person</td>
<td>u-</td>
<td>ni-</td>
</tr>
<tr>
<td>3rd Person</td>
<td>ú-</td>
<td>bá-</td>
</tr>
</tbody>
</table>

1.8 Organization of the dissertation

The dissertation is structured as follows: Chapter 2 introduces the analysis of reduplication within DM, and examines issues involving the default verbal final vowel -a and extension suffixes such as the causative -is- and applicative -el-. The topic of Chapter 3 is the inclusion of prefixal material in reduplication, and the extent to which “accidental syllabification” (Marantz 1987) is able to account for the facts from prefixes occurring before VCV stems. Chapter 4 focuses on three case studies of reduplication (one exclusively from Ndebele), and the advantages afforded by examining them in a DM-based analysis. In Chapter 5, I look at the passive construction, focusing principally on non-reduplication phenomena, but rather the phonotactics of glides and palatals, and how to best account for the non-local palatalization rule that applies in the passive.

Chapter 6 looks at tone, the differences between Zululand Zulu and Durban Zulu, and the implications of reduplicating non-Macrostem prefixal morphemes for domains of tonal
spreading. In Chapter 7, I present data from adjectival reduplication, which shows interesting similarities with the process of verbal reduplication.
Chapter 2: A Distributed Morphology analysis of Zulu reduplication: The default verbal final vowel -a and extension suffixes

2.1 Theoretical Assumptions

A primary claim of this dissertation is that a derivational analysis of Zulu reduplication provides insights that directly result from reduplication a) taking place at different points in the derivation, and b) being a copying operation that does not have direct access to morphosyntactic structure. In Distributed Morphology (Halle and Marantz 1993, Embick 2010), the principles of syntactic combination are applied to word formation, and this theory is the groundwork for the analysis implemented here. In DM, a “y-model” of the grammar is used (Harley and Noyer 1999):

(1) Architecture of the grammar in DM (Pak 2008, Fig 1.2)

Syntactic derivation

\[ \text{Spell-Out} \]

PF Operations:
- structural readjustment
- vocabulary insertion
- linearization

Phonological Form (PF)  Logical Form (LF)

To summarize what happens along the branch from Spell-Out to Phonological Form, Pak (2008) writes:

The output of the syntactic derivation is taken to be a hierarchically arranged but linearly unordered configuration of roots (content morphemes) and abstract syntacticosemantic feature bundles (function morphemes), which is sent to the PF and LF branches at spell-out. (p.25)
Each of the processes laid out along the branch to PF is targeted in Zulu reduplication, and in this chapter and the following, we will see how the mechanisms and machinery of DM are well-equipped to handle much of the data.

First, we will address some of the issues involved with analyzing a morphophonological process with a strong prosodic and templatic component within DM. The analysis put forward here proposes that reduplication results from a bare \([\sigma\sigma]\) template that is filled by segmental material mapped from earlier cycles of spell-out that have undergone Vocabulary Insertion and Linearization. Several different options of accounting for the default verbal final vowel \(-a\) are discussed, along with the advantages and drawbacks of each. Although reduplication helps shed light on the relationship between the default \(-a\) and the full verb complex, as well as specific extension suffixes, a perfect account of its distribution remains elusive.

The variation in the final vowel on reduplications of verbs containing extension suffixes like the causative \(-is\) and applicative \(-el\) is attributed to a structure containing two \(v\) heads (following Harley’s 2006 analysis of Japanese). This is shown by comparing reduplications of compositional/syntactic causatives and applicatives with reduplications of “lexicalized” forms. The latter class does not show the same variation in reduplication, which I argue stems from the relevant structures containing only one \(v\) head, meaning that there is only one cycle of spell-out that takes place prior to reduplication and the possibility of reduplication targeting one or the other of two spell-out cycles is eliminated.

The chapter is laid out as follows, first I apply the principles of cyclic spell-out to the Zulu VP and reduplication. In the following section, I present analyses of
reduplication assuming that the -a is the realization of a final vowel projection that serves as a “stabilizer morph” (as described for Hausa high and low-toned clitics in Inkelas 2009 (16)). Next, I will look at the possibility of the -a being the realization of the verbalizing morpheme, the root-attached ν head. The remainder of the chapter is devoted to understanding the relationship between the productivity of extension suffixes and optionality in the final vowel of the reduplicant.

2.2 Challenges posed by analyzing reduplication within DM

Haugen (2011) notes in his analysis of reduplication in the Uto-Aztecan language Hiaki, that much of the work in DM has focused on “piece-based” allomorphy phenomena. Since reduplication is a canonical example of prosodic morphology (McCarthy and Prince 1986), in DM it is not immediately evident how to best represent a morphophonological process with a templatic component. However, it is not the prosodic component alone that makes reduplication a good testing-ground for DM, it also highlights phenomena that are familiar from the work on allomorphy, questions of locality, mismatches between phonology and morphology (aka “bracketing paradoxes” (Pesetsky 1985)), and most importantly, the ways in which phonological operations are sensitive to morphosyntactic constituency.

The first step in applying DM to reduplication is to assess the potential options with the most straightforward example: for roots that are larger than CVC, meaning that the disyllabic reduplicant is copied from a monomorphemic constituent, i.e. the root (tone marked is underlying). Reduplication consists of a disyllabic constituent prefixed to the verb stem.
Due to both the semantics of reduplication and the position of the reduplicant in the verb complex, the morpheme responsible for reduplication is assumed to appear in a structural position outside the root, but within all the prefixal TAM morphemes, such as a the *u*-subject marker in (2). The tree below will be more articulated later in this chapter and the following, but preliminarily the underlying structure for (2) is assumed to be:

(3) Structure of *u-[sebe+sebenz-a]*

```
full verb complex
       \       /
  2SG    RED+base
        \    /
     RED        stem
           \  /
              \vP
               \FV
               \      /
              √ROOT \  v
                \  v
               -sebenz-
```

The “action” of reduplication is located in the RED morpheme, termed the “diminutive” in Doke’s grammar (1927) and labeled as the UNINT (unintensive) in Frampton (2009). Although RED is a phonological rather than syntactico-semantic morpheme label, it is used for the sake of convenience and readability. When the structure in (3) undergoes vocabulary insertion (VI)— when each of the terminal nodes receives phonological content— what sort of phonology does RED receive (or trigger)?

Broadly, there are two distinct options for how to interpret the phonological effects of reduplication observed on the surface (Haugen 2011). When RED undergoes VI, it can either be realized as a “zero”, with no immediate phonological realization, but
linked to a “readjustment rule” that will trigger a copying operation later in the derivation to produce the disyllabic reduplicant. Alternatively, it can be realized as a bare CVCV (σσ) template that is linearized in the position where it has semantic scope (at least in the default case). For the former option, templates are unavailable as linguistic objects, and it is this readjustment rule view that is advocated in the DM-based approaches of Raimy (2000) and Frampton (2009). In contrast, it is the template approach that is adopted here in order to retain the insights from Prosodic Morphology (McCarthy and Prince 1986, 1995), specifically that prosodic constituents like syllables and feet are primary linguistic objects that are referred to by the grammar. However, as noted by Haugen “many of the major empirical predictions regarding the actual syntax of reduplication made by these two competing approaches are often equivalent” (p.2).

In DM, a chunk of syntactic structure is sent to spell-out (and from there, off to PF and LF) when a cyclic head merges (Embick 2010). The only cyclic head we encounter in Zulu reduplication is the category-defining ν head, but it must also be the case that there are other morphemes that trigger a phonological cycle. In DM, there is a distinction between the category-changing phase-cyclic morphemes (written in DM notation with a lower-case letter), and the language-specific morphemes that trigger a phonological cycle alone (indicated with capitals). To distinguish between the two, the latter are known as φ-cycles, with the φ indicating “phonological”. A φ- cycle does not mean that the structure has been sent to LF, but instead simply that it is subject to phonological processing or spell-out; RED will be treated as a morpheme that triggers a φ-cycle.
For instance, if we have the structure in (4), \( x \) is a category-defining cyclic phase head while \( Y \) only triggers a \( \phi \)-cycle, also called a phonological cycle:

(4) Spell-out cycles and \( \phi \)-cycles

\[
\sqrt{\text{ROOT}} \quad x \quad \phi \quad Y \quad Z
\]

Although many of the theoretical implications of \( \phi \)-cyclic morphemes are beyond the scope of this dissertation, the important point is that DM allows for language-specific morphemes (like Nguni \textsc{red}) to be responsible for cycles of phonological processing, even if there is a restricted and “closed-class” cross-linguistic inventory of morphemes that trigger a PF and LF cycle. Although the only theory-sanctioned cyclic heads we will be looking at are \( v \) heads, I argue the \textsc{red} morpheme is responsible for a \( \phi \)-cycle of phonological spell-out. In the spell-out of (3), the acategorical root \(-sebenz-\) merges with the \( v \) head, and this structure is sent to spell out:

(5) Spell-Out of \( vP \)

\[
\text{ROOT} \quad \sqrt{vP} \quad \rightarrow \quad \text{sebenz}
\]

-\( -sebenz-\)  \( \emptyset \)

The realization of the \( v \) head in this context is null, so the output of the \( vP \) cycle is the phonological object \(-sebenz-\). After working on the \( vP \) node, the next cycle is run when the \textsc{red} morpheme is encountered in the structure. The curved marks indicate the placement of a cycle, and in the case of \textsc{red}, a \( \phi \)-cycle.
(6) Cyclic spell-out of \( u-[\text{sebe}+\text{sebenz}-a] \) including phonological exponents of morphemes

\[
\begin{align*}
\text{full verb complex} & \\
T & \\
2\text{SG} & \\
u- & \\
\text{RED} & \\
\text{stem} & \\
\text{vP} & \\
\text{FV} & \\
\text{ROOT} & \\
-sebenz- & \\
-v & \\
\emptyset & \\
\end{align*}
\]

The FV morpheme undergoes spell-out on the cycle that RED triggers, meaning that \(-\text{sebenz}-a\) is present as a phonological object, and it is mapped to the template (as in Marantz 1982). When RED undergoes Vocabulary Insertion, it is realized as a bare template, and it is subsequently filled with segmental material from the constituent to its right. The mapping begins with the initial consonant of what has already been sent to PF, and it is straightforward to see that the reduplicative template will be filled with \(-\text{sebe}-\).

(7) Spell-Out and PF operations on RED+base constituent in (5)

Vocabulary Insertion and linearization: \([\text{oo}]-\text{sebenz}-a\)

Mapping to template: \(-\text{sebe}+\text{sebenz}-a\)

2.3 Accounting for the default verbal final vowel

Having seen how reduplication works in the simplest case, in which the reduplicant is in perfect correspondence with the first two syllables of the root, we will move on to more interesting and challenging examples, where there is a “mismatch” between the final vowel of the reduplicant and the final vowel (FV) of the base.
Throughout much of the Bantu zone, especially in Southern and Eastern Bantu, a verb is required to end in a vowel, known as the “final vowel” (Schadeberg 2003). The majority of verbal paradigms end in -a, and this morpheme is known as the “default verbal final vowel” (first identified for reduplication in Mutaka and Hyman 1990):

(8) Examples of default final -a across Zulu TAM paradigms
a. ú-phek-a ‘he cooks’ (present indicative)
   b. é-phek-a ‘(if) he cooks’ (present participial)
   c. w-á:-phek-a ‘he cooked’ (distant past)
   d. ú-bé-phek-a ‘he was cooking’ (past progressive)
   e. ú-zo-phek-a ‘he will cook’ (future)
   f. ú-sé-phek-a ‘he just started cooking’
   g. w-a-ngá-phek-a ‘(if) he doesn’t cook’
   h. úku-phek-a ‘to cook’ (infinitive)
   i. a-ka-phek-a-ng-a ‘he didn’t cook’

In reduplications of CVC roots with -a final bases, the -a is present on the reduplicant as well. All the examples in (8) reduplicate as:

(9) [-phek-a+phek-a]

Despite the fact that the majority of TAM paradigms end in -a, some do end in -e or -i:

(10)a. a-ká-phek-i ‘he doesn’t cook’ (negative present)
   b. é-nga-phek-i ‘(if) he doesn’t cook’ (negative participial present)
   c. ú-phek-ê ‘he cooked’ (recent past perfect)
   d. …á-phek-ê ‘he cooks’ (subjunctive)

Note that in the examples in (10), the TAM information is not encoded *exclusively* in the segmental content of the final vowel. In (10a), there is an initial a- marking negation, and the subject marker is a ká, rather than the normal subject marker for 3SG, ú-, (10b) has an
- subject marker and a -nga- (a morpheme often correlated with negation), (10c) has a final high tone, and (10d) has an a- SM and a final high tone.

At first we will analyze the -a as the phonological realization of a final vowel morpheme. This account resolves the tension between the accepted structure of the Bantu verb in which the final vowel is bracketed with the stem, but often shows sensitivity to prefixal TAM morphemes which are outside the stem (shown in (11) below). Positing an FV morpheme that is realized as -a also explains the common phenomenon of final vowel "mismatches" in reduplication. In the account presented here, these mismatches occur because reduplication happens before the FV of -a can be overwritten by exponents of TAM morphemes located higher in the structure.

Although there are a number of advantages to proposing that the default verbal final -a is related to an FV morpheme, there is another option as well: the -a is the phonological realization of the verbalizing morpheme itself. The proposal that -a realizes the v head is also able to account for the facts from reduplication involving a mismatch between the final vowel on the reduplicant and the base. We will then evaluate each of these options: -a as the spell-out of the FV morpheme or the v head– for different types of causativized and applicativized verbs. Both options are shown to be problematic, but the notion that -a is the phonological realization of the v head ultimately proves more compelling than proposing a discrete FV morpheme.

It has been the tradition in Bantu literature, beginning with Doke (1954), and Meeussen (1967), to place TAM material high in the pre-stem domain, but include a final vowel outside extension suffixes (discussed in the subsequent section) but still internal to the stem. From Hyman (2007):
(11) Structure of verbal unit (Hyman 2007, p.201):

```
VU
├── pre-stem
│   └── stem
│       ├── base
│       │   └── FV
│           ├── radical
│           │   └── extensions
```

Evaluated together with the constructions in (10), the structure in (11) shows a conflict between the location of the morphemes affecting whether the FV surfaces as -a or another vowel (related to prefixal TAM morphemes in the pre-stem domain), and the location of the final vowel morpheme itself (within the stem, on the right).

When we reduplicate verb complexes with a non-a FV, the reduplicants must nonetheless end in the default final vowel -a, rather than the “inflectional” vowel that is present on the base (these facts are the same for Ndebele, described in Sibanda (2004) and Hyman et al. (2009)):

(12) Reduplications of verb complexes ending in a final vowel other than -a

a. $u$-fúnd-a \textsuperscript{1} ‘you study’ $\rightarrow$ $u$-[fúnd-a+fund-á]
   \textsuperscript{2} 2SG-study-FV

b. $u$-fúnd-é \textsuperscript{1} ‘you studied’ $\rightarrow$ $u$-[fúnd-a+fund-é]
   \textsuperscript{2} 2SG-study-FV.PERF $\ast$ $u$-[fund-e+fund-e]

c. $a$-(w)$u$-fúnd-i \textsuperscript{1} ‘you don’t study’ $\rightarrow$ $a$-(w)$u$-[fúnd-a+fund-i]\textsuperscript{3}
   \textsuperscript{3} NEG-2SG-study-FV.NEG $\ast$ $a$-(w)$u$-[fund-i+fund-i]

\textsuperscript{3} In this example, NEG $\gg$ RED so the meaning is “you don’t do a bad job of studying”
In a derivational theory like DM, the absence of correspondence between the FV of RED and the FV of the base follows straightforwardly from the nature of the derivation, as the FV -a is taken to be the phonological realization of the FV morpheme that attaches to a verb(alized root). In the RED+base verb complex as a whole, this -a (can) get overwritten as the verb moves up to higher syntactic projections (such as mood, aspect, and negation), but at this point, RED is no longer accessible as a privileged constituent, and its -a FV cannot be targeted, as shown below because reduplication happens before the exponents of higher TAM morphemes get expressed:

(13) Movement to higher projections

```
NegP (3)
   /
  /  \\
TP (2)  AspP [fundafunda]
   /   /
(a(w)ufundafund-i)
   /   /
  u-fundafunda
```

Descriptively, tacking the final -a onto a reduplicant is a means of making the reduplicant a well-formed disyllabic verb stem without including any exponents of the pre-stem inflectional material– pre-stem material that also manifests itself in the final vowel in (10) and (12). As first pointed out for Kinande by Mutaka and Hyman (1990), and later formalized in work on Swati by Downing (1997), -a is a final vowel “par excellence,” and as a default verbal ending lacking any inflectional features, it can appear on a reduplicant to satisfy well-formedness requirements.
However, in the analysis presented here, reduplication is a copying operation that only has access to a phonological string (Rackowski 1999). What’s important about this proposal is that reduplication is argued to be a phonological process that interacts only with phonological objects, and that it is not a phonological process that “sees,” or is sensitive to morphological features. In DM, it is not possible to claim that the -a is found on the reduplicant because it is a verb, or an “instance of a verb stem” (Inkelas and Zoll 2005, Downing 2006). If an -a is on the reduplicant, there must be a morpheme realized as -a somewhere in the underlying structure that is present at some point during the course of the derivation, even if it ultimately deletes, or more accurately, is overwritten by the phonological exponents of morphemes that are higher in the structure, and are sent to PF on a subsequent cycle of spell-out.

The tension between syntactically high TAM morphemes and the final vowel is a key component of any analysis of Nguni reduplication. What’s proposed in this section is that, in all cases, there is a low FV morpheme that always undergoes VI to emerge as an -a, and that this -a can be overwritten later in the derivation by TAM morphemes that are above the RED morpheme. This process is illustrated in the derivation of (12b) that is sketched out below:
(14) Derivation of \( u-[\text{fund-a+fund-e}] \) ‘you did a bad job studying’ (12b)

Under the T head associated with the past morpheme, the phonological realization of this morpheme is a readjustment rule (RR), which changes the final vowel of the \( \text{RED}^+\text{base} \) constituent from \(-a\) to the \(-e\) that marks the recent past. When the \( \nu \text{P} \) is sent to PF, it is realized as \(-\text{fund}-\), and the subsequent cycle is run at the AspP which is headed by the \( \text{RED} \) morpheme responsible for reduplication. Just as we saw for (7), Vocabulary Insertion and linearization produce:

(15) Spell-Out and PF operations on AspP:

Vocabulary Insertion and linearization: \([\alpha\sigma]-\text{fund-a}\)

Mapping to template: \(-\text{fundafund-a}\)

Neither of the higher T heads are cyclic (Embick 2010), so the remaining structure that hierarchically dominates the AspP is subject to a single cycle of spell-out. The past morpheme triggers a readjustment rule on the final vowel of the full \( \text{RED}^+\text{base} \) complex such that \([a] \rightarrow [e]\), but the final vowel of the reduplicant cannot be targeted. The 2SG morpheme is realized as \( u-\).
Buell (2005) addresses the fact that the final vowel looks like it is “overwritten” (footnote 30, p.102) but does not go into any detail as to how the mechanics of the process might work.\(^4\) The claim here is that the “default verbal -a” which has long been recognized in analyses of Bantu reduplication for languages like Kinande (Mutaka and Hyman 1990, Downing 2000), Kikuyu (Peng 1992, Downing 1999), Shona (Beckman 1998), Swati (Kiyomi and Davis 1992), and most importantly, Ndebele (Hyman et al. 2009) is the phonological realization of an FV morpheme that attaches low in the syntactic structure underlying the verb complex.

The derivation for \(u-[\text{fund}-a+\text{fund}-e]\) shows that at the point when the AspP containing RED is sent to PF, it does not “see” the T (perfective) morpheme whose effect is to re-write the FV from -a to -e. When it is time for the T/perfective morpheme to undergo VI, the reduplicant has been closed off. Essentially, it is not surprising that the exponents of the higher TAM morphemes are realized on the base and not on the reduplicant, since the RED+base relationship is not accessible to the grammar once the reduplicative template has been filled. The final vowel mismatch is not a mismatch between the reduplicant and the base, but instead between the reduplicant and the RED+base complex as a whole.

After the copying operation of reduplication has taken place the result is a disyllabic constituent that docks at the left edge of the verb stem. The “final vowel” on RED is simply a phonological copy of the -a present on the base, the -a that is present before higher TAM morphemes are spelled-out. At the point these morphemes, like the

\(^4\) Buell mentions a FV being overwritten in the context of negative forms with a FV of -i, but the basic pattern is the same for the recent past case discussed here.
negative or subjunctive, *do* get spelled-out, RED is just the first two syllables of the verb stem; it is not a morphosyntactic object that is somehow in correspondence with the base.

In addition to making sense of the reduplicative phenomena in which we see a mismatch between the FV of RED and the FV of the base, positing a final vowel morpheme that always has a phonological realization as -a helps clarify hierarchical issues with the structure of Bantu verbs given in (11). In many cases the content of the final vowel is determined by morphemes occurring in the pre-stem domain, however, it is bracketed with the stem. This is resolved by the analysis proposed in this section: there is an FV morpheme found in the position shown in (3) (and (11)), and it is always spelled out as -a, but can be overwritten depending on the morphemes present higher in the structure.

2.4 Default -a as phonological realization of v head

For CVC roots, the analysis of the default verbal final vowel -a as the spell-out of the verbalizing head that attaches to an acategorical root is similar in many ways to the claim presented in the preceding section: that the -a is the spell-out of an FV morpheme. Just as we saw in the argument that -a was the phonological realization of an FV morpheme, if we claim that it is in fact the spell-out of the v head, the presence of mismatches between the FV of RED and the base naturally falls out of the derivation. Under the analysis of -a as an exponent of the v head, it is also a morpheme that is present at an intermediate stage that ultimately ends up getting overwritten by TAM morphemes that structurally dominate RED.
Basically, the only difference (in this context) between the -a as a spell-out of a
dedicated FV morpheme or the v head is how the underlying structure is envisioned; if
we take the -a as the v head, the FV projection is eliminated.

(16) Early cycles in the derivation of a reduplicated verb

The remainder of the derivation involving the higher TAM projections that affect the
quality of the “final vowel” and rewrite -a to -e or -i is the same as laid out for (14). The
-a on the reduplicant cannot be targeted because it is phonologically embedded in the
construction. It is not accessible to the TAM-linked morphophonological readjustment
rules that affect the final vowel of the full RED+base complex.

2.5 Reduplication and extension suffixes

In this section, we will examine how reduplication interacts with verbs containing an
extension suffix, principally the causative -is- and applicative -el-. The term “extension
suffix” is from the Bantuist literature, and is often explained as “derivational” (Hyman et
al. 2009); they are suffixes to the verb root and alter the argument structure of the verb.

The main objective of this section is to relate optionality in the final vowel on the
reduplicant to a more articulated structure containing two v heads; this is shown by
comparing reduplication forms with productive causatives and applicatives with forms
from lexicalized constructions. In the following sections, I will again propose analyses
from both perspectives: based on the -a as a spell-out of the ν head, and as the spell-out of a distinct FV morpheme.

2.5.1 Attempting an analysis with a distinct FV morpheme

Although positing a final vowel morpheme that invariably undergoes VI as -a helps to account for the systematic mismatches between the FV on the reduplicant and “inflectional” FV’s on the base, when a CVC root combines with an extension suffix a new set of issues arise. In Bantu linguistics, the extension suffixes alter the argument structure of a verb either by adding or absorbing an argument. They include the causative -is-, applicative -el-, reciprocal -an-, and passive -w-. Here we will focus on the causative and applicative. Crucially, these morphemes all fall within the semantic scope of reduplication, and structurally we will place them between the verbalizing ν head and the final vowel (following the accepted structure for the Bantu verb given in (11)).

When a CVC root with an extension suffix reduplicates, the final vowel of the reduplicant can be selected either from the initial vowel of the extension suffix or the FV morpheme itself, in which case we see a final -a on the reduplicant:

(17)a. \[-cul\text{-}is\text{-}a \rightarrow -cul\text{-}i+cul\text{-}is\text{-}a\]  \quad OR  
\text{sing-CAUS-FV}  
\quad -cul\text{-}a+cul\text{-}is\text{-}a

b. \[-hamb\text{-}el\text{-}a \rightarrow -hamb\text{-}e+hamb\text{-}el\text{-}a\]  \quad OR  
\text{walk-APPL-FV}  
\quad -hamb\text{-}a+hamb\text{-}el\text{-}a

\[\text{5 The behavior of the passive is somewhat more involved, and will be discussed separately in Chapter 5.} \]
\[\text{6 The pre-stem material is lumped under TP; the hierarchical structure of pre-stem material is more articulated than a “lump” of inflectional material (contra Myers 1998), and this is discussed in the following chapter on the behavior of prefixal material under reduplication.} \]
(18) Structure for both reduplications in (17a)

```
AspP
  Asp⁰
    RED
      stem
        extended root
          \\ROOT
            cul
          \v
            CAUS
              -is-
          \FV
            -a
```

Semantically, the RED morpheme scopes over the extension suffixes, (17a,b) mean “do a bad job of making someone sing” and “do a bad job of walking for someone”, respectively, meaning we can be confident of the structure in (18), at least in that the RED morpheme scopes over the causative. Furthermore, since there is no change in the meaning based on whether the reduplicant ends in the default -a or the vowel from the extension, the same structure should underlie the (a) and (b) options, the variation must come from the interaction of the underlying structure with the PF component.

However, based on this structure, it is unexpected that we should ever see reduplications with the final vowel -a, since it is not structurally adjacent to the root, nor is it linearly adjacent to the root after the structure undergoes VI and is linearized. In (18), the null verbalizing morpheme (v) is replaced by a causative v head, -is- (the same holds for the applicative morpheme -el-, it is also a v head) (Marantz 2001, p.5). The intuition for some researchers (at the heart of Downing (2003, 2006)) is that the reduplicant is an instance of a verb stem “in its own right”, and that reduplication is stem-stem compounding (related to Inkelas and Zoll’s morphosyntactic doubling theory that is discussed in Chapter (3)). Under this view, the reduplicant can always bear an FV of -a

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7 The readings with the reverse scopings are unavailable, cul-a+cul-is-a *“make someone do a bad job of singing,” and *hamb-a+hamb-el-a *“walk badly for someone’s benefit.”
because the reduplicant is always a verb stem (and if the vowel from the extension suffix appears, they argue that a constraint PARSEExt outranks PARSEFV).

Although there is certainly a basis in arguing that -a is the “default” verbal ending (Grégoire (1979) claims that -a was added to verbs that lacked an “inflectional” ending), it is important to understand what underlies its “default” nature— the argument advocated in this section is that it is a spell out of the FV morpheme that is present in every verbal structure. Working within DM, it is not possible to say that the -a is tacked on to the end of the reduplicant because of its status as a verb stem. This is because reduplication is interpreted as a copying operation that does not have access to morphosyntactic structure; i.e., when the RED template is being filled, it does not “know” that the phonological material that is being copied is material from a verb. There are a handful of options as to how to resolve the variation in DM if we retain the idea that the -a is a spell-out of an FV morpheme, though none seem especially compelling.

The first is to claim that, optionally, a non-root morpheme cannot be included in the reduplicant unless all of its segmental content fits into the template.\(^8\) If this requirement is in effect, and cul-is-a is being mapped to a disyllabic template and only the [i] of -is- will fit, if the full morpheme is required, the causative will be skipped and the FV -a included instead. Another possibility is to claim that the underlying structure in (18) is not in fact correct, and that the correct one has the FV attaching closer to the root than the causative suffix:

---

\(^8\) This is a version of the Morpheme Integrity Constraint from Kinande (Mutaka and Hyman 1990).
From other constructions in the language, we do have concrete evidence of mismatches between the underlying order of suffixes and their surface order. For example, the causative must always precede the applicative, regardless of the underlying structure and scope interpretation.9

9 An especially striking example of this phenomenon (detailed in Hyman et al.) is found with applicativized passives and passivized applicatives; it is discussed in the case studies chapter (Chapter 4).

Although it is difficult to disentangle the meanings related to the different scopings, when CAUS \(\gg\) APPL, someone is being made to study, and the studying itself is to someone's benefit, whereas when APPL \(\gg\) CAUS, the actual causing of studying (rather than the studying itself) is to someone's benefit.
would need to adopt the structure in (19); that at some point in the derivation -cul-is-a is
cul-a-is, and is then re-ordered to what we see on the surface. This claim is especially
suspicious with a morpheme that is supposed to be “final”. However, in the following
section we will look at some data that strongly seem to indicate that the optionality in
selecting the final vowel of the reduplicant from the extension suffix or the default verbal
FV -a is directly related to the presence of two cyclic v heads in the structure.

2.5.2 Reduplication and productive vs. “lexicalized” suffixes

The meanings of the examples in (17) are clearly compositional: -cul- is a root meaning
‘sing’, and it combines with the causative suffix -is- yielding a meaning of ‘cause to
sing.’ However, certain constructions can have a lexicalized meaning in the sense of
Wasow (1977), which argues that an idiomatic meaning indicates a construction has been
formed in the lexicon rather than the syntax. When a lexical causative or applicative
reduplicates, the reduplicant must copy the vowel from the extension suffix rather than
the default -a. In (a), the form with the compositional meaning is given, and the idiomatic
form is in (b):

(21)a. i. -hamb-is-a ‘make leave’  →  -hamb-i+hamb-is-a OR
  leave-CAUS-FV
                                -hamb-a+hamb-is-a
    ii. -hamb-is-a ‘purge’      →  -hamb-i+hamb-is-a ONLY
                                      * -hamb-a+hamb-is-a

b. i.  -lal-el-a ‘sleep for’  →  -lal-e+lal-el-a OR
    sleep-APPL-FV
                                    -lal-a+lal-el-a
    ii.  lal-el-a ‘listen’       →  -lal-e+lal-el-a ONLY
                                      * -lal-el+lal-el-a
This pattern is clearly reminiscent of *sase* causatives in Japanese (Miyagawa 1984, Harley 2006), which can be either lexical (idiomatic) or syntactic (compositional and taking a full clausal complement). In her analysis, Harley writes that her aim is to “unify the lexical and syntactic causatives by treating them both in the syntax” (p.23). She proposes two distinct structures, the difference between them being the presence of a single v head in the “lexical” causative, and two v heads for the syntactic one ((36), p. 31). As in Japanese, a single surface form—the causative suffix *-is*- can be tied to two different structures; phonological identity ≠ syntactic identity. Diachronically there was another causative suffix which caused spirantization of the root-final consonant, *vuk-* ‘awake’ vs. *vus-* ‘wake someone up’ which acts as a transitivizer, meaning that it produces lexical causatives. Synchronically, the only productive causative suffix is *-is-* , and the diachronic component is discussed more extensively in (5.5).

On analogy with what Harley proposes for Japanese, the two structures for the Zulu idiomatic (a) and compositional (b) causatives and applicatives are given below, illustrated with the two *-hamb-*:  

\[
\begin{align*}
\text{c. i. } & \text{ ling-is-a ‘help try’} \quad \rightarrow \quad \text{ling-i+ling-is-a} \quad \text{OR} \\
& \text{try-CAUS-FV} \quad \text{-ling-a+ling-is-a} \\
\text{ii. } & \text{ling-is-a ‘imitate’} \quad \rightarrow \quad \text{ling-i+ling-is-a} \quad \text{ONLY} \\
& \text{ ONLY} \quad \text{ling-a+ling-is-a}
\end{align*}
\]

---

\footnote{Based on Marantz’s (1998), (2007) analysis of Chichewa data detailing the interaction of the passive and stative presented in Dubinsky and Simango (1996). The idiosyncratic “lexical” meanings associated with the stative are tied to a structure in which the stative is close to the root (Embick 2004).}
Notice that neither of the structures in (22) contain an FV morpheme, since positing an FV morpheme that gets spelled out as -a is incompatible with the reduplication data from (17). If we pursue the idea introduced in section (2.4.2), that the phonological realization of the (non-causative) v head is -a, we could then use a process of “structural readjustment” to derive each of the reduplications in (b). Embick and Noyer (2001) describe local dislocation as:

(23) The Local Dislocation Hypothesis (Embick and Noyer (2001), (16), p. 566)

If a movement operation is Vocabulary sensitive, it involves only string-adjacent items.

