TOPICS IN RUNYANKORE PHONOLOGY

DISSERTATION

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By

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ABSTRACT

This dissertation examines several issues in the phonology and morphology of the Bantu language Runyankore. While this language has been studied in the past, to date there has been no extensive discussion of the tonal patterns, reduplication, or the syntax-phonology interface. Along with a descriptive account of these aspects of the language, this dissertation also seeks to examine the role of Optimality Theory in a grammatical analysis of the language.

The verbal system of Runyankore contains a number of different types of tonal patterns. These are described and analyzed from an Optimality Theoretic perspective. Ultimately, two major categories of tone pattern emerge: lexical and melodic. The lexical tone patterns contain high tones that are associated with some segmental morpheme. On the other hand, the melodic tone patterns contain a high tone that is morphologically associated with the tense/aspect and with no specific segmental morpheme. We find that in order to describe adequately these patterns the notion of constraint must be extended to include macroconstraints, which comprise two or more constraints that are joined in a Boolean relationship. These constraints are associated with specific tense/aspect and outrank those constraints responsible for the more general lexical tone patterns. In fact, the linking of the macroconstraints with particular patterns indicates a close relationship between constraint conjunction and morphology.

Reduplication in Runyankore exhibits the familiar pattern found in many Bantu languages. However, there are two very interesting features of Runyankore reduplication that have special theoretical interest. First, very short verbs in Runyankore cannot undergo reduplication because they do not contain enough segmental material to create a well-formed reduplicant. This is explained by reference to the possibility that a null parse is a possible candidate as an output from GEN. Secondly, we find a number of morphologically conditioned consonant mutations in Runyankore. There is an asymmetry

ii

between their appearance in the reduplicant and the base of reduplication. This is an indication that similarity to the input outranks the constraints on similarity with the output.

Finally, we consider the interface between syntax and phonology in Runyankore. There are two different tonal rules that apply within distinct phrasal contexts. One rule deletes a high tone from nouns. The second rule inserts a high tone onto a number of different lexical categories. Ultimately, through thorough description and analysis, we find that the grammar must make reference to syntactic structures to predict high tone deletion and to prosodic structures to predict high tone insertion.

Dedicated to my fellow graduate students

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3. 1996. Base-Identity Effects in Runyankore Reduplication. *Ohio State University Working Papers in Linguistics 48*. Columbus: The Ohio State University Department of Linguistics.

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TABLE OF CONTENTS

FIGURES

TABLEAUX

xviii

xix

CHAPTER 1

INTRODUCTION

"The truth is the whole."

G. W. F. Hegel

Preface to *The Phenomenology Of Spirit*

1.1   Introduction to Runyankore

The goal of a generative grammar of a language is to provide a means of assigning a structural description to every sentence of that language. (Chomsky 1957, 1965). For the phonologist, this goal includes the creation of a model of the mental representations of the phonetic signals that are interpreted as meaningful by speaker of a language. Thus, the phonologist seeks to write a grammar in two senses of the word. One represents the set of rules or principles that describes the speaker's linguistic competence, the cognitive structures we suppose are responsible for the speaker's ability to produce and process language. The second sense of the word "grammar" is the abstract linguistic model of that competence.

However, the linguist does not have direct access to the contents of the speaker's mind and must content him/herself with the physical manifestation of the speaker's linguistic competence—performance (Chomsky 1965). Thus, the development of a linguistic grammar is dependent upon painstaking data collection. Linguists are fortunate that

there is a long tradition of language description, dating back millennia. Humans have wondered about language like the Twenty-sixth dynasty Pharaoh Psammētichus (seventh century BCE), who sought out the 'oldest' language.[1] Others have sought to describe (a) language like the Indian grammarian Pāṇini (supposed to have lived in the fourth century BCE) whose grammar of Sanskrit set the standard for the religious linguistic code of Hinduism, Buddhism and the Indian subcontinent (Whitney 1889). The basis for understanding human languages lies in complete and accurate linguistic description. Furthermore, only an understanding a language as an integrated system can truly elucidate the underlying structure of linguistic phenomena. In this spirit, we quote Hegel: "The truth is the whole."

Thus, this dissertation seeks to document the Bantu language Runyankore. While only a subset of the language is described herein, it represents a significant addition to the literature on Runyankore and Bantu languages generally. Nearly all of the data contained in this dissertation were collected by the author.[2] Beyond simply documenting aspects of the language, we also seek to examine the theoretical import of the data we have uncovered. The topics explored in this dissertation: tone, reduplication and the syntax-phonology interface, have been important and theoretically challenging areas on phonology. It is hoped that this dissertation will not only preserve some previously unrecorded data from an interesting language, but also ask (and hopefully answer) some important questions about current theories in linguistics.

1.1.1   Facts about the Language

Runyankore is spoken in the Southern province (also known as the Ankole district) in southwestern Uganda, in east Africa. The region where Runyankore is spoken lies be-

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[1] Herodotus (Book II.2, from Finley p. 63) relates that Psammētichus attempted to discover the oldest language by isolating children from the speech community. Of course, this story may be apocryphal, but, it demonstrates that someone, Egyptian or Greek, was wondering about language.

[2] Much of the data were collected with the assistance of Prof. David Odden who suggested directions to take and tricks to learning to hear tone.

tween Lake Edward and Lake Victoria, just north of the borders with Rwanda and Tanzania. (Ladefoged, Glick & Criper) The capital city of this district is Mbarara, which can be seen in the map of Uganda given in Figure 1.1, below. There are two main dialects of Runyankore (Johnson 1976, Taylor 1985): high and low. The difference between them is that low speakers have lost a number of tonal contrasts in the language. This dissertation examines the speech of a "high dialect" speaker. The primary source of linguistic data for this dissertation, Dr. Patrick Bamwine, is a native of Uganda and lived in Mbarara prior to taking up residence in the United States. The author worked personally with Dr. Bamwine, first with David Odden and then independently, for approximately four years.

Guthrie (1948) classified Runyankore as a zone E (E13) language. Runyankore has also been classified as a Rutara language in the Interlacustrine group of Bantu languages. The Rutara subgroup is taken to include Runyoro, Rutoro, Rukiga, Runyankore, Haya, Zinza, Kikerewe, and Kinyambo (Nurse 1979). Runyankore is often cited with Rukiga with which is bears considerable similarities.[3] It is closely related to a number of other languages spoken in Uganda, in particular Runyoro and Rutoro. Other closely related languages include Haya (Hyman & Byarushengo 1984, Hyman 1993), Kikerewe (Odden 1995a, 1996a), Zinza (Odden 1997), Kinyambo (Bickmore 1989).

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[3] One might argue they are dialects of the same language, but this question ultimately concerns social, political, and anthropological issues we are not prepared to deal with here. Interestingly, there is a political movement in Uganda to unite the languages of Runyankore, Rukiga, Runyoro, and Rutoro under the rubric of one language, Runyakitara (Bernsten 1996)

Figure 1.1   Map of Uganda

1.1.2   Previous Scholarship

The most complete previous works on Runyankore focus upon the syntax and morphol-
ogy of the language. Taylor (1985) provides a fairly detailed description of the syntax
and morphology of the language. However, his discussion of phonology is relatively brief
and does not include much detail about the tonal system. Taylor's (1959) dictionary rep-
resents a significantly useful tool for the researcher of Runyankore/Rukiga. The dialect
represented in the dictionary was nearly always coincident with Dr. Bamwine's intui-
tions. Additional information about Runyankore can be found in Morris and Kirwan's
(1972) grammar of the language. While written to facilitate the English speaker's leaning
of Runyankore, it contains some useful information about the language. Taylor (1972)

discusses the initial vowel in Runyankore nouns and adjectives. Taylor (1977) also discusses presuppositional clauses in Runyankore. Johnson (1976) discusses the common process of vowel devoicing in Runyankore. These works represent important contributions to an understanding of the language. However, the issue of the tonal properties remains relatively undescribed. Taylor (1985) devotes a small section of his grammar to the tonal properties of Runyankore (about four pages). Generally, we have found that the data in this dissertation are in agreement with those presented in previous works.

1.2   The Goals of this Dissertation

The two primary goals of this dissertation are to provide a fuller description of the language, beyond that provided by previous scholars, and to explore contemporary issues in phonological and linguistic theory based upon the data findings presented.