Basically, if the initial output of spell-out is: -hamb-a-is, the operation of local dislocation switches the position of the causative and the v head, and this process could be freely ordered with respect to reduplication. It is important to note that Local Dislocation takes place subsequently to Vocabulary Insertion, such that the constituents being moved are morphemes and not abstract feature bundles.

(24)a. Deriving -hamb-a+hamb-is-a from (22b):

Vocabulary insertion and linearization on first vP cycle: -hamb-a
Vocabulary insertion and linearization on second vP cycle: -hamb-a-is
VI and linearization triggered by RED: [oo]-hamb-a-is
Mapping to template: -hamb-a+hamb-a-is
Local Dislocation: \(-hamb-a+hamb-is-a\)

b. Deriving \(-hamb-i+hamb-is-a\) from (22b)
   Vocabulary insertion and linearization on first \(vP\) cycle: \(-hamb-a\)
   Vocabulary insertion and linearization on second \(vP\) cycle: \(-hamb-a-is\)
   VI and linearization triggered by RED: \([\sigma\sigma]-hamb-a-is\)
   Local Dislocation: \([\sigma\sigma]-hamb-is-a\)
   Mapping to template: \(-hamb-i+hamb-is-a\)

Even if we concede that this account works for (22b), the situation with (22a) is not resolved. Although proposing a root-attached causative explains the reduplication data, in that the causative will necessarily appear adjacent to the root, we do not have an explanation for the \(-a\) that is also found in this construction. Despite the fact that it cannot appear on the reduplicant for the lexicalized causatives and applicatives, it is found on the full verb complex, as shown in the examples in (21). The question is, what is the source of the \(-a\) on verb complexes that contain a lexicalized causative or applicative suffix? It is clearly related to the constituent being a verb, and it cannot be an epenthetic segment, since Nguni languages use \((y)i\)- for this purpose (as is discussed at length in Chapter (3) on prefixal material). It is difficult to justify adding another \(v\) head outside the causative in (22a), since there is nothing about the behavior of the lexicalized constructions to indicate the presence of two \(v\) heads (aside from the default \(-a\) that is the final syllable in the verb complex).

It is potentially possible to attempt an argument that involves all \(v\) heads being realized with a final \(-a\):
(25) Morphemes | Phonological Realization
---|---
v | -a
v-CAUS | -isa
v-APPL | -ela
v-PASS | -(i)wa
v-RECIP | -ana

However, we know that suffixes can co-occur with one another, as with the causativized applicative and applicativized causative in (20), but we don’t see two -a’s in such constructions; the string surfaces as -is-el-a, and not as *-is-a-el-a. Under this scenario, we could claim that the -a deletes unless it is final in some defined domain. It cannot simply delete if not word-final, because of course we need to make sure it is preserved on reduplicants. Little work has been done on Nguni compounding, but Koopman (1979) gives examples of compound nouns with a V+N structure in which the final -a on the verb is retained (Koopman p.75):\(^\text{12}\)

(26) a. isi-qopha-muthi ‘woodpecker’ → -gopha ‘chop’ + umuthi ‘tree’
b. in-dlula-mithi ‘giraffe’ → -dlula ‘surpass’ + imithi ‘trees’
c. in-dla-nkumbi ‘stork’ → -dla ‘eat’ + inkumbi ‘locust’
d. i-bheka-nkosi ‘royal guard’ → -bheka ‘watch’ + inkosi ‘king’

If the structure/position of the verb in these compounds is somehow analogous to the reduplicant in the RED+base complexes, it would constitute considerable support for the Vocabulary Items corresponding with the different types of v heads given in (25).

\(^\text{12}\) Interestingly, Koopman contrasts the compound nouns with names, and the clear pattern from nouns is that the final vowel from the verb is retained while the initial vowel of the noun is deleted, and it is the exact opposite for names: the final vowel from the verb is deleted and the initial vowel from the noun is preserved, e.g. uBhekinkosi “have regard for the lord” (a man’s name) with (d) ibhekankosi which is a common noun.
2.5.3 A cline of productivity and idiomaticity in causatives

In (21), there is a clear distinction between the reduplication options available for extension suffixes that combine with a root to yield a semantically compositional form, and those that yield a semantically unpredictable form. This difference was explained by proposing a structure for the former in which a \(v\) head intervenes between the CAUS morpheme (also a \(v\) head), and for the latter, a root-attached CAUS morpheme. However, the “productive” causatives were not just productive, they were also “high” (in the sense of Pylkkänen 2001 and McGinnis 2001, where a high applicative takes a verbal complement and a low applicative takes an NP complement). The “high” vs. “low” distinction has a structural component, but syntactico-semantically, in a high causative there is an agent argument available for the causativized verb, and a high applicative denotes a relationship between an event and an individual, rather than two individuals.

Each of the productive examples in (21), applicative or causative, satisfies the “high” criterion, but there are a number of root+extension suffix combinations that are compositional (more or less), but do not meet the syntactico-semantic requirements of a high applicative or causative. The reduplication facts from constructions of this type are not as straightforward as the dichotomy in (21) (in the examples below, high causatives are labeled (H)). The (ii) examples are neither high nor genuinely idiomatic, and all can reduplicate with the vowel from the extension, but the judgments for the (ii) alternants, which are semi-compositional, are more muddled:
Unlike the “lexicalized” causatives in (21), the examples in (ii) are not truly idiomatic, but nor are they truly compositional.\(^\text{13}\) Currently, I have examples from two constructions that show a three-way distinction between i) compositional/productive (high), ii) intermediate between compositional and idiomatic, and iii) idiomatic:

\(^\text{13}\) Additionally, there are many examples of the causative simply acting as a transitivizer, making a transitive verb out of an intransitive. Since this is the distinguishing behavior of a lexical causative, the examples below show that the causative suffix is often root-attached. :

i. `-suth-a` ‘be full’ -`suth-is-a` ‘satisfy (v.t.)’

ii. `-sind-a` ‘be heavy’ -`sind-is-a` ‘overload’

iii. `-qond-a` ‘be straight’ -`qond-is-a` ‘correct (v.t)’

iv. `-pheph-a` ‘be safe’ -`pheph-is-a` ‘rescue’

Unfortunately, I do not have data on how these forms reduplicate, although it is certainly a worthwhile project for future research.
If the (i) forms contain two v heads– a root-attached v and an outer causative, and the (iii) forms contain a single root-attached causative v, the question remains: what is the status of the (ii) forms? Since their meaning is intermediate between compositional and idiomatic, I claim that speakers are ambivalent about their structural analysis as well.

The variation attested in the grammaticality judgments of the (ii) options (i.e. inter- and intra- speaker variation in whether the -a final reduplicates are acceptable), is related to whether or not speakers’ grammars produce a structure containing one or two cyclic spell-out domains. Or put differently, there is an absence of consensus among speakers as to whether the structure below the aspectual RED morpheme responsible for reduplication contains one or two phases (Chomsky 2000, 2001). This means that there are two structures for -lal-el-a (similar to the structures proposed for the two

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14 Reduplications of sub-minimal roots (roots that are not fully syllabic, CVC) are discussed at length in Chapter 3 on prefixal material. For (28b), it only matters to note that when a root like -dl- ‘eat’ is reduplicated, it can combine with the augmentative empty morpheme -yi- to satisfy the disyllabicity requirement imposed by the RED template.
interpretations of -hamb-is-a in (22)). Speakers who accept -lal-a+lal-el-a as a
reduplication for ‘lie in ambush for’ would have a grammar that produces an underlying
structure like (b), and those who accept only -lal-e+lal-el-a would have a structure as in
(a):\(^{15}\)

(29) a. 

\[
\text{AspP} \quad \text{AspP}
\]
\[
\text{Asp}^0 \quad \text{Asp}^0
\]
\[
\text{RED} \quad \text{RED}
\]
\[
[\sigma] \quad [\sigma]
\]
\[
\sqrt{\text{ROOT}} \quad \sqrt{\text{ROOT}}
\]
\[
lal \quad lal
\]
\[
\text{APPL} \quad \text{APPL}
\]
\[
-el- \quad -el-
\]

2.6 Conclusion

This chapter has outlined an analysis of Zulu reduplication within the derivational
framework of Distributed Morphology. A cycle of spell-out is triggered by \(v\) heads, as
well as by the morpheme responsible for reduplication, an aspectual morpheme labeled as
RED. Two different options for the default verbal final vowel -a are evaluated: 1) it is the
phonological realization of an FV morpheme, and 2) it is the phonological realization of a
\(v\) head, or verbalizing morpheme. Each of the options offers insights into the interaction
of reduplication with underlying morphosyntactic structure, but there are also seemingly
intractable problems that render each, ultimately, unfeasible. The proposal in (25) has the
potential to resolve some of these issues. The intuition there is that the final -a is common
to all verbal endings that are not generated in the prefixal TAM domain, but that it does
not appear twice for a causativized or applicativized verb.

\(^{15}\) Potentially a third option is available as well, one in which the structure contains two \(v\) heads with one
being non-cyclic. This would look like (29b) but the upper \text{CAUS} head would not trigger a cycle of spell-
out.
The behavior of extension suffixes like the causative -is- and applicative -el- is analyzed to show that variation in reduplication is related to the presence of two v heads in the structure below RED. The absence of variation with reduplications of “lexicalized” causatives and applicatives is in turn related to these structures having a single v head. Constructions that are “intermediate” between productive and lexicalized have this “in-betweenness” reflected in reduplication, which is argued to stem from an ambiguity of analysis among speakers between a structure containing one or two v heads.
Chapter 3, Sub-minimal roots and reduplication: The availability of prefixal material, and structural sensitivity

3.1 Introduction

As shown in the previous chapter, reduplication in Zulu and Ndebele consists of a disyllabic constituent prefixed to the verb stem (the part of the verb complex beginning with the root and extending to the right); in the examples, the RED+base complex is bracketed, the constituents are separated by a ‘+’, and tone marked is underlying.

(1) a. \( u\text{-}f\text{únd-a} \) ‘you study’ → \( u\text{-}[f\text{únd-a}+f\text{únd-a}] \) ‘you’re doing a bad job of
2SG-study-FV studying’

b. \( u\text{-}s\text{èbenz-a} \) ‘you work’ → \( u\text{-}[s\text{èbe}+s\text{èbenz-a}] \) ‘you’re doing a bad job of
2SG-work-FV working’

This chapter will focus on cases in which the verb stem alone does not contain sufficient prosodic material to fill the disyllabic template of the reduplicant, and the various strategies employed to satisfy disyllabicity. Broadly, there are two distinct options, either the reduplicant can be augmented with a suffixal \( -yi- \), or a prefixal morpheme is pulled into the reduplicant; this results in an interesting asymmetry that is discussed in Section 3.6, with augmentation on the right (2a) and circumscription or incorporation on the left (2a,c).

(2) a. \( u\text{-f\text{à}} \) ‘you die’ → \( u\text{-}[f\text{à}-yi+f\text{à}] \)
2SG-die

b. \( u\text{-ya-f\text{à}} \) ‘you die (phrase final)’ → \( u\text{-}[f\text{à}-yi+f\text{à}] \) OR
2SG-LF.PRES-die \( u\text{-}[ya-f\text{à}+ya-f\text{à}] \)
We will see that, in Zulu, a range of prefixal morphemes are available to be pulled into the reduplicant, augmenting the previous literature on Zulu reduplication (Downing 2009), and revealing an important difference between reduplication in Zulu and Ndebele, in which the only prefixal morpheme allowed to reduplicate is the object marker (Sibanda 2004, Hyman et al. 2009), shown in (2c).

This finding challenges the notion that the Macrostem, the constituent consisting of the object marker and everything to its right, is a privileged morphosyntactic object that is referred to under reduplication in Zulu. The process of local dislocation (Embick 2007) provides an explanation for how many morphemes immediately to the left of the root reduplicate without reference to the Macrostem, or classes of prefixal morphemes. Discussed in section 3.5, local dislocation operates on a structure in which the reduplicative template originates in a linear position between prefixal material and the stem. However, under certain conditions of prosodic sub-minimality, the template can “switch positions” with a prefixal morpheme so that it is copied to the template along with the stem.

Finally, a key distinction in this chapter is made between prefixal morphemes that are included as fully syllabic pieces vs. those that are included by virtue of processes of syllabification (as in Odden and Odden 1985, Odden 1993, 1996, Marlo 2011). Interestingly, we will see an example from negation showing that even in cases where morphemes are simply pulled in as a result of syllabifying with the verb stem, sensitivity to morphosyntactic structure is still evident.
3.2 Reduplication of sub-minimal roots with -yi- and the internal structure of the verb complex

The familiar examples in (1) show that if a verb stem consists of minimally two syllables, the reduplicant will begin with the first segment of the verb stem/root. However, if the stem is not fully disyllabic (referred to as “sub-minimal”), the reduplicant must necessarily include material that is drawn from a source outside the verb stem. The most widely reported method of achieving disyllabicity is to use the empty augmentative morpheme -(y)i- which is found in other areas of the grammar as well (for Zulu and Ndebele, also Swati in Downing 1999, Kiyomi and Davis 1992, Ziervogel 1952, and Xhosa in Cassimjee 2001):

(3) a. *u*-dl-á ‘you eat’ → *u*-[dl-á-yi+dl-a]
b. *ngi*-f-á ‘I die’ → *ngi*-[f-á-yi+f-a]
c. *u*-enz-a ‘you make’ → *w*-[enz-a+y-enz-a]
d. *ngi*-akh-a ‘I build’ → *ng*-[akh-a+y-akh-a]

Looking to other constructions, this -yi-, -y- alone before VC roots in (c) and (d) (Itô 1989), is also used to satisfy a disyllabicity requirement in the imperative.\(^{16}\) In this construction, the verb stem is used without any accompanying prefixal material; the initial y- in (c–f) is optional. The examples in (c,d) show that -yi- is not specific to the imperative, but is part of a larger pattern in the grammar of satisfying minimality requirements when the underlying segmental content is insufficient:

\(^{16}\) It is not clear whether the -yi- and -y- are in fact the same morpheme, but they are discussed together here since both are prosodic repairs associated with sub-minimal roots under reduplication, C and VC respectively.
Since we will be discussing the behavior of prefixal morphemes under reduplication, we will take another look at the underlying structure of the (Southern) Bantu verb which is generally assumed in the literature, and is also given in Chapter 2. It is outlined in Meeussen (1967), and detailed in Myers (1987), Hyman and Mtenje (1999), and Downing (2001a):

(5) Internal Structure of Bantu Verbs

\[\text{Verb complex} \rightarrow \text{INFL} \rightarrow \text{Macrostem} \rightarrow \text{object marker} \rightarrow \text{stem} \rightarrow \text{extended root} \rightarrow \text{root} \rightarrow \text{extension suffixes} \rightarrow \text{final material}\]

This figure shows that the object marker has been given special status over the other prefixal morphemes, which are collectively lumped under an INFL node. As used in the Bantuist literature, this single INFL node is not intended to indicate that there is no order among the non-object marker morphemes that occur in the prefixal domain, but rather that they constitute a class apart from the object marker. Myers (1998) argues for

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(4) a. bhâl-a ‘write!’ b. câbang-a ‘think!’
c. (y)i-dl-á ‘eat!’ d. (y)i-mb-a ‘dig!’
e. (y)-akh-a ‘build!’ f. (y)-ehl-a ‘climb down!’

17 Although the method in (3) is the most common way of forming imperatives from sub-minimal roots, Doke and Sibanda write that another option to augment the stem with a suffixal -na (dl-a-na, m-a-na), an empty morpheme which is used to render absolute pronouns disyllabic. (Schladt 1998)

i. w-a-mi ‘mine (cl. 6)’ cf. mi-na ‘me’, ‘as for me (contrastive)’
ii. l-a-bo ‘theirs (cl. 11)’ cf. bo-na ‘them’, ‘as for them’
an INFL-stem that selects for a verb stem, and though more recent syntactic work treats
the inflectional domain as nested hierarchical projections, the idea that INFL represents a
chunk of structure has persisted, largely for notational convenience. However, based on
the Zulu data regarding the different behavior of prefixal morpheme vis à vis
reduplication, there is hierarchical structure along the lines of (6), though we will see in
Chapter 6 that the prefixal domain is important for patterns of tone spreading.

(6) Revised figure showing hierarchy within INFL, based on data from reduplication

The logic behind the presence of two -ku-morphemes is outlined in 3.6
(infinitive and future). This figure is not intended as a formal syntactic analysis
(see Buell 2005, Halpert 2012), but as a framework for the order of prefixes in
the prefixal domain.

With this structure in mind, we will move on to the data involving reduplication of
prefixal morphemes.

3.3 Reduplication of object markers in Ndebele

the only morpheme that had been reported as eligible to participate in reduplication was
the object marker (Hyman et al. 2009, Hyman 2009b, Downing 2009). However, new
data collected from Zulu speakers reveal that there are a number of prefixal morphemes which can appear in the reduplicant, challenging the notion that the Macrostem is a meaningful constituent in reduplication, contrasting with the findings for Ndebele presented in Sibanda (2004) and Hyman et al. (2009).

Although there are speakers who permit only the object marker to reduplicate (and the validity of these judgments is without question), the data presented here argue that the object marker is simply the most likely prefixal morpheme to reduplicate because it is structurally closest to the root, and not due to any “qualitative” distinction between object markers and other prefixal morphemes. However, we will see in Chapter 6.5 that the Macrostem is a domain relevant for tonal phenomena, specifically tonal spreading (Kisseberth 1984, Black 1995, Poletto 1999, Zerbian and Barnard 2008), but that it is not privileged under reduplication in Zulu.

The finding that prefixal morphemes outside (to the left) of the Macrostem can participate in reduplication is an important one because it presents a counterpoint to the argument put forward in Hyman et al. (2009), as well as Inkelas and Zoll (2005), that reduplication is a matter of morphosyntactic matching (the traditional template is given in (5)). The crux of the argument presented here is that the constituents that reduplicate in Zulu do not correspond to any constituent that has standing elsewhere in the grammar. Unlike the Macrostem that consists of the om + stem, there are no pre-established constituents that correspond to ya+stem and sá+stem; this finding leads to the conclusion
that reduplication in Zulu is best analyzed as process that interacts with phonological constituents, rather than directly with morphosyntactic structure.\footnote{In a theory like free base generalization (Benua 1997, Steriade 2013), a constituent is any string occurring in speech. Under this analysis, the strings \textit{ya}+stem and \textit{sá}+stem are “constituents”, but the FBG predicts many ungrammatical forms to be grammatical.}

Before turning to the details of the various analyses, we will first introduce the data under discussion. For Zulu and Ndebele, an object marker occurring with a consonantal root can reduplicate– an option that exists alongside the -\textit{yi}- augmentation shown in (3).\footnote{In my fieldwork, I encountered several speakers who rejected reduplications containing -\textit{yi}-, but reduplicated whatever prefix that immediately preceded the root. However, the more typical situation for the speakers I interviewed was to augment a monosyllabic root either by using -\textit{yi}- or by incorporating the root-adjacent prefix. Since this was the more common pattern, it is the “general” grammar of reduplication presented here, though significant divergences will be noted (as discussed in Chapter 1).}

(7) a. \quad \textit{u-ya-zi-dl-a}^{20} \quad \text{‘you eat them (cl.8)’} \quad \rightarrow \quad \text{\textit{u-ya-[zi-dl-á+zi-dl-a]}} \quad \text{OR} \quad \text{\textit{u-ya-zi-[dl-á-yi+dl-a]}} \\
\quad \text{2SG-LF.PRES-OM.8-eat-FV} \quad \text{u-ya-zi-[dl-á-yi+dl-a]}

\quad \text{b. \textit{ngi-ya-bá-zw-a} \quad \text{‘I hear them (cl.2)’} \quad \rightarrow \quad \text{\textit{ngi-ya-[bá-zw-a+ba-zw-a]}} \quad \text{OR} \quad \text{\textit{ngi-ya-bá-[zw-a-yi+zw-a]}} \\
\quad \text{1SG-LF.PRES-OM.2-hear-FV} \quad \text{ngi-ya-bá-[zw-a-yi+zw-a]}

For Hyman et al. and Inkelas and Zoll, when the stems are fully disyllabic, reduplication is a matter of morphosyntactic correspondence between D-stem constituents (Downing 1997, 1999). The D-stem consists of the root plus any extension suffixes– it is labeled the “extended root” in the structure in (5) and (6)– but if the root is sub-minimal, the constituents in correspondence under reduplication can be Macrostems instead of D-stems.

The fact that the Macrostem is a constituent that can be referred to, or “picked out” within the structure of the verb is a critical component of the analyses implemented when a verb contains an object marker (-\textit{zi}-), the verb must appear in its ‘long form’. In the present, the -\textit{ya}- is how the long form, or non-phrase final version, is marked.
within the framework of Inkelas and Zoll’s Morphosyntactic Doubling Theory. That is, if the constituent formed by the object marker and the stem were not already reified as a “legitimate” morphosyntactic/morphophonological constituent within the verb, the argument that the base for reduplication can be expanded to include the object marker would be undermined.

What the new data from Zulu will show in the following section is precisely this, that the Macrostem is not “special” in terms of reduplication, and that the object marker is simply the most likely prefixal morpheme to reduplicate because it is phonologically (and structurally) closest to the root. It is not the case that the object marker reduplicates because the Macrostem is a constituent that can be targeted by the grammar of reduplication, distinct from other prefixal morphemes. Instead, it can reduplicate because it merges early enough in the derivation to be available to RED. In other words, a structural difference attributed to a particular morpheme (the object marker) is explained instead as an ordering effect that depends on structure.

3.4 Prefixal non-Macrostem morphemes permitted to reduplicate

A number of TAM morphemes are found under the INFL node in (5), some of them are allowed to reduplicate, and some are not. In (6) currently, no significant generalization that captures the difference has yet been uncovered. Prefixal material that is available for reduplication in Zulu but not Ndebele includes the present long form/focus marker -ya-, the progressive or “durative” -sá-, and the “two -ku-’s” (infinitival and future). Crucially, no morpheme that precedes either -ya- or -sá- can reduplicate before consonantal roots, showing that there is a surface component of linear adjacency that is important.
The exact nature of the distribution of -\textit{ya-} has been discussed in detail elsewhere (van der Spuy 1993, Buell 2005, 2006, Voeltz 2004); some have claimed it is an aspectual distinction (Botne and Kershner 2000), and others contend it is connected to focus— that when no other element is focused, default focus is assigned to the verb (Sabel and Zeller 2006).\footnote{The equivalent of -\textit{ya-} in the perfect, -\textit{il-} is discussed in depth in Chapter 4.2} For our purposes, it is sufficient to say that -\textit{ya-} occurs on affirmative present tense verbs to signal they are final in some XP; for Zulu, but not Ndebele, -\textit{ya-} is permitted in the reduplicant.

\begin{align*}
(8) & \text{a.} \quad u\text{-}ya\text{-}dl\dot{a} \quad \text{‘you eat’} \rightarrow u\text{-}[ya\text{-}dl\dot{a}\text{-}ya\text{-}dl\text{-}a] & \text{✓Zulu, *Ndebele} \\
& \quad u\text{-}ya\text{-}[dl\dot{a}\text{-}yi\text{+dl}\text{-}a] & \text{✓Zulu, ✓Ndebele} \\
& \text{b.} \quad b\text{á}\text{-}ya\text{-}mb\text{-}a \quad \text{‘they dig’} \rightarrow b\text{á}\text{-}[ya\text{-}mb\text{-}a\text{+ya\text{-}mb\text{-}a}] & \text{✓Zulu, *Ndebele} \\
& \quad b\text{á}\text{-}ya\text{-}[mb\text{-}a\text{-}yi\text{+mb}\text{-}a] & \text{✓Zulu, ✓Ndebele}
\end{align*}

As we saw in (7), when -\textit{ya-} co-occurs with an object marker, -\textit{ya-} is to the left, and in such constructions the -\textit{ya-} is unavailable for reduplication because the object marker is closer to the root.

\begin{align*}
(9) & \quad u\text{-}ya\text{-}zi\text{-}dl\dot{a} \quad \text{‘you’re eating them’} \rightarrow u\text{-}ya\text{-}[zi\text{-}dl\dot{a}\text{+zi\text{-}dl}\text{-}a] \\
& \quad \text{✓} u\text{-}zi\text{-}[ya\text{-}dl\text{-}a\text{+ya\text{-}dl}\text{-}a]
\end{align*}

There is also an aspectual morpheme -\textit{sá-} meaning ‘still’ or ‘yet’ that can also reduplicate in Zulu, but not in Ndebele. It is in complementary distribution with -\textit{ya-}; like -\textit{ya-} it is to the left of an object marker if one is present. It is for this reason that they are placed in the same position in the tree in (6). They also pattern together because neither can co-occur with any additional inflectional morphology. Verb complexes on which
either is present only ever show the default final vowel -a, and no additional prefixal TAM marking, negation, irrealis, subjunctive, past, etc., is present either (although this may seem to indicate that both -ya- and -sá- are aspectual, -ya- is in fact a marker of the verb’s position in a syntactic frame).

\[(10)a. \quad u-sá-dl-á \quad \text{‘you’re still eating’} \quad \rightarrow \quad u-[sá-dl-á+sa-dl-a] \quad \checkmark \text{Zulu, *Ndebele}
\]

\[u-sá-[dl-á-yi+dl-a] \quad \checkmark \text{Zulu, Ndebele}\]

\[b. \quad bá-sá-lw-a \quad \text{‘they’re still fighting’} \quad \rightarrow \quad bá-[sá-lw-a+sa-lw-a] \quad \checkmark \text{Zulu, *Ndebele}
\]

\[bá-sá-[lw-a-yi+lw-a] \quad \checkmark \text{Zulu, Ndebele}\]

Constructions like those in (8) and (10) pose a problem for the morphosyntactic doubling account because, unlike examples where the object marker is pulled in, there is no pre-identified/pre-existing constituent in the verb that consists of the present long form marker plus the root, or the durative aspectual marker plus the root. Essentially, when prefixal material is pulled into the reduplicant, the Macrostem is essentially voided because everything internal to the RED+base complex is treated as part of the verb stem (as in Downing 2003, which treats reduplications as compound verb stems). Only when the object marker is not pulled into the reduplicant does the Macrostem still exist in a reduplicated verb. In Chapter 6, we will analyze tonal data that further support this claim.

3.5 Local Dislocation in reduplication of sub-minimal roots

The model proposed here differs from morphosyntactic doubling theory in that reduplication is treated as an operation that interacts with phonological objects, and not directly with morphosyntactic structure. That is, morphosyntactic objects are only accessible indirectly through their phonological realization, as opposed to MDT where it
is morphosyntactic objects that are manipulated under reduplication. Based on semantic considerations, the position of the RED morpheme in the underlying structure is argued to be immediately outside the “extended root” in (5) and (6). Its meaning scopes over any extension suffixes that may be present, but its relationship to prefixal material, specifically object marking and TAM markers like -ya- and -sá- is somewhat more difficult to assess.\footnote{For a reduplication like ngi-ya-wá-thánd-a ‘I love them (cl.6)’ → ngi-ya-wá-[thánd-a+thand-a], it is impossible to distinguish between a reading in which the reduplicative semantics scopes over the object marker and one in which it doesn’t. For reduplications containing -sá-, the scope relations are fortunately clearer to understand: take u-sá-fínd-a ‘you still study’ → u-sá-[fínd-a+fund-a], the meaning is ‘you’re still doing a bad job of studying’ and not ‘you’re doing a bad job of still studying’. The semantics laid out in this footnote are the same whether or not the object marker or durative aspectual morpheme appears in the reduplicant with a sub-minimal root.} Since in the default case, when the root is fully syllabic (like -fínd- ‘study’, -thánd- ‘love’), the reduplicant copies as much of the root as possible, it is reasonable to assume that the RED morpheme attaches closer to the root than any of the prefixal morphemes under discussion, including object markers.

For a construction like u-ya-zí-dll-á, we have seen there are two possible reduplications: one in which the object marker appears in the reduplicant, and one in which the sub-minimal root is augmented with the empty morpheme -yi-. The basic intuition at work is that if reduplication happens right away, we get a -yi- variant, and if the process waits, we get the variants containing prefixal morphemes; this is laid out in (13).

Each begins with the same underlying structure:

\[
\]
In (11) \( v \) is the verbalizing morpheme that takes an acategorical root -\( dl \)- and makes it a verb, since the final vowel does not play a role here, the default -\( a \) will be taken as the phonological realization of the \( v \) head (as outlined in Chapter 2).

(12) Structure underlying both \( u-ya-zi-[dl-a-yi+dl-a] \) and \( u-ya-[zi-dl-a+zi-dl-a] \)

(13) Schematizing the difference between “immediate” and “delayed” reduplication

a) AspP

\[
\begin{align*}
\text{RED} & \quad [\sigma\sigma] \\
\sqrt{\text{ROOT}} & \quad -dl- \\
\quad vP & \quad v \quad -a
\end{align*}
\]

b) AgrOP

\[
\begin{align*}
\text{RED} & \quad [\sigma\sigma] \\
\sqrt{\text{ROOT}} & \quad -dl- \\
\quad vP & \quad v \quad -a
\end{align*}
\]

The only material that is phonologically available to the \text{RED} template in (a) is the stem -\( dl-a \); if filling does not wait until structurally superior material has also been sent off to the phonology, we see augmentation with -\( yi- \). However, if reduplication does not take place immediately, other morphemes like the object marker -\( zi- \) can appear in \text{RED}, provided local dislocation applies.
(14) Deriving $u$-$ya$-$zi$-$[dl$-$a$-$yi$+$dl$-$a]$ from (10):

Vocabulary insertion and linearization of $vP$: -$dl$-$a$

VI and linearization triggered by $\text{RED}$: $[\sigma\sigma]$-$dl$-$a$

Mapping to template: $[dl$-$a$ $\sigma]$+$dl$-$a$

-$yi$- rescue: $[dl$-$a$-$yi]$+$dl$-$a$

Final cycle (none of the other morphemes are cyclic/trigger spell-out): $u$-$ya$-$zi$-$[dl$-$a$-$yi$+$dl$-$a]$}

In (14), the assumption at the fourth step is that if template-filling is initiated before sufficient prosodic material has undergone VI, -$yi$- can be called upon to “save” the derivation. Rather than crashing, the template is satisfied with augmentation of the freely available empty morph -$yi$-.

In order to derive $u$-$ya$-$[zi$-$dl$-$a$+$zi$-$dl$-$a]$, we will need to implement a rule of local dislocation, as proposed in Rackowski (1999), and formalized in Embick (2007), and it has the effect of prosodic cirumscription (Lombardi and McCarthy 1991, McCarthy 2000). Local dislocation involves the movement of elements that are linearly adjacent to each other; this process necessarily occurs after the hierarchical structure has been linearized. As introduced in the first part of this chapter, it is how $\text{RED}$ $X$ $Y$ $Z$ becomes $X$ $\text{RED}$ $Y$ $Z$. Embick (2007) defines it as a “postsyntactic movement under adjacency…” Formally, the operation is one of adjunction under adjacency” (p. 13).

To understand how the process of reduplication is different when prefixal material appears in $\text{RED}$, I follow Rackowski (1999) in schematizing the morphemes/Vocabulary Items involved as $X$ $Y$ $Z$. When a verb stem ($Z$) is minimally CVC-$a$, the reduplicant is prefixed to the root and copies material from its right: $X$ $Y$ $\text{RED}$ $Z$. However, when $Z$ is sub-minimal ($-dl$- ‘eat’, -$ph$- ‘give’), there are two options for $\text{RED}$’s alignment within
this string. It can either stay in its natural, default position, in which case the reduplicative template will be filled out by the empty augmentative morpheme -yi-, or the reduplicant can be realized in a different position, and include material that it does not scope over, that is, morphemes that attach outside RED appear in the reduplicant. In these cases, RED can be represented as X RED Y Z, and RED copies material from Y as well as Z. Crucially, any reduplication that contains material outside the scope of reduplication alternates with a form consisting solely of material within its scope. This is taken as evidence for an analysis in which reduplication can take place at various points in the derivation, specifically immediately upon the merging of RED and the cycle of spell-out it triggers, or at a later point, at which certain morphemes outside the scope of RED can appear in the reduplicant.

The analysis invoking Local Dislocation is predicated on the assumption that the template does not need to be filled at the moment it undergoes Vocabulary Insertion, but can wait until a later point in the derivation. Crucially, local dislocation feeds reduplication, and can be formalized as a rule that is triggered in a certain phonological environment, with Y being the prefixal morpheme that winds up in the reduplicant. When the RED template is followed by a single syllable, local dislocation can apply so that the prefixal morpheme to the left of RED moves to its right, and can then be copied to fully satisfy the disyllabic template.

(15) Local Dislocation in Zulu Reduplication:
Y - [σσ] → [σσ] - Y / Y __ [σ]₁
Deriving $u\text{-}ya\text{-}[zi\text{-}dla+zi\text{-}dla]$ from (12):

Vocabulary insertion and linearization of $vP$: $dl\text{-}a$

VI and linearization triggered by RED: $\sigma\sigma\text{-}dl\text{-}a$

Final cycle: $u\text{-}ya\text{-}zi\text{-}[\sigma\sigma\text{-}dl\text{-}a]$

Local dislocation: $u\text{-}ya\text{-}[\sigma\sigma\text{-}zi\text{-}dl\text{-}a]$

Mapping to template: $u\text{-}ya\text{-}[zi\text{-}dl\text{-}a+zi\text{-}dl\text{-}a]$

The mechanism is the same for reduplicants including $-ya\text{-}$ (and $-sá\text{-}$) where no object marker is present. Under this analysis, there is no qualitative distinction between the object marker and the other prefixal morphemes that can participate in reduplication. The ability of the OM to reduplicate is not tied to it belonging to the Macrostem, but rather its linear position (at the right time in the derivation, after linearization has taken place) as left adjacent to the verb root, and presumably the RED template.

Although local dislocation accounts for a number of the facts involving reduplication of prefixal morphemes, it is important to understand the relationship between the source of the copying and what is being copied onto, as well as how the copying itself works. Copying proceeds left-to-right, and in order for a constituent to be “available” for reduplication, it must be to the right of the template; this holds whether the constituent includes the root + default $-a$ alone, or prefixal material too. In other words, copying works on material to the right of the template, but in cases of sub-minimal roots, the material is brought in from the left. The actual copying process of reduplication is not necessarily crucially ordered with respect to a number of (morpho)phonological rules. We will see this with suffix ordering in 4.4 in the next.

---

23 It’s not clear whether all the prefixal morphemes in this particular derivation undergo VI at once. Neither the object marker, the $-ya\text{-}$, or the subject marker are cyclic, and in this particular example, it doesn’t affect the outcome whether they are inserted one at a time or simultaneously.
chapter, and although it is fed by local dislocation, local dislocation does not apply categorically in all cases where its environment is met. However, once copying is initiated, the RED template simply copies the first two syllables of the phonological string to its right; if this string is monosyllabic, it is augmented with -yi-. In cases when the template has undergone local dislocation prior to copying, the dislocated morpheme will be within the phonological scope of the [σσ] template of RED, and prefixal material will be included in the reduplicant.

3.6 The left-right asymmetry

Local dislocation plays a considerable role in accounting for the left-right asymmetry in reduplication, or a “conscription asymmetry”. The X Y RED Z representation also explains why only material to the left of the root is allowed to reduplicate. We will see a noteworthy asymmetry between the long form prefixal present marker -ya-, and the suffixal long form perfect marker -il-. Both are markers of a verb being final in a syntactic domain, but we have seen that former can reduplicate, and the latter cannot. If we take the RED morpheme to be linearized as a bare template [σσ] in the phonological string of the verb with an instruction to copy from material to its right, it follows that flipping its position with the root would be unattested, since the root is the very constituent targeted by RED. The difference in behavior between prefixal -ya- and suffixal -il- also highlights why reduplication looks more phonological than morphological; although it cannot independently of morphosyntactic structure, the copying at the heart of reduplication is a phonological process.
When the verb is final in a particular syntactic configuration, a long form (also termed disjunctive) marker is required. This morpheme is -\textit{ya}- in the present and -\textit{il}- in the recent past. In (17) long forms are on the left and short, followed by an adverb, are on the right.

\begin{align*}
(17) & \quad u\text{-ya-dl-á} \quad \text{“You are eating”} \quad \text{vs. } u\text{-dl-á kahle} \quad \text{“… well.”} \\
& \quad u\text{-ya-fúnd-a} \quad \text{“You are reading”} \quad \text{vs. } u\text{-fúnd-a kahle} \quad \text{“… well.”} \\
& \quad u\text{-dl-il-e} \quad \text{“You ate”} \quad \text{vs. } u\text{-dl-e- kahle} \quad \text{“… well.”} \\
& \quad u\text{-fund-il-e} \quad \text{“You read”} \quad \text{vs. } u\text{-fúnd-e kahle.} \quad \text{“… well”}
\end{align*}

The morphemes serve the same function, and it would be reasonable (if not required) for them to originate in similar syntactic position and be equally accessible to RED. However, while -\textit{ya}- can reduplicate, -\textit{il}- cannot:

\begin{align*}
(18) & \quad u\text{-ya-dla} \rightarrow u\text{-ya-[dl-a-yi+dla]} \quad u\text{-dl-il-e} \rightarrow u\text{-[dl-a-yi+dl-il-e]} \\
& \quad u\text{-[ya-dla+y-a-dla]} \quad \ast u\text{-[dl-a-il-dl-il-e]}^{24}
\end{align*}

In light of the derivation in (16), the contrast between prefixal -\textit{ya}- and suffixal -\textit{il}- falls out naturally.

\textsuperscript{24} It should be noted that this form is grammatical in mutually intelligible Swati (Ziervogel 1952, p. 82).
(19) Deriving the left-right asymmetry in reduplication

\[
\text{VI \& linearization: } -dl-a \quad \text{VI \& lin. from RED: } [\sigma\sigma]-dl-a \\
\text{VI of LF.PRES and 2SG: } u-ya-[\sigma\sigma]-dl-a \quad \text{u-[\sigma\sigma]-dl-il-e} \\
\text{Local dislocation: } u-[\sigma\sigma]-ya-dl-a \quad *u-dl-[\sigma\sigma]-il-e \\
\text{Map to template: } u-[ya-dla+ya-dla] \quad \text{crashes}
\]

With prefixal material, local dislocation provides another means of reduplicating monosyllabic stems in addition to augmentation with -yi-, however it is blocked from applying productively to suffixal morphemes because doing so misaligns the template and the root. Due to the fact that the reduplicant is a prefix to the stem in Zulu, local dislocation is constrained to apply only with prefixal morphemes. The role of linearity in reduplication emphasizes its position solidly in the phonological component of the grammar; although it is effected by morphosyntactic structure, copying operates on a structure that has been linearized. That is to say, reduplication as a template-filling operation is a process that interacts exclusively with a phonological string.

3.7 Reduplication of -ku- in the future and infinitive

While object markers, -ya-, and -sá- behave fairly straightforwardly under reduplication, there are other morphemes that have a more complicated distribution. One such example is found with the future marker -zo-(ku-), where the interaction of future marking with reduplication of sub-minimals also merits discussion. For fully syllabic roots, the future is formed by prefixing -zo- to the verb root (additionally, the -zo- falls outside the object marker, if one is present), and a form with -ku- is ungrammatical here:
(20)  a. *ngi-zo-phek-a  ‘I will cook’
       b. *ngi-zo-zi-phek-a  ‘I will cook them’
       c. *ngi-zo-ku-phek-a  ‘

However, for roots with a prosodic shape of C or VC, the presence of -ku- is optional, and future marking may appear as either -zo-ku or -zo- alone (there is no difference in meaning) and both are low-toned:

(21)  a. *ngi-zo-dl-á  ‘I will eat’
       b. *ngi-z-enz-a  ‘I will make’
       c. *ngi-zo-ku-dl-á  ‘I will eat’
       d. *ngi-zo-kw-enz-a  ‘I will make’

The forms in (21) (a) and (b) are not permitted to reduplicate with the future marker:

(22)  a. *ngi-[zo-dl-a+zo-dl-a]  ✓ ngi-zo-[dla-yi+dla]
       b. *ngi-[z-enz-a+z-enz-a]  ✓ ngi-z-[enz-a+y-enz-a]

while reduplication of the (c) and (d) forms is perfectly acceptable:

       c. ngi-zo-[ku-dl-a+ku-dl-a]
       d. ngi-zo-[kw-enz-a+kw-enz-a]

Initially, this pattern might seem difficult to account for, but when we look at more data, a fuller picture of the future begins to emerge. The -ku- we see with sub-minimal roots is in complementary distribution with object marking:

(23)  a. ngi-zo-si-dl-a  “I will eat it (the bread)”
       b. *ngi-zo-ku-si-dl-a
       c. *ngi-zo-si-ku-dl-a
The future is transparently derived from the verb -za ‘come’ + the infinitive, which is marked by the prefix uku-, so we have -za+uku- → -zoku-. It is then reasonable to argue that future verb forms are composed of two verbs, an auxiliary consisting of a subject marker + -za and an infinitival main verb from which the infinitival prefix drops off unless it is required for minimality (Givón 1971). Although this is the diachronic source of the future construction, its synchronic status is less clear; at this point, it is more likely that -ku- is now a construction-specific minimality repair.

The -ku- we see with sub-minimal roots behaves similarly to the yi- we see in the imperative, which is also bled by the presence of object marking.

(24) a. yi-dl-a ‘eat!’
    b.* dl-a
    c. si-dl-e ‘eat it (the bread)’!
    d.* yi-si-dl-a

In the imperative we see the yi- when the verb root + -a alone is not disyllabic. The -ku- seems to be serving the same function in the future; obviously, it is not surprising that -zo- may not be parsed into the reduplicant if it is not in the same ‘word’ as the verb which is undergoing reduplication. That is, if the future consists of an auxiliary + main verb, there is a boundary between the -zo- and what follows, whether or not it contains -ku-.26

---

25 There is a tonal difference between the future and the infinitive, however. The future is low-toned, while the initial [u] in ụku- bears a high tone.
26 Downing (2001a) and Khumalo (1981, 1982) note that in a future construction, there are two instances of penultimate lengthening, argued by Downing to be a test for prosodic wordhood in Nguni. That is, we have:
   (i) ngi:-zo-phe:ka   (ii) ngi:zo-ku:-dla
Since the ‘latent’ -ku- in the future is allowed to appear in the reduplicant, we should expect that the -ku- that is part of the infinitival prefix can appear in the reduplicant as well, and this is indeed the case.\(^\text{27}\)

\[(25) \quad \text{a. } \textit{ngi-thánd-a úku-fünd-a} \rightarrow \textit{ngi-thánd-a úku-[fünd-a+fund-a]} \]

‘I like to study’

\[(25) \quad \text{b. } \textit{u-fún-a úku-dl-á} \rightarrow \textit{u-fún-a úku-[dl-á-yi+dl-a]} \text{ OR } \textit{…… ú[ku-dlá+ku-dl-a]} \]

‘You want to eat’

\[(25) \quad \text{c. } \textit{ú-zam-a úku-lw-a} \rightarrow \textit{ú-zam-a úku-[lw-a-yi+lw-a]} \text{ OR } \textit{…… ú[ku-lw-a+ku-lw-a]} \]

‘(S)he’s trying to fight’

\[(25) \quad \text{d. } \textit{i-qál-a úku-m-á} \rightarrow \textit{i-qál-a úku-[m-á-yi+m-a]} \text{ OR } \textit{…… ú[ku-má+ku-ma]} \]

‘(the baby) is starting to stand up’

We see that the list of non-Macrostem (i.e., non-object marker) prefixal morphemes that robustly appear in the reduplicant includes the long-form present marker -ya-, the durative marker -sá-, the -ku- in the future marker -zoku-, and the -ku- from the infinitival marker úku-. Although this may seem like a somewhat limited selection of morphemes, there are not many that appear between the subject marker and the (macro)stem. The remote past tense marker -á: - was not tested, and there are some that are only present under negation (-ngê-, -nga-, -ka-), which will be discussed in the final section of this chapter. The inclusion of the potential marker -nga- was somewhat marginal—approximately half the speakers permitted it to reduplicate, a significant number, but not as high a percentage as those admitting -ya- and -sá-.

\(^{27}\) Interestingly, although the -ku- from the future and the -ku- from the infinitival seem to be the same morpheme (assuming that the infinitive is a component in the future), there were three speakers who augmented their reduplications of future forms with -ku- but who rejected reduplicated infinitives containing this same -ku- morpheme.
3.8 VCV stems: Subject marking

We have seen that with CV stems, there is a small group of prefixal morphemes that is permitted to participate in reduplication. For VCV stems, a prosodic class including forms like -enza ‘do, make’, -akha ‘build’, -eba ‘steal’, and -ába ‘share’, take all the morphemes that reduplicate with consonantal roots, along with subject markers, which are not allowed to reduplicate before CV roots:

(26) a. $u$-lwa → $u$-[lwa-yi+lwa]
   ‘you fight’
   * [$u$-lwa-(w)u-lwa]

   b. $ni$-má → $ni$-[má-yi+ma]
   ‘you (pl) get up’
   * [$ni$-ma+ni-ma]

   c. $si$-akh-a → $s$-akh-a →
     i. [s-akh-a+s-akh-a]
     ‘we build’
     ii. s-[akh-a+y-akh-a]

   d. $u$-enz-a → $w$-enza-a →
     i. [w-enz-a+w-enz-a]
     ‘you make’
     ii. w-[enza-a+y-enz-a]

At first glance, the process by which the subject markers are included in the reduplicant looks a by-product of syllabification, but a closer look reveals that is in fact sensitive to morphosyntactic structure as well.

The data from subject markers alone support an analysis in line with Marantz (1987) in which the syllabification is analyzed as incidental, in that reduplication does not distinguish between the root as the morphosyntactic object it targets and the phonological object of the root, which is syllabified with prefixal material. Reduplication is a phonological process and interacts with phonological units; despite morphosyntactically targeting the root, the phonological unit of the root is inseparable from the subject marker.
with which it has syllabified. Marantz analyzes Odden and Odden’s (1985) Kihehe data
that are very similar to (26) (Marantz (1987) ex. (1), Odden (1993) ex. (39)). The
infinitival prefix *ku* is normally excluded from reduplicating, but before a vowel-initial
root it is included in the reduplicant:

\[
(27) \begin{align*}
\text{a. } & \text{ku-teleka ‘to cook’ } \rightarrow \text{ku-teleka-teleka ‘to cook a bit’} \\
\text{b. } & \text{kw-iita (/ku-ita/) ‘to spill’ } \rightarrow \text{kw-iita-kw-iita ‘to spill a bit’}
\end{align*}
\]

Marantz writes that the inclusion of the infinitive prefix with the reduplicant is due to the
strictly phonological process of syllabification:

what is being targeted for copying in Kihehe full morpheme reduplication is the set of
syllables that contain all the phonological material corresponding to a verb root. These
syllables might also contain material associated with other morphemes, but the copying
of reduplication doesn’t care about that. (p. 205, Marantz 1987)

For Zulu subject markers, Marantz’s assertion appears to accurately describe the facts,
but the analysis underlying them is far from straightforward. How do we describe
reduplication in a way that lets us rule out the inclusion of moraic subject markers, but
allow for those that are glided/non-moraic? Assuming the structure:

(28) Structure for *w-[enz-a+y-enz-a]* and *[w-enz-a+w-enz-a]*

\[
\text{TP} \quad \text{u-AspP} \quad \text{RED vP} \quad -enz-a
\]

If RED targets the vP, we will see the *w-[enz-a+y-enz-a]* reduplication, since *-y-* is
“emergency hiatus repair” on analogy with *-yi-* as a rescue morpheme to satisfy
disyllabicity in the presence of insufficient prosodic material. In order to explain the
presence of the non-moraic subject marker, it is potentially helpful to assume that the
[σσ] template is not CVCV, and that the reduplication does not crash if the initial syllable
lacks an onset.\(^{28}\)

However, with an intermediate representation of: -enz-a+_enz-a, it’s difficult to see how to interpolate the subject marker onto the base (the righthand constituent) without a backcopying analysis.\(^{29}\) Regardless of how to best account for the reduplication of subject markers with VCV stems, data from negation show that phonological syllabification alone is not sufficient to explain the facts, and that reference to underlying structure is necessary as well.

3.9 VCV stems and negation

In the present, negation surfaces as an initial a- and final -i and also conditions the realization of the 3SG subject marker as ká-:

\[
\begin{align*}
\text{(29)} &\quad a-ká-hámb-i & \text{‘he doesn’t walk’} & \rightarrow & \quad a-ká-[hámb-a+hamb-i]^{30} \\
& & & & *a-ka-[hamb-i+hamb-i] \\
\end{align*}
\]

When a VCV stem is inflected for negation, the negation is reflected in the subject marker, which reduplicates, but the final -i, does not (along with the initial a- which in any case is outside the prosodic domain of reduplication):

\(^{28}\) Zulu allows vowel-initial syllables word-initially, it is strictly CV word-externally as an epiphenomenon of a ban on hiatus.

\(^{29}\) Backcopying entails an analysis in which material from the reduplicant is copied to the base, rather than the more familiar relationship where the direction is from base to reduplicant (McCarthy and Prince 1995)

\(^{30}\) The requirement that inflectional material at the right edge of the stem be absent from the reduplicant is discussed in Chapter 2.
(30) a. \textit{a-ka-eb-i} → \textit{a-k-eb-i} ‘he doesn’t steal’ → \textit{a-[k-eb-a+k-eb-i]}
\textit{a-k-[eb-a+y-eb-i]}
* \textit{a-[k-eb-i+k-eb-i]}
* \textit{a-[k-eb-a+w-eb-i]}

b. \textit{a-ka-os-i} → \textit{a-k-os-i} ‘he doesn’t roast’ → \textit{a-[k-os-a+k-os-i]}
* \textit{a-[k-os-i+k-os-i]}
✓ \textit{a-[k-os-a+w-os-i]}

The form with \textit{w} on the base is grammatical in the last example in (30b), but it is crucial to note that the [w] is not a reflex of the subject marker; instead it is the epenthetic glide [y] assimilating to the backness of the following [o] (Doke 1926, 1927).

3.10 Negation behaves differently

If the inclusion of the subject marker before VC roots (whether the unmarked \textit{w-} or the \textit{k(a)-} that appears under negation) is simply an effect of syllabification unrelated to underlying structure, we would expect any morpheme occurring in this position to be included in RED without issue. However, this is not what we find, and there is an interesting cline of interaction between underlying structure and phonological realization.

We saw that in the present, negation surfaces as an initial \textit{a-} and final \textit{-i}, but it is not possible to assign the present tense to one of these morphemes and negation to the other. These morphemes are often related to negation in other tense aspect paradigms, in the recent past:

\begin{tabular}{lll}
Affirmative & & Negative \\
\hline
a. \textit{ú-fúnd-é} & ‘he studied’ & \textit{a-ka-fúnd-a-nga} \\
recent past continuous: & & \\
b. \textit{ú-be-fúnd-a} & ‘he was studying’ & \textit{ú-be-nga-fund-i} \\
\end{tabular}
But, it’s the -nga- morpheme, along with other markers that vary according to the TAM paradigm, that is found in the majority of negative forms in the language and can occur in a variety of positions (Güldemann 1999). As shown in (31a,b), it can be suffixed or prefixed to the root; additionally in the remote past perfect, it can occur in both positions:

(32)  wá-(y)e-fúnd-a  ‘he studied (a long time ago)’  wa-(y)e-nga-funda-nga

Since -fúnda is fully disyllabic, we wouldn’t expect any of the negative forms in (31) or (32) to include -nga- in the reduplicant. Given the syllabification conventions we’ve already seen for Zulu, in the case of a VC root, the hypothesis would have to be that an occurrence of -nga- immediately preceding the root should be allowed to reduplicate. However, including -nga- in RED is not acceptable; for the negative of the recent past continuous (the same tense as the lefthand example in (31b)):

(33)  a.  ú-be-nga-eb-i  →  ú-be-ng-eb-i  →  * u-be-[ng-eb-a+ng-eb-i]
      ‘He wasn’t stealing’  * u-be-[ng-eb-i+ng-eb-i]
                        ✓ ú-be-ng-[eb-a+(y)-ebi]

      b.  ú-be-nga-os-i  →  ú-be-ng-os-i  →  * u-be-[ng-os-a+ng-os-i]
          ‘He wasn’t roasting’  * u-be-[ng-os-i+ng-os-i]
                              ✓ ú-be-ng-[os-a+(w)-osi]

To show that a structural explanation of the examples in (33) is indeed necessary, the pre-nasalized velar is permitted in the reduplicant if it is from the 1SG subject marker ngí-(a,b), or the 1sg object marker -ngí- (c):

(34)a.  ngí-eb-a  ‘I steal’  →  [ng-eb-a+ng-eb-a]
and in the present negative:

b. \textit{a-ng-eb-i} \ ‘I don’t steal’ \ $\rightarrow$ \ \textit{a-[ng-eb-a+ng-eb-i]}

c. \textit{u-ng(i)-ang-a} \ ‘You hug me’ \ $\rightarrow$ \ \textit{u-[ng-ang-a+ng-ang-a]}

Along with the data from consonantal roots, the examples showing the interaction between negation and VCV stems demonstrate that both structure and surface form must be taken into consideration to account for the data on which morphemes may be included in the reduplicant in Zulu.

\textit{3.11 Conclusion}

In this chapter, we have seen how sub-minimal stems are treated under reduplication. Specifically, when a CV stem like \textit{-dlá} reduplicates, it achieves disyllabicity in one of two ways: it can either be suffixed with the empty augmentative morpheme \textit{-yi-}, or a prefixal morpheme can be pulled in on the left. This left-right asymmetry, between dummy syllable repair on the right and prosodic circumscription of prefixal material on the left is explained with reference to Local Dislocation. Due to the linear mechanics of reduplication in Zulu, Local Dislocation is limited to bringing prefixal material into RED while syllabic suffixal material is off-limits.

The chapter concluded by looking at the prefixal morphemes that are permitted to reduplicate before VCV stems like \textit{-enza}, and showing that negation marking is always excluded from the reduplicant. This data proves that underlying structure is a key factor in determining which morphemes are available for reduplication, whether they are included as a full syllable, or merely as an onset. Zulu presents an interesting counterpoint to languages like Kikerewe (Odden 1996) which reduplicate the full
complement of suffixal material, and prefixal material is excluded. Understanding the
range of variation in the behavior of non-root material under reduplication in Bantu
languages not only sheds light on the diachronic trajectory by which it developed
(Hyman 2009b), but also has the potential to shed light on how these different languages
divide the labor between phonology and morphology.
Chapter 4: Case Studies

4.1 Introduction

This chapter develops and expands on the Distributed Morphology analysis of reduplication introduced in Chapter 2. Specifically, we will look at three constructions in-depth to see the benefits of the DM approach. The first is related to a process known as imbrication, in which the -il- of the perfective -il-e fuses with the root to raise the root vowel from /a/ to [e], and is no longer realized as a distinct morpheme (Bastin 1983, Hyman 1993, 1995). Next, we will look at the non-application of a rule that normally deletes the vowel from the class 1 object marker -mù- and the second vowel from the infinitival prefix uku-, but fails to apply under reduplication. The chapter concludes with an analysis of data for mutually-intelligible Ndebele cited in Hyman et al. (2009) for applicativized passives and passivized applicatives.

4.2 Imbrication

For the recent past perfect tense-aspect paradigm, there is a distinction between a short and long form, also referred to as a conjoint/disjoint alternation. While the long, or disjoint, form has been analyzed as an indicator of verb focus in Zulu and other Bantu languages (Güldemann 2003, Ndayiragije 1999, Van der Wal 2010, Voeltz 2004), I will follow Buell (2005, 2006) and Halpert (2012) in asserting that the disjoint form is found when the verb is in a particular syntactic configuration. The conjoint (a) is marked by a final vowel -é and the disjoint is marked by -il-e (b). Neither the final vowel -é nor the

---

31 This alternation is similar to the long-short distinction in the present, in which “phrase-final” forms are marked with -ya- (discussed in Chapter 3).
long form marker -il- is allowed to reduplicate (identical facts for Ndebele are presented in Hyman et al.):

(1) a.  \textit{ngi-thand-\textasciitilde inja} \quad \text{‘I loved the dog’} \quad \rightarrow \text{ngi-[thand-a+thand-\textasciitilde]} \quad * \text{ngi-[thand-e+thand-e]}

 b.  \textit{ngi-yi-thand-il-e} \quad \text{‘I loved it (the dog)’} \quad \rightarrow \text{ngi-[thand-a+thand-il-e]} \quad * \text{ngi-[thand-i+thand-il-e]}

4.2.1 The role of phonology and morphology for imbricating roots and suffixes

The class of roots that imbricate has both a phonological and morphological component. There are certainly phonological generalizations that are active in determining whether or not a root imbricates, but these generalizations are not without exception.\textsuperscript{32} For example, many roots ending with the strings -ath-, -al-, and -an- imbricate, but there are also roots ending in these same sequences that do not imbricate (footnote (33)). Crucially, there is no short/long, conjunct/disjunct distinction for imbricating roots (Doke 1927, p. 339-340).

An imbricated root vowel is optionally included in the reduplicant, which is unexpected because the affixal realizations of the recent past perfect do not reduplicate (in (1)), showing an interesting asymmetry between “pieces” and “processes”. The examples in (2) show the absence of the long/short distinction with imbrication, and the optional inclusion of the imbricated vowel in reduplication while the final vowel marking the perfective is still banned from appearing on RED. Since there is no long/short distinction with imbricated forms, the reduplication possibilities are only provided for

\textsuperscript{32} See Sibanda (2004) pg. 139-152 for a quantitative analysis of the proportion of roots with particular segmental combinations that undergo imbrication.
one construction per root, and are identical for the other. The imbricated vowel is highlighted in the topmost construction for each lettered example:

(2) a. *-phatha ‘carry’ → -pheth-e
gi-pheth-e isikhwama33 ‘I carried the bag’ → -phath-a+phath-a
1SG-carry-FV bag.7 -pheth-a+pheth-e
* -pheth-e+pheth-e

gi-si-pheth-e ‘I carried it (the bag)’
1SG-OM.7-carry-FV

b. -gcwala ‘fill up’ → -gcwel-e
umfula u-gcwel-e ‘The river overflowed’ → -gcwal-a+gcwel-e
river.3 SM.3-fill.up-FV -gcwel-a+gcwel-e
* -gcwel-e+gcwel-e

umfula u-gcwel-e izolo. ‘The river overflowed yesterday’
river.3 SM.3-fill.up-FV yesterday

c. *-phana ‘be generous’ → -phen-e
si-phen-e ‘We have been generous’ → -phan-a+phen-e
1PL-be.generous-FV -phen-a+phen-e
* -phen-e+phen-e

si-phen-e e-khaya ‘We have been generous at home’
1PL-be.generous-FV LOC-home

Verbs with the reciprocal -an- and “stative” -al- undergo imbrication universally, and imbrication also applies without exception (though vacuously) in verbs with the applicative suffix -el-, and optionally in many of those containing “reversive” -ul-

33 To demonstrate exceptions to any phonological generalizations over which root shapes imbricate, the roots form their perfective forms as below:

i. -qath-a ‘break up soil’ → short: -qath-è long: -qath-il-e
iii. -fan-a ‘resemble’ → short: fan-è long: -fan-il-e
We can infer that these forms are imbricating because in phrasal contexts where we expect short (conjoint) morphology, there is no high tone on the final vowel, even though the affix-internal “imbricated” vowel is unchanged. Without imbrication, we would expect the final [e] to be high-toned, -é as in (1a).

(3) a. -dl-an-a ‘eat each other’ → -dl-en-e
    eat-RECIP-FV
b. -sal-a ‘remain’ → -sel-e
    remain-FV
c. -lw-el-a ‘fight for’ → -lw-el-e *lw-el-é
    fight-APPL-FV
d. -fukul-a ‘raise a heavy object’ → -fuk-ul-e
    raise-FV

Having seen the distribution of the morphophonological process of imbrication, we will assume that it is a marked feature of a root, that the morpheme responsible for imbrication has a “list” of roots and suffixes to which the vowel raising rule applies. If a root/suffix is on the list, the rule will apply, and if not, we get the normal alternation between short form -é and long form -il-e.

---

34 The reciprocal -ana and applicative -ela are highly productive in the synchronous language, but -ula and -ala have lost whatever productivity they had diachronically. Additionally, Doke (1927) mentions -atha as a “contactive” but he notes that in the perfect of the forms containing this suffix, some imbricate and others take the full -il-e.
35 Grammatical tone, like the final -é on the short form perfective is discussed in 6.10.
36 Botne and Kershner (2000) propose an analysis based on semantic classes, arguing that the distinction is between inchoative and non-inchoative verbs, whereas the analysis here proposes a morphophonological rule underlying imbrication.
37 This is similar to the standard DM analysis of root-conditioned past tense allomorphy in English. A “special” simple past form obtains if the relevant rule applies. For instance, a lowering rule applies in the context of T[PAST] and ‘sing’, because T[PAST] has a list of roots that are subject to this rule, and √SING is
4.2.2 An analysis of imbrication

The analysis of imbrication proposed here will crucially rely on outward sensitivity in order to explain why an imbricated root vowel is able to reduplicate but a suffixal morpheme expressing the same morphosyntactic feature cannot.\(^{38}\) Although the -\textit{il}--long form marker (\texttt{LF.PERF}) is linearized to the right of the root, the analysis here locates the morpheme in the prefixal domain where the rest of the TAM markers originate. This structure is proposed mainly for consistency, the \texttt{LF.PERF} morpheme could also be base-generated to the right of the root.

A first pass at analysis of the relevant portion of the structure is given below, and will be revised later; the morpheme responsible for reduplication is excluded here (\texttt{RED}). No structural position for the final vowel is present, different DM-based accounts for its distribution are discussed in Chapter 2. Following Buell who places the long-form present marker -\texttt{ya}--in the head of a projection \texttt{yaP}, -\texttt{il}--heads an \texttt{iP} below:

(4) Structures for short (a) and long (b) perfectives, imbricating and non-imbricating

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{structure.png}
\end{figure}

\(^{38}\) See Bobaljik (2000) for how inner morphemes in Chukotko-Kamchatkan can be outwardly sensitive to certain morphosyntactic features, specifically to outer subject and object agreement morphemes.
The same morphosyntactic structure is assumed to underlie both the imbricating and non-imbricating forms. Despite the fact that the verb’s phrase-final position—marked by -il- in the non-imbricated forms—is not phonologically marked for imbricating verbs, the distinction is assumed to be encoded in the underlying structure.