1.2.1   Descriptive Goals

This dissertation provides a fairly thorough description of the tonal properties of Runyankore.[4] While there have been a number of works that have described the syntax and morphology of Runyankore fairly well, to date, there has not been a discussion of the full range of types of tonal patterns found in the language. In particular, previous discussions have tended to obscure the tonal distinctions found between high and low toned roots because they have only considered verb stem that were too short to display all of the contrasts that can be found between these two types of stems.

   To that end, Chapters 3 and 4 present an analysis of the tone patterns found in the language. Chapter 3 concentrates on the tonal patterns that emerge when there are multiple high-toned morphemes in a word. The most important generalization is that there may be only a single high tone on the stem of a word (verb or noun). Chapter 4 examines the

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[4] According to Taylor (1959, 1985), there are two dialects of Runyankore that differ with respect to tone. The dialect discussed in this dissertation would be a member of the so-called "high speakers" dialect, which retains more tonal contrasts (i.e., more high tones) than the corresponding "low speakers" dialect.

tonal principles that are governed more directly by the tense/aspect morphology of the language. Specifically, we find a special tonal pattern appearing on verb stems when they are in certain verb tenses (for example, the yesterday past tense form of a toneless verb root will have a high tone association to the syllable containing the second mora of the stem). This additional high tone is part of the morphology of the language. In describing it, we will see a hierarchy of default patterns. In other words, there is a primary pattern found with high-toned roots, then a default tonal pattern found in toneless roots. Finally, in the absence of a floating morphological high tone, the lexical tone-association patterns discussed in Chapter 3 emerge. The issue of tonal assignment will also be relevant in the discussion of Reduplication in Chapter 5.

Chapter 5 considers reduplication in Runyankore. The reduplicative pattern found in Runyankore is very similar to that found in many other Bantu: the reduplicated string is a foot copied from the verb stem. Runyankore exhibits a number of interesting properties that are highlighted in this chapter. One of them concerns the issue of minimality—what happens when there are not enough segments in the verb stem to build a reduplicant that is a binary foot? (The answer: reduplication fails.) We will also see in Runyankore a stronger tendency for the reduplicant to resemble the input morphemes and some divergence from the form of the surface-corresponding segments.

In Chapter 6, we expand the discussion of tone in Runyankore to consider the relationship between syntactic structure and tone on a phrasal level. There are two complementary phrasal tone principles in Runyankore. One deletes a high tone and the other inserts a high tone. We compare the environments in which each of these occurs and compare theories that have been proposed to account for these types of phenomena. Ultimately, we shall discover that these two tonal principles cannot be collapsed under a single theoretical account.

1.2.2   Theoretical Goals

The data presented in Chapters 3–5 are analyzed within the framework of Optimality Theory and its extensions. One of the primary goals in these chapters is to describe the

tonal system of the language within this theory. Beyond the goal of description, however, we also seek to examine the theoretical picture that emerges from this type of analysis.

Typically, optimality theoretic analyses have tended to focus on a particular phonological problem or phenomenon in a number of languages. This acknowledges one of the goals of OT—to discover the linguistic universals responsible for phonological patterns as reflected in the different languages that emerge from various rankings of a small set of constraints. However, it is a different matter to examine the entire phonological system of a language and determine whether a particular theory provides any further insights into the language.[5] We believe that by examining a particular language *system* in detail, we might gain insights into the theory that is used to explicate the system. The system of a language is a whole, with many interconnected and interrelated parts. Because of this, the entire system must be comprehended as well as it possible.

In terms of the linguistic system, one of observations that we will make over and over in the chapters that follow is that there are tone patterns that emerge because of morphologically restricted constraints. At the same time, there is a "default" pattern that emerges (surfaces, is pronounced, etc.) when no specific morphological restrictions come to bear. What turns out to be particularly interesting is the fact that the constraints that are morphologically more specific will rank higher than those constraints that are less specific (or not specific at all). For example, the V2/Final and the V2/default patterns discussed in Chapter 4 show a hierarchy of constraints: the most morphologically marked outrank the less morphologically marked. This pattern is superimposed upon the ranking of more and less violable constraints in the language. In other words, I do not believe that we can claim that every morphologically conditioned constraint outranks every general constraint. However, when a morphologically conditioned constraint functions similarly to a general constraint, the former outranks the latter.

At this point, I am hesitant to draw conclusions about Optimality Theory based upon just this study. However, I see it as a prolegomena and an invitation to the further examination of individual languages as systems within the theory. Ultimately, we may discover

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[5] This dissertation is not a *complete* grammar of Runyankore. But, it does represent a relatively thorough account of the tonal phenomena encountered in the language.

the constraint ranking system of OT mirrors the organizational patterns of lexical phonology. The violability of certain groups of constraints is closely connected with their association to particular morphological classes (such as a particular tense/aspect). Furthermore, these constraints rank above the morphologically unrestricted tonal constraints, almost as a block. In Chapter 3, we see another set of constraints, ones that would be considered post-lexical in a rule-ordered lexicalist approach. Taken together, we see the possibility that these patterns represent a general truth about the organization of grammars.

1.3   Theoretical Assumptions

The general theoretical approach taken in this dissertation will rely upon the model proposed within Optimality Theory (Prince & Smolensky 1993, McCarthy & Prince 1993a, 1993b, 1995, McCarthy 1994). Chapters 3–5 work within this model. Chapter 6, which discusses two rules in the syntax-phonology interface of Runyankore, does not explicitly couch its arguments in Optimality Theory. The question that this chapter explores does not benefit from a treatment within Optimality Theory because it concerns primarily the levels of representation necessary in order to account for specific syntax/phonology phenomena. There is no question that the results could be translated or reformulated in an Optimality Theoretic model; however, I saw no benefit in doing so.

1.3.1   Optimality Theory

One of the most significant theoretical developments in phonology (and syntax) has been the Optimality Theory (OT) model of phonological processing. A full treatment of the theory is beyond the scope and limitations of this discussion. However, the reader unfamiliar with it and wishing a proper introduction is referred to Prince & Smolensky (1993), McCarthy & Prince (1993a, 1993b, 1995), McCarthy (1994), and many other works referenced at the end of this dissertation.

The most basic assumption of OT is that there are two components in the grammar. The first generates a set of possible candidates (subject to very general constraints). This is referred to as GEN (for "Generator"). This candidate set is then evaluated by the

constraints on well-formedness (H-EVAL, "harmonic evaluation"). Ultimately, one of the goals of OT is to posit a universal constraint set for language. The differences between languages arise from the ranking of the constraints. In other words, some languages will prefer to delete consonants that would end up in the coda of a syllable, while others will allow them to remain. In the first case, the language ranks the constraint NOCODA above the constraints that would prevent deletion (i.e., penalize the failure to include the segment in the output). In the second case, NOCODA ranks below those constraints.

The key assumptions of OT are worth repeating as we are concerned with testing them in this dissertation. These are taken from McCarthy & Prince (1993a).

(1.1)   Properties of Optimality Theory

        a. **Violability**. Constraints are **violable**; but violation is minimal.

        b. **Ranking**. Constraints are **ranked** on a language-particular basis; the notion of minimal violation (or best-satisfaction) is defined in terms of this ranking.

        c. **Inclusiveness**. The candidate analyses, which are evaluated by the constraint hierarchy, are admitted by very general considerations of structural well-formedness; there are no specific rules or repair strategies with specific structural descriptions or structural changes or with connections to specific constraints.

        d. **Parallelism**. Best-satisfaction of the constraint hierarchy is computed over the whole hierarchy and the whole candidate set.

We shall wish particularly to examine the claims of Inclusiveness and Parallelism. At a number of points throughout this discussion, I will point out alternative analysis that would simplify the grammar if we were to omit Parallelism and allow for the possibility of multiple evaluation stages in the grammar. Inclusiveness requires that the candidate set admitted to H-EVAL contain all the possible parses of the input. In fact, the candidate set is theoretically infinite. This assumption forces us to encode information into the constraint hierarchy that in previous analyses of languages has been the purview of a separate

grammatical component, generally a morphological component. We shall see this specifically in Chapter 4, where we will examine the verb tenses that have morphologically conditioned tonal patterns.

Ultimately, I suggest that we shall find that it is possible to retain these assumptions. However, they greatly complicate the types of constraints that are necessary to describe the system. This leads to very powerful system. On the other hand, if we dispense with Parallelism the system is simpler. However, at this point OT begins to appear less coherent and more like a theoretical variant of Lexical Phonology, with its levels of derivation.

I will not explore the interpretation of the tableaux so characteristic of OT in this introduction. Rather, I will leave that to the text so that we may examine a specific example at the outset of the discussion. Again, the interested reader may wish to consult Prince & Smolensky (1993) or McCarthy & Prince (1993a, 1993b) for a more complete discussion of OT tableaux.

Since the appearance of the original manuscript detailing the theoretical contents of OT (Prince & Smolensky 1993), there have been some important changes to the theory. It would be useful to briefly discuss them before continuing.

1.3.2   Alignment Theory

Alignment Theory (McCarthy & Prince 1993b) introduces a formalism into OT that seeks to capture the generalization that the edges of constituents play a significant role in phonology and morphology. As we shall see in the chapters that follow, this is also true of Runyankore. Alignment theory can be summarized as a family of constraints that McCarthy & Prince (1993b) refer to as "Generalized Alignment". They offer a schema that is the basis for this family of constraints.

(1.2)   Generalized Alignment

      ALIGN(Cat1, Edge1, Cat 2, Edge2) $=_{def}$

          ∀ Cat1 ∃ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

      Where

          Cat1, Cat2 ∈ PCat ∪ GCat

          Edge1, Edge2 ∈ {Right, Left}

An alignment constraint enforces the edge-alignment of two constituents, which range over the possible phonological and grammatical categories. For example, in Chapter 3 we see the following constraint.

(1.3)   ALIGN(MACROSTEM, RIGHT, HIGH, RIGHT)

This constraint is read "align the right edge of any (or all) macrostem with the right edge of some high tone". Basically, it requires a high tone to be associated to the end of a macrostem (part of the verb, see Chapter 2). If a candidate has a high tone only on the penult syllable, it receives a single mark; if the high tone is on the antepenult syllable, then two marks are assigned. One mark is awarded for each tone-bearing unit that separates the right edge of the high tone from the right edge of the word. This type of mark assignment is illustrated in the following mini-tableau.

Tableau 1.1 High tone alignment: /CV́CVCV/

	ALIGN(MACROSTEM, R, H, R)
a. CVCVCVCV́	
b. CVCVCV́CV	*
c. CVCV́CVCV	**
d. CV́CVCVCV	***

The use of the universal and existential quantifiers ($\forall$: "for all" and $\exists$ "there is") is also an important element in the interpretation of an alignment constraint. The first argument in the alignment constraint is universally quantified. Because of this, every instance of that element in a candidate is considered for the purposes of mark assignment. On the other hand, the second argument is only existentially quantified. Therefore only a single instance of proper alignment is necessary to satisfy the constraint. This quantification also ensures that the second argument is present in the candidate parse: for every Cat1 there must be a Cat2.

1.3.3   Correspondence Theory

Originally, OT (Prince & Smolensky 1993) had as one of its core principles the notion of containment:

(1.4)   **Containment**

No element may be literally removed from the input form. The input is thus contained in every candidate form. (McCarthy & Prince 1993b)

This principle meant that deleted segments were not absent from the output, but were marked for phonetic deletion after H-Eval. It allowed the constraint hierarchy to access information about the input.

However, **Containment** was ultimately superseded by a family of constraints referred to collectively as Correspondence (McCarthy & Prince 1995).

(1.5)   **Correspondence**

Given two strings S_1 and S_2, **correspondence** is a relation $\Re$ from the elements of S_1 to those of S_2. Elements $\alpha \in S_1$ and $\beta \in S_2$ are referred to as **correspondents** of one another when $\alpha \Re \beta$.

The correspondence relationship instantiates a family of constraints on relationships between several different grammatical categories. For example, there are correspondence constraints that hold between input (S_1) and output (S_2), between base and reduplicant, and so forth. Every candidate is accompanied by a set of correspondence relationships that are necessary to evaluate this family of constraints. Two members of this family bear introduction because of their importance.

(1.6)   MAX Constraint Family (McCarthy & Prince 1995)

General Schema
Every segment of S_1 has a correspondent in S_2.
Specific Instantiations
MAX-BR
Every segment of the base has a correspondent in the reduplicant.
MAX-IO
Every segment of the input has a correspondent in the output.

(1.7)   The DEP Constraint Family

General Schema
Every segment of S_2 has a correspondent in S_1.
(S_2 is "dependent on" S_1.)
Specific Instantiations
DEP-BR
Every segment of the reduplicant has a correspondent in the base.
DEP-IO
Every segment of the output has a correspondent in the input.

The MAX constraint family basically penalizes deletion of segments (or, as we shall see, tones). On the other hand, the DEP constraint family penalizes the insertion of material (e.g., segmental epenthesis). Correspondence constraints play a key role in the

explanation of reduplication. Further aspects of OT and its extensions will arise in the following chapters. We will discuss their details as necessary.

1.4   Conclusion

We can only discover the underlying order in the grammar of a language through painstaking research and data-collection. In this dissertation, we attempt to provide a body of data from Runyankore and to analyze it in a way that may shed some light onto the organization of a grammar (in particular an OT style grammar). The hope is that even after OT has been superseded by another theory (as all theories and models are) that linguists will still be able to turn to these pages and find insights and information that will help guide their researches into the structure and patterns in human language.

CHAPTER 2

SEGMENTAL PHONOLOGY AND GRAMMATICAL STRUCTURES IN RUNYANKORE

2.1 Introduction

This chapter provides the basic grammatical and morphological background that is relevant to Runyankore. It is not the intention of this chapter to provide a complete grammar of Runyankore. The purpose of this chapter is to provide a quick reference to the major grammatical categories and the general principles of the morphology. The interested reader is directed toward Taylor (1959, 1985) and Morris & Kirwan (1957) for more complete information on the grammar of Runyankore. Taylor (1985) provides a fairly thorough overview of the syntax and morphology of the language. Taylor's dictionary (1959) also contains some grammatical information. Morris & Kirwan (1957) is intended to be a grammar for English speakers wishing to learn Runyankore.

The segmental phonology of Runyankore is relatively simple. The most distinctive phonological pattern that emerges is the pervasive palatalization of dorsal consonants. There is also a tendency for high vowels to be devoiced or deleted entirely between voiceless or identical consonants.[1] Because we are concerned primarily with tone, morphology and syntax, we will not explore this topic further here but it will be a topic of discussion with respect to reduplication (Chapter 5).

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[1] See Johnson (1976) for a discussion of vowel devoicing in Runyankore.

Like most Bantu languages, nouns and verbs in Runyankore are nearly always poly-morphemic. There is a system of morpho-syntactic concord between nouns and adjectives based upon the nominal class system. Verbs agree in class with their subjects. Adjectives must agree with the nouns they modify. The same is true for demonstratives and deter-miners. The verb tense system is very complex, with fine gradations between degrees of past, present and future.

2.2   Transcription and Segments

The representation of Runyankore is a compromise between the orthography and a strict phonetic transcription. The orthography of many Bantu languages is fairly representative of the pronunciation of words. Because of this, many Bantuists use the orthography in their work. However, the orthography of Runyankore offers a number of potentially problematic issues. Because of this, the decision was made to use a system that would be most accessible to the widest audience.

Like most of the Bantu languages of the area, the writing system provides a relatively transparent representation of the pronunciation of the language. However, in some cases, Runyankore is confusing because of the relatively common palatalization of velars. Ad-ditionally, some sound-letter pairings may not be familiar to all Bantuists (e.g., "j" is the sound [ž]). For readers who may wish to consult other works on Runyankore, the follow-ing chart compares the orthography, the transcription used in this dissertation and the pronunciation of words for the sounds that diverge most from either the IPA or other commonly used systems of transcription.

(2.1)   Runyankore Transcription, Orthography and Pronunciation

Transcription	Pronunciation	Official Orthography
sh	š	"sh"
zh	ž	"j"
c	č	"c" "ky" "k" / __ $\left\{\begin{matrix} i \\ e \end{matrix}\right\}$
j	ǰ	"gy" "g" / __ $\left\{\begin{matrix} i \\ e \end{matrix}\right\}$
ng	ŋ	"n" / __ $\left\{\begin{matrix} k \\ g \end{matrix}\right\}$
b	b / N ___ β / elsewhere	"b"

The segmental inventory of Runyankore is given below. The voiceless stops are pronounced with aspiration, which we will not represent. The sounds [b] are [v] (many Bantu languages do not distinguish these sounds having only [β] as an allophone of /b/) may be separate phonemes: [okuβúumba] 'to knead' and [okuvúumba] 'to brew beer'. But, there are not many of these pairs.