It is relatively straightforward to see how the perfect is realized for the short/conjoint forms whose structure is given in (a). Previous work by Carstairs (1987) and Bobaljik (2000) addresses how morphemes may be “outwardly sensitive”, but the behavior of imbrication is different in noteworthy ways from the patterns they discuss. For Bobaljik, inner morphemes are outwardly sensitive only if they agree with an outer morpheme (p.5). Operating under the standard DM assumption that Vocabulary Insertion proceeds from the inside out, Bobaljik makes the important distinction between sensitivity to morphemes that have undergone VI and those that have not. The notion of No Lookahead (essentially “no outward sensitivity,” for our purposes) only holds for VI, and not for morphosyntactic features which are present prior to VI. He writes “for morphosyntactic features, which are present in the representation prior to any operation of vocabulary insertion, No Lookahead will not apply” (p. 13, emphasis mine).

Carstairs (1987) proposes a Peripherality Constraint (p. 168, 193) which allows for outward sensitivity to a broad morphosyntactic category, or node type, but not its specific featural content. Summarizing Carstairs’ conclusions, Embick (2010) writes that “the idea that the externally sensitive form does not vary according to the specific features of outer morphemes, but is consistent across different person/number combinations,” (p. 195). Similarly, Bobaljik interprets Carstairs “digesting the
termination...outwards sensitivity is barred for particular features...but is admitted for classes of features,” (p.30).

Although it is certainly the case that “outward sensitivity” is illustrated in imbrication, the key component of imbrication is that an inner morpheme (the root) is phonologically affected by an outer morpheme \([\text{PERF}]\) before this morpheme undergoes VI. At some point in the derivation, but crucially before the \(\text{PERF}\) morpheme itself undergoes Vocabulary Insertion (VI), an imbrication rule is triggered to raise the root vowel from /a/ to [e]. The key point in proposing that imbrication is a morphophonological rule is that it can take place prior to VI on the \(\text{PERF}\) morpheme, since the trigger is morphosyntactic (the morpheme \([\text{PERF}]\)) rather than phonological.

4.2.3 Questioning the synchronic phonological status of imbrication

This account provides adequate coverage for the imbrication facts for verbs in a short form, but it does not explain why the -il- should not be present in the long form, given the assumption that imbrication is triggered by a \([\text{PERF}]\) morpheme that is distinct from -il-. In synchronic Zulu, imbrication is not genuinely productive except for certain suffixes, and we need to posit something like a lexical diacritic in order to get the process to apply correctly. Diachronically however, imbrication triggered by the Proto-Bantu suffix jd-e was productive, and involved a fusion of the -jd- suffix with the root (Bastin 1983). The vowel raised from /a/ to [e] following an intermediate level of derivation in which the [a] root vowel and [i] suffix vowel are adjacent, following prosodic circumscription of the final consonant of the root (Hyman 1995, and Kula 2001 describe this for Bemba).
(5) Deriving imbrication from an underlying -il-e (adapted from Hyman 1995 (15), (16) p.10)

| UR       | /phath-/     | ‘carry’ |

Prosodic circumscription of final consonant

| -il- suffixation | pha-il<th> |
| add final vowel  | pha-il th-e |

syllabify + stray erasure

\[
\begin{array}{c}
\sigma \\
\sigma \\
\hline
\text{pha-} \\
\text{il} \\
\text{th-e} \\
\hline
\emptyset
\end{array}
\]

Output [pheth-e]

One of the most convincing reasons to argue against this phonological process having much traction in the synchronic grammar is the presence of imbrication for short/conjoint form verbs. For long/disjoint verbs, there is an alternation between imbrication vs. -il-, but for short/conjoint forms the alternation is between imbrication vs. \(\emptyset\). It seems the best explanation for the synchronic pattern to claim that imbrication in short form perfects is tied to a morphophonological rule that results from an overgeneralization from the more robust diachronic alternation. A raised vowel is arguably less phonologically salient than a full -il- suffix, so the short and long forms collapsed into a single paradigm that imbricated regardless of the syntactic frame of the verb, and diverging from the historical pattern. The table below contrasts the historical and synchronic imbrication patterns:

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Table 4.1: Diachronic and synchronic alternations between imbricating and non-imbricating verbs with short and long form verb morphology

<table>
<thead>
<tr>
<th></th>
<th>Short</th>
<th>Long</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIACHRONIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-imbricating</td>
<td>-thand-e</td>
<td>-thand-il-e</td>
</tr>
<tr>
<td>Imbricating</td>
<td>-phath-e</td>
<td>-pheth-e</td>
</tr>
<tr>
<td><strong>SYNCHRONIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-imbricating</td>
<td>-thand-ê</td>
<td>-thand-il-e</td>
</tr>
<tr>
<td>Imbricating</td>
<td>-pheth-e</td>
<td>-pheth-e</td>
</tr>
</tbody>
</table>

The contrast between the diachronic and synchronic patterns is in the cell for short imbricated forms. When imbrication spread to the short forms, the phonological generalization underlying imbrication was lost.

In the diachronic table, the [PERF] morpheme would have a single phonological realization (ijd-e) if the verb was in a syntactic configuration tied to long form morphology. Under this analysis historically, there would be two allomorphs for the perfective, [ijd-e] and [∅], with the former being selected when the verb is final in a particular syntactic phrase and the latter selected for non-final forms.

The crucial prediction made by this analysis is that if imbrication is purely phonological—meaning there is no need for any sort of lexical diacritic or a “list” containing imbricating roots—with all the other facts from Zulu/Ndebele reduplication held constant, imbrication should not be allowed on the root because it is a spell-out of a morpheme, rather than a readjustment rule triggered by a particular morpheme [PERF]. That is, if imbrication is fed by the spell-out of the -il- morpheme, it should not appear in the reduplicant. I claim that, in Zulu, the presence of imbrication in the reduplicant is an indicator that imbrication has become morphologized, and can occur prior to the [PERF]
morpheme undergoing Vocabulary Insertion. In this scenario, the interaction of the (morpho)syntax and phonology is laid out below:

(7) Figure for diachronic perfective with phonological exponents of [PERF] as -il- and ∅ (Diachronic section of Table 6.1)

In (7b), the process by which phath-il becomes pheth is a process that belongs solely in the domain of phonology (as in (5)), since it is supported by a phonological alternation. Diachronically, the alternation was between -il- and imbrication, and synchronically, both -il- and ∅ alternate with imbrication. Essentially, a phonological rule that was triggered by an exponent exclusive to the long form has been reanalyzed as a morphophonological triggered by a morpheme common to short and long forms.

4.2.4 The morphosyntactic basis of -il-

The previous section showed that there must be a morphosyntactic component to imbrication in order to explain why short/conjoint forms imbricate. The claim is that the root can imbricate in the presence of the morphosyntactic feature [PERF] without the [PERF] node having undergone Vocabulary Insertion itself. However, the distribution of -il- has not been accounted for. Diachronically for long form verbs, -il- and imbrication were in complementary distribution because they were separate allomorphs of a single

39 Complications involving the -e final vowel are set aside here. As argued in Chapter 2, there are good reasons to think an inflectional FV is added at a relatively late stage of the derivation.
morpheme, -il-. However, in the synchronic grammar, imbrication is argued to be a morphophonological rule rather than an allomorph of -il-, though the two are still in complementary distribution.

It is clear that, for long form verbs, imbrication bleeds -il- suffixation, but what are the mechanics of how imbrication and suffixation interact? Unfortunately, a non-stipulative account is difficult to formulate; as in the diachronic tree in (7), there is a \[ \text{PERF} \] morpheme that undergoes VI as -il- in a phrase-final context absent the application of the imbrication rule, and the notion of a separate -il- projection depicted in (4b) is rejected.

(8) Structure of synchronic perfective (RR = readjustment rule, imbrication)

```
AspP
Asp^0
\[ \text{PERF} \]
RR
\[ [il] \]
\[ [\emptyset]^{40} \]
\[ \sqrt{\text{ROOT}} \]
thand
phath
```

There are two allomorphs of the \text{PERF} morpheme: the -il- is inserted when the verb is in a long form syntactic configuration, and we see [\emptyset] elsewhere (short form). Insertion of either of these allomorphs is bled by the application of the root-triggered imbrication rule.

Another alternative, shown in (9), is to claim that there are three allomorphs of the \text{PERF}: [il], [\emptyset], and imbrication. This analysis is perhaps a more compelling argument, but we will see it run into trouble when we attempt to apply it to the data from reduplication.

---

40 Although the segmental content of this morpheme is [\emptyset], it can be argued that it contributes a floating high tone that docks at the right edge of the verb complex (see discussion in 6.10)
(9) Structure of perfective with imbrication as an allomorph of [PERF]\(^{41}\)

![Diagram of (9)](image)

Three allomorphs of the PERF morpheme:
- [¨]: selected with the imbricating class of roots/suffixes
- [il]: selected in syntactic configurations when the verb is phrase-final
- [∅]: selected in syntactic configurations when the verb is non-final

Perhaps the best alternative is to have only two allomorphs of [PERF], a [∅] and [il].

Along the lines of what’s proposed in (8), but instead of having a readjustment rule distinct from [∅] and [il], the [∅] can surface with the autosegmental effect of vowel raising and imbrication.

(10) Option with imbrication as realization of [∅]

![Diagram of (10)](image)

In (10), either [∅] or [il] is selected based on the syntactic frame of the verb. However, the imbrication rule is activated by the presence of the PERF morpheme, rather than its phonological realization. The [∅] is a single zero that appears on both non-imbricating short forms and imbricating verbs, and for the latter bleeds long form morphology.

### 4.2.5 Imbrication and reduplication

In line with the analysis of other TAM morphemes presented in Chapter 2, the perfect is taken to be outside the scope of RED:

\(^{41}\) In this analysis, imbrication is represented with an umlaut to indicate an autosegment that raises the vowel from /a/ to [e] (taken from Hyman et al.).
(11) Structure of reduplication in the perfect

The pattern of reduplication that needs to be accounted for is exclusion of \textit{-il} and the FV \textit{-e}, and optional inclusion of an imbricated vowel:

(12)  
\begin{itemize}
  \item a. \textit{-thand-\textit{il}-\textit{e}} ‘loved (long)’ \rightarrow \textit{thand-\textit{a}+thand-\textit{il}-\textit{e}}
        \textit{* thand-\textit{i}+thand-\textit{il}-\textit{e}}
  
  \item b. \textit{-thand-\textit{\acute{e}}} ‘loved (short)’ \rightarrow \textit{thand-\textit{a}+thand-\textit{\acute{e}}}
        \textit{* thand-\textit{e}+thand-\textit{\acute{e}}}
  
  \item c. \textit{-pheth-\textit{e}} ‘carried’ \rightarrow \textit{phath-\textit{a}+pheth-\textit{e}}
        \textit{pheth-\textit{a}+pheth-\textit{e}}
        \textit{* pheth-\textit{e}+pheth-\textit{e}}
\end{itemize}

Assuming the morphophonology of (8), with imbrication as a readjustment rule rather than an allomorph of the \textit{PERF} morpheme, the rule orderings that are responsible for the variation are how template filling and the imbrication readjustment rule are ordered with respect to each other. The earliest the readjustment rule can apply is after the \textit{vP} spell-out cycle, because the root constituent must be processed phonologically before it can be accessible to a readjustment rule. And as laid out in Chapter 2, the root undergoes spell-out after the cyclic \textit{v} head merges.\footnote{Although root phonology is present from the outset of the derivation it cannot participate (or trigger) phonological processes until it has undergone spell-out and send off to PF.} The imbrication rule is not crucially ordered with respect to reduplication, meaning that reduplication can apply either prior or subsequent
to imbrication. The -a FV found on the reduplicant is treated here as the phonological realization of the v head:

(13) Deriving -phath-a+pheth-e from (11) with the morphophonology of (8)

Vocabulary Insertion and linearization on vP cycle: -phath-a

VI and linearization triggered by RED: [ɔɔ]-phath-a

Mapping to template: phath-a+phath-a

Outwardly sensitive readjustment rule: phath-a+pheth-a

Spell-out of PERF morpheme: ------------

Final Vowel adjustment: phath-a+pheth-e

(14) Deriving -pheth-a+pheth-e from (10) with the morphophonology of (8)

Vocabulary Insertion and linearization on vP cycle: -phath-a

Outwardly sensitive readjustment rule: pheth-a

VI and linearization triggered by RED: [ɔɔ]-phath-a

Mapping to template: pheth-a+pheth-a

Spell-out of PERF morpheme: ------------

Final Vowel adjustment: pheth-a+pheth-e

Under this analysis, it is straightforward to explain the inability of -il- to occur on the reduplicant. Since the PERF morpheme is outside RED in the underlying structure, mapping to the template will necessarily take place before PERF undergoes Vocabulary Insertion.

---

43 Imbrication does not apply iteratively, e.g. -phath-an-a ‘carry each other’ is -phath-en-e in the perfect, cf. *phethene, showing imbrication in both the root and reciprocal suffix is ungrammatical.
44 It is unclear whether the readjustment rule is crucially ordered with respect to template insertion, presumably it can apply either before or the template is inserted (but before it is filled), and the intended outcome of the imbricated vowel appearing in the reduplicant will result.
The ungrammaticality of *-thand-i+thand-il-e

Vocabulary Insertion and linearization on vP cycle: -thand-a

VI and linearization triggered by RED: [σσ]-thand-a

Mapping to template: -thand-a+thand-a

Spell-out of PERF morpheme

(long form allomorph selected): -thand-a+thand-il-a

Final Vowel adjustment: -thand-a+thand-il-e

However, if we assume instead the morphophonology in (9), in which there are three distinct allomorphs of the PERF morpheme, accounting for the reduplication pattern becomes considerably more difficult. Since -il- and [¨] are both allomorphs, they will both be spelled-out at the same point in the derivation, and principally, at a point when reduplication is hypothesized to be complete, and the reduplicant is a closed off constituent, no longer accessible to morphophonological modification. Either the analysis is too permissive, and it is predicted that -il- be allowed to reduplicate, or it is too restrictive, and an imbricated vowel is blocked from appearing on the reduplicant.

4.2.6 Other analyses of imbrication and reduplication

4.2.6.1 Hyman et al.’s analysis

Hyman et al. analyze the optionality of reduplication under imbrication as an ambiguity related to how the perfective suffix is classified. In their analysis, only derivational material may occur in the reduplicant while inflectional material is excluded. As discussed in Chapter 2, in their analysis, extension suffixes are derivational and may be optionally included in RED, and root material is required in RED. Consequently, when a derivational suffix affects the segmental content of the root, the altered phonology is obligatorily included in the reduplicant.
In the case of imbrication, they argue that there is an ambiguity in the grammar concerning whether the imbricating perfective is derivational or inflectional. When the perfective is derivational, we see the raised vowel appearing in the reduplicant, and when it is inflectional, the -a- of the root is what surfaces instead.

(16) Ambiguous classification of the perfective suffix (Hyman et al. (40a,b))

a. Imbrication is part of the root, included within the reduplicant

```
+-----------------+
|                  |
|  I-stem          |
|                  |
+-----------------+
 |                  |
 +-----------------+           +-----------------+     +-----------------+
     |                 |           | IFS              |
     +-----------------+           |                  |
                   | root                | ext              |
                   +-----------------+ [raising]
                     `-thath-`
```

b. Imbrication is part of the IFS, inflectional and excluded from the reduplicant

```
+-----------------+
|                  |
|  I-Stem          |
|                  |
+-----------------+
 |                  |
 +-----------------+           +-----------------+     +-----------------+
     |                 |           | IFS              |
     +-----------------+           |                  |
                   | root                | ext              |
                   +-----------------+ [raising]
                     `-e`
```

To rule out -il- in RED, they write “the nonimbricating -ile suffix is unambiguously in the inflectional final suffix” (p.292). However, this ignores the fact that imbrication and -il- are clearly tied to the same morpheme in the underlying structure.

4.3 Non-deletion of penultimate vowels and reduplication

We will look next at a deletion rule that is sensitive to prosodic structure. The vowel of the class 1 human object marker -mu- and the second vowel of the infinitive uku- are subject to a deletion rule, the former categorically, and the latter nearly categorically in
casual speech. As seen in (17) however, this process is blocked if they are followed by a monosyllabic stem. The non-deletion is related to penultimate lengthening; the vowel deletes unless it is in the penultimate stressed position (Hyman 2009a). \(^{45}\) Penultimate lengthening is marked in the examples below.

4.3.1 The role of penultimate lengthening

(17)  
\begin{align*}
a. \text{i-ya-mú:-dlá} & \quad \text{‘it is eating him/her’} \\
& \quad \times \text{i-ya-m-dla} \\
b. \text{u-ya-m-di:da} & \quad \text{‘you confuse him/her’} \\
& \quad \times \text{u-ya-m-mida} \\
c. \text{úku:-fá} & \quad \text{‘to die’} \\
& \quad \times \text{uk-fá} \\
d. \text{úku:-hlwa} & \quad \text{‘to darken’} \\
& \quad \times \text{uk-hlwa} \\
e. \text{úku-fiunda} & \rightarrow \text{úk-fú:nda} \quad \text{‘to study’} \\
f. \text{úku-sébenza} & \rightarrow \text{úk-sébe:ns-a} \quad \text{‘to work’}
\end{align*}

It is clear that the non-deletion of the vowel in (17a,c,d) is related to it occupying the penultimate position in the verb. Penultimate lengthening is assumed to be a late rule in Zulu morphophonology (Khumalo 1981), and it is reasonable to assume the same to be true of the related process of vowel deletion that is shown in (17b,e,f). Lengthening is a correlate of stress, so even in cases when a word is not phrase-final, it is plausible to posit

\(^{45}\) Although these vowels behave similarly for the process described here, the -mu- vowel is not written in environments when it is not pronounced, and is only variably pronounced in careful speech. In contrast, the uku- vowel is written, and is pronounced in careful speech. It is likely best analyzed as a distinction between deletion vs. elision (Browman and Goldstein 1990).
a positional stress diacritic that does not trigger lengthening, but does render the penultimate resistant to deletion.

Another point arguing for vowel deletion as a late rule is that it creates consonant sequences that are not licit given Zulu phonotactics. Zulu is strictly (C)V(C)V, and does not permit underlying forms to contain any consonant clusters, such as the [k-f] or [k-s] that are the result of the deletion rule operating on the infinitival prefix. Relatedly, the only nasal-stop sequences in Zulu are permitted with homo-organic nasals (Downing 2005). The example in (17b) u-ya-m-dida shows that the labial [m] does not undergo place assimilation with the alveolar [d].

While it seems legitimate to classify deletion of the uku- vowel and mu- vowels as a late rule—the flipside of the penultimate lengthening coin—data from reduplication argue otherwise. In the reduplicant, despite these vowels occurring in a non-penultimate position (preantepenultimate), they do not delete.:

(18)  
\( a. \)  \( \text{úku-fá} \rightarrow \text{ú-}[\text{ku-fá+ku:-fa}] \rightarrow \text{ú-[ku-fá+ku:-fa]} \)  
\( \quad \text{‘to die’} \)  
\( \rightarrow \)  
\( \quad * \text{u-[k-fa+ku:-fa]} \)  
\( b. \)  \( \text{i-ya-mú-dlá} \rightarrow \text{i-ya-[mú-dlé+mu-dla]} \rightarrow \text{i-ya-[mú-dlé+mu:-dla]} \)  
\( \quad \text{‘it} _9 \text{eats him/her’} \)  
\( \rightarrow \)  
\( \quad * \text{i-ya-[m-dlá+mu:-dla]} \)

In the grammatical examples in (18) it is important that the non-deletion of the ku- vowel in the reduplicant (the lefthand constituent) cannot be explained through reference to vowel perseveration as a correlate of penultimate lengthening. In non-reduplicated forms,

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46 There is evidence in Zulu for an unspecified nasal which assimilates to the following consonant; it is found in the 9/10 class prefix i(zi)N- → im-bono ‘opinion’, in-komo ‘cow’, in-tabu ‘mountain’. Interestingly, the cl.10 prefix iziN shows minimality effects as well, surfacing with all its segmental material intact before monosyllabic noun stems, but reducing to iN- elsewhere: i) izin-ja ‘dogs’ *inja, ii) izin-gubo ‘clothes’ → in-gubo, iii) izin-to ‘things’ *into, iv) izin-gane ‘babies’ → ingane. The elision of the -zi- portion of the prefix is spreading to the cl.8 izi- prefix (the plural of cl.7 isi- nouns) as well.
the non-deletion of *ku*- before monosyllabic stems can be explained by taking lengthened vowels to be stressed (or assigned a stress diacritic because of their penultimate position, and consequently resistant to deletion. However, the same is not true under reduplication since the lefthand *ku*- and *mu*- do not undergo lengthening.

Although reduplication can take place early in the derivation (technically, as early as the point at which RED is phonologically processed and undergoes Vocabulary Insertion), it copies only phonological material, and no vestige of the morphosyntactic structure with which this material was formerly affiliated. The behavior of *mu* and *ku* morphemes under reduplication highlights the fact that the morphosyntactic “source,” or category, of the phonological material that appears in RED is absent or inaccessible when this content is copied.

4.3.2 Morphosyntactic affiliation is critical for non-penultimate deletion

Ordering reduplication prior to penultimate lengthening/non-deletion, *ku*- and -*mu*- are copied to the reduplicant template before the late rules targeting the penult. This means that if the vowels in *ku*- and -*mu*- are only preserved because of penultimate lengthening, their non-deletion in the reduplicant is unexpected. Treating reduplication as a copying operation only, the *ku*- and -*mu*- in the reduplicant are simply a phonological string lacking any morphosyntactic status, and they are unrelated to the infinitival *ku*- and object marker -*mu*- whose vowel can delete in non-reduplicative contexts.

The rule for deletion of these morphemes must refer to their morphosyntactic category, because other strings of *[ku]* and *[mu]* that occur in non-penultimate position do not delete:
The rules given in (20) assert that the vowel from the object marker -mu- and infinitival prefix -ku- delete if followed by two or more syllables:

(20) Rules require reference to morphosyntactic structure

a. \([ \text{mu} ]_{\text{OM,1}} \rightarrow \emptyset / \sigma_2 \)

b. \([ \text{ku} ]_{\text{INF}} \rightarrow \emptyset / \sigma_2 \)

Employing Inkelas and Zoll’s Morphosyntactic Doubling Theory (MDT, 2005), Hyman et al. argue that reduplication is a doubling of morphosyntactic structure. If this is true, the reduplicated object marker and infinitival morphemes in (18) are “genuine” instances of these morphemes, rather than segmental strings without any morphosyntactic affiliation.\(^{47}\) With this assumption from MDT, the rule descriptions in (20a,b) are met, and we expect deletion to apply— that it doesn’t supports a view of reduplication like the one advanced here, with reduplicants consisting solely of phonological strings without morphosyntactic affiliation or category.

\(^{47}\) In an OT analysis, the non deletion of the mu and ku vowels in RED would be taken as evidence that reduplicant disyllabicity must be “surface true” (McCarthy 1999). The deletion rule would be blocked from applying because the output would be in violation of the constraint requiring RED to be disyllabic.
4.4 Applicativized passives and passivized applicatives

4.4.1 Evidence for intermediate levels of representation in Nguni reduplication

From Hyman et al., we know that reduplication respects the ordering (and scopings) of the underlying morphosyntactic structure instead of the surface phonotactics that impose a uniform order (causative precedes applicative precedes passive) on the suffix string (Alsina 1995). Ndebele examples from (51), p. 298 (Hyman et al., 2009):

(21) a. Abantwana b-a-phek-el-w-a ukudla. (passivized applicative)
    children they-PST-cook-APPL-PASS-FV food
    “The children were cooked food.”
b. Ukudla kw-a-phek-el-w-a abantwana. (applicativized passive)
    food it-PST-cook-APPL-PASS-FV children
    “Food was cooked for the children.”

In each of the sentences in (21), the applicative suffix must precede the passive, but underlingly there are two different structures. In (a), the surface order is true to the underlying order, the passive scopes over the applicative, but in (b), the underlying order has the applicative scoping over the root-attached passive, the opposite of what we see on the surface. The examples in (22) show that reduplication can take place either prior or subsequent to the re-ordering of the suffixes according to surface phonotactic requirements of suffix order.
4.4.2 Reduplications as snapshots of a derivation

When the verbs reduplicate, we observe the following:\n
(22)a. UR: phek-v-el-w \(\rightarrow\) \(b-a\)-phek-e+phek-el-w-a \hspace{1em} \text{(passivized applicative)}
\[\begin{align*}
&b-a\text{-}phek-a+phek-el-w-a \\
&\ast b-a\text{-}phek-w-a+phek-el-w-a
\end{align*}\]

b. UR: phek-v-w-el \(\rightarrow\) kw-a-phek-w-a+phek-el-w-a \hspace{1em} \text{(applicativized passive)}
\[\begin{align*}
&kw-a\text{-}phek-a+phek-el-w-a \\
&kw-a\text{-}phek-e+phek-el-w-a
\end{align*}\]

The examples above present a convincing argument for the case that filling of the reduplicative template can apply at intermediate levels of representation that are present in the course of the derivation, crucially distinct from the UR and the surface form. The only form that is ungrammatical is the form which juxtaposes morphemes that are never adjacent at any level of representation. In the passivized applicative, the applicative starts out adjacent to the verb and ends up adjacent to the verb, at no point does the passive morpheme intervene between these two. It is for this reason that \(\text{-phek-w-a}\) is a bad reduplicant in (a), it represents a constituency or linear order that doesn’t hold at any level of the derivation.

This contrasts with the reduplicants in (b). Here too reduplication can apply early, before whatever late rule exerts an inviolable order on the string of suffixes, and capture a stage of the derivation when the verb and passive are still adjacent. Or, reduplication can apply late, after the constraint enforcing surface ordering has applies, and produce a reduplicant with the same suffix order that we see on the base.

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48 The \(v\) category-defining head is included in the UR because the root-\(v\) constituent is what gets spelled out when we see the reduplicant \(\text{-phek-a}\). As in Chapter 2, high applicatives (which these forms are) are argued to have two \(v\) heads.
(23): Underlying structure and reduplications for an applicativized passive

Possible reduplicants:
1) phek-a+phek-el-w-a (RED targets spell-out of innermost vP)
2) phek-w-a+phek-el-w-a (RED targets structure after linearization but before local dislocation of passive and applicative)
3) phek-e+phek-el-w-a (filling occurs after the local dislocation of passive and applicative)

(24): Underlying structure and reduplications for a passivized applicative

Possible reduplicants:
1) phek-a+phek-el-w-a (RED targets spell-out of innermost vP)
2) phek-e+phek-el-w-a (RED can target either the cycle of spell-out triggered by APPL, or the cycle RED triggers itself, with the same result)
3) *phek-w-a+phek-el-w-a (this reduplication is ruled out because at no point is the passive adjacent to the root)

4.5 Conclusion

To conclude, we have seen that the Distributed Morphology based analysis implemented in this dissertation helps us to understand some specific reduplicative phenomena from a new angle. In the case of imbrication, the patterns were amenable to a DM-analysis provided that imbrication is a morphophonological process that displays outward sensitivity toward a PERF feature that structurally dominates RED. However, if imbrication was instead analyzed as a third allomorph of the PERF morpheme, the data

49 In DM, the passive morpheme is not a cyclic v head so it does not trigger a spell-out cycle when it merges (Embick 2010, p.83).
were more difficult to account for. The piece-process asymmetry between the inability of the suffix -il- to reduplicate as compared with the optional reduplication of an imbricated root vowel led to a stronger interpretation of the degree to which outwardly sensitive allomorphy can interact with phonology. This contributes to the exploration of the “limits of allomorphic interaction” (Embick 2010, p.48), and how morphology and phonology are interleaved.

The failure of a morphosyntactically conditioned rule of vowel deletion to apply in reduplicants was taken as evidence that reduplicants do not share the morphosyntactic constituency of the morphemes (Vocabulary Items) from which they are copied. This pattern lent further support to an analysis of reduplication as a process that interacts exclusively with phonological strings, and has only indirect access to morphosyntactic structure. Data on applicativized passives and passivized applicatives from Hyman et al.’s analysis of Ndebele were used to demonstrate that reduplication can target intermediate levels of representation that exist after Vocabulary Insertion, but before re-ordering rules of local dislocation apply. Significantly, the Ndebele data strongly favor an approach in which reduplication can occur at various points in the derivation.
Chapter 5: Palatalization, Minimality, and Reduplication in the Zulu Passive

5.1 Introduction

The Zulu passive has received attention in the literature for two phenomena: palatalization and minimality (Khumalo 1987, 1988, Beckman 1993, Ndebele: Downing 2001a, Sibanda 2004) that make this construction an excellent testing ground for theories of locality, and domains of application for morphophonological rules (Alderete and Frisch 2007, Embick 2012). Palatalization, the first of these processes, affects only labials that are internal to and non-initial in the verb stem. It can occur across intervening suffixes (b), and can target multiple labial segments in a single stem (c).

(1) a. -boph-a ‘tie’ → -bosh-w-a ‘be tied up’
   b. -boph-is-a ‘cause to tie’ → -bosh-is-w-a ‘be caused to tie up’
   c. -phapham-a ‘wake up (intr)’ → -phashany-is-w-a ‘be woken up’

The other process is concerned with prosodic minimality; the shape of the passive suffix alternates between -w- and -iw- depending on the size of the root to which it attaches. Roots consisting of a single consonantal segment (a, b), or a vowel plus a consonantal segment (c, d) take the -iw- form, and we see -w- elsewhere (e):

(2) a. -dl-a ‘eat’ → -dl-iw-a ‘be eaten’
   b. -mb-a ‘dig’ → -mb-iw-a ‘be dug’
   c. -enz-a ‘make’ → -enz-iw-a ‘be made’
   d. -eb-a ‘steal’ → -eb-iw-a ‘be stolen’
   e. thand-a ‘love’ → -thand-w-a ‘be loved’

In reduplication, in which a disyllabic constituent is prefixed to the verb stem, palatalization is obligatorily present in the reduplicant, while the -w- suffix itself is
optional (Hyman et al. 2009). Forms with the -iw- allomorph, which cannot co-occur with palatalization because of its prosodic properties, must include the -iw-, or the empty augmenative morpheme -yi- which is freely available in reduplications of sub-syllabic roots:

\[(3)\]

a. \(-bamb-a\) ‘catch’ \(\rightarrow -banj-w-a\) \(-banj-w-a+banj-w-a\) OR \(-banj-a+banj-w-a\) * \(-bamb-a+banj-w-a\)

b. \(-dl-a\) ‘eat’ \(\rightarrow -dl-iw-a\) \(-dl-iw-a+dl-iw-a\) \(-dl-a-yi+dl-iw-a\) * \(-dl-w-a+dl-iw-a\) * \(-dl-iw-a+dl-w-a\)

The analysis presented here will argue that palatalization is a morphophonological rule triggered by glide dissimilation (Khumalo 1988, Kotzé and Zerbian 2008), and that the alternation between -w- and -iw- is due to a confluence of diachronic and synchronic factors. Reduplication is treated as a copying process (Marantz 1982) that uses syllabification to explain why palatalized segments are required to appear in the reduplicant, while the -w- suffix is optional.

5.2 Palatalization outside of the passive, and the role of phonotactics\(^{50}\)

5.2.1 Labials cannot be followed by a /w/ glide

Throughout the Southern Bantu languages, there is a ban on labial consonants followed by a labial glide (labio-dental fricatives are exempt), represented as *B\(^w\), with avoidance

\(^{50}\) Although the change is most conveniently referred to as “palatalization”, the result of the process is not technically palatal segment, but rather pre-palatals or post-alveolars (this is widely noted).
of this sequence noticed as early as Doke (1926, 1927). Not only are these sequences avoided morpheme internally, but when a B\textsuperscript{w} arises across morpheme boundaries, steps are taken to prevent it from surfacing.