(2.2)   Consonants of Runyankore

Labial	Coronal	Palatal	Dorsal	Glottal
p	t		k	h
b	d		g	
f	s	sh		
v	z	zh		
		c		
		j		
	r			
m	n	ñ	ng	

Runyankore has a typical five vowel system. The vowels [i] and [u] are closer to [ɪ] and [ʊ] when they are short. However, this is not a phonemic distinction.

(2.3)   Vowels

i		u
e		o
	a	

Runyankore also has a number of diphthongs. The most common are written as "ai" and "ei". However, they are both pronounced as [ey]. We will maintain the contrast for two reasons (1) to match the orthography and (2) to maintain morphological patterns. For example, the sequence of morphemes *-an-* 'reciprocal' and *-ire* 'perfective' interact phonologically to produce *-aine*. On the other hand, the suffix *-er-* 'applied' plus *-ire* 'perfective' appears as *-eire*. Thus, by maintaining this distinction, the orthography gives a clue to the morphology. The diphthong [oi] also exists.

18

(2.4)   Diphthongs in Runyankore

     a. "ai" = [ey]

        okubaizha   'to carve'

        [okuβeyža]

        enkaito   'shoe'

        [eŋkeyto]

        afutaine   's/he chewed' (yesterday)

        [afu̥teyne]

     b. "ei" = [ey]

        eicúmu   'spear'

        [eyčúmu]

        eihuri   'egg'

        [eyhuri]

        eikára   'ember, coal'

        [eykʰára]

        eipapa   'wing'

        [eypʰapʰa]

     c. "oi" = [oy]

        okubóígora   'to bark, snarl'

        [okuβóygora]

        amyóire   's/he twisted'

        [amyóyre]

        okutoizha   'to tithe, donate'

        [oku̥toyža]

2.3   Basic Phonological Interactions

Like many Bantu languages, the consonantal phonology of Runyankore is relatively simple. The most common segmental interactions are also found in most Bantu languages:

nasal assimilation, nasal hardening, pre-nasal lengthening, vowel height harmony, and glide formation and compensatory lengthening. Runyankore also exhibits palatalization, which is not present in many of the neighboring languages. We discuss these topics below.

2.3.1   Nasal Assimilation

One of the most common segmental processes is found in many languages: nasal assimilation. A coda nasal will assume the place specification of the following consonant

$$(2.5) \quad n \rightarrow [\alpha \text{ place}] / \underline{\hspace{1cm}} \begin{bmatrix} \text{Stop} \\ \alpha \text{ place} \end{bmatrix}$$

/-ń -/	'me' (object prefix)
okúú-m-bara	'to count me'
okuu-n-téera	'to beat me'
okuu-ñ-jeeshera	'to harvest (millet) for me'
okúú-ŋ-gaambera	'to talk to me'

A coda nasal always agrees in place of articulation with the following consonant.

2.3.2   Sonorant Hardening

Another common consonant assimilation involves the hardening of *r* to *d* when it appears after a nasal.[2] This same assimilation is found in many other Bantu languages.

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[2] Most instances of *d* in the language arise from underlying *r*. However, there are numerous borrowings that contain initial or intervocalic *d*: *deréeva* 'driver', *eiduuka* 'shop', *edaazini* 'dozen', *edébe* 'oil-tin', *boodi* 'body (of a car), etc. Because of this fact, we cannot say with certainty that *d* is not present in the underlying inventory of the language.

(2.6)   r → d / n ___

    a. okureeba   'to see'

       okúúndeeba   'to see me'

    b. mu-raingwa   'tall (person)'

       CL1.tall

       ndaingwa   'tall'

       CL9.tall

2.3.3   A Lexical Exception—Meinhof's Ghost

We should note a lexical exception that will appear several times in the following chapters. The adjective stem *-ruunji* 'good' is subject to a process found in some other Bantu languages (most notably Luganda) referred to either as Ganda Law or Meinhof's Law. This law prohibits multiple instances of NC clusters in a word. It is robust in Luganda, as shown below in (2.7), taken from Cole (1967). Note that the underlying stem begins with a consonant. However, when a nasal is prefixed to the stem the initial consonant becomes a nasal: `m+bĕngó → `mmĕngó 'grinding-stones'.

(2.7)   Meinhof's Law in Luganda

    a. `mmĕngó   'grinding-stones' (class 10) /mbengo/

       lùbĕngó   'grinding-stone' (class 15)

    b. `mmûmbá   'I mould' /mbumba/

       kúbûmbá   'to mould'

    c. `mbááwô   'boards' (class 10)

       lùbááwô   'board' (class 11)

In Runyankore, there is only one word where this rule applies. When the adjective stem *-ruunji* 'good' appears with the class 9 or 10 prefix *n-* it surfaces as [nuunji].[3]

(2.8)   a. enkóko nuunji   'good chicken' (← /n-ruunji/)

          embwá nuunji   'good dog'

          enkaitó nuunji   'good shoe'

    b. omuuntú muruunji   'good person'

          emiguhá miruunji   'good rope'

          eihurí riruuunji   'good egg'

(2.9)   Other NCVVNC Clusters in Runyankore

    a. orubiindi   'plot to cultivate'

       embiindi   'plots to cultivate'

    b. orubaande   'path, track'

       embaande   'paths, tracks'

    c. orujeendo   'journey'

       enjeendo   'journeys'

    d. enkaitoo mpáango   'big car'

       ebitoosha biháango   'big mushroom'

Only the adjective stem *-ruunji* 'good' is subject to this alternation. The words in (2.9) demonstrate that multiple nasal consonant clusters in a word are not generally prohibited. Now that we have examined the most significant consonantal alternations, let us move on to vowels.

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[3] While there are geminates in Luganda, there are none in Runyankore. Hence, [*nnuunji*] could not be possible.

2.3.4   Pre-Nasal Lengthening

Another pervasive rule in the segmental phonology is that of pre-nasal lengthening. A vowel that appears before a nasal-consonant cluster (or, a coda nasal) will be lengthened.

(2.10) V → V: / ___ NC

a.	okutéera	'to beat'
	okuuntéera	'to beat me'
b.	okubara	'to count'
	okúúmbara	'to count me'

One very interesting fact about these long vowels is that they do not count as long vowels for the purposes of tone assignment. This issue is discussed in Chapter 4.

2.3.5   Consonant Palatalization

One of the characteristic features of Runyankore that distinguishes it from some of its neighbors (such as Haya) is the palatalization of velar consonants, [k] and [g]. When these sound appear before a front vowel, [i] or [e], they are pronounced as [č] "ch" and [ǰ], respectively.

(2.11) Palatalization of velar consonants

    a. okutéeka   ‘to cook’

        okutééc-er-a   ‘to cook for’

        ateec-íre   ‘s/he cooked’

    b. okugúruka   ‘to jump’

        okugúruc-ir-a   ‘to jump for’

        aguruc-íre   ‘s/he jumped’

    c. okuhíinga   ‘to cultivate’

        okuhíínj-ir-a   ‘to cultivate for’

        a-hiinj-íre   ‘s/he cultivated’

    d. okukáraanga   ‘to dry roast’

        okukáraanj-ir-a   ‘to dry roast for’

        akaraanj-íre   ‘s/he dry roasted’

    Palatalization is exceptionless before the vowel [i]. However, there is at least one morphological exception to palatalization before [e]: the subjunctive suffix *-e* does not condition palatalization.

(2.12) Palatalization failure before subjunctive

    a. okutéeka   ‘to cook’

        ateék-e   ‘s/he should cook’

    b. okukáraanga   ‘to dry roast’

        akaraáng-e   ‘s/he should dry roast’

    c. okubíinga   ‘to drive away’

        abiíng-e   ‘s/he should drive off’

This failure of palatalization is an idiosyncratic property of the subjunctive suffix. The morpheme boundary here is not significant because we find palatalization before other morphemes in this position: *-ire* ‘PERFECTIVE’ in (2.11), above.

The official orthography was designed around the fact that this palatalization is otherwise completely regular. Thus, "ki" is always pronounced [či] However, note also that palatalization is not the only source of palatal consonants in Runyankore: *okuchacha* 'to chop' spelled "okucaca". We will also point out here that there is also a morphologically conditioned set of spirantizations in Runyankore. These appear before three morphemes in the language: *-ire* 'PERFECTIVE', *-i* 'NOMINALIZE', and *-y* 'CAUSATIVE'. This process is discussed extensively in Chapter 5, §5.4.

2.3.6   Vowel Harmony

The verbal suffixes classified as extensions (§ 2.6.2.2) that have non-low vowels will harmonize in [±high] with the vowels of a verb root. For example, the verbal suffix (extension) *-ir-* 'for' harmonizes to a non-low root vowel.

(2.13)   a   okubara   'to count'
             okubar-ir-a   'to count for'
         b. okubóna   'to find'
             okubón-er-a   'to find for'
         c. okutéma   'to cut, chop'
             okutém-er-a   'to cut for'

Not all verb suffixes are subject to vowel harmony. The perfective suffix *-ire* fails to undergo any type of vowel harmony.

(2.14)   a-rééb-ire   's/he saw'
             a-bon-íre   's/he found'
             a-baz-íre   's/he counted'

The vowel *i* of this suffix is a reflex of the proto-Bantu superhigh vowel *$\dot{i}$. However, the contrast between high vowels and superhigh vowels (*$\dot{i}$, *$\dot{u}$) is no longer maintained

in Runyankore. It is just an idiosyncratic fact about this morpheme that it fails to undergo vowel harmony.[4]

2.3.7 Vowel-Vowel Sequences

When two vowels are brought together, three separate outcomes are possible: (1) glide formation and compensatory lengthening; (2) assimilation of the first vowel to the second; or (3) diphthongization. These effects always take place within the word. However, across word boundaries, the most common outcome is that the first vowel is lost. In some instances, perhaps in more careful speech there may be some glide formation if the first vowel is high.

   If the first vowel in the sequence is a high vowel ([i] or [u]) and the second vowel is not identical to the first vowel, that high vowel becomes a glide and the following vowel lengthens.

(2.15) Glide Formation and Compensatory Lengthening

a.	oku-bara	'to count'
	okw-éega	'to learn'
	okw-áara	'to spread out'
	okw-íita	'to kill'
	okw-óoga	'to bathe'
b.	omu-káma	'chief' (class 1)
	omw-áana	'child' (class 1)
c.	tiba-rí-bara	'they will not see'
	tiba-ry-éébara	'they will not see themselves'
	tiba-ry-áara	'they will not spread out'
	tiba-ry-óoga	'they will not bathe'

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[4] The morphemes *-ire* 'perfective', *-i-* 'causative' and *-i* 'nominalize' contain reflexes of *i̧*. They condition a number of consonant mutations, discussed in Chapter 5, §5.4.

There are a few gaps in this list because of some segmental gaps in the lexicon. First, there are no vowel roots that begin with the vowel [u]. It has also proven difficult to find any examples of [yu] where the 'y' is not actually part of a palatal glide.

Another interesting gap occurs when the sound [t] should be followed by a glide: the glide disappears completely. Lexically, there are only a few words (about 15 separate roots) in Taylor's dictionary that contain either [tya] or [tyo]. Observe that the [i] of the negative prefix *ti-* disappears before the subject prefixes *-a-* 's/he' and *-o-* 'you_{sg}'.

(2.16) [i] Deletion

a.	ti-ba-bára	'they don't count'
	t-a-bára	's/he doesn't count'
	t-o-bára	'you don't count'
	t-a-teéka	's/he doesn't cook'
	t-a-karaánga	's/he doesn't dry roast'
b.	ti-ba-rí-bara	'they will not count'
	t-o-rí-bara	'you will not count'
	t-a-rí-bara	's/he will not count'

Because the sequence [ty] is relatively rare, we hypothesize that there is a type of OCP or cooccurrence restriction at work. However, we will not delve further into this issue.

If the first vowel is not a high vowel and the second vowel is [i], then we usually expect to find a diphthong: [ey] or [oy]. Some examples are provided above in (2.4). The examples in (2.17) illustrate diphthongs formed when imbrication (see (2.37) below for examples and discussion) combines the affixes *-an-* 'each other (RECIP)' and *-ire* '(PERFECTIVE)'. The surface result is *-aine* which is pronounced with the diphthong [ey].

(2.17) Diphthongs

  a. okutéécer-an-a   'to cook for each other'

    tuteeceraíne ← …an-ire   'we cooked for each other'

  b. okugaambir-an-a   'to tell each other'

    tugaambíraine   'we told each other'

  c. okureeb-an-a   'to see each other'

    turéébaine   'we saw each other'

  d. okufúñer-an-a   'to herd for each other'

    tufuñeraíne   'we herded for each other'

The class 5 prefix ei-, which is build up from the morphemes *e-* and *-i-* (see §2.4.1 below for more information about the morphological breakdown of class prefixes) also surfaces with a diphthong [ey]: *eríisho* 'eye' and *amáisho* [améyšo] 'eyes'.

If the two vowels are not high, then the first vowel takes on all the features of the second. This is illustrated by the following verbs that contain subject or object prefixes followed by vowel-initial verb roots.

(2.18) a. ga-omire → goomíre   'they$_6$ dried out'

    a-ba-orecire → aboorecíre 's/he showed them'

    tu-ba-e-bariire → tubeebaríire 'we counted them for ourselves'

  b. na enda → néenda   'with a stomach'

    na emizi → néémizi   'with roots'

    na omukóno → nóómukóno 'with an arm'

Finally, we see some examples of vowel assimilation across word boundaries. If the last consonant of the preceding word is not a coronal, there seems to be a greater chance that a final high vowel will have a trace of glide left over. However, in many cases, the first vowel (i.e., the last vowel of the first word) is lost entirely.

28

(2.19) Word-Word Vowel Assimilation

       enkaito ezi → enkeit' éezi   'those shoes'

       akatebe aka → akateb' áaka   'that stool'

       orubazhu oru → orubazh' óoru   'that rib' (carefully orubazhw óoru)

       emiguha ebiri → emiguh' éébiri 'two ropes'

These processes represent the most significant phonological interactions that appear throughout the language. There are others, but they are often limited to specific morphemes. We will discuss them at length in specific sections of the dissertation.

2.4 Noun Morphology

Like most Bantu languages, each noun in Runyankore belongs to a particular noun class. The class of the noun is indicated by a prefix. While some noun classes are associated with particular semantics (e.g., class 1/2 includes people) this is by no means completely consistent in the language.

(2.20)   Runyankore Noun Class Prefixes

Prefix	Class #	Example Noun	Gloss
omu-	1	omu-kózi	'worker'
aba-	2	aba-kózi	'worker
omu-	3	omu-guha	'rope'
emi-	4	emi-guha	'ropes'
ei-	5	ei-huri	'egg'
eri-	5a	eríisho	'eye'
ama-	6	ama-huri	'eggs'
eci-	7	eci-tábo	'book'
ebi-	8	ebi-tábo	'books'
eñ-	9	eñ-aanya	'lake'
eñ-	10	em-bazhu	'ribs'
oru-	11	oru-bazhu	'rib'
aka-	12	aka-guha	'tiny rope'
otu-	13	otu-guha	'tiny ropes'
obu-	14	obú-ro	'millet'
oku-	15	oku-gúru	'leg'
omu-	16	omu-mu-guha	'in the rope'
aha-	18	aha-mu-káma	'about the chief'

The classes group as follows (singular/plural): 1/2, 3/4, 5/6, 7/8, 9/10, 11/10, 14, 15/6. While class 9 appears the same in the plural (which is class 10) the agreement prefixes for class 9 and 10 are distinct, see (2.28) and (2.34) below. Class 14, which comprises mainly mass or abstract nouns (millet, ugali, intelligence/brain, etc.) has no corresponding plural form. The difference between class 5 and class 5a is the presence of the consonant *-r-* in the class prefix. We maintain this distinction primarily because it is maintained in previous grammars of the language. However, the reader should note that the absence of the *-r-* is predictable: if the noun stem begins with *i* then the *-r-* is deleted. There only a

few nouns that exhibit this property: *eriino/amaino* 'tooth', *eríisho/amáisho* 'eye', *eríizi/amáizi* 'tear (sg)/water (pl)', for example.