(4) a. uku-akha $\rightarrow$ uk\textsuperscript{w}-akha “building (cl. 15)"
    b. ulu-andle $\rightarrow$ ul\textsuperscript{w}-andle “ocean (cl. 11)”
    c. umu-akhi $\rightarrow$ um-akhi, *um\textsuperscript{w}-akhi “builder (cl 1)”
    
    (Sibanda 2004, p. 205, (42))
    d. uku-dla kw-a-mi “my food” (ku-a-mi)
    e. u-hlanya lw-enz-a umsindo “the madman makes noise” (lu-enz-a)
    f. ubu-so b-a-mi *bw-a-mi “my face” (bu-a-mi)
    
    (Khumalo 1988, p. 79, (12))

The historical origins of this phonotactic pattern are not well understood, but its effects are manifold throughout Zulu grammar (and mutually intelligible Ndebele, which is Sibanda’s topic). The examples in (4) show that deletion is one way of resolving a derived B\textsuperscript{w} sequence that arises through hiatus resolution, as a /u-a/ across morpheme boundaries typically turns into [w-a] (Sibanda 2009). When a derived B\textsuperscript{w} sequence arises across morpheme boundaries where the labial belongs to a prefixal morpheme, deletion is the only way to resolve the ill-formed “cluster”\textsuperscript{51}.

Outside of the passive, we also see palatalization in locatives and diminutives, which are formed by suffixation of -ini/-eni and -ana, respectively. Each of these suffixes attaches productively to nouns, and since all Zulu words are vowel-final, V-V hiatus will arise in all cases of locative and diminutive formation. A key point on display in the

\textsuperscript{51}Khumalo gives two exceptions to this rule, utshani ‘grass’, (ubu-ani) and utshwala ‘beer’ (ubu-ala), both belonging to the ubu- noun class (class 11).
examples below is that the front vowels /i, e/ (which glide to [y]) trigger palatalization as well, though to a markedly lesser extent than the back vowels /u, o/ (which glide to [w]). We also see palatalization of non-labials before palatal glides, but not before labials (9).

It is important to keep in mind that for all of these examples, the glides that are triggering, or failing to trigger, palatalization are all derived via hiatus resolution—none are underlying.

Labial palatalization stemming from a front vowel (Khumalo 1987 p. 158)

(5)  
   a. in-kabi ‘ox’ → in-katshana (via inkabyana)  
   b. u-phaphe ‘feather’ → u-phashana  
   c. um-khumbi ‘ship’ → em-khunjini (Doke 1926, p. 143)

Labial palatalization stemming from a back vowel (Sibanda 2004, p. 204 (41a)):

(6)  
   a. i-phaphu ‘lung’ → i-phash-ana (via iphaphwana)  
   b. in-tamo ‘neck’ → in-tany-ana  
   c. isi-bopho ‘grass rope’ → e-si-bosh-eni (Doke 1926, p.142)

Palatalization of non-labials stemming from a front vowel (Sibanda p. 204 (42d))

(7)  
   a. in-hloni ‘hedgehog’ → in-hlony-ana  
   b. isi-khathi ‘time’ → isi-khash-ana (Doke p. 144)

Crucially, there are examples where stems ending in a labial and a high vowel do not undergo palatalization (8), and (9) shows that /o, u/ do not trigger palatalization of preceding coronals.

(8) Non-palatalization of labials preceding a front vowel (Sibanda 2004, 204 (41b))
   a. ul-imi ‘tongue’ → ulimana / ulinyana  
   b. in-debe ‘lip’ → indebana / indetshana

52 This [y] is best analyzed as part of the palatal nasal [n].
c. *isi-khebe* ‘game pit’ \(\rightarrow\) *esikhebeni*

(9) Non-palatalization of non-labials (coronals) preceding a back vowel

a. *in-dlu* ‘house’ \(\rightarrow\) *endlini*

b. *ulu-khezo* ‘spoon’ \(\rightarrow\) *ulukhezwana*

To sum up the data given in (5-9), the main trend is that labials followed by /o, u/ are palatalized nearly without exception.\(^{53}\) Front vowels /i, e/ condition palatalization of preceding labials and coronals in some cases, but nowhere close to categorically. Much rarer is the palatalization of coronals before back vowels, as there is no phonetic or dissimilatory motivation for such a change.

Table 5.1: Palatalization in the locative and diminutive

<table>
<thead>
<tr>
<th></th>
<th>/i, e/</th>
<th>/u, o/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labial</td>
<td>✓ (ex. 5)</td>
<td>✓✓ (ex. 6)</td>
</tr>
<tr>
<td>Coronal</td>
<td>✓ (ex. 7)</td>
<td>– (ex. 9)</td>
</tr>
</tbody>
</table>

5.2.2 The phonotactics of glides in Zulu

The ban on B\(^w\) sequences is exceptionless, and the analysis proposed here, as well as by Kotzé and Zerbian (2008), Khumalo (1988), Beckman (1993), and Bennett (2010) is that palatalization is related to a dissimilatory effect between two adjacent labial segments. However, the exact mechanics of how this dissimilation is implemented vary between approaches. The absence of B\(^w\) sequences is striking precisely because labial offglides are compatible with a wide range of non-labial segments in the language (from Doke (1926) 117-121):

\(^{53}\) Doke (1926) notes a handful of exceptions where a labial followed by an /o, u/ does not palatalize:

i. *insimu* ‘garden’ \(\rightarrow\) *ensimini*

ii. *iphupho* ‘dream’ \(\rightarrow\) *ephuphoeni* (alternates with the palatalized *ephusheni*).
(10) a. um-thwa  “Bushman”
b. isi-dwaba  “traditional leather skirt”
c. u-nwabu  “chameleon”
d. -swela  “be in need”
e. -lwa  “fight (v.)”
f. isi-hlwle  “supporter”
g. i-khwapha  “chameleon”
h. i-gwala  “coward”

The examples in (10) all contain segments with a labial offglide underlyingly, none of the /w/ are synchronically derived from a vowel. The status of /w/ in Zulu phonology differs significantly from that of /y/, which does not occur in clusters:54

(11) a. -shaya  “hit”
b. -ya-  “go”
c. in-hliziyo  “heart”

The majority of occurrences of orthographic /y/ are due to the palatal nasal /ɲ/, which is written as /ny/, a digraph of a single segment (-nyakaza ‘move about’, u-nyawo ‘foot’). The only instances of the palatal glide /y/ that are not between two vowels are root-initial, after the class 1 and 3 prefix um(u)-. I assume that the underlying form is umu-, and the vowel deletes except before monosyllabic roots. Since the underlying form is umu-, the examples in the lefthand column in (12) below do not constitute a meaningful exception to the rule that a palatal glide is not permitted to be a secondary articulation on a consonant.

54 /w/ is also found as a consonant, rather than an offglide: iwisa ‘traditional club (knob kerrie)’.
The facts presented in (10-12) relate to data from the locative and diminutive. In instances when we see palatalization (5-7), the derived glide that is taken to be the trigger is not found on the surface. Stahlke (1976) analyzes this as “segmental fusion”, where a segment itself deletes but is preserved by means of its phonological effects, i.e. the glide itself deletes, but it is preserved via the palatalization we see affecting the preceding consonants.

When a back vowel /o, u/ does not trigger palatalization, it is often present in the surface form as a [w] glide:

(13)  a. i-moto ‘car’ → e-motw-eni ‘in the car’
    b. i-zulu ‘heaven’ → e-zulw-ini ‘in the sky;
    c. umu-ntu ‘person’ → u-mntw-ana ‘child’
and less often, it simply deletes (also shown in (9)):
    d. um-gwaqo ‘road’ → em-gwaq-eni ‘in the road’

In some cases, an /o/ can be retained as a vowel, presenting a rare exception to the rule that VV hiatus is not allowed (examples from Doke (1926) p. 34, 145):

    e. in-to ‘thing’ → intoana
    f. isi-lo ‘leopard’ → isiloana
    g. i-phupho ‘dream’ → ephuphoeni
The front vowels /e, i/, which are argued to glide to [y] to account for the palatalization we see on the surface, often delete (as in 13d), but there is not a single instance of a derived [y] appearing in the surface form (as we see [w] doing in (13a-c)):

(14) a. isi-kole ‘school’ → esikoleni
    b. ulu-khuni ‘firewood’ → olukhunini
    c. im-pande ‘root’ → empndeni

Unlike the back vowels that glide to [w], there is no concrete evidence of the [y] glide that is assumed to be an intermediate step on the way to palatalization triggered by a front vowel. There are two distinct reasons why this could be so: either the vowel deletes before gliding (and possibly triggering palatalization), or because, in cases when it does not trigger palatalization, it is not allowed to surface without violating Zulu phonotactics. Ultimately, both of these factors contribute to the palatalization patterns attested in the locative and diminutive.

5.3 Other accounts

The analysis proposed here contends that palatalization in the passive is the result of a morphophonological rule linked to the passive suffix. The effect of this rule is to dissimilate stem-internal labials from the [w] labial glide of the passive, and it is accomplished by introducing a floating palatal glide [y] that targets these stem-internal labials, and transforms them into palatales.

5.3.1 Kotzé and Zerbian (2008)

This argument is built in large part upon the analysis proposed by Kotzé and Zerbian (K&Z) who claim that a labial glide becomes a palatal when following a labial
consonant, /w/ → [y] / [LAB] __ , and it is this palatal glide that in turn triggers palatalization of preceding labials. Their account is purely phonological in that the /w/ → [y] change is motivated by dissimilation, and the palatalization that follows is assimilation to the palatal glide. As a side note, K&Z write that their analysis is intended to account for the palatalization pattern in the Nguni languages\(^{55}\), but their primary focus is the Sotho/Tswana languages, where palatalization does not occur “at a distance”, or across intervening material, as it does in Nguni.

Since K&Z claim that it is in fact a palatal glide, dissimilated from a /w/, which is responsible for palatalization, we would expect that palatal glides derived from the front vowels /i/ and /e/ should be as closely linked with palatalization of labials as labial glides derived from the back vowels /u/ and /o/. However, we clearly saw in (5), (6), and (8), that this is not the case. While sequences consisting of a labial consonant followed by /i, e/ often palatalize, the rates of palatalization for a labial consonant followed by /u, o/ are far higher. A key prediction of K&Z’s analysis is that there should be no difference in the palatalization-triggering behavior of palatal and labial glides, because essentially all palatalization is triggered by palatal glides. In contrast, Ziervogel (1969) argues that it is necessary to independently motivate both palatalization resulting from palatal glides derived from /i, e/ and palatalization resulting from labial glides derived from /u, o/.

We have already established that palatal and labial glides do not have a comparable distribution in Zulu grammar, principally in that consonants are allowed to have a secondary labial articulation but not a palatal one. If we agree with K&Z’s argument (which is traceable to Khumalo), accounting for the discrepancy between the

---

\(^{55}\) A group of mutually intelligible Southern Bantu languages consisting of Zulu, Ndebele, Swati, and Xhosa.
palatalization effects of palatal and labial glides becomes a significant problem. One way of solving it is to propose a vowel deletion rule that can apply prior to glide formation and palatalization. Currently, we are assuming derivations along the lines of:

Table 5.2: Derivations of *inkatshana* ‘small ox’ and *esigujini* ‘in the calabash’

<table>
<thead>
<tr>
<th>Underlying Representation</th>
<th>inkabi-ana</th>
<th>e-sigubhu-ini</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glide Formation</td>
<td>inkaby-ana</td>
<td>esi-gubhw-ini</td>
</tr>
<tr>
<td>/w/ → [y] / [LAB] ___</td>
<td>N/A</td>
<td>esi-gubhy-ini</td>
</tr>
<tr>
<td>Palatalization</td>
<td>inkatshana</td>
<td>esigujini</td>
</tr>
<tr>
<td>Output</td>
<td>inkatshana</td>
<td>esigujini</td>
</tr>
</tbody>
</table>

Several problems with this schema are readily apparent, perhaps the most obvious being why the derived glide deletes. In the passive, the suffix itself never deletes, regardless of whether or not it causes palatalization. The dissimilation effect introduces a floating palatal glide that targets stem-internal labials. In order to derive the difference between labial palatalization before underlying /i, e/ in the diminutive/locative which is not as robust as labial palatalization before underlying /o, u/, we will postulate a vowel-deletion rule that is able to target /i, e/ but not /o, u/. Without this rule, it is difficult to explain the facts in Table 1, or why, in the diminutive and locative, labials are more likely to palatalize before /u, o/ than /i, e/ if each is ultimately attributable to a palatal glide.

Since /i/ is the language’s epenthetic vowel and most likely to be inserted by default, it is also the most likely to be deleted. The difference between labials followed by /u, o/ palatalizing to a greater extent than labials followed by /i, e/ is that the latter vowels are variably subject to deletion while the former are not. When this deletion rule applies, it bleeds palatalization:
Table 5.3: Derivations of ulimana and ulinyana, both meaning ‘small lip’, and iphashana ‘small lung

<table>
<thead>
<tr>
<th>Underlying Representation</th>
<th>ulimi-ana</th>
<th>ulimi-ana</th>
<th>ipaphu-ana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowel deletion</td>
<td>ulim-ana</td>
<td>does not apply</td>
<td>N/A</td>
</tr>
<tr>
<td>Glide Formation</td>
<td>N/A</td>
<td>ulimy-ana</td>
<td>ipaphwu-ana</td>
</tr>
<tr>
<td>/w/ → [y] / [LAB] ___</td>
<td>N/A</td>
<td>N/A</td>
<td>ipaphwy-ana</td>
</tr>
<tr>
<td>Palatalization</td>
<td>N/A</td>
<td>ulinyana</td>
<td>iphashana</td>
</tr>
<tr>
<td>Output</td>
<td>ulimana</td>
<td>ulinyana</td>
<td>iphashana</td>
</tr>
</tbody>
</table>

By postulating this rule, we are able to attribute all instances of palatalization to a [y], whether derived from a front vowel via glide formation, or from a back vowel via glide formation followed by dissimilation.

The passive suffix is different for a number of reasons: the -w- is underlying, it remains on the surface co-present with the palatalization it effects, and it can trigger palatalization at a distance. The proposal here is that the passive suffix is linked to a rule that is called up when there is an OCP violation on the labial tier (McCarthy 1986, Archangeli and Pulleyblank 1987). Rather than proposing a palatalizing autosegment, as in Hyman et al. (2009) or Sibanda (2004), I will argue that the palatalization is effected through a morphophonological rule. In Embick (2012), a morphophonological rule (MP-rule) is identified as a rule that has “either a Morphological Target or a Morphological Trigger, with the other component being phonological” (p. 5).

Applying this definition to the palatalization we see in the passive, its morphological component is that it is tied to a specific morpheme, and it is activated by a particular phonological configuration, namely a labial OCP violation, and its phonological “resolution” is to insert a floating [y] that docks on non-initial labial segments. It is evident that this morphophonological rule linked to the passive is related

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56 Sibanda’s formulation is slightly different, he argues for a [+lingual, +high] feature that is contributed by the passive suffix in all cases.
to the more overtly phonological palatalization we see in the locative and diminutive, but it requires a different mechanics and implementation, as laid out below for 
-setshenz-w-a‘be worked’ (from -sebenza ‘work’), using the feature geometry notation of Clements (1991):

\[
\begin{array}{cccccccc}
 s & e & b & e & "z" & w & a \\
 \text{C-place} & \text{C-place} & \text{C-place} \\
 \text{Labial} & \text{Labial} \\
\end{array}
\]

Due to the labial OCP violation between the /ɓ/ (orthographic [b]) and the /w/ passive suffix, the morphophonological rule that introduces a floating [y] to target the stem-labial is activated. We have seen that [by] is not a licit cluster, so rather than being realized as a palatalized labial, it comes out as a consonant with primary palatal articulation (the details of /ɓ/ becoming [č’] will be explained in Section 3).

5.3.2 Beckman (1993)

Beckman (1993) also argues for a process of labial dissimilation that is driven by an OCP violation, and has a featural representation that is basically identical to (15). However, rather than propose a floating autosegment to condition palatalization, Beckman puts forward a purely feature geometric account. In order to resolve the OCP violation, the stem-internal /ɓ/ delinks from its labial place specification and is then assigned a coronal specification by default:
A crucial problem with Beckman’s analysis (that she acknowledges herself) is that, while coronal is the default place feature to be filled in once the /ɓ/ has delinked from the [labial] node, its default specification is [+ant] (Avery and Rice 1989).

However, it’s clear that a [+ant] specification will not get us the desired output, because the post-alveolar/pre-palatal segments that are the output of the dissimilation process are all [-ant]. The failure of the changed segments to surface as [+ant], or as “genuinely” default consonants, that is, as [+ant] coronals, is not tied to Zulu’s phonological inventory, which contains /t, tʰ, d, s, z/ underlyingly, along with [t’, s’] allophones.

Consequently, it seems that Beckman’s approach is fundamentally flawed in some important ways. Sibanda notices this problem, and seeks to rectify it by proposing a floating [+lingual, +high] feature associated with the passive suffix, “since a default lingual is a coronal and a [+high] coronal is palatal” (2004, p. 209). Although this provides better coverage of the facts in light of the main assumptions of feature theory, it’s somewhat arbitrary as to why a [+lingual, +high] bundle should be carried by the passive suffix if it’s not formally linked to the labial dissimilation facts on display elsewhere in the grammar. It is preferable to have the change from labial to palatal “fall
out” from something more phonologically natural, as is the case for Kotzé and Zerbian’s analysis which is followed up on here.

5.3.3 Bennett (2010)

Bennett (2010) uses correspondence theory (Hansson 2001, Rose and Walker 2004) to argue that surface correspondence drives dissimilation, and not an OCP violation. Correspondence theory works by proposing a constraint CORR-[F] that demands correspondence between segments that share a feature [F], in this case the place feature [lab]. Correspondence arises between correspondents via phonological similarity, and from the establishment of the correspondence relationship, constraints can be exerted on the members of the correspondence set, typically to require exact featural matching. We can see how it functions with liquid agreement in Bukusu, a Bantu language spoken in Kenya. In Bukusu, the /l/ of the applicative suffix becomes [r] when an /r/ occurs within the verb root, regardless of its position in the root57 (Odden 1994, p. 315 (83)):

(17)  

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>teex-ela</td>
<td>‘cook for’</td>
<td>kar-ira</td>
<td>‘twist’</td>
</tr>
<tr>
<td></td>
<td>lim-ila</td>
<td>‘cultivate for’</td>
<td>rum-ira</td>
<td>‘send someone’</td>
</tr>
<tr>
<td></td>
<td>iil-ila</td>
<td>‘send thing’</td>
<td>resy-era</td>
<td>‘retrieve for’</td>
</tr>
</tbody>
</table>

In the righthand examples, the /l/ of the suffix is in correspondence with the /r/ of the root by virtue of both being liquids, and it constitutes an example of long distance consonant agreement. Under correspondence theory, the assimilation of the suffixal liquid to match the features of the root liquid “should be analyzed as featural agreement mediated

\[57\] There is also a vowel harmony process affecting the quality of the suffix vowel, but it does not interact with liquid agreement.
through an output-based correspondence relation rather than as spreading or multiple linking of features” (Rose and Walker, p. 520).

The principal insight in using correspondence theory to account for dissimilation is that the \text{CORR-[LAB]} violations can be escaped by “shedding”, or losing the [LAB] feature. In order for shedding the feature to be optimal, there must also be a constraint against the correspondence so that dissimilation for [LAB] is the only way to satisfy the surface correspondence constraints. The constraint against correspondence is \text{CC-EDGE-(morph)}: “assign one violation for each pair of corresponding segments that belong to different morphemes”. The tableau below illustrates how this analysis works: by changing to a non-labial segment, the labial is exempt from the correspondence relationship. By changing place and “opting out” of labial correspondence, the undominated constraints \text{CORR-[LAB]} and \text{CC-EDGE} are satisfied with a violation of a low-ranked I-O constraint.

Table 5.4 (Bennett, p. 9), Tableau: Dissimilation to escape \text{CORR-[LAB]} (subscripts indicate segments belonging to a Correspondence Set)

<table>
<thead>
<tr>
<th>\text{gub-w-a/}</th>
<th>\text{CORR-[LAB]}</th>
<th>\text{CC-EDGE}</th>
<th>\text{IDENT-[LAB]}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( \rightarrow \text{guj}_x\text{-w}_y\text{-a} )</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. ( \text{gub}_z\text{-w}_y\text{-a} )</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bennett points out that an OCP analysis should fail when there is a root-initial labial, because when the labial place delinks from a stem-medial labial, this segment is predicted to re-associate with the labial feature connected to the root-initial segment.
However, (18) is only true if we accept certain assumptions of association conventions that are not taken as universal (Paradis and Prunet 1989), and additionally an OCP-type effect is clearly active because stem-medial labials fail to palatalize if the initial segment is a palatal (Sibanda p. 176, (12)):

(18) \[ b \quad e \quad m \quad - \quad w- \quad a \]

\[
\text{LAB} \quad \text{LAB} \quad \text{LAB}
\]

Some verbs fitting this segmental pattern alternate between palatalized and non-palatalized versions:

(19) a. -jwabul-a ‘tear (meat from hide)’ \(\rightarrow\) -jwabul-w-a
    b. -nyomul-a ‘pull out’ \(\rightarrow\) -nyomul-w-a
    c. -tshobol-a ‘peck with beak’ \(\rightarrow\) -tshobol-w-a

Some verbs fitting this segmental pattern alternate between palatalized and non-palatalized versions:

(20) a. -jabul-a ‘be happy’ \(\rightarrow\) -jabul-w-a/-jatshul-w-a
    b. -tshombulul-a ‘uncoil’ \(\rightarrow\) -tshombulula/-tshonjululwa

If the labial is root-final, palatalization is obligatory irrespective of the place of the root-initial segment:

(21) a. -nyob-a ‘rub off (dirt)’ \(\rightarrow\) -nyotsh-w-a
    b. -jum-a ‘take by surprise’ \(\rightarrow\) -juny-w-a

To some extent, the contrast between (19) and (21) can be explained by noting that a violation of \(*B^w\) is more serious if the segments are skeletally adjacent, rather than just autosegmentally adjacent. Pierrehumbert (2003) accounts for this property of dissimilation by arguing that it is “grounded in the scalar and quantitative property of similarity,” meaning it is to be expected that dissimilation should be more robust between
segments that have no intervening material than between segments where material intervenes (Suzuki 1998). However, the non-local palatalization of labials we see in the passive is closer to categorical than the highly local palatalization witnessed in the locative and diminutive.

Intuitively, it’s easy to understand the pattern in (19-21), but formalizing it is a challenge, especially in a rule-based approach.\textsuperscript{58} The data in (19) indicate that in (21), when a labial dissimilates from the passive suffix via the “floating [y]” morphophonological rule, what’s happening is assignment of a new place feature, not delinking of the original specification. It is important as evidence that palatalization is not a delinking from the labial place node and assignment of a default specification, but instead the establishment of a new place of articulation for the segment.

\begin{itemize}
\item \textbf{Cor} \quad \textbf{Labial} \quad \textbf{Labial}
\item [\textbf{Coronal}[-ant]] \quad \textbf{[y]}
\item \textbf{b} \quad \textbf{w} \quad \textbf{a}
\end{itemize}

Since b\textsuperscript{y} is not a licit segment, it becomes a palatal and a new association line to the place specification is established. It does not link to the place of the palatal that is initial in the root.

This configuration is obviously dispreferred, otherwise we have no explanation for why the labial does not palatalize in the examples in (19). Interestingly, in \textit{-tshobol-w-a} ‘be pecked with beak’, if the labial /b/ were to palatalize, it would become [ć'], identical to the initial segment in the root. Since there is no palatalization in this passive form, we can

\textsuperscript{58} Although a detailed discussion of the morpheme structure conditions in place for Zulu roots will not be undertaken here, it should be noted that it is common but not required that root-internal segments to agree in both place and laryngeal specification (see Sibanda (2004) and Schnoebelen (2007) for an analysis of the data in Ndebele).
assert that the feature complex of initial palatal cannot and does not link to a stem-
internal palatalized labial. This also holds in cases where there would be perfect featural
matching: there are still two distinct specifications in clear violation of the OCP. For
examples like (19) where palatalization does not target labials over an intervening
syllable, the morphophonological “floating [y]” rule is blocked by the palatal feature of
the initial segment, but the details of how this plays out remain to be formalized.

Finally, Bennett’s analysis relies on a constraint that penalizes a correspondence
set whose members stretch over multiple morphemes. This overlooks the fact that
morpheme-internally, the *B* requirement also holds, and palatalization of labials in the
Zulu passive cannot be understood without reference to the OCP.

5.3.4 Ohala (1978) and Bateman (2010)

What these analyses share is approaching labial dissimilation from a phonetic-cum-
diachronic perspective. Ohala cites place of articulation cues as F2 transitions and noise
bursts, and that the F2 transition for a palatalized labial is closer to the dental than the
plain labial. The cue to labiality then becomes the noise burst, but if this is missed, the
dental/palatal nature of segment reinforced by any fricative noise produced by the rush of
air thru the narrow palatal constriction (Ohala, p. 375).

In order to motivate labial glides becoming palatal glides after labial consonants,
Ohala acknowledges the familiar dissimilatory approach, saying that, from a phonetic
perspective, we would expect a labial offglide to “reinforce the labiality of labials” (p.
377). He then proposes a more phonetically-based account which assumes that -iw- was
the diachronic form of the passive, but that with polysyllabic stems it coalesced to [j] or
[ɻ] (a rounded palatal glide). This would give a B’ sequence that leads to palatalization as laid out in the preceding paragraph.

Bateman, focusing on similar facts in Tswana, argues for phonological dissimilation of labial glides following labial consonants, and that this glide subsequently “hardens” to a non-sonorant palatal consonant, and the labial consonant eventually deletes (Bateman (2010)p. 191). In her analysis, it is unclear why a [w] is present on the surface if it is said to lose its glide-properties and harden to a palatal consonant.

5.4 How the change from labial to palatal is effected

In most of the work on palatalization of labials, the palatal segment that each labial turns into is not subject to scrutiny, it is simply a question of turning a labial into its “corresponding palatal” (Doke, Khumalo). However, the actual mechanism by which this is accomplished deserves attention. Below is the table showing the orthographic and phonetic representation of each labial segment as well as the segment it becomes when palatalized.

Table 5.5: Labial → Palatal Changes (left hand from Doke, right hand from Khumalo)

<table>
<thead>
<tr>
<th>Lab Orth</th>
<th>Pal Orth</th>
<th>Lab Phon</th>
<th>Pal Phon</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>tsh</td>
<td>[p’]</td>
<td>[č’]</td>
</tr>
<tr>
<td>ph</td>
<td>sh</td>
<td>[pʰ]</td>
<td>[ʃ]</td>
</tr>
<tr>
<td>bh</td>
<td>j</td>
<td>[b]</td>
<td>[ʃ]</td>
</tr>
<tr>
<td>b</td>
<td>tsh</td>
<td>[b]</td>
<td>[č’]</td>
</tr>
<tr>
<td>m</td>
<td>ny</td>
<td>[m]</td>
<td>[n]</td>
</tr>
<tr>
<td>mp</td>
<td>ntsh</td>
<td>[m’p]</td>
<td>[nč’]</td>
</tr>
<tr>
<td>mb</td>
<td>ntsh</td>
<td>[m’b]</td>
<td>[nʃ]</td>
</tr>
</tbody>
</table>
As pointed out by Sibanda, “the ejective bilabial plosive [p’] and the [implosive bilabial ɓ] merge when they become palatals (pre-palatals to be more specific)” (p. 168, 2004).

Since the language does not have voiced ejectives, the voicing specification is compromised to preserve the glottal specification. The relationship conveyed by the orthography for “ph” and “bh” is illusory, as the phonetic descriptions show, the former is an aspirated stop and the latter is a “plain b” phonetically, but the “plain b” orthography is taken by the implosive [ɓ].

Also noteworthy is that the only fricative resulting from the process is the [ʂ] that is the output of the palatalization rule acting on aspirated p, [pʰ]; with the exception of the nasal [m] → [ɲ] all the others are, or contain, affricates. Given [pʰ] → [ʂ], we might expect [b] → [ʐ] as well, but there is a gap in Zulu’s phonological inventory for the voiced (pre-)palatal fricative. In order to preserve the appropriate laryngeal features on [p’], [ɓ], and [m’], it is impossible to render them as fricatives, since voiceless affricates are the only segments available with the ejective specification.

5.5 The non-palatalization of root-initial labials

One of the most striking features of the morphophonological interactions we see in the Zulu passive is the “immunity” of stem-initial labials to palatalization. This holds of both consonant-initial roots, as well as vowel-initial roots whose first consonantal segment is a labial:59

59 The initial vowel of these roots is argued to be extra-prosodic in Downing (1998, 2001):
(23)  \(-boph-a\) ‘tie’      \(\rightarrow\)  \(-bosh-w-a\)  \(*-tshosh-w-a\)
(24)  \(-bhal-a\) ‘write’  \(\rightarrow\)  \(-bhal-w-a\)  \(*-jal-w-a\)
\(-popol-a\) ‘examine medically’  \(\rightarrow\)  \(-potshol-w-a\)
\(-bamb-a\) ‘catch’  \(\rightarrow\)  \(-bang-w-a\)
\(-bhabh-a\) ‘trap’  \(\rightarrow\)  \(-bhaj-w-a\)
\(-ebul-a\) ‘peel’  \(\rightarrow\)  \(-ebul-w-a\)  \(*-etshul-w-a\)
\(-abel-a\) ‘allocate’  \(\rightarrow\)  \(-abel-w-a\)  \(*-atshel-w-a\)
\(-esab-a\) ‘be afraid’  \(\rightarrow\)  \(-esaj-w-a\)

We know that palatalization can apply iteratively and target multiple labial segments within a single stem (24), so in stems where an initial labial retains its place and a stem-internal labial is palatalized, it is not feasible to argue that the palatalizer has been “used up” in one application of the palatalizing rule.

(24)  \(-phapham-is-a\) ‘wake up’  \(\rightarrow\)  \(-phashany-is-w-a\)
\(-phuphum-is-a\) ‘make boil’  \(\rightarrow\)  \(-phushuny-is-w-a\)

That the palatalizing rule applies iteratively is not surprising. As a morphophonological rule, it is linked to the passive suffix and is called up in cases of a labial OCP violation. Once the rule has applied to the righthand offender in verb stems like (24), the lefthand labial will then be in an illicit OCP configuration with the passive suffix.
In (25), we assume the rule applies right to left, initially the /m/ is the target of the floating [y] rule triggered by an OCP violation involving the -w- passive morpheme, but once this segment has received a new place specification as a pre-palatal/alvelo-palatal, the /pʰ/ onset to the second syllable of the stem triggers another application of the rule.

Although the iterative nature of the rule has been demonstrated, we are no closer to understanding why stem-initial labials are protected from palatalization. To explain this phenomenon, psycholinguistic explanations citing the importance of word onsets for lexical retrieval are often referenced (Nooteboom 1981). The psycholinguistic evidence is certainly valid, but it doesn’t easily translate to a linguistic explanation. Beckman (1997) takes these psycholinguistic generalizations and makes them into constraints to account for vowel height harmony in Shona, prioritizing faithfulness to the input in initial syllables while markedness constraints can dominate faithfulness constraints for non-privileged positions.