2.4.1   The Initial Vowel

The class prefix is decomposable into two separate morphemes: an initial vowel and the class prefix proper. The initial vowel of the class prefix, also referred to as the augment or pre-prefix, is predictable based upon the vowel quality of the prefix. The initial vowel is the non-high variant of the class prefix vowel. When the class prefix contains no vowel, as in classes 9 and 10, the initial vowel is *e-*.[5]

(2.21) Preprefix vowels and initial vowel

Preprefix	Class Prefix	Example	Gloss
a-	-ba-	a-ba-kózi	'workers'
	-ma-	a-ma-árwa	'beer'
e-	-mi-	e-mi-ti	'trees'
	-ri-	e-rí-isho	'eyes'
	-ci-	e-ci-híimba	'bean'
o-	-ru-	o-rú-shu	'(a) gray hair'
	-tu-	o-tú-ro	'sleep'
	-ku-	o-kú-tu	'ear'
e-	-ñ-	e-ñ-áma	'meat'

The function of the preprefix is not very clear. Taylor (1972) examines the functions of the initial vowel in Runyankore.[6] Its semantics relate to definiteness. However, this relationship is quite complicated. For example, lack of the preprefix suggests a type of

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[5] The quality of the vowel is predictable if we assume that it is inserted by default and then made non-high. In this case, the default vowel would be *i-*.

[6] See also Hyman & Katamba (1990) who discuss some of the functions of the preprefix (which they term the augment) in Luganda.

31

definiteness (e.g., *orufu* is 'death' but *Rufu* suggests death as a personification.) We shall see below that adjectives may appear with a preprefix, which gives them a definite meaning. A full explanation of the semantic and syntactic functions of this morpheme is beyond the scope of this discussion. The most relevant fact that the reader should bear in mind is that the preprefix may be deleted under certain circumstances, both syntactic and semantic. One good example are locative constructions using class 16 and 18 prefixes, which prefix to a noun that has no preprefix: *omu-mu-haanda* 'on the path'. The initial vowel also appears to relate to the definiteness of nouns and adjectives.

In the phrasal context, the initial vowel is high-toned. For example, definite adjectives have an augment vowel in the prefix.

(2.22) Definite and indefinite adjectives

a.	omwaana muháango	'a big child'
	omwááń' ómuháango	'the big child'
b.	omtuuntú muruunji	'a good person'
	omuunt' ómuruunji	'the good person'
c.	eihurí riruunji	'a good egg'
	eihur' ériruunji	'the good egg'

Similarly, a noun not in phrase-initial position will retain the high tone on the initial vowel of the prefix.

(2.23) Nouns within the phrase

    a. amahuri   'eggs'

       buremu' akatéék' ámahuri   'Buremu cooked the eggs.' (remote past)

    b. obúro   'millet'

       buremu' akatéék' óbúro   'Buremu cooked the millet.'

    c. obusaza   'peas'

       burem' akakáraang' óbusaza   'Buremu dry roasted the peas.'

    d. ebicoori   'corn'

       buremu' akakáraang' ébicoori   'Buremu dry roasted the corn.'

Generally, high tones are not permitted at the edges of utterances. We will see in Chapter 3 than final high tones are retracted. However, the high tone of the initial vowel, when it is in utterance-initial position, is simply deleted. The fact that this vowel is high-toned, however, will be relevant in the discussion of the syntax-phonology interface in Chapter 6.

2.4.2   Number Pairings

For the classes 1–10, the singulars and the plurals are paired. So, class 1 and class 2 represent the singular and plural of a noun. However, above class 10, the singular and plural do not necessarily belong to adjacent classes.

(2.24) Noun Class Pairings

Noun Class	Singular/Plural	Singular	Plural
'person'	1, 2	omu-untu	aba-antu
'rope'	3, 4	omu-guha	emi-guha
'egg'	5, 6	ei-huri	ama-huri
'tooth'	5a, 6	erí-ino	amá-ino
'foot'	7, 8	eci-jere	ebi-jere
'shoe'	9, 10	en-kaito	en-kaito
'rib'	11, 10	oru-bazhu	em-bazhu
'little shoe'	12, 14	aka-kaito	obu-kaito
'sleep'	13	otu-ro	——
'honey'	14	obú-ro	——
'herd'	14, 5	obu-syo	ama-syo
'pasture'	14, 6	obu-ríísizo	ama-ríísizo
'ear'	15, 6	okú-tu	amá-tu

Some nouns have no class prefix and are generally treated as class 9 nouns. Many of these words are borrowings from other languages.

(2.25) Prefixless Class 9 Nouns

bukaando	'long trousers'
cay	'tea'
cizhúbwe	'green grasshopper'
cóoka	'chalk'
deréeva	'driver'
garon	'gallon'
káamba	'sisal'
kaankomáangwa	'woodpecker'
kaartuusi	'eucalyptus tree'
kaarweza	'thin salt and butter sauce'
kabóha	'ink plant, seeds make dye'
kaawa	'coffee'
mabuushu	'prison'
magaro	'pliers'
makáansi	'scissors'

2.4.3   Locatives

A further set of prefixes can be used to indicate location with respect to the noun stem. Historically, these would be *pa-*, *ku-*, and *mu-* representing classes 16, 17 and 18. However, in Runyankore, these prefixes are limited to *aha-*, 'about, on' and *omu-*, 'in.' The locatives in Runyankore prefix directly onto the class prefix (minus the initial vowel):

(2.26)   aha-mu-káma   'about the chief'

            aha-ba-káma   'about the chiefs'

            aha-i-huri   'about the egg'

            aha-ma-huri   'about the eggs'

            omu-mu-guzi   'in the buyer'

            omu-ba-guzi   'in the buyers'

            omu-ríino   'in the tooth'

            omu-kú-tu   'in the ear'

            omu-ñ-íindo   'in the nose'

            omu-cí-ibo   'in the basket'

            omu-mótoka   'in the car'

            omu-sáati   'in the shirt'

2.4.4   Noun Phrases

Morphological concord between the words in a noun phrase is required in Runyankore (as in most Bantu languages). In other words, demonstratives, determiners, numbers, and adjectives must have a class prefix that is the same morphological class as the noun they modify or quantify over. We will review some of the most common nominal complements and then provide an overview of the forms of the prefixes that agree with the various noun classes.

2.4.5   The Possessives

Possessives follow the nouns they modify and take an agreement marker that corresponds to the class of the head noun. Given that the class 1 possessive prefix is /u-/ then the forms of the possessive adjectives are in the second column of the following display.

(2.27)   omuguzí waanje   -anje   'my buyer'

            omuguzí waawe   -awe   'your buyer'

            omuguzí we   -e   'his/her buyer'

            omuguzi wéytu   -iytu   'our buyer'

            omuguzi wáanyu   -anyu   'your_{pl} buyer'

            omuguzi wáabo   -abo   'their buyer'

The class prefix of the possessive will change to agree with the noun class of the head of the phrase (the possessor). Representative examples are provided below.

(2.28) Possessive concord

Class	Noun + Possessive	Concord Prefix	Gloss
1	omuguzí waanje	w- (u-)	'my buyer'
2	abaguzí baanje	ba-	'my buyers'
3	omuguhá gwaanje	gu-	'my rope'
4	emiguhá yaanje	y- (i-)	'my ropes'
5	eihurí ryaañje	ri-	'my egg'
6	amahurí gaanje	ga-	'my eggs'
7	ecijeré caanje	c-	'my foot'
8	ebijeré byaanje	bi-	'my feet'
9	embwáá yaanje	y- (i-)	'my dog'
10	embazhú zaanje	z-	'my ribs'
11	orubazhú rwaanje	ru-	'my rib'
12	akabwáá kaanje	ka-	'my little dog'
13	oturó twaanje	tu-	'my sleep'
14	oburó bwaanje	bu-	'my millet'
15	okutú kwaanje	ku-	'my ear'

In many cases, the adjective prefix is the same as the noun prefix.

2.4.6   Demonstratives and Determiners

Demonstratives and determiners also follow the nouns they modify and take a class prefix to indicate agreement. Some examples of these are provided below.

(2.29) Demonstratives

a.	omukám' ógu	'this chief'
	omukám' ógwe	'that chief (the other)'
	omukám' óríya	'that chief (visible)'
	omukám' ógwo	'that chief (closer)'
b.	abakám' ába	'these chiefs'
	abakám' ábwe	'these chiefs'
	abakám' ábo	'these chiefs'
	abakáma baríya	'those chiefs'
	abakáma bóona	'all chiefs'
c.	omukáma wóona	'the whole chief'
	omukáma wéena	'any chief'
	abakáma wééñji	'many chiefs'
	abakáma wake	'few chiefs'
	omukám' óndíizho	'another chief'
	abakáma báángáhi	'how many chiefs'
	omukám' óha	'which chief'
	omukáma wéénka	'only a chief'

2.4.7   Numbers

As with other nominal complements, the digits one through five take an agreement prefix.

(2.30)   omukamó ó-mwe   'one chief'

           abakama bá-biri   'two chiefs'

           abakama bá-shatu   'three chiefs'

           abakama bá-na   'four chiefs'

           abakáma bá-taano   'five chiefs'

However, for the digits six through ten, there is no agreement (eleven and higher will be reviewed later).

(2.31)   abakáma mukáaga   'six chiefs'

           abakáma mushaanzhu   'seven chiefs'

           abakáma munáana   'eight chiefs'

           abakáma mweenda   'nine chiefs'

           abakám' ikúmi   'ten chiefs'

2.5   Adjectives

As with other words, adjectives take agreement prefixes. There are relatively few true adjectives in Runyankore. The adjective concord prefixes are often the same as the possessive concord prefixes. However, this is not true of all the forms: e.g., class 1. Apart from the phonological alternation in the class 5 prefix, the adjective prefixes are the same as the noun class prefixes.

(2.32) Adjective concord

Class	Noun + Possessive	Concord Prefix	Gloss
1	omuguzí mu-ruunji	mu-	'good buyer'
2	abaguzí ba-ruunji	ba-	'good buyers'
3	omuguhá mu-ruunji	mu-	'good rope'
4	emiguhá mi-ruunji	mi-	'good ropes'
5	eihurí ri-ruunji	ri-	'good egg'
6	amahurí ma-ruunji	ma-	'good eggs'
7	ecijeré ci-ruunji	ci-	'good foot'
8	ebijére bi-ruunji	bi-	'good feet'
9	embwá nuunji	n-	'good dog'
10	embazhú nuunji	n-	'good ribs'
11	orubazhú ru-ruunji	ru-	'good rib'
12	akabwá ka-ruunji	ka-	'good little dog'
13	oturó tu-ruunji	tu-	'good sleep'
14	oburó bu-ruunji	bu-	'good millet'
15	okugúru ku-ruunji	ku-	'good leg'

Colors also behave similarly. However, only 'white,' 'black', and 'red' act as adjectives. Other colors ('green', 'blue', 'yellow', etc.) must be associated with the noun with the linking morpheme /-a/, which takes the agreement prefix.

(2.33)   a.   omweenda gu-rikwéera   'white cloth'

                     omweenda gu-rikwíiragura   'black cloth'

                     omweenda gu-ríkutukura   'red cloth'

          b.   omwénda gwa kiragara   'green cloth'

                     omweenda gwa burúru   'blue cloth'

                     omweenda gwa keénju   'yellow cloth'

                     omwéenda gwa kitaka   'purple cloth'

                     omeenda gwa keéju   'gray cloth'

The list in (2.34) summarizes the nominal class prefixes and their forms. The "abstract" prefix is a notion taken from Taylor. While it does not play a major role in the discussion, it does capture a generalization about the underlying phonological representation of the class prefixes. This is particularly true for the class 5 prefix, which has two surface allomorphs: *ei-* and *eri-*.

(2.34) Summary of noun class prefixes

Class	Abstract Prefix	Noun Prefix	Verb Prefix	Number Prefix	'this'	Possessive	Adjective
1	*mu*	omu-	a-	o-	ógu	w-	mu-
2	*ba*	aba-	ba-	ba-	ába	b-	ba-
3	*mu*	omu-	gu-	gu-	ógu	gu-	mu-
4	*mi*	emi-	i-	e-	éji	y-	mi-
5	*ri*	ei-	ri-	ri-	éri	ri-	ri-
5a		eri-	ri-	ri-	éri	ri-	ri-
6	*ma*	ama-	ga-	a-	ága	g-	ma-
7	*ki*	eci-	ci-	ci-	éci	ci-	ci-
8	*bi*	ebi-	bi-	bi-	ébi	bi-	ji-
9	*n*	en-	e-	e-	éji	y-	n-
10	*n*	en-	e-	i-	ézi	z-	n-
11	*ru*	oru-	ru-	ru-	óru	ru-	ru-
12	*ka*	aka-	ka-	ka-	áka	w-	ka-
13	*tu*	otu-	tu-	tu-	otu	tw-	tu-
14	*bu*	obu-	bu-	bu-	óbu	bu-	bu-
15	*ku*	oku-	ku-	ku-	óku	ku-	ku-
18	*mu*	omu-					
19	*ha*	aha-					

2.6   Verb Morphology

In my discussion of the verb in Runyankore, I will use the following terms: *root*, *stem*, and *macrostem*. In the chapter on reduplication (chapter 5) we will also introduce the terms *reduplicant* and *base*. The verb in Bantu languages is classically analyzed in a hierarchical fashion. Following Odden 1996a, (cf. also Myers 1987, Downing 1997), I analyze the verb hierarchically as shown in Figure 2.1.

```
                              Verb
                      ┌─────────┴─────────┐
                 Inflectional          Macrostem
                 Prefix(es)       ┌────────┴────────┐
                            ObjectPrefix(es)        Stem
                                ┌──┴──┐      ┌───┬───┴───┬────────┐
              Infinitive    DOP    IOP  Reduplicant Root Extension  Final
                  │          │      │       │       │      │         │
                 oku        bi     ba      kára   karaanj  ir        a
```
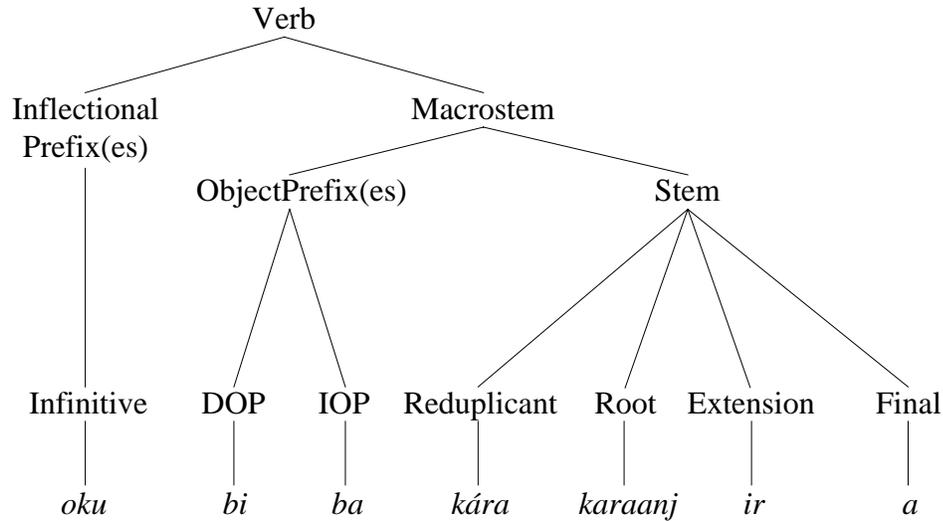
Figure 2.1   Verb structure in Runyankore: *okubibakárakaraanjira* 'to dry roast them$_7$ for them over and over'

The macrostem subsumes the stem and the object prefixes (up to three have been attested). The stem includes the reduplicant (if one is present), the verb root, any verb extensions and the final vowel morpheme. The inflectional portion of the verb stem precedes the macrostem. It may contain the person/number morphology, the tense/aspect morphology, a negative prefix and the relative prefix. Each of these levels is discussed in greater detail below.