Positional faithfulness constraints permit the assignation of “violation marks when a segment in a privileged output position is unfaithful relative to its input correspondent” (Jesney 2008, p.1). However, beyond capturing the facts of the domain of application for a particular rule, positional faithfulness fails to provide any insight into the workings of the grammar. For instance, it is possible to write a caveat preventing the morphophonological rule proposed here from applying to stem-initial labials, but it is preferable to connect it to something more general about the grammar of Zulu, and the behavior of stem-initial segments. Unfortunately, no such account has been formulated as of yet, nor does the analysis proposed here provide coverage of the resistance of stem-initial segments to palatalization.
5.6 Attributing palatalization to an underlying -iw- passive morpheme

Since palatalization is commonly associated with the high front vowel [i], the form of the passive morpheme that we see with sub-minimal roots is identified by Khumalo as both

i) the genuine underlying form of the passive morpheme, rather than -w- alone, and ii) the trigger of palatalization. When this analysis is examined in light of the diachronic evidence, it is revealed to be untenable. In Proto-Bantu, there were two high front vowels, a super-close or super-high vowel [i] and a [-ATR] vowel [ɪ]\(^{60}\) (Hyman 2003a). This distinction has been lost in modern Zulu and the two vowels have been collapsed into a single segment, but there is still evidence in the synchronic grammar that there were once two vowels occupying this space.

Although the language only has one productive causative morpheme -is-, Proto-Bantu also had a causative ɪ, which can be seen in certain lexicalized intransitive/transitive alternations in Zulu. The vowel itself is absent, but its effects are visible in consonant mutations in the final consonant of the verb stem (see Bostoen 2008, Downing 2007).

(26) -vuk-\(a\) ‘awaken’ → -vus-\(a\) ‘wake someone up’
-aluk-\(a\) ‘graze’ → -alus-\(a\) ‘take animals to pasture’
-ethuk-\(a\) ‘be startled’ → -ethus-\(a\) ‘frighten, startle’
-sondel-\(a\) ‘approach’ → -sondez-\(a\) ‘bring near’
-wela ‘cross’ → -wez-\(a\) ‘take over’ (also -wel-\(is\)-\(a\))
-khathal-\(a\) ‘be tired’ → -khathaz-\(a\) ‘worry’

\(^{60}\) The Proto-Bantu vowel space was divided into a symmetrical 7-vowel system, so there was a similar distinction in the back vowels between [u] and [o].
The examples in (26) shows that the [j] can have a phonological effect on the preceding consonant, and throughout Bantu, these types of consonant mutations are often found in association with the degree 1 [j] vowel (e.g. Hyman on Bemba, 1995). This [j] causative is not synchronically productive, and -iš- does not interact with preceding consonants:

(27)  -ahluk-a ‘differ’ → -ahluk-is-a ‘make different’
     -dabuk-a ‘break, be sad (intr)’ → -dabuk-is-a ‘break (tr.), make sad’
     -banel-a ‘burn off grass’ → -banel-is-a ‘make burn off grass’
     -cel-a ‘ask’ → -cel-is-a ‘make ask’

If the Proto-Bantu reflex of the passive were the degree 1 vowel, the claim that this is what’s responsible for palatalization would be compelling; but the suffix has been reconstructed as *-iɓ-ʊ (Schadeberg 2003). There is no reason to think that this vowel could be a trigger of palatalization, since none of the other morphemes where we find it in synchronic Zulu are linked to palatalization, or other types of consonant mutation.

Despite the dead end in attempting to trace the palatalization in the passive to the vowel of the suffix, the diachronic shape of the suffix does shed some light on the synchronic alternation between -w- and -iwf-, in that we see -iwf- with roots of the shape C and VC, and -w- elsewhere. The distribution of -iɓ-ʊ vs. -ʊ alone is not well understood, but Schadeberg implies that it was conditioned in part by stem size. In this way, the alternation between -w- and -iwf- in synchronic Zulu grammar (that will be addressed in the following section) is directly related to the alternation between -iɓ-ʊ and -ʊ-
historically. It is noteworthy that the epenthetic segment in the language is an [i], which is used to bring imperatives of monosyllabic verb stems up to two syllables:

(28)  -dl-a ‘eat’ → (y)i-dl-a ‘eat!’ *dl-a
       -m-a ‘stand’ → (y)i-m-a ‘stand!’ *m-a
       -f-a ‘die’ → (y)i-f-a ‘die!’ *f-a

There are no other extension suffixes in Zulu that show a minimality-based alternation like the passive (though other Bantu languages do show this pattern with the causative); all the others are fully VC (applicative -el-, causative -is-, reciprocal -an-). That the passive shows the sort of alternation it does is attributable both to diachronic factors, and the ease with which the diachronic alternation assimilates to the synchronic grammar of epenthesision.

5.7 Minimality and the alternation between -w- and -iw-

The pattern underlying the alternation between -w- and -iw- initially appears to be straightforward: the -iw- form is chosen (or the -i- is epenthized) so that the stem can be disyllabic, assuming that the initial vowel in VC roots is extra-prosodic.

(29)a. u-dl-á ‘you eat’ → i-dl-íw-a ‘it is being eaten’  *i-dl-w-a

       b. u-kh-á ‘you pick (fruit)’ → i-kh-íw-a ‘it is being picked’  *i-kh-w-a

       c. u-énz-a w-énz-a ‘you make’ → í-énz-íw-a  y-énz-íw-a ‘it is being made’  *y-énz-w-a
Interestingly, if we look at a construction that allows for the co-occurrence of the passive and the reciprocal, Sibanda notes that these two suffixes may co-occur only with a “locative or semantically empty subject” (p.66, 2004):

(30)  *Phandle k(u)-a-sik-an-w-a / kw-a-sik-w-an-a (ex. 12, p. 66)*
     ‘outside there was stabbing of each other’ (there was stabbing in the streets)

If we look at the passive with other extension suffixes, we find that it appears as -w-, because there is a suffixal verb template that requires the passive to occur outside the applicative and causative (Hyman 2003b), and an object marker is introduced to mark the applied object.

(31)a.  *i-dl-iw-a  →  i-m(ú)-dl-él-w-a*  ‘it is being eaten for him’
     *i-m-dl-el-iw-a*
     *i-m-dl-iw-el-a*
     *i-m-dl-w-el-a*
     *u-yi-dl-is-w-a*  ‘you are being made to eat it’
     *u-yi-dl-is-iw-a*  

b.  *y-eb-iw-a  →  i-b(á)-eb-el-w-a*  ‘it is being stolen for them’
     *i-b-eb-el-iw-a*

c.  *w-eb-iw-a  →  u-z(i)-énz-is-w-a*  ‘you are being made to make them’
     *u-z-énz-is-iw-a*
However, the order of the reciprocal and passive is not fixed.

d.  
-\textit{dl-\textit{iw}-an-a}\hspace{1em} ‘be eaten reciprocally’

-\textit{dl-\textit{an}-iw-a}

\* -\textit{dl-\textit{w}-an-a}

There are also instances where the passive can occur \textit{twice}. Sibanda (1999) discusses the interaction of the passive with the intensive \textit{-isis-} suffix (p. 56):

(32)a.  
-\textit{dl-\textit{iw}-isis-w-a}\hspace{1em} ‘be eaten well’

\* -\textit{dl-\textit{iw}-isis-a}

\* -\textit{dl-\textit{iw}-isis-\textit{iw}-a}

b.  
-\textit{dl-isis-w-a}\hspace{1em} ‘be well eaten’

\* -\textit{dl-isis-\textit{iw}-a}

\* -\textit{dl-\textit{iw}-isis-a}

These examples show that the choice between the \textit{-w-} and \textit{-iw-} allomorphs is highly local, it is not decided by how many syllables its addition will make the verb stem, but instead, by the prosodic size, or syllable count, of the structure present when the suffix is added.

Put differently, the decision about which allomorph is selected (or whether or not epenthesis happens) involves attention to a smaller domain than the full verb stem.

As proposed at the end of the preceding section, this alternation is related to both diachronic factors and the availability of \textit{[i]} as an epenthetic segment used for minimality repairs in the passive. Although there is a pressure for verb stems to be fully disyllabic, as seen in the imperative and reduplication (Downing 2006), \textit{[i]} epenthesis is only available with the passive morpheme:

\footnote{\textbullet It is somewhat difficult to determine the underlying order and scope of the passive and reciprocal. It is potentially possible to disentangle whether the construction is a “passivized reciprocal” or “reciprocized passive,” but more semantically advanced elicitations are necessary.}

\footnote{\textbullet The exception to this is in (31d), -\textit{dl-\textit{an}-iw-a}, where the -\textit{iw-} attaches outside a fully syllabic constituent.}

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The i-epenthesis in the passive also satisfies the definition of a morphophonological rule: the passive morpheme, a morphological constituent, is subject to an epenthesis rule sensitive to prosodic structure.

5.8 How the passive behaves under reduplication

The problem the data present is clear; as (34) shows, the two phonological effects of the passive morpheme behave differently with regards to reduplication. The -w- suffix is optionally included in the reduplicant, while the palatalized segments are obligatory. In Distributed Morphology, the -w- and palatalization result from different processes, with the suffix attaching first, followed by the morphophonological rule of labial dissimilation. Underlyingly, the structure for the passive forms in (34a) is [[[root] PASS] RED], because semantically, reduplication scopes over the passive; -bosh-(w)-a+bosh-w-a means ‘be tied up badly/intermittently’. For (34b), since hamb- is intransitive, the causative necessarily attaches first, and the passive scopes over the causative. Additionally, as discussed in Chapter 2, RED attaches outside all extension suffixes, yielding the order: [[[hamb] CAUS] PASS] RED].

63 The judgments in (34a) are taken from Hyman et al. (2009), the speakers I interviewed all required the -w- to be present on the reduplicant as well as the base.
(34)a. -boph-a ‘tie’ \[ -bosh-w-a \] OR \[ -bosph-\[bosh-w-a\] \]
* \[ -tshosh-(w)-a+bosh-w-a \]
* \[ -boph-a+bosh-w-a \]
* \[ -boph-w-a+bosh-w-a \]

b) -hamb-is-a ‘make walk/leave’ -hanj-is-w-a \[ -hanj-i-+hanj-is-w-a \] OR \[ -hanj-a+hanj-is-w-a \]
* \[ -hanj-w-a+hanj-is-w-a \]
* \[ -hanj-w-i+hanj-is-w-a \]
* \[ -hamb-i+hanj-is-w-a \]
* \[ -hamb-a+hanj-is-w-a \]

The aspect of this data that is most confusing is how palatalization is obligatorily present in RED while the -w- is not, if it is the -w- attaches first. If we were able to “freely order” reduplication with respect to -w- suffixation and palatalization, we would order them as below (with the order between (2) and (3) not set):

1) palatalization
2) -w- suffixation ↯
3) reduplication ↷

However, this ordering is not possible since the passive morpheme -w- must attach first, because it is a morpheme and palatalization is the morphophonological rule associated with it.

Instead, and since Vocabulary Insertion happens from the inside out, first the passive undergoes VI to yield a -w- suffix, next the palatalization rule applies, and last, the aspectual morpheme (RED) prefixes a [\sigma\sigma] template to what has already undergone VI, and initiates copying to fill its template with segmental material.
(35)  a. Underlying structure  

   

b. VI of Pass morpheme  

   

c. Palatalization rule  

   

d. Template insertion  

   

e. Template filling  

   

e. Template filling  

The difference between the reduplications given in (e) and (eii) is related to how reduplication interacts with syllabification. The suffixation of -w- is the first step in the derivation, but its presence early in the derivation does not guarantee it will be included in the reduplicant. Due to it being a separate morpheme from the root (as is indicated by the brackets in (34)), the phonological operation of syllabification needs to be run in order for the passive suffix to appear on the reduplicant. The same is not true of the palatalized segments; although they occur subsequently to suffixation of the -w- in the derivation, they are instantly part of the root, and no additional operation is necessary to get them on the reduplicant.

We know that palatalization must apply prior to reduplication, without this ordering, the failure of initial labials to palatalize becomes even more difficult to account for. Although some of the details of the reduplication analysis remain to be fully implemented, the need for cyclicity and crucial rule orderings is clear. Most importantly, passivization— and specifically, the phonological effect of palatalization— must apply prior to reduplication in order to explain why there are invariably two occurrences of palatalized root-internal labials even in cases when the root itself begins with a labial.
If we allow reduplication to happen first, we will produce intermediate structures like:

(36)  
\[-boph\_a+boph\_a\] ‘tie’
\[-bamb\_a+bamb\_a\] ‘catch’
\[-bhem\_a+bhem\_a\] ‘smoke’

Allowing the ordering in (36) of reduplication happening prior to palatalization, it is necessary to palatalize each occurrence of the second (non-initial) labial separately.

Formulating a rule to palatalize each of the Bᵢ segments over the initial labial of the base would necessarily require that a rule be blocked by the same segment to which it would need to subsequently apply. In order to avoid this undesirable configuration, we will assume that palatalization precedes reduplication in all cases.

The freely ordered rules are syllabification and reduplication; currently, reduplication is conceived of as two separate steps, 1) template insertion, and 2) template filling. Obviously these are crucially ordered with respect to one another, but it is feasible that (re-)syllabification could occur at any point relative to each of them, that is all three of the orderings below are possible (beginning at [[[bosh] w] RED], (d) of (35)):

(37) Possible orderings of syllabification, template insertion, and template filling

<table>
<thead>
<tr>
<th>a. sylla.</th>
<th>[[[bosh] w] RED]</th>
</tr>
</thead>
<tbody>
<tr>
<td>insertion</td>
<td>[[bosh-w] RED]</td>
</tr>
<tr>
<td>filling</td>
<td>[σσ][[bosh-w] RED]</td>
</tr>
<tr>
<td></td>
<td>[bosh-w-a] + [bosh-w]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b. insertion</th>
<th>[[[bosh] w] RED]</th>
</tr>
</thead>
<tbody>
<tr>
<td>filling</td>
<td>[σσ][[bosh] w]</td>
</tr>
<tr>
<td>sylla.</td>
<td>[bosh-a] + [[[bosh] w]</td>
</tr>
<tr>
<td></td>
<td>[bosh-a] + [bosh-w]</td>
</tr>
<tr>
<td>c.</td>
<td>[\text{[[}bosh\text{]}\text{w}] \text{RED}]</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>insertion</td>
<td>[\sigma\sigma\text{[}bosh\text{]}\text{w}]</td>
</tr>
<tr>
<td>syllabify</td>
<td>[\sigma\sigma\text{[}bosh-w]]</td>
</tr>
<tr>
<td>filling</td>
<td>\text{[}boshw-a\text{]} + \text{[}bosh-w\text{]}</td>
</tr>
</tbody>
</table>

The outcomes of the rule orderings in (a) and (c) are identical, and it’s possible this will always be the case, but there may be other constructions that yield different reduplications for the (a) and (c) orderings.

Positing a syllabification rule helps us look at the data in a different way from Hyman et al, who analyze it within the Morphological Doubling framework of Inkelas and Zoll (2005), which analyzes reduplication as a process that doubles morphosyntactic structure. For them, the morphosyntactic structure that gets doubled is a constituent known as the D-stem (Derivational stem) which consists of the root and any extension suffixes that may be present: here, the passive. The passive is treated as any other derivational suffix, like -\text{-is-} or -\text{-el-}, as jockeying with the default verbal ending \text{-a} for space in the reduplicant. CVC roots + an extension suffix reduplicate as either CVC-\text{-a} or CVC + ext. vowel (discussed in Section 2.5):

(38)  
\begin{align*}
\text{a. } -\text{theng-el-a} & \quad \text{‘buy for’} \quad \rightarrow \quad -\text{theng-a+theng-el-a} \\
& \quad \quad -\text{theng-e+theng-el-a} \\
\text{b. } -\text{dlal-is-a} & \quad \text{‘make play’} \quad \rightarrow \quad -\text{dlal-a+dlal-is-a} \\
& \quad \quad -\text{dlal-i+dlal-is-a}
\end{align*}

However, the passive suffix doesn’t actually take up any phonological space, unlike the vowels from the extension suffixes, so including the -\text{-w} in the reduplicant along with the default verbal final vowel -\text{-a} should be optimal under any constraint ranking.
5.9 Conclusion

This chapter has proposed an analysis of the passive construction that treats palatalization in the passive as a phenomenon distinct from palatalization in other areas of the grammar, specifically the formation of locatives and diminutives. Similar to Kotzé and Zerbian (2008), a morphophonological rule triggered by a violation of the OCP introduces a floating palatal glide [y], which dissimilates stem-internal labials from the passive suffix -w- and ultimately leads to palatalization. When a passivized verb reduplicates, palatalization is obligatorily present in RED because a cycle of syllabification must apply in order for the -w- suffix to be included in the template. Although the suffix must be phonologically present prior to palatalization, no cycle of syllabification is necessary for the palatalized to be present on RED. Instead, both palatalization and -w- suffixation take place prior to reduplication, but syllabification and reduplication are not crucially ordered with respect to each other. It is this ordering that is responsible for the optionality we see in including the passive suffix itself on RED.
Chapter 6: Tone

6.1 Introduction

In this chapter, we will look at how tone interacts with reduplication. Although the project undertaken here focuses in large part on sub-minimal stems (those with a prosodic shape of CV like -dlá ‘eat’), in order to understand how tone rules function when they are not constrained or inhibited by stem length, it is helpful to look first at longer, non-reduplicated stems: those that are minimally four syllables. It will become clear shortly why four syllables is the minimum stem within which all the tone rules can apply free of length restrictions. Along with understanding the main tone rules at work in the language, a primary goal of the chapter is to explore the differences between Zululand Zulu (Khumalo 1981, 1982, Downing 1990), and Durban Zulu (Cassimjee and Kisseberth 2001, Downing 2001b).

In addition, a key finding of the research presented here is that a morpheme’s affiliation with the prefixal domain is voided if this morpheme is reduplicated; this is shown with the durative prefixal morpheme -sá-. The prefixal domain consists of all morphemes to the left of the root; being part of the Macrostem, the object marker is discussed separately from other prefixal morphemes (Kisseberth 1984, Myers 1998). The final section shows that grammatical tone is assigned subsequent to reduplication, and treats the verb complex as a single constituent, rather than targeting the reduplicant and base individually.

Zulu is a two-toned system, high and toneless/low; following the literature, we will assume that H tones are marked underlingly, and low is the default for syllables that are not specified H (Pulleyblank 1986, Maddieson 1978). While each syllable of a noun
can be tonally specified (Rycroft 1963, Laughren 1984), verb roots are only high or toneless, regardless of how many syllables they contain. The extension suffixes: causative -\textit{is}-, applicative -\textit{el}-, reciprocal -\textit{an}-, are all toneless and simply extend the tonal domain of the root.

The examples we will be looking at in this chapter are all phrase-final, meaning they are subject to a rule of penultimate lengthening. Provided a phrase-final verb complex is prosodically “big enough” – specifically, a stem of minimally four syllables– a high tone (H) will surface on the antepenult, regardless of where it is sponsored or underlyingly linked (Downing 1990, Cope 1960). The penultimate syllable lengthens, and the H shifts to the antepenult. In the following examples, the underlying location of the high tone is underlined, and its surface position is marked with an acute accent. For high-toned roots, the H is marked as linked to the first mora of the root. Penultimate lengthening is marked in the examples in (1)–(6) but not elsewhere, since it applies in all the examples cited here as all forms given are phrase-final.

6.2 Zululand Zulu and Durban Zulu

A systematic point of variation between two main dialects of Zulu is discussed in the literature (Khumalo 1981, 1982, Cassimjee and Kisseberth 2001, Downing 2001b), and examples from both Zululand Zulu (ZZ) and Durban Zulu (DZ) will be presented for all the examples where I have the relevant DZ data. The differences will be discussed at

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64 Penultimate lengthening is a process which applies overwhelmingly in phrase final verb forms (van der Spuy 1993, Buell 2009), and is argued to interact with the antepenultimate shift that affects high tones such that the two are non-overlapping, i.e. H to antepenult so that it does not target the same syllable as penultimate lengthening (Cassimjee (1998) and Cassimjee and Kisseberth (1998) propose distinct domains of H spread and penultimate accent assignment). However, we will see that this is an “ideal scenario” that often fails to obtain since the majority of verb forms we are dealing with (and the majority of those produced in speech) consist of stems that are one to three syllables long.
length throughout the chapter, but the main distinction, in the default case of a 4-syllable stem, is between tones that are underlyingly linked to prefixal material vs. those that are linked to the stem.

Zululand Zulu: H surfaces on the antepenult whether prefix-linked (a) or stem internal (b):

(1) a. ba-ya-beléthi:s-a ‘they are helping to carry’
    3PL-LF-carry-CAUS-FV

b. u-ya-shumáye:l-a ‘you are preaching’
    3SG-LF-preach-FV

Durban Zulu: Prefixal H surfaces on sponsor and all intervening syllables up to antepenult (a),

stem H surfaces on penult (b):

(2) a. bá-ya-lánde:la ‘they are following’ (C&K 2001, p.336 (14)
    3PL-LF-follow

b. si-ya-bonisá:n-a ‘we show each other’ (Downing 2001b, p.8 (22b))
    1PL-LF-show

6.3 Verb complexes containing a single high tone in the prefix domain

The examples in (5) show the patterns of tone realization in the Zululand dialect for four syllable (a-b), trisyllabic (c-d), disyllabic (e-f), and monosyllabic (g-h) stems with an H linked to a prefixal morpheme. In (a-f), we see the H shifting to the antepenult, so that the syllable to which the tone is shifted is distinct from the penultimate syllable that undergoes lengthening (Hyman 2009a). For descriptive purposes, it is helpful to lay out an atheoretical “scale” to explain the position in which a high tone surfaces. The difference between (3) and (4) shows that reference to morphological structure--

65 Although these examples of prefixal H are word-initial, we see in (7) that non-initial prefixal H’s also spread in the Durban dialect.
specifically high tones linked to prefixal material vs. the root– is required to explain the patterns of Durban Zulu, while this is not the case for Zululand Zulu, in which high tones behave the same irrespective of the position in which they’re sponsored.

(3) Understanding where a high tone surfaces for Zululand Zulu:
   a) if H is linked to a syllable to the left of the antepenult, H surfaces on antepenult
   b) if H is linked to antepenult, H surfaces on penult
   c) if H is linked to penult, H surfaces on penult (in position where it is sponsored)
   d) if H is linked to final syllable, H surfaces on final syllable (in position where it is sponsored)

(4) Understanding where a high tone surfaces for Durban Zulu (Downing 2001b):
   a) if H is linked to a syllable in the prefixal domain to the left of the antepenult, it spreads to the antepenult
   b) if H is linked to antepenultimate prefixal syllable, H spreads to penult
   c) if H is linked to root, and stem is minimally disyllabic, H surfaces on penult
   d) if H is linked to final syllable, H surfaces on final syllable (in position where it is sponsored)

(5) H underlyingly linked to prefixal morpheme in Zululand Zulu
   a. *ba*-ya-beléth-i:s-a ‘they are helping to carry’ (ZZ)
   b. *u*-ku-thukúthe:l-a ‘to be annoyed’ (ZZ)
   c. *ba*-ya-bèlé:th-a ‘they are carrying’ (ZZ)
   d. *u*-ya-sîne:k-a ‘(s)he is grinning’ (ZZ)
   e. *i*-yá-qo:nd-a ‘it is going straight ahead’ (ZZ)
   f. *u*-kú-hle:k-a ‘to laugh’ (ZZ)
   g. *i*-yá:-hlw-a ‘it is getting dark’ (ZZ)
   h. *u*-kú:-lw-a ‘they are fighting’ (ZZ)
In the Durban dialect, a high tone sponsored by a prefixal morpheme will surface where it originates, and on every syllable up to and including the antepenultimate syllable. Cassimjee and Kisseberth (p.337) distinguish between “shifting” and “spreading” varieties of Nguni. Zulu is normally classified as shifting, meaning that the tone does not surface on the mora where it is underlingly linked, but on another mora some number of syllables to the right. Other Nguni languages like Phuthi (Donnelly 1997) are “spreading”, in which all the moras between and inclusive of the sponsor and the rightmost target of the domain surface with a high tone.

Durban Zulu shows the spreading pattern for high tones linked to prefixal morphemes, and the shifting pattern for stem-internal highs (Downing 2001b). The examples in (6) below show that high tones sponsored in the prefixal domain spread to form tonal plateaus, contrasting with the shifting data for Zululand Zulu in (5):

(6) H underlingly linked to prefixal morpheme in Durban Zulu (Cassimjee & Kisseberth (14), p.336, (18), p.338 for (a-f), data from Downing)

<p>| | | |</p>
<table>
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<tbody>
<tr>
<td>a.</td>
<td>ú-kú-námáthe:la</td>
<td>‘to stick to’</td>
</tr>
<tr>
<td>b.</td>
<td>bá-yá-lánde:la</td>
<td>‘they are following’</td>
</tr>
<tr>
<td>c.</td>
<td>ú-kú-hlánga:na</td>
<td>‘to meet’</td>
</tr>
<tr>
<td>d.</td>
<td>ú-kú-ba:mba</td>
<td>‘to catch’</td>
</tr>
<tr>
<td>e.</td>
<td>bá-yá-li:ma</td>
<td>‘they are farming’</td>
</tr>
<tr>
<td>f.</td>
<td>ú-kú-cu:la</td>
<td>‘to sing’</td>
</tr>
<tr>
<td>g.</td>
<td>ì-yá:-hlwa</td>
<td>‘it is getting dark’</td>
</tr>
<tr>
<td>h.</td>
<td>ú-kú:-lwa</td>
<td>‘to fight’</td>
</tr>
</tbody>
</table>

We will look next at a specific prefixal morpheme -sá- ‘still’ (durative), which behaves largely as expected given what we already know about prefixal high tones in
each dialect. One important feature of -sá- is that it does not shift or spread its tone unless it is in a pre-antepenultimate position; that is, if -sá- is antepenultimate, its tone will only appear on the -sá- morpheme itself, and will not surface on the penult (Buell 2005, p.85, Khumalo 1982, p. 38, 41). This feature of -sá- is distinct from other high-toned prefixal morphemes, which will shift or spread to the penult, as shown in (5g-h) and (6g-h):

(7) Behavior of -sá- in Zululand and Durban dialects

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<tbody>
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<td></td>
</tr>
<tr>
<td>a.</td>
<td>u-sá-beléth-is-a</td>
<td>‘you are still helping to carry’</td>
<td>(ZZ)</td>
</tr>
<tr>
<td></td>
<td>u-sá-béléth-is-a</td>
<td>(DZ)</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>ni-sá-sínek-a</td>
<td>‘you (pl) are still grinning’</td>
<td>(ZZ)</td>
</tr>
<tr>
<td></td>
<td>ni-sá-sínek-a</td>
<td>(DZ)</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>si-sá-qond-a</td>
<td>‘we are still going straight ahead’</td>
<td>(ZZ)</td>
</tr>
<tr>
<td></td>
<td>si-sá-qond-a</td>
<td>(DZ)</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>ngi-sá-lw-a</td>
<td>‘I am still fighting’</td>
<td>(ZZ)</td>
</tr>
<tr>
<td></td>
<td>ngi-sá-lw-a</td>
<td>(DZ)</td>
<td></td>
</tr>
</tbody>
</table>

We will return to -sá- in a subsequent section, but we’ll look next at root-linked high tones (alternatively, high-toned roots, since roots are only either high or toneless and do not have syllable-by-syllable tonal specifications).

6.4 Verb complexes with a single stem-internal high tone

In this data, another significant difference between the dialects will come to light. For Zululand Zulu, a stem-internal H behaves much as a prefixal H does and shifts to the antepenult in stems that are minimally four syllables long. However, for Durban Zulu, all
stem-sponsored high tones shift to the *penult*, even in cases where the stem contains four syllables.66

When looking at the examples below, it’s important to bear in mind that only for stems that are at least four syllables long is this difference revealed. Although H-shift to the antepenult is optimal, for stems that are trisyllabic, the stem-initial syllable is the antepenult; like many Bantu languages, the tonal domain in Zulu is minimally disyllabic (Herman 1996, Leben 2001). Consequently, for trisyllabic stems, the H shifts to the penult in both the Zululand and Durban dialects (as laid out in (3) and (4)):

(8) Stem-internal H in Zululand Zulu vs. Durban Zulu67

<table>
<thead>
<tr>
<th></th>
<th>Zululand Zulu</th>
<th>Durban Zulu</th>
</tr>
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<tbody>
<tr>
<td>a.</td>
<td><em>si-ya-qamund-isis-a</em></td>
<td>‘we are really talking, and going on and on’ (ZZ)</td>
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<tr>
<td></td>
<td><em>si-ya-khuluphal-a</em></td>
<td>‘we are putting on weight’ (DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-khuluphalís-a</em></td>
<td>‘we are causing to put on weight’ (DZ)</td>
</tr>
<tr>
<td>b.</td>
<td><em>u-ya-shumáyel-a</em></td>
<td>‘you are preaching’ (ZZ)</td>
</tr>
<tr>
<td></td>
<td><em>ni-ya-phakámis-a</em></td>
<td>‘you (pl) are raising yourselves up’ (ZZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-bonisán-a</em></td>
<td>‘we show each other’ (DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-phemísán-a</em></td>
<td>‘we help each other start’ (DZ)</td>
</tr>
<tr>
<td>c.</td>
<td><em>ngi-ya-shayél-a</em></td>
<td>‘I am sweeping’ (ZZ, DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-sebénz-a</em></td>
<td>‘we are working’ (ZZ, DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-bonis-a</em></td>
<td>‘we show’ (ZZ, DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-phemís-a</em></td>
<td>‘we help start’ (ZZ, DZ)</td>
</tr>
<tr>
<td>d.</td>
<td><em>si-ya-fünd-a</em></td>
<td>‘we are studying’ (ZZ, DZ)</td>
</tr>
<tr>
<td></td>
<td><em>ni-ya-hléb-a</em></td>
<td>‘you (pl) are whispering’ (ZZ, DZ)</td>
</tr>
<tr>
<td>e.</td>
<td><em>u-ya-má</em></td>
<td>‘you are getting up’ (ZZ, DZ)</td>
</tr>
<tr>
<td></td>
<td><em>si-ya-fá</em></td>
<td>‘we are dying’ (ZZ, DZ)</td>
</tr>
</tbody>
</table>

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66 This dialectal difference is mentioned in Khumalo (1981), and discussed at length in Downing (2001).
67 The non-monosyllabic examples from Durban Zulu are taken from Downing (2001), (21, 22), p.8.
The contrast between Zululand Zulu and Durban Zulu is highlighted in (8a,b). In the Zululand dialect, stems of ≥4 syllables shift an H to the antepenult (the same position to which a prefixal H shifts), but in the Durban dialect, all high-toned stems (except those that are monosyllabic) shift an H to the penult. This is noteworthy because all the Nguni languages aside from this dialect show penultimate lengthening with an H shift or spread to the antepenultimate syllable (Ndebele: Rycroft 1980, Sibanda 2004; Swati: Creissels 1999; Xhosa: Cassimjee and Kisseberth 1998). What makes Durban Zulu different is that the penult is the target of stem-internal high shift no matter how many syllables the stem contains.

Downing (2004) argues that the penultimate syllable is the location of a “stress-accent” diacritic in Nguni, and that H shift is to the antepenult “instead of shifting further right (to the penult) to avoid the syllable which is prominent for stress accent” (p.130). The reason motivating the change in the Durban dialect is evident in examples (8c,d): the overwhelming majority of verb stems in Zulu are 2-3 syllables, and with stems of this length, the H appears on the penult, either shifting to this position (for trisyllabic stems), or surfacing where it is underlyingly linked (for disyllabic stems).

6.5 Tone in the Macrostem

Having looked at the behavior of high tones underlyingly linked to prefixal morphemes, and compared them to those that are stem-internal, we turn next to H’s linked to an object

68 Downing acknowledges that in many languages, like Lingala (Guthrie and Carrington 1988) and Giryama, tone shift targets the accented syllable, but in canonical Nguni these domains are optimally non-overlapping.
As discussed previously in this dissertation, object markers are the prefixal morphemes with the “closest” relationship to the stem, and together with the stem form the Macrostem: a constituent consisting solely of the OM+stem, and excluding prefixal material to the left of the object marker (Kisseberth 1984, Hyman et al. 2009).

Based on what we’ve already seen, we can assert that OM-linked high tones in Zululand Zulu will shift to the antepenult with trisyllabic and longer verb stems, to the penult in cases of disyllabic stems, and appear on the OM itself, where underlyingly linked, on the penult of monosyllabic stems. In the Durban Zulu dialect, the key data point will involve where the H surfaces in cases of trisyllabic and longer stems, meaning that the object marker occupies (at rightmost) the pre-antepenultimate position. If it shifts to the antepenult, it will be behaving as a prefixal morpheme, and shifting to the penult will indicate it patterns as though it is internal to the verb stem.

(9) Macrostem H in Zululand Zulu

a.  
   *si-ya-wa-landélis-a*  
   ‘we are making them (cl. 6) follow’  
   (ZZ)
   
   *ni-ya-wa-hlangánel-a*  
   ‘you (pl.) are ganging up on them (cl. 4)’  
   (ZZ)

b.  
   *ngi-ya-li-ländel-a*  
   ‘I am following it (cl. 3)’  
   (ZZ)
   
   *ngi-ya-ba-hlángan-a*  
   ‘I am meeting with them (cl. 2)’  
   (ZZ)

c.  
   *u-ya-sí-hlóm-a*  
   ‘you are putting it (cl. 7) in the ground’  
   (ZZ)
   
   *si-ya-zí-kháb-a*  
   ‘we are kicking them (cl. 10)’  
   (ZZ)

d.  
   *u-ya-sí-lw-a*  
   ‘you are fighting us’  
   (ZZ)

As anticipated, (9) shows that a high tone underlyingly linked to an object marker will spread to the antepenult in Zululand Zulu. This data is unsurprising, since both

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69 All the object markers in the language are high-toned, which unfortunately limits the range of tonal configurations we can test for the Macrostem domain.
prefixal and stem-internal high tones in the dialect shift to this position— if it is feasible given the prosodic make-up of the stem/verb complex. For the Durban Zulu data presented below, the object marker is shown to behave like a prefixal morpheme in that its H shifts to the antepenultimate syllable— though of course it will shift to the penult if the stem that follows is disyllabic, meaning that the OM is antepenultimate. In DZ, prefixal highs target the antepenult, and stem highs target the penult. Since the OM targets the antepenult, it is behaving like a prefixal morpheme, at least in terms of its target.

Although the target of the OM’s high tone is antepenultimate, showing that OMs pattern with prefixal morphemes in this respect, it’s important to note that unlike the DZ examples in (6) and (7), the OM shifts its tone, instead of spreading it as the other morphemes, like infinitival ù-ku, durative -sá-, and high toned subject markers do.

(10) Macrostem H in Durban Zulu (For (a,b): Downing 2001b (31b), p. 11, (21) p. 8)

a.  si-ya-ba-limela  ‘we cultivate for them (cl.2)’
    si-ya-mu-culela  ‘we sing for him/her (cl.1)’

b.  si-ya-yi-khele  ‘we trip it (cl.9)’
    si-ya-li-kaka  ‘we surround it (cl.3)’

6.6 Tone in reduplicated verb complexes with disyllabic or larger stems

Having reviewed the patterns for a single high tone in different morphological domains for both the Zululand (ZZ) and Durban (DZ) dialects, we will now examine how a single high tone behaves in a reduplicated verb, for disyllabic (and larger) verb stems that do not need to augment with non-stem material to satisfy reduplicant disyllabicity. We’ll begin
with reduplications of stems that are four syllables, with a high in either the prefixal or stem domain.

(11) Reduplications of 4-syllable stems (DZ data from Cassimjee & Kisseberth 2001, (18), p. 338)

Prefixal H

a. u-ku-hlabélela ‘to sing’ → u-ku-[hlabe+hlabélela] (ZZ)
  ū-kú-hlabélela → ū-kú-[hlábē+hlabélela] (DZ)

b. bá-ya-namáthela ‘they stick’ → bá-ya-[nama+namáthela] (ZZ)
  bá-yá-námáthela → bá-yá-[náma+námáthela] (DZ)

c. si-sá-landélisa ‘we still help follow’ → si-sá-[landé+lándélisa] (ZZ)
  si-sá-landélisa → si-sá-[lándé+lándélisa] (DZ)

Stem H

d. si-ya-bonisána ‘we show e.o.’ → si-ya-[boni+bonisána] (ZZ)
  si-ya-bonisána → si-ya-[boni+bonisána] (DZ)

e. ni-ya-shumáyela ‘you (pl.) preach’ → ni-ya-[shúma+shumáyela] (ZZ)
  ni-ya-shumayéla → ni-ya-[shúma+shumayéla] (DZ)

The data in (11) reinforce the patterns established in (5-8). In Zululand Zulu, a high tone will shift to the antepenultimate syllable, irrespective of whether it is underlyingly linked to a prefixal morpheme or the stem. In Durban Zulu, a prefixal high spreads to the antepenult, and a stem-internal H shifts to the penult. For both dialects, reduplicated stems of four syllables behave identically to non-reduplicated stems of six syllables (a disyllabic reduplicant + a four-syllable base). Basically, reduplicating a four syllable stem does not tell us anything new about tone that we didn’t already know from examining
tone in non-reduplicated four syllable stems. We turn next to reduplications of trisyllabic stems.

(12) Reduplications of trisyllabic stems

Prefixal H

a. \textit{u-ku-hlángana} ‘to meet’ \rightarrow \textit{u-ku-[hlanga+hlángana]} (ZZ)
\textit{ú-kú-hlángana} \rightarrow \textit{ú-kú-[hlángá+hlángana]} (DZ)

b. \textit{bá-ya-phékana} ‘they cook e.o.’ \rightarrow \textit{bá-ya-[pheka+phékana]} (ZZ)
\textit{bá-ýá-phékana} \rightarrow \textit{bá-ýá-[phéká+phékana]} (DZ)

c. \textit{si-sá-phékana} ‘we still cook e.o.’ \rightarrow \textit{si-sá-[phéká+phékana]} (ZZ)
\textit{si-sá-phékana} \rightarrow \textit{si-sá-[phéká+phékana]} (DZ)

Stem H

d. \textit{si-ya-la-léla} ‘we listen’ \rightarrow \textit{si-ya-[lale+laléla]} (ZZ)
\textit{si-ya-la-léla} \rightarrow \textit{si-ya-[lale+laléla]} (DZ)

\* \textit{si-ya-la-léla} \rightarrow \textit{si-ya-[lale+laléla]} (ZZ)

\* \textit{si-ya-la-léla} \rightarrow \textit{si-ya-[lale+laléla]} (DZ)

e. \textit{si-ya-bonísa} ‘we show’ \rightarrow \textit{si-ya-[boni+bonísa]} (ZZ)
\textit{si-ya-bonísa} \rightarrow \textit{si-ya-[boni+bonísa]} (DZ)

\* \textit{si-ya-bonísa} \rightarrow \textit{si-ya-[boni+bonísa]} (ZZ)

\* \textit{si-ya-bonísa} \rightarrow \textit{si-ya-[boni+bonísa]} (DZ)

Unlike (11), the data presented in (12) do differ in some important ways from our expectations of how the tonal rules could interact with reduplication, especially for the Zululand examples in (12d,e).\textsuperscript{70} If the \textsc{red}+base complex were identical to a non-reduplicated 5 syllable stem, the starred examples for the Zululand dialect would be grammatical; that they are not tells us that the shifting of tones within a reduplicated verb

\textsuperscript{70} Similar data is reported for the mutually intelligible Nguni languages Swati, in Downing (2003), ex (34), p.30, and Ndebele in Sibanda (2004), ex (42), p. 331-332.
does not operate independently of the morphosyntactic/morphophonological changes effected by the process of reduplication.

For the Zululand examples with a stem-internal H, the realization of tone in the base (the righthand constituent in the RED+base complex) is identical to the realization of tone in the non-reduplicated examples. This fact could be used in support of an approach requiring paradigmatic uniformity (Steriade 2000), but I will argue that both the reduplicant and base carry an H tone. We can explain the patterns in (d) and (e) by invoking Meeussen’s Rule (Goldsmith 1984). When two high tones are present in the same morphological domain, the action of Meeussen’s Rule in Zulu is to delete the lefthand H, such that HH → LH (this process explains the data in (12d,e), but we will see that it encounters problems with reduplications of disyllabic and monosyllabic stems).

To illustrate the action of Meeussen’s Rule, (13) shows examples that are grammatical in both Zululand and Durban Zulu. The high tone of the OM and the root are in a single tonal domain— the Macrostem— and Meeussen’s Rule deletes the OM H and preserves the stem H. We know it must be the stem high that is maintained, because if it were the high from the object marker, it would shift to the antepenult rather than the penult.

(13) Meeussen’s Rule in Zulu deletes OM H and preserves stem H:
   a.  *u-ya-ýi-bonis-el-a*  ‘you are showing for it (cl 9)’
   b.  *ngi-ya-si-fumána*  ‘I am catching up to it (cl 7)’
   c.  *ni-ya-wa-khêla*  ‘you are picking for them (cl 4)’
Action of Meeussen’s Rule in Macrostem (bracketed)

a. Meeussen’s Rule (lefthand branch delinking)

\[ \text{ngi ya [si fu ma na]} \]

\[ \begin{array}{c|c}
\text{H} & \text{H} \\
\end{array} \]

b. Tone shift (to antepenult)

\[ \text{ngi ya [si fu ma na]} \]

\[ \begin{array}{c|c}
\text{H} & \text{H} \\
\end{array} \]

Assuming that the RED+base complex forms a single tonal domain, the H on the reduplicant– being the lefthand constituent– would undergo deletion, and the surviving H remains on the base. This H then shifts to the penult, just as we saw for the Zululand examples in (8).

Although an analysis based on Meeussen’s Rule accounts for the data on reduplications of trisyllabic stems, it is less successful for those that are disyllabic. While the data for (15) are straightforwad, we see in (16) that a stem-internal high surfaces on the final syllable of the base for Zululand Zulu– the antepenultimate syllable of the full verb complex– but under the analysis proposed for the reduplications of trisyllabic stems, we would expect the H to surface on the penultimate syllable.

Reduplications of disyllabic stems

Prefixal H (Durban Zulu data from Cassimjee & Kisseberth 2001, p. 338)

a. \( u\text{-kú-cul-a} \) ‘to sing’ \( \rightarrow u\text{-ku-[cul-á+cul-a]} \) (ZZ)

\( ū\text{-kú-cul-a} \) \( \rightarrow ū\text{-kú-[cúl-á+cul-a]} \) (DZ)

b. \( b\text{á-yá-lim-a} \) ‘they farm’ \( \rightarrow b\text{á-ya-[lim-á+lim-a]} \) (ZZ)

\( b\text{á-yá-lim-a} \) \( \rightarrow b\text{á-yá-[lim-á+lim-a]} \) (DZ)
(16) Stem H (DZ data adapted from Downing 2009 (3))

a. \( \text{si-ya-méma} \) ‘we yell’ \( \rightarrow \) \( \text{si-ya-[mem-ã+mem-a]} \) (ZZ)
   \( \text{si-ya-mém-a} \) \( \rightarrow \) \( \text{si-ya-[mem-ã+mem-a]} \) (DZ)
   * \( \text{si-ya-[mem-a+mém-a]} \) (ZZ), (DZ)

b. \( \text{ngi-ya-hlêb-a} \) ‘I whisper’ \( \rightarrow \) \( \text{ngi-ya-[hlêb-ã+hleb-a]} \) (ZZ), (DZ)
   * \( \text{ngi-ya-[hlêb-a+hlêb-a]} \) (ZZ), (DZ)

The tone patterns in (16a,b) do not match with those from the unreduplicated form
(which paradigm uniformity would predict), which is identical to what we would expect
if Meeussen’s Rule were exerting its effect on two separate H tones within the RED+base
complex, and deleting the lefthand H. If either of these were the correct explanation, the
ungrammatical forms with H on the penult would be the result. Instead for Zululand Zulu,
what we find looks like a full RED+base complex being treated as a single verb stem,
with a single H underlyingly linked to the initial syllable, and spreading to the antepenult.
However, this hypothesis is undermined by the fact that the data from the Durban and
Zululand dialects agree with each other.

In Durban Zulu, the H of a non-reduplicated 4 syllable high-toned stem surfaces
on the penult, and not the antepenult (as shown in (8a,b)), and it is puzzling why the
penult should not also be the target of H-shift in reduplications of disyllabic stems. If
realization of tone in reduplications of disyllabic stems were identical to how tone is
realized in 4-syllable stems (which is essentially what is argued in Downing (2003)), then
the ZZ and DZ examples in (16a,b) would differ from one another. Since stem-internal
high tones shift to the antepenult in ZZ but the penult in DZ, we would expect different
tonal patterns for the ZZ and DZ examples if reduplications of a disyllabic stem were identical to 4-syllable stems.

One possible explanation is that the initial syllable of both RED and the base have an underlying high, and the tone does not surface in a position where it is underlingly linked. Since a high tone never shifts to a final syllable, the only remaining option is for the H to surface on the second syllable of the reduplicant.

6.7 Tone and the reduplication of monosyllabic stems

Having seen how tone behaves in non-reduplicated and reduplicated verb stems, we will focus on the tone patterns in sub-minimal roots. Beginning with the most straightforward case, in which a monosyllabic stem is augmented with the empty morph -yi- to satisfy disyllabicity of the reduplicant, the dialects behave in accordance with what we already know about each:

(17) Reduplications of monosyllabic stems with augmentative -yi-

Prefixal H

a. u-kú-lwa ‘to fight’ → u-ku-[lwá-yi+lwa] (ZZ)
   ū-kú-lwa → ū-kú-[lwá-yi+lwa] (DZ)

b. ba-yá-lwa ‘they fight’ → ba-ya-[lwá-yi+lwa] (ZZ)
   bá-yá-lwa → bá-ya-[lwá-yi+lwa] (DZ)

Stem-Internal H

c. si-ya-fá ‘we die’ → si-ya-[fá-yi+fa] (ZZ), (DZ)

d. ngi-ya-phá ‘I give’ → ngi-ya-[pha-yi+pha] (ZZ), (DZ)

Next, we’ll look in turn at monosyllabic stems with an object marker, long form present marker -ya-, and the durative morpheme -sá- pulled in to the reduplicant.
(18) Reduplications of monosyllabic stems containing object markers\textsuperscript{71}

Low-toned stems

a. \textit{u-ya-si}-lwa ‘you fight it (cl.7)’ \textasciitilde \textit{u-ya-[si-lwa+si-lwa]} (ZZ, DZ)

b. \textit{si-ya-yi}-lwa ‘we fight it (cl.9)’ \textasciitilde \textit{si-ya-[yi-lwa+yi-lwa]} (ZZ, DZ)

High-toned stems (Meeussen’s Rule deletes OM H)

c. \textit{u-ya-wa-ph}â ‘you give them (cl.4)’ \textasciitilde \textit{u-ya-[wa-ph+wa-ph]} (ZZ, DZ)

d. \textit{si-ya-li-ph}â ‘we give it (cl. 3)’ \textasciitilde \textit{si-ya-[li-ph+li-ph]} (ZZ, DZ)

(19) Reduplications of monosyllabic stems with -ya-

Prefixal H

a. \textit{ba-yá-lwa} ‘they fight’ \textasciitilde \textit{ba-[ya-lwa+ya-lwa]} (ZZ)
\textit{bá-[ya-lwa+ya-lwa]} (DZ)

Stem H

b. \textit{ni-ya-ph}â ‘you (pl) give’ \textasciitilde \textit{ni-[ya-ph+ya-ph]} (ZZ, DZ)

In (19a) the prefixal H spreads to the antepenult of the verb complex, and in (19b), from the antepenult to the penult. What’s important about (19) is that in non-reduplicated verbs, -ya- is in the prefixal domain, but when it is pulled into the reduplicant for sub-minimal roots, its affiliation with the prefixal domain is voided, and the H from the stem -phâ can shift to be realized on -ya-. This is strong evidence that the copying operation of reduplication needs to take place prior to tone spreading-- otherwise, there is no occurrence of -ya- to the right of the root. If tone spreading took place prior to reduplication, the tone in the RED+base complex would be identical to the non-reduplicated form, and we would expect: \textit{ni-[ya-ph+ya-ph]}

\textsuperscript{71} The only stems used in these examples are -lwa ‘fight’ and phâ ‘give’ because these are the only two monosyllabic stems that are transitive and don’t contain a depressor segment (Traill et al. 1987).
Although it is clear that the high-tone on -ya- in (19b) must originate on the -phá verb to its left (the reduplicant), it remains difficult to account for why the base acts as the source of stem-internal high tones in reduplications of trisyllabic and larger stems, but if the stem is disyllabic or monosyllabic, high tones are sponsored within the reduplicant itself. There is no single rule (or constraint ranking) which can account for all the facts without specific reference to different prosodic constituencies of the stem, and any prefixal morphemes that are part of the reduplicant.

Although it is somewhat difficult to account for the forms in (12d, 16), if we assume that both RED and the base enter with high tones, we can predict where the tone will ultimately surface with the following constraints for Zululand Zulu (Hyman, p.c.):

(20) The realization of tone in reduplications of high-toned stems
   a. H to antepenult
   b. H cannot be realized on its sponsor/where it is underlyingly linked (assuming the initial syllable of both RED and the base bear a high tone)
   c. *H]\w (no high on final syllable)
   d. RED+base forms a single tonal domain = can only contain a single output H

6.8 The co-occurrence of high tones in the prefixal and stem domains

In (13) and (18c,d) we saw what happens when two high-toned constituents, an object marker and a high-toned verb, co-occur in the Macrostem domain, but we have not yet examined any cases in which a high-toned prefixal (non-OM morpheme) co-occurs with a high-toned stem. The key phenomena are, for Zululand Zulu, downstep or non-shifting of the prefixal H off the syllable where it is sponsored, and for Durban Zulu, downstep of
the initial syllable/mora of the stem domain (Khumalo 1981, 1982, Cassimjee and Kisseberth 2001). All are illustrated in the examples below:

(21) Co-occurrence of high tones in prefixal and stem domains

Zululand: Downstep between high tones on adjacent syllables

a. bâ-\textsuperscript{-1}phûz-a ‘they drink’ (C&K (1), p. 329)

b. ú-\textsuperscript{-1}thând-a ‘(s)he loves’

c. ni-sâ-\textsuperscript{-1}thând-a ‘you (pl) still love’
Zululand: H shift in prefixal domain blocked by H on stem (C&K (24), p. 342, (28), p. 344)

d.  úkù-hám̄ba ‘to go’  *úkù-hám̄ba

e.  bá-ya-létha ‘they bring’ *bá-yá-létha

In examples like the immediately preceding (21c,d), for no speakers will the high tone shift off the subject marker to the next TBU if the following stem is high-toned and disyllabic. In other words, a high-toned disyllabic stem blocks high-tone shift off a subject marker to another prefixal morpheme.72 However, if the stem is trisyllabic, speakers vary as to whether the prefixal tone shifts from its sponsor to the syllable to the right. This variation is noted in C&K (p.344), as Khumalo (1981) reports the shifting version (i) and Rycroft (1980) reports a non-shifting version (ii).

(22)  a.  i.  u-ýá-bónísa ‘(s)he shows’  (ZZ)  OR
      ii.  ú-ýa-bónísa  (ZZ)

      b.  i.  u-ðkù-sébénza ‘to work’  (ZZ)  OR
      ii.  ú-ðkù-sébénza  (ZZ)

(23)  Durban Zulu: H spread in prefixal domain plus downstep at stem boundary
     (C&K (27) p. 343, data from Laura Downing)73

     a.  úkù-¹théng-a ‘to buy’
     b.  bá-ýá-¹láléla ‘to listen’
     c.  bá-ýá-¹théthisána ‘they scold each other’

---

72 An interesting counterpart to the examples in (21c,d) would be a verb complex containing a trisyllabic prefixal domain with an initial high. Unfortunately, I am unaware of any paradigms that would fit this pattern.

73 This closely matches with the data from Ndebele (Sibanda (15) p. 229), which is in keeping with both of these varieties showing H-spreading from the prefixal domain.
For both Zululand and Durban Zulu, downstep is evidence of high tones from different morphological domains being realized on adjacent syllables.

When verb complexes with a high in the prefixal domain and stem domain reduplicate, the outcomes are fairly straightforward. If we reduplicate constructions like those given in (21), we see that reduplication bleeds the downstep we see in (21a-c), and when forms like (21d,e) are reduplicated, an initial H is allowed to shift off the syllable where it is sponsored:

(24) Reduplications of Zululand constructions in (21a-c)

a. \( bá^{-1}\text{phúza} \rightarrow bá-[\text{phúz}á+\text{phuza}] \)
b. \( ú^{-1}\text{thánda} \rightarrow ú-[\text{thand}á+\text{thanda}] \)
c. \( ni-sá^{-1}\text{thánda} \rightarrow ni-sá-[\text{thand}á+\text{thanda}] \)

For (21d,e), reduplication creates an environment such that the H can optionally shift off the syllable where it is sponsored, relating to the variation in prefixal H-tone shift before high-toned stems illustrated in (22).

(25) Reduplications of Zululand constructions in (21d,e)

a. \( ú-\text{ku-hám}ba \rightarrow i. \ u-\text{kú-[hamb}á+hamba] \quad \text{OR} \quad \]
   ii. \( ú-\text{ku-[hamb}á+hamba] \)

b. \( bá-\text{ya-létha} \rightarrow i. \ bá-\text{yá-[leth}á+\text{letha]} \quad \text{OR} \quad \]
   ii. \( bá-\text{ya-[leth}á+\text{letha]} \)

The variation between the shifting (i) and non-shifting (ii) alternants is also on display in reduplications of monosyllabic stems:
Reduplications of monosyllabic stems with highs in prefixal and stem domains in Zululand Zulu:

a. \( \text{bá-ya-fá} \) ‘they die’ → \( \text{bá-[ya-fa-yá-fá]} \)

b. \( \text{bá-ya-fá} \) → i. \( \text{bá-ya-[fa-yi+fá]} \) OR
   ii. \( \text{bá-ya-[fa-yi+fá]} \)

The difference between the two possible reduplications in (b) is the same phenomenon as the variation in (22) and (25). Although all Zululand speakers produce the non-reduplicated form in the same way– with a high on the subject marker and a high on the stem– some speakers will shift the high tone from the \( \text{bá-} \) subject marker to \(-ya-\) before trisyllabic stems, and some will keep the H in the position in which it is sponsored.

Presumably, the same pattern of optional shift from \( \text{bá-} \) to \(-ya-\) should be at work in (27) below, but I do not have that data at this time. What (27b) shows is that even when the object marker does not appear in the reduplicant, the Macrostem is still an intact constituent because it contains only a single high tone on the surface. Despite there being two H’s that are underlyingly linked (to the OM \(-sí-,\) and the stem \(-phá,\) the Macrostem, here consisting of the OM and the RED+base complex, behaves as a single domain for high tone realization:

Meeussen’s Rule applies in Macrostem domain independently of reduplication of object marker:

\( \text{bá-ya-sí-phá} \) ‘they give it (cl.7)’ → a. \( \text{bá-ya-[sí-phá+sí-phá]} \) (ZZ)

b. \( \text{bá-ya-sí-[pha-yi+pha]} \) (ZZ)

Laura Downing reports data from the Durban dialect (C&K p. 343):

\( \text{bá-yá-\text{\dagger}théthisána} \) ‘they are scolding e.o.’ → \( \text{bá-yá-[\text{\dagger}théthi+théthisána]} \)
There are several points to note in the example given in (28). The first is the absence of downstep on the initial syllable of the base: $^{*} \text{thēthi}+\text{thēthisāna}$

If downstep is an indication that high tones from different morphological domains are being realized on adjacent syllables, the lack of downstep on the base shows that there is a single H spreading throughout the RED+base complex, rather than one H linked to the reduplicant and another H linked to the base. Another is that the H spreads throughout the full verb complex, even though the H that spreads through the RED+base complex is (presumably) the H linked to -thethisana. In other examples from Durban Zulu, high tones originating in the prefix domain were shown to be spreading while those that were stem-linked were shifting. However (28) shows that when a stem-H co-occurs with a prefixal H, the stem-H spreads rather than shifts its high tone.

6.9 The behavior of -sá- under reduplication

We see in the non-reduplicated forms in (29) below that -sá- is in the prefixal domain and outside the Macrostem because, unlike object markers, it does not undergo Meeussen’s Rule when it is adjacent to a high-toned stem, i.e. it retains its high tone when it precedes a high-toned verb. However, when it appears in the reduplicant with a high-toned stem, -sá- undergoes Meeussen’s Rule and loses its high tone. The tonal patterns of a high stem with reduplicated -sá- are identical to those with toneless -ya-, presenting strong evidence that when prefixal morphemes are reduplicated, they lose their prefixal affiliation and undergo the tonal alternations characteristic of (Macro)stem-internal morphemes, specifically object markers:
(29)  
\begin{align*}
a. \text{si-sá-sebénza} & \quad \text{‘we are still working’} \rightarrow \text{si-sá-[sebe+sebénza]} \\
b. \text{u-sá-\textdegree fā} & \quad \text{‘you are still dying’} \rightarrow \text{u-[sa-fā+sá-fā]}
\end{align*}

(29b) shows that one of the two underlying H’s in the non-reduplicated form is deleted when -sá- is reduplicated. The pattern shown with -sá- is identical to the tone of the toneless morpheme -ya- when it is reduplicated:

(30)  
\begin{align*}
a. \text{u-ya-fā} & \quad \text{‘you’re dying’} \rightarrow \text{u-[ya-fā+yā-fā]}
\end{align*}

The tonal patterns of reduplications of a high-toned monosyllabic stem are identical whether the prefixal morpheme appearing in the reduplication is high-toned -sá- or toneless -ya-. This shows that the -sá- dissimilates and undergoes Meeussen’s Rule, and that reduplication voids the prefixal affiliation of -sá- in non-reduplicated forms.

For the sake of comparison, reduplication of -sá- with a low-toned root, when the tone of -sá- is indisputably preserved, since it is the only high-toned morpheme present in the construction:

(31) \quad \text{u-sá-lw-a} \quad \text{‘you’re still fighting’} \rightarrow \text{u-[sa-lwā+sa-lwa]}

6.10 The interaction of reduplication with grammatical tone

The data from reduplications of disyllabic and trisyllabic stems show the complications involved with asserting whether high-tones are linked to the reduplicant, the base, or both constituents, consequently making it difficult to fully understand the ordering of the processes of tone assignment, spreading, and reduplication. However, when we look at grammatical tones, those that are linked with certain paradigms, we can see that reduplication certainly happens before these tones associate with the verb complex. Up to this point, the tones that have been discussed are lexical tones, meaning tones that are
linked to specific morphemes, like subject markers or verb roots. Grammatical tones behave somewhat differently, as they “dock” at an edge of the verb complex and often target multiple syllables (Claughton 1983).

For instance, the negative present is characterized as an initial *a-* and final *-i*, but it is also characterized by a high tone that targets the penult (Buell 2005, p. 83):

(32)  
\[
\text{ngi-ya-namathelis-}a \quad \text{‘I stick’ } \rightarrow \text{a-ngi-namathelis-}i \quad \text{‘I don’t stick’}
\]

Under reduplication, the final vowel of negation *-i* cannot occur in the reduplicant, nor can the penultimate high the suffix (or tense) contributes:

(33)  
\[
\begin{align*}
\text{a. } \text{ngi-ya-khaph-}a & \quad \text{‘I lead’} \\
\text{b. } a-\text{ngi-kháph-}i & \quad \text{‘I don’t lead’} \rightarrow a-\text{ngi-[khaph-}a+kháph-}i \\
& \quad \ast a-\text{ngi-[khaph-}i+kháph-}i \\
& \quad \ast a-\text{ngi-[kháph-}a+kháph-}i
\end{align*}
\]

The ungrammatical examples in (32) show that neither the segmental nor tonal realization correlated with negation may appear on the reduplicant. This is the case even for paradigms bearing a suffix with the default segmental content of the final vowel *-a*, which is what we find with the negative past subjunctive. This TAM paradigm is marked by an *-a-* that follows the subject marker, after which we find a *-nga-*; additionally, there is a HH tonal pattern that docks over the last two syllables of the verb complex (the tense carries a consecutive reading):

(34)  
\[
\begin{align*}
\text{ng-a-nga-kháph-}â & \quad \text{‘and then I didn’t lead’} \rightarrow \text{nga-nga-[khaph-}a+kháph-}â \\
1\text{SG-PST-NEG-lead-FV.SBJ} & \quad \ast \text{nga-nga-[kháph-}â+kháph-}â \\
& \quad \ast \text{nga-nga-[kháph-}â+kháph-}â
\end{align*}
\]
Even when there is no segmental suffix that characterizes a particular paradigm, the tonal suffix cannot target the reduplicant, and must instead dock at the right edge of the full RED+base complex.

In conclusion, this chapter has reviewed the key distinctions between Zululand and Durban Zulu, and shown how these dialectal differences play out under reduplication. The data suggest that the copying operation of reduplication takes place prior to tone assignment, but this is complicated by patterns that seem to indicate that a stem-internal high tone is linked to the base for trisyllabic and larger stems, but to the reduplicant for stems that are disyllabic and smaller. An interesting finding is that a morpheme outside the domain of application of Meeussen’s Rule can be subject to its application if it is reduplicated; this is shown with the prefixal morpheme -sá-. Finally, the tonal exponents of “inflectional” morphemes, like the present negative and past negative subjunctive, behave like their segmental equivalents in that they cannot target the reduplicant and must instead appear on the full RED+base complex.
Chapter 7: Adjectival Reduplication in Zulu

7.1 Introduction

The phenomenon of verbal reduplication in the Nguni languages (Ndebele, Swati, Xhosa, and Zulu) is well-known and documented in the literature, but of these languages, at least Zulu has adjectival reduplication as well. We will see that there are many similarities between verbal and adjectival reduplication, but we also find a number of key differences. Since, in general, adjectival reduplication is not as widely studied as verbal reduplication in Bantu, it is helpful to examine the patterns in Zulu with an eye to those described for Kikerewe (Odden 1996), Kinande (Mutaka and Hyman 1990), Sotho (Gowlett 1984), and Kirundi (Brassil 2003) as points of comparison.

Many themes that occur elsewhere in the dissertation will be present here as well, albeit with a different word category. The elements that tie in this chapter with the rest of the document include a disyllabic template for adjectival reduplication, the availability of prefixal morphemes to appear in the reduplicant if it is sub-minimal, and syllabification across morpheme boundaries leading to reduplicants that are not isomorphic with morphosyntactic constituents (Inkelas 1990). Although nominal morphology is markedly different from verbal morphology, the same agglutinative principles and class based agreement system are at work.

This chapter will show that for monosyllabic adjectives, prefixal classifier morphemes can be pulled into the reduplicant—just like prefixal morphemes that are allowed to appear in the verbal reduplicant—and that syllabic and non-syllabic classifiers behave differently from one another. Additionally, a long-recognized distinction between two categories of adjectives, “adjectives” and “relatives” in Doke (1927), “adjective
bases” and “free stem adjectives” in van der Spuy (2001), “qualificative nouns” with a “variable prefix” and those with a “fossilized prefix” (Posthumus 2000), is shown to interact with reduplication such that syllabic fossilized prefixes are treated as a constituent distinct from the adjectival stem, in spite of being an invariant, non-agreeing morpheme.

Although the structure of adjectives will be discussed in more detail in section (2), an adjective used attributively (rather than predicatively) will consist of a relative marker (REL) and a class marker/classifier (CM) that each agree with the head noun of the construction. As with verbs, reduplications of adjectives are required to be minimally and maximally disyllabic (tone marked for Zulu is underlying):

(1) a. u-hlébez-a → u-[hlébe+hlebez-a]
   ‘you whisper’ → ‘you’re doing a bad job of whispering’

   b. si-fínd-a → si-[fínd-a+fund-a]
   ‘we study’ → ‘we’re doing a bad job of studying’

   c. umuntu ó-m-físhane → ó-m-[físhá+físhane]
      person.1 REL1-CM1-short * o-m-[físhane+físhane]
      ‘a short person’ → ‘a kind of short person’

   d. aba-fana a-ba-dala → a-ba-[dala+dala]
      boys.2 REL2-CM2-old
      ‘kind of old boys’

Note that the semantics of (1c,d) are similar to those of (1a,b). This is true of adjectival reduplication in Kikerewe as well:

(2) mu-kokolo → mu-[kokoló+kókolo] (Kikerewe, Odden (19))
   ‘old (cl. 1)’ → ‘kind of old (cl.1)’

This contrasts with Kinande, Kirundi, and Sotho, where adjectival reduplication has an
“intensifying” semantics: 74

(3) a. mú-bisi → mú-[bisi+bisi]  (Kinande, M&H (23b))
   ‘raw (cl.1)’ ‘real raw’

b. ma-gúfi → magúfi+mágufi  (Kirundi, Brassil (10d))
   ‘short (cl.6)’ ‘short (emphatic)’

c. ba-ba-ŋata → ba-ba-[ŋata+ŋata]  (Sotho, Gowlett (32))
   ‘many (cl. 2)’ ‘very many’

We see that in Kikerewe, a polysyllabic adjectival root is permitted to reduplicate without truncation. In Kinande and Sotho, a disyllabic adjective reduplicates and the class prefix is excluded, while the full adjectival complex reduplicates in Kirundi. For Kinande stems that are more than two syllables, reduplication is not possible, but in Zulu, truncation of the adjectival stem to fit the disyllabic template is allowed, as we see in (1b), -fishane.

The example is from nominal reduplication, but Mutaka and Hyman (p. 84) note that the processes of nominal and adjectival reduplication are identical in Kinande.

(4) a. o-tu-gotseri ‘sleepiness’ → no reduplication  (M&H (21b))
   b. e-si-fishane ‘short cl.7’ → e-si-[fisha+fishane]  (Zulu)

Setting semantics and disyllabicity aside for Zulu, the behavior of adjectival reduplication is distinct in many ways from this process for verbs. Adjectival reduplication is not as productive as verbal reduplication, and many adjectives that would seem to yield semantically and structurally felicitous reduplications are not acceptable:

(5) a. umuntu ó-m-ncáne →*ó-m-[ncáne+ncane]  
   person.1 REL.1-CM.1-small

74 Two Zulu adjectival forms were elicited that, when reduplicated, yielded the intensifying meaning described for other languages. These were -bi ‘ugly, bad’ and -ningi ‘many’.
b. \textit{umuntu ō-mú-shá} \quad \rightarrow \ast ō-[mú-shá+mu-sha]

\begin{tabular}{ll}
\text{person.1} & \text{REL.1-CM.1-young} \\
\end{tabular}

7.2 \textit{The structure (and status) of adjectives in Zulu}

Welmers (1973) points out that:

Many works on African languages… show a remarkable lack of sophistication in their treatment of noun modifiers. The term “adjective” maybe applied to any form which is reflected by an English adjective in translation, without reference to its derivation or grammatical function in the language being described. (p. 249)

Doke (1927) identifies a very limited number of “true adjectives” in Zulu; they comprise a small closed class which has about 15 members (de Schreyver 2008, Gauton 1994).

Doke distinguishes between two types of adjectives that he dubs the “adjective” and the “relative” on the basis of the type of concord each takes (this same view is advocated in Davey (1984) and Louw (1984)). This terminology has come under fire for being misleading, since both the adjective and relative \textit{are} adjectives (van der Spuy 2001), and the “true” adjective can be used in a relative context (Wilkes 1988). Although the terms are not as explanatory as they could be, they have great practical usage since the classes they denote are well-known to linguists familiar with Zulu, and this much is even conceded by those who argue against Doke’s classification scheme (Gauton 2002). The terminology of “adjective” and “relative” will be employed here, as it is necessary to distinguish between these two classes of modifiers, and the well-known descriptors are as useful as any.

Doke writes “the relative concord may be formed from the adjectival concord by eliding the nasal consonant and any vowel following the nasal” (p.107). The lefthand column below shows the adjectival agreements because \textit{hle} is a member of the true
adjective class, and the righthand column has relative agreements—\textit{-qotho} is a relative stem.

(6) a. \textit{u-mu-ntu ó-mú-hle} vs. \textit{u-mu-ntu ó-qotho}

\textit{‘good-looking person (cl.1)’} vs. \textit{‘honest person (Cl.1)’}

b. \textit{i-n-tombazane ē-n-hle} vs. \textit{i-n-tombazane ē-qotho}

\textit{‘good-looking girl (cl.9)’} vs. \textit{‘honest girl (Cl.9)’}

c. \textit{i-zin-ja e-zin-hle} vs. \textit{i-zin-ja e-zin-qotho}

\textit{‘good-looking dogs (cl.10)’} vs. \textit{‘honest dogs’}

For the non-nasal noun classes, there is no distinction between “adjectival” and “relative” agreement:

(7) a. \textit{isinkwa e-si-hle} vs. \textit{isinkwa e-si-qotho}

\textit{bread.7 REL.7-CM.7-good} vs. \textit{bread.7 REL.7-CM.7-honest}

b. \textit{ubuso o-bu-hle} vs. \textit{ubuso o-bu-qotho}

\textit{face.14 REL.14-CM.14-good} vs. \textit{face.14 REL.14-CM.14-honest}

In (6) and (7) we see that the agreeing part of the adjective/relative consists of two parts, an initial vowel—either \textit{e-}, \textit{o-}, or \textit{a-}\textsuperscript{75}—and a prefix that is closely phonologically related to the class prefix of the head noun. For instance, adjectives agreeing with \textit{u-m-ntu} are prefixed with \textit{o-mu-}, and adjectives agreeing with \textit{i-si-nkwa} are prefixed with \textit{i-si-}.

7.3 \textit{The inclusion of non-root material in adjectival and verbal reduplication}

In reduplication of sub-minimal verb roots (those with a prosodic shape of C or VC), fully syllabic subject material is not permitted into the reduplicant. However, if the

\textsuperscript{75} The initial vowel is traditionally assumed to be the result of a hiatus resolution operation, with the first vowel in hiatus always being the relative marker \textit{a-}. When this \textit{a-} combines with \textit{i-} in cases where the head noun is \textit{i-} initial, [a+i] coalesces to [e], [a+u] coalesces to [o], and of course [a+a] yields [a].
subject marker is realized as a glide, reduplication is possible; for each, the augmentative
morpheme -(y)i- is available under reduplication:

(8) a.  u-dl-á  →  * u-dl-a+u-dl-a
      ‘You eat’  ✓ u-[dl-a-yi+dl-a]

b.  u-énz-a  →  ✓ w-énz-a+w-enz-a
      ‘You make’  ✓ w-[enz-a+y-enz-a]

Similarly for adjectival reduplication, when the class marker is underlyingly syllabic
(class 1 -mú-), it may not be included in reduplicants of disyllabic adjectival stems, but
when the class marker is a nasal (class 9 -n-), it is obligatorily included (in (b)). (9c)
shows that the class 10 adjectival prefix -zin- is broken up so that the first two segments, -
zi-, are excluded from reduplication, but the -n- syllabifies with the adjectival stem and
reduplicates:

(9) a.  ugogo ó-m-dala  →  ó-m-[dala+dala]
      ‘old grandma (cl.1)’  * ó-[m-dala+m-dala]

b.  inja é-n-dala  →  é-[n-dala+n-dala]
      ‘old dog (cl.9)’  * é-n-[dala+dala]

c.  izinja e-zin-dala  →  e-zi-[ndala+ndala]
      ‘old dogs (cl.10)’  ?? e-zin-[dala+dala]

d.  isinkwa e-si-dala  →  e-si-[dala+dala]
      ‘old bread’  * e-[si-da+si-dala]
      * e-[si-dala+si-dala]

The data in (9) match up neatly with what was found for other languages. For
reduplications of adjectives with class 9 agreement in Kikerewe we find nearly identical
data:
In Kinande, recall that adjectival reduplication behaves identically to nominal reduplication, and we have:

\[(11)\]

<table>
<thead>
<tr>
<th>a.</th>
<th>n-deehi → n-deehii+n-deehi</th>
<th>(Kikerewe, Odden (23))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>‘long (Cl.9)’</td>
<td>‘kind of long (Cl.9)’</td>
</tr>
</tbody>
</table>

b. é.n-zoka → é[n-zoka+n-zoka] (M&H (10d))

‘snake’

‘real snake’

### 7.4 Minimality effects with monosyllabic adjectives

Turning back to Zulu, the pattern of excluding (underlyingly) syllabic prefixes only holds for adjectives that are minimally disyllabic. For cases of monosyllabic adjectives, reduplication is only grammatical in cases where a fully syllabic class prefix is present:

\[(12)\]

<table>
<thead>
<tr>
<th>a. i.</th>
<th>umuntu ó-mú-hle → ó-[mú-hle+mu-hle]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>‘good-looking person (Cl.1)’</td>
</tr>
<tr>
<td>ii.</td>
<td>intombazane é-n-hle → *[é-n-hle+e-n-hle]</td>
</tr>
<tr>
<td></td>
<td>‘good-looking girl (Cl.9)’</td>
</tr>
<tr>
<td>iii.</td>
<td>izintombazane e-zin-hle → e[zin-hle+zin-hle]</td>
</tr>
<tr>
<td></td>
<td>‘good-looking girls’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b. i.</th>
<th>umuntu ó-mú-de → ó-[mú-de+mu-de]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>‘tall person (Cl.1)’</td>
</tr>
<tr>
<td>ii.</td>
<td>intombazane é-n-de → *[é-n-de+e-n-de]</td>
</tr>
<tr>
<td></td>
<td>‘tall girl (Cl.9)’</td>
</tr>
</tbody>
</table>

For Kikerewe, the reduplicant is not required to be minimally disyllabic (it must be bimoraic instead), so adjectives with class 9 agreement are free to reduplicate:
In Kinande, there are two allomorphs of the class 9 prefix – nyi- and N– and morph selection seems to be related to minimality. For (most) disyllabic adjectives, either can be used:

(14) a. e.nyamá nyí-bisi ~ e.nyamá m-bisi
    ‘raw meat’

but for monosyllabic adjectives:

b. é.m-bwá nyí-bii
    ‘‘bad dog’’
    * é.m-bwá m-bii

For the Zulu examples, it’s important to note that the initial o- and e- we see as the first segment in the adjectival forms are in fact the result of a process of hiatus resolution. The relative prefix (dubbed the “qualificative formative” by Doke) is an a- that combines with the vowel-initial class prefix, which itself agrees with the noun being modified. So, what we have underlyingly is:

(15) a. i. umuntu a+um(u)-dala → umuntu o-m-dala (Class 1)
    ii. umuntu a+um(u)-hle → umuntu o-mu-hle

b. i. inja a+in-dala → inja e-n-dala (Class 9)
    ii. inja a+in-hle → inja e-n-hle

Since e-n-hle is perfectly acceptable as a non-reduplicated form, the explanation for its inability to undergo reduplication must be related to a constraint against including the 

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76 However, as Mutaka & Hyman point out, there are factors beyond minimality that condition allomorph choice, as there are some bisyllabic adjectives that are only able to take N, and others that require -nyi-.
relative prefix in the reduplicant, or alternatively the fact that the initial vowel is not yet present at the point in the derivation when reduplication applies. The presence or absence of the [u] in -mu- is assumed to be conditioned by minimality (Khumalo 1981, Gowlett 1984).

7.5 The “true” adjectives

The distinction between the so-called adjective and relative was introduced in section (2); there are a very limited number of “true adjectives”, whereas the relative adjectives comprise an open class, including borrowings like -bhizi ‘busy’ and neologisms like -kahle, originally an adverb that has acquired a new adjectival usage (van der Spuy 2001, p. 156). Gauton (2002) provides an “exhaustive” list of the true adjectives in Zulu (p. 350), and it is repeated here:

Table 7.1: Zulu’s “true” adjectives:

| -bi 'evil, bad'       | -hle 'nice, good beautiful' |
| -khulu 'big, great'   | -ncane 'small, young, a little' |
| -de 'long, tall'      | -fishane 'short' |
| -sha 'new, fresh'     | -dala 'old' |
| -bili ‘two’           | -ningi ‘much, many’ |
| -thathu ‘three’       |                          |
| -ne ‘four’            |                          |
| -hlana ‘five’         |                          |

None of the numerals were permitted to reduplicate, but in Kikerewe they may do so with a particular meaning of “x by x” (Odden1996, p. 115):

(16) babili-bábili ‘two by two (cl.2)’
     basatu-básatu ‘three by three (cl.2)’
     musaanzu-músáanzu ‘seven by seven’

Of the other 9 adjectives, all may reduplicate with the exceptions of -khulu ‘big’, -ncane ‘small’, and -sha ‘new’, though there are restrictions for the non-syllabic nasal class 9.
Table 7.2: Reduplications of “true” adjectives for classes 1 $u$-$m(u)$-, 9 $i$-$n$, 10 $i$-$zin$-, and 7 $i$-$si$-

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Class 9</th>
<th>Class 10</th>
<th>Class 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>$o$-[mu-bi+mu-bi]</td>
<td>*$[e-m-bi+e-m-bi]$</td>
<td>$e$-[zi-mbi+zi-mbi]</td>
<td>$e$-[si-bi+si-bi]</td>
</tr>
<tr>
<td>$o$-[mu-hle+mu-hle]</td>
<td>*$[e-n-hle+e-n-hle]$</td>
<td>$e$-[zhle+zhle]</td>
<td>$e$-[si-hle+si-hle]</td>
</tr>
<tr>
<td>*$o$-[khulu+khulu]</td>
<td>*$e$-[n-khulu+n-khulu]</td>
<td>*$e$-[n-khulu+n-khulu]</td>
<td>*$e$-[si-khulu+khulu]</td>
</tr>
<tr>
<td>*$o$-[ncane+ncane]</td>
<td>*$e$-[ncane+ncane]</td>
<td>*$e$-[zi-ncane+ncane]</td>
<td>*$e$-[si-ncane+ncane]</td>
</tr>
<tr>
<td>$o$-[mu-de+mu-de]</td>
<td>*$e$-[ncane+ncane]</td>
<td>*$e$-[zi-ncane+ncane]</td>
<td>*$e$-[si-ncane+ncane]</td>
</tr>
<tr>
<td>$o$-[fisha+fishane]</td>
<td>*$e$-[n-tsha+e-n-tsha]</td>
<td>*$e$-[zin-tsha+zin-tsha]</td>
<td>*$e$-[si-sha+si-sha]</td>
</tr>
<tr>
<td>$o$-[dala+dala]</td>
<td>$e$-[ndala+ndala]</td>
<td>*$e$-[zi-n-dala+n-dala]</td>
<td>*$e$-[si-dala+dala]</td>
</tr>
<tr>
<td>$o$-[ningi+ningi]</td>
<td>$e$-[ningi+ningi]</td>
<td>*$e$-[zi-[ningi+ningi]</td>
<td>*$e$-[si-[ningi+ningi]</td>
</tr>
</tbody>
</table>

There are some interesting phenomena attested, especially in the middle two columns of the table: reduplications of adjectives showing agreement with class 9 and 10 nouns. In particular, the contrast between $e$-[fisha+fishane] and $e$-[ndala+ndala] deserves a closer look.

As is clearly shown when it assimilates to [m] before -bi, the classifier morpheme is an unspecified nasal, N, that takes its place feature from the following segment (the -n- in enkhulu is pronounced as [ŋ]). Before labio-dentals like /f/, it becomes the labio-dental nasal [n], but this segment is peripheral in Zulu, only occurring as the output of an allophonic rule, and is never underlying.

The orthographic -m- in class 9 e-m-fishane is pronounced as [ŋ], and this segment is not included in the reduplicant: *e-[m-fisha+m-fishane]. Before -dala, the

---

77 Voiceless stops and fricatives become ejectives after non-syllabic nasals. Since this is an allophonic process, it is not normally reflected in the orthography: enhle [en̥e]; but in the case of /ʃ/, the ejective allophone is transcribed as -tsh-. 
placeless nasal assimilates to [n], taking the alveolar place feature from the following /d/.

Unlike [ŋ], [n] is an underlying phoneme of Zulu, in addition to being a possible output of the rule of nasal allophonic alternations. When e-n-dala reduplicates, the [n] is obligatorily included, and a reduplication omitting the class prefix is ungrammatical: *e-n-[dala+dala]. The difference between the behavior of the class prefix under reduplication when it surfaces as an [ŋ] versus when it surfaces as an [n] leads to important questions about reduplication as a structure-preserving process, to be investigated in future research.

Relatedly, there is some variation around the class 10 prefix -zin-, which also ends in an N whose place assimilates to the segment that follows. Before -dala it reduplicates like the class 9 prefix -n- with the nasal of the prefix being included in the reduplicant, but the version in which the nasal is excluded is marginally acceptable ?e-zin-[dala+dala], unlike the unequivocally bad *e-n-[dala+dala]. That the class 10 form (??e-zin-[dala+dala]) is markedly better than the class 9 version (*e-n-[dala+dala]) is a clue that there are issues other than syllabification alone that affect the availability of reduplication.

In terms of syllabification, the final -n- of the -zin- prefix syllabifies with the adjectival stem, and it is for this reason that e-zin[n-dala+n-dala] is fully acceptable. However, it appears that some sensitivity to morphological structure is active as well, which manifest as a pressure to treat morphemes as a single unit, so that the reduplication which excludes all segments of the -zin- prefix is somewhat acceptable. 78 This trend

78 Of course there is the possibility that the judgment on ??e-zin-[dala+dala] is due to metalinguistic
manifests itself in Kinande to a much stronger extent; and is known as the Morpheme Integrity Constraint (MIC) (Mutaka and Hyman 1990, p. 83):

Morpheme Integrity Constraint: Mapping of a melody to a reduplicative template takes place by morpheme. If the whole of a morpheme cannot be successfully mapped into the bisyllabic reduplicative template, then none of the morpheme may be mapped.

Obviously the MIC is not fully active in Zulu grammar, but without some recognition of the role of “morpheme integrity”, it is difficult for the different grammaticality judgments for ?

7.6 Relatives, and the effect of fused prefixes on the availability of reduplication

Relatives are permitted to reduplicate like adjectives, but the process appears to be restricted to a smaller proportion of relatives, compared to the proportion of adjectives that reduplicate. An interesting feature of relatives is that many of them have fossilized prefixes that co-occur with the variable agreement displayed based on the head noun of the construction, and this seems to be a factor in preventing reduplication from being more productive.

Many of the forms that are not allowed to reduplicate have a fused class 1 prefix that is present along with the concord (Lanham 1971). The prefixal m- in the relative stems given below behaves as part of the root itself, and not like a separable prefix or independent morpheme.79

---

79 As discussed in section (2) the class prefix for “relatives” (rather than “true” adjectives) is identical for all the noun classes except those containing a nasal, and for the nasal noun classes, the nasal deletes in the relative prefix, along with any prefixal vowels that follow it: adjectival o-m(u)- is relative o-, adjectival e-zin- is relative e-zi-, adjective e-n- is relative e-, etc.
In the last example, if we exclude the initial m- from the adjectival stem, the resulting form is ungrammatical, which just shows that the m- is genuinely part of the stem, and is (synchronously) unrelated to any class agreement. The adjectival stem -mpofu cannot reduplicate, and this is the general pattern for relatives showing a fossilized -m- prefix.

The unavailability of reduplication is unrelated to the class of the head noun the relative is agreeing with:

(18)  

(a) -mpofu ‘poor’ → * o-[mpofu+mpofu] (cl.1)  
    * o-m-[pofu+pofu] (cl.1)  
    * aba-[mpofu+mpofu] (cl.2)  
    * aba-m-[pofu+pofu] (cl.2)  
    * e-[mpofu+mpofu] (cl.9)  
    * e-m-[pofu+pofu] (cl.9)

(b) o-mhlope ‘white (cl.1)’ → * o-[mhlope+mhlope]  
    * o-m-[hlope+hlope]

(c) o-mtoti ‘sweet (cl.1)’ → * o-[mtoti+mtoti]  
    * o-m-[toti+toti]

(d) o-mnene ‘kind (cl.1)’ → * o-[mnene+mnene]  
    * o-m-[nene+nene]

There is one exception to this trend, which we find for the relative form -mnandi ‘pleasant’; of all the relatives, -mnandi is certainly the most frequently encountered in the
language. Interestingly, the -m, behaves as part of the root like the examples of other relatives in (18), but it is dispreferred to include it in what gets reduplicated:

(19) a. umoba ó-mnandi → umoba óm[nandi+nandi]
‘good-tasting sugar cane (cl.1a)’
?? umoba o[mnandi+mnandi]

b. inyama é-mnandi → inyama ém[nandi+nandi]
‘good-tasting meat (cl.9)’
?? inyama e[mnandi+mnandi] 80

This pattern is surprising given that there is robust evidence that the m- is part of the relative, rather than an agreement morpheme. Forms like those shown below are encountered very frequently:

(20)a. u-bisi ó-lú-mnandi ‘good-tasting milk (cl.11)’
   * u-bisi o-lu-nandi

b. imithi é-mi-mnandi ‘good-tasting medicine (cl.4)’
   * imithi e-mi-nandi

c. ukudla o-ku-mnandi ‘good tasting food (cl.15)’
   * ukudla o-ku-nandi

What (20) tells us is that there is no ambiguity about the status of the initial m- vis-à-vis the relative stem– it is the initial segment, and is unrelated to the agreement morphology that is exerted on the relative by the head noun of the construction. However, this is difficult to reconcile with the reduplication judgments given in (15), in which the m- is treated like a separable prefix, and dispreferred in the reduplicant.

The data in (19) show that there is “something” about the fossilized m- prefix that

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80 The absence of data in (19) of forms showing agreement with a head noun belonging to a noun class which has a fully syllabic relative agreement prefix (such as class 7 esi-, etc.) is regrettable. Unfortunately, the judgments presented in this chapter were collected from a single speaker in Berkeley who has returned to South Africa, although the phenomena introduced here certainly warrant more extensive study.
indicates to speakers that it can be separated from the relative stem, even though they clearly treat it as though it is part of the stem in non-reduplicated contexts, like those in (20). For one thing, the sequence of -mn- is not phonotactically licit, and could only have developed diachronically through an alternation involving the -m(u)- morpheme, an alternation which is still synchronically active (shown with the class agreement prefixes in “true” adjectives, cf. o-mu-hle vs. o-m-khulu).

In light of this aspect of Zulu’s synchronic grammar, it is reasonable for speakers to interpret the initial m- of the relative stem as a morpheme distinct from the -nandi that follows. Additionally, without data from other noun classes, it is possible that for classes 1 and 9 the m- has been re-analyzed as a prefix, on analogy with the nasal prefix that is part of the agreement paradigm for “true” adjectives but not relatives (though this hypothesis is admittedly somewhat far-fetched since there is robust evidence from other noun classes that the m- is in fact part of the relative stem).

Although many relatives contain a fossilized m- prefix whose erstwhile prefixal status seems to be marginally accessible to speakers, there are a small number of relatives with fused prefixes that are more “easily identifiable” as such. Preliminarily, it appears to be the case that speakers are more comfortable lopping off this prefix and reduplicating the root, and there is none of the ambiguity we saw in (19) with -mnandi. In the examples below, the -lu- in lu(-)hlaza ‘blue’ is a vestige of class 11 agreement (the ulu- class), and the -ma- in -ma(-)khaza is a vestige of class 6 agreement (the ama-class).81

---
81 The dashes in -lu(-)hlaza and -ma-khaza indicate the boundary between the fused prefix and the original stem.
(21) a. inja é-lú(-)hláza → inja é-lú-[hláza+hlaza]
   ‘ blue dog (Cl.9, Cl.11) * inja e-[lu-hla+lu-hlaza]

b. kú-má(-)kháza\(^{82}\)
   ‘ it’s cold out (Cl. 17, Cl.6) → kú-má-[kháza+khaza]
   * ku-[ma-kha+ma-khaza]

The contrast between (19) and (21) is noteworthy; it appears that the lack of ambiguity in
the fused prefixes in -lu(-)hlaza and -ma(-)khaza helps make these forms available for
reduplication. Of the numerous relatives with a fossilized m- prefix, I only encountered
one that could reduplicate (-mnandi), but both of the relatives with the easily separable
prefixes were acceptable as reduplications. Especially in the case of relatives, the
relationship between the “morphological analyzability” and reduplication is a promising
area for future work.

7.7 Possible phonological generalizations- absence of final /u/ and /o/?

Although more data is needed to confirm the pattern, no adjectival reduplications of
adjectives or relatives were found that ended in /o/ or /u/. Leaving aside the relatives with
initial m- that are unavailable for reduplication for reasons discussed above, the list
striking is the contrast between -qatha ‘strong’ and -qotho ‘honest’; the former is
permitted to reduplicate while the latter may not:

(22) a. i. umuntu ó-qatha → umuntu ó[qatha+qatha]
   ‘ strong person’ ‘kind of strong person’

\(^{82}\) The ku-makhaza example is the one instance I elicited an adjective in a predicative/copulative context
rather than attributive/qualificative.
If the absence of final /u/ and /o/ is genuine, rather than an artifact of the general lack of productivity we see for adjectival reduplication, one possible explanation has to do with the presumable source of adjectival reduplication: verbal reduplication. The CVC root shape is common in Zulu, and absent any extension suffixes, such roots are required to take a final -a in the reduplicant, a pattern familiar from earlier chapters:

(23)a.  u-fund-e
    “you studied”
    →  i. u-[fund-a+fund-e]
        ii.* u-[fund-e+fund-e]

    b.  a-wu-fund-i
    “you don’t read”
    →  i. a-wu-[fund-a+fund-i]
        ii.* a-wu-[fund-i+fund-i]

If an extension suffix such as causative -is- or applicative -el- is present, its vowel may also serve as the final vowel on the reduplicant (Hyman et al. 2009):

(24) a.  u-ya-m-fund-is-a
    ‘you make him study’
    →  u-ya-m-[fund-a+fund-is-a]
          u-ya-m-[fund-i+fund-is-a]

    b.  u-ya-m-theng-el-a
    ‘you shop for him’
    →  u-ya-m-[theng-a+theng-el-a]
          u-ya-m-[theng-e+theng-el-a]
However, if a verb root is polysyllabic (or includes the fossilized and synchronically non-productive -uk- or -ul- suffixes), it is possible that the reduplicant end in -o or -u.\(^8^3\)

(25) a. uku-bangul-a ‘cut skin to remove a thorn’ → uku-[bangu+bangul-a]
b. uku-canuk-a ‘be disgusted’ → uku-[canu+canuk-a]
c. uku-dondolozela ‘walk with a cane’ → uku-[dondo+dondolozela]
d. uku-gqolozela ‘stare at’ → uku-[gqolo+gqolozela]

Leaving the data in (25) aside, if reduplications of adjectives and relatives ending in -o and -u are rejected because they are unfamiliar as endings on verbal reduplicants, it is logical to expect the converse as well: that adjectives and relatives ending in -a are most likely to be acceptable as reduplications, but this expectation is not borne out, since the adjective -sha ‘young, new’ does not reduplicate even with a fully syllabic classifier prefix:

(26) o-mu-sha ‘young (cl.1)’ → *o-[mu-sha+mu-sha]
e-si-sha ‘youn (cl.7)’ → *e-[si-sha+si-sha]

7.8 Nominal Reduplication

The phenomenon of nominal reduplication was not targeted in my fieldwork, but it is reported in Gowlett (1984), largely for monosyllabic stems because the focus of his article is “stabilizer” morphemes. First identified for Tswana by Cole (1955), stabilizers are defined as:

Stabilizers are prefixal or suffixal elements which have no intrinsic significance or concordial function, their sole purpose being to provide an additional syllable for words which, generally speaking, would otherwise be monosyllabic. (cited in Gowlett, p.187)

\(^8^3\) A number of the Zulu speakers who served as consultants for verbal reduplication were uncomfortable with reduplications that did not end in an -a, but the pattern of truncation in (25) is documented in Doke.
For nouns that are disyllabic—in which no stabilizer is necessary—the stem is reduplicated as expected, following the pattern for adjectival reduplication. The semantics of nominal reduplication are intensive, rather than “diminutive”:

(27) a. *imi-fula* ‘rivers (cl.4)’ → *imi-[fula+fula] ‘many rivers’
    b. *ama-sonto* ‘weeks (cl.6)’ → *ama-[sonto+sonto] ‘many weeks’

（Gowlett, p. 189 (12))

For monosyllabic noun stems, there are two possible options, familiar from verbal reduplication: the stems may be augmented with the noun prefix, or the empty -yi-morpheme that is commonly used in verbal reduplication of monosyllabic stems:

(28) a. *imi-hla* ‘days (cl.4)’ → *imi-[hla-+hla] ‘many days’

    i-[mi-hla+mi-hla]

    b. *ama-fu* ‘clouds (cl.6)’ → *ama-[fu-+fu] ‘many clouds’

    a-[ma-fu+ma-fu]

（Gowlett, p. 189 (13))

Augmentation with -yi- was absent from the discussion of adjectival reduplication because the judgments in this chapter are from a single speaker (as stated in footnote (80)), who lacked augmentative -yi- word internally. She produced imperatives such as:

(29) *yi-dl-a* ‘eat!’ *yi-ma* ‘stand!’ *yi-lwa* ‘fight!’ *yi-fa* ‘die!’

However, for these same roots, she only produced and accepted reduplications containing prefixal morphemes, like an object marker, long form present marker -ya-, or durative -sa-:

(30) a. *u-ya-si-dl-a* ‘you eat it (cl.7)’ → *u-ya-[si-dla+si-dla]

    *u-ya-si-[dla-+yi+dla]

    b. *u-ya-ma* ‘you’re getting up’ → *u-[ya-ma+ya-ma]

    *u-ya-[ma-+yi+ma]
c.  \( u\text{-sa-lwa} \) ‘you still fight’  \( \rightarrow \)  \( u\text{-}[sa\text{-dla}+sa\text{-dla}] \)
    * \( u\text{-sa-[dla-yi+dla]} \)

After consulting with other Zulu speakers, it was revealed that her rejection of verb-internal -yi- was the exception rather than the rule (though I did encounter 3 other people who also rejected all occurrences of verb-internal -yi-). It is clear that the data presented here need to be verified with other speakers, and one likely outcome of re-checking the judgments will be finding that adjectival reduplication participates in the same alternations as verbal and nominal reduplication. That is, it is my strong suspicion that we will encounter speakers who reduplicate \( o\text{-mu-hle} \) ‘good (cl.1)’ as \( o\text{-mu-[hle-yi+hle]} \) in addition to the \( o\text{-}[mu\text{-hle+mu-hle]} \) that is reported here. Obviously of course, these data need to be collected in order for this hypothesis to be confirmed.

In conclusion, adjectival reduplication presents a good testing ground to examine a number of important questions about Zulu morphophonology. Although in some ways these questions are similar to those raised by verbal reduplication, such as, minimality, syllabification, and (pseudo)morphological complexity, the structure of the adjective and the morphemes involved lets us look at these familiar topics in a new light. Potential areas to pursue further include how tone behaves in adjectival reduplication, how fossilized unseparable class prefixes affect the availability of reduplication, whether the generalization that adjectival reduplicants cannot end in -u and -o is influenced by the endings we see most often on verbal reduplicants, and -yi- as an augmentative option for monosyllabic adjectives if a larger group of speakers is consulted.
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