2.6.1   Verb Root

The root is the core of the verb. Most roots are either CVC or CVVC, though there are other forms, such as C, CV, or CVCVVC. The verb root cannot stand in isolation; the minimal verb form that can stand on its own is the verb stem. Tone in Runyankore is lexically marked and in verbs contrasts different lexical items. For example, the verb

oku-shar-a 'to go crazy' is toneless while *oku-shár-a* 'to cut' is high toned. The roots in question here are √*shar* and √*shár*.

2.6.2   Verb Stem

The verb stem always begins with the root of the verb (or the reduplicant if one is present) and may be followed by a number of different morphemes that are usually referred to as extensions. Finally, the verb ends with a morpheme commonly referred to as the final vowel. However, one should note that there are forms of this final morpheme that comprise more than a single vowel, namely the perfective, *-ire*.

2.6.2.1   Terminal Morphemes

In order to qualify as a stem, a verb root must have at least a final morpheme. The most common of these (in that it is found in the most verb tenses) is the suffix [-a]. This vowel is commonly referred to as the "final vowel". In general, all of the stem-terminal morphemes are referred to in this way. However, note that the so-called perfective morpheme, [-ire], is not a single vowel.

(2.35) Verb stem terminal morphemes

-a	Indicative/Default
-e	Subjunctive
-ire	Perfective

2.6.2.2   Verb Stem Extensions

In addition to a verb root and a terminal morpheme, there are a number of other morphemes that can be suffixed to the verb root. These are referred to as extensions and are generally thought to be derivational in nature. They add such information as "for the benefit of" or reciprocity.

(2.36) Common verb extensions

Extension	Form	Common Translation
Reciprocal	*-an-*	'each other'
Benefactive	*-ir-*	'for'
Facultative	*-is-*	'with'
Causative	*-y-*	'caused to'
Passive	*-w-*	'was VERB-ed'

Two of these, the causative [-y-] and the passive [-w-], are somewhat different from the others. First, they are single segments. Second, they always must be in segment penultimate position (this is discussed in greater detail in chapter 5 where they play a role in reduplication).

```
                    Stem
                     /|\
          Root   Ext1   Ext2    FV
           |      |       |       |
          tééc-  er-     an-      a
          cook   for   each other
```
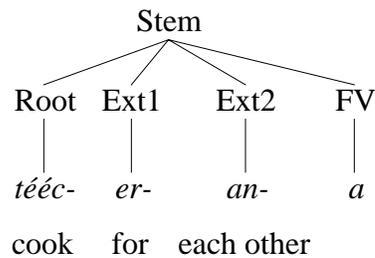
Figure 2.2   Verb stem

The order of extensions in the verb stem is benefactive *-ir-* followed by reciprocal *-an-*. Note that there is a process of morphological overlap referred to as "imbrication" that takes place when the perfective morpheme follows a morpheme that ends in a coronal. We will not be exploring the mechanics of this process in Runyankore. However, here are a few examples so that the reader may recognize them when they appear.

45

(2.37) Imbrication

    a. Reciprocal + perfective: [ir] + [ire]

        téék-er-ire → tééc-eire   'cooked for'

        bar-ir-ire → baziire   'counted for'

    b. Applicative + perfective: [an] + [ire]

        reeb-an-ire → reebaine   'see each other'

        téér-an-ire → teeraine   'beat each other'

    c. Reciprocal + applicative + perfective: [ir] + [an] + [ire]

        gaamb-ir-an-ire → gaambíraine 'told each other'

        baziir-ir-an-ire → baziiriraine   'sewed for each other'

    d. Coronal-final roots

        téér-ire → ateíre   'beat-PERF'

        baziir-ire → baziire   'sew-PERF'

        bóígor-ire → boigoire   'bark-PERF'

        ñoogan-ire → ñoogaine   'jostle-PERF'

        fútan-ire → futaine   'chew-PERF'

2.6.3   Verb Macrostem

The next largest level of structure in the verb is the macrostem. It includes the verb stem plus any object prefixes or reflexive prefixes. The distinction between the verb stem and the verb macrostem is an important one as both levels of structure play distinct roles in the tense/aspect tonology (Chapters 3 and 4) and in reduplication (Chapter 5). There are tonal principles that refer specifically to the edges of the verb stem. Similarly, reduplication generally targets the verb stem, but may include the macrostem when the stem is insufficiently long to satisfy minimality constraints.

A left bracket ([) will be used to separate the verb macrostem from the prefix domain. If there are no object prefixes, this boundary will be the same as the verb stem boundary.

However, if there are object prefixes, then a simple dash with separate them from the stem.

(2.38) Verb macrostems and stems

a-ka[téek-a   's/he cooked' (remote past)

3S-REM[√cook-FV

a-ka[bu-téek-a   's/he cooked it$_{14}$'

3S-REM[OP$_{14}$-√cook-FV

a-ka[ga-tu-tééc-er-a   'he cooked them$_6$ for us'

3S-REM[OP$_6$-OP$_{1p}$-√cook-APPL-FV

The macrostem from the last example in (2.38) is given below in Figure 2.3.

```
                  Macrostem
                 /    |      \
                /     |       Stem
               /      |      /  |   \
            OP      OP   Root  Ext   FV
             |       |     |    |     |
           [ga-    tu-   tééc-  er-   a
            it      us   cook   for
```
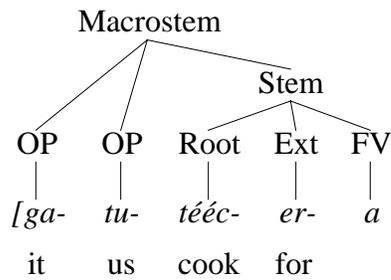
Figure 2.3   Verb macrostem

The order of object prefixes is generally direct object followed by indirect object. We will assume for this discussion that there is no hierarchical relationship between the object prefixes.

2.6.4   Tense/Aspect Morphology

Prefixed to the verb macrostem are the various parts of the verb that correspond to the tense/aspect morphology, the person/number morphology, the polarity of the verb and so on. The order is generally as follows.

(2.39) Prefix elements in the verb

> ti-tu-ri [bara   'we will not count'
> Polarity - subject prefix - tense/aspect prefix [STEM
> negative - 1st person plural - future [*count*

2.6.4.1   Subject Prefixes

The prefixes indicate the person and number of the verb are given in (2.40). The subject prefixes precede the tense/aspect prefix(es) of the verb. The subject prefixes for the remaining class prefixes are found in (2.34), above.

(2.40)   Verb subject prefixes

	1st	n-
Singular	2nd	o-
	3rd	a-
	1st	tu-
Plural	2nd	mu-
	3rd	ba-

2.6.4.2   Tense/Aspect Prefixes

The tense/aspect system of Runyankore, like many Bantu languages, is complex and can express several different degrees of past as well as future. There are several distinct past tense forms (which are not periphrastic).

(2.41) Tense/aspects

Tense	Time reference/gloss
Infinitive	Gerund, VERBing
Distant Past	Prior to yesterday, long ago
Yesterday Past	Yesterday
Hodiernal	Today, "have already"
Recent Past	"have just"
Immediate Past	"have just", "just now"
Habitual	habitual, simple present
Present Prog.	ongoing action
Near Future	about to happen
Future	more remote future
Perstitive	"still"
Conditional	"can", "would"
Counterfactual	"would have", "will have"
Hortative	"let us"
Subjunctive	"should"

Tense/aspect is indicated by a combination of tense/aspect prefixes, suffixes (cf. (2.39) on the final morphemes), and tone patterns (discussed in Chapter 4). The tense/aspect prefixes combine in various ways. However, it is not clear how the meaning emerges from these combinations. For example, the remote past tense appears with the prefix *-ka-*. However, so do the conditional and counterfactual. These prefixes are given in (2.42).

(2.42)   Tense/aspect prefix   Tenses in which it appears

          -ka-   Remote Past Affirmative, Hoderinal Nega-
                                           tive, Conditional Affirmative/Negative,
                                           Counterfactual Affirmative/Negative

          -rá-   Remote Past Negative, Hypothetical

          -rí-   Distant Future (all forms)

          -á-   Remote Past Affirmative Relative Clause,
                                           Hodiernal Affirmative/Negative/Relative,
                                           Recent Past (all forms), Future Affirmative,
                                           Conditional Main Clause, Counterfactual
                                           Main Clause

          -ci-   Perstative Main Clause.

2.6.4.3 Negative Prefixes

There are two different negative prefixes in Runyankore. One appears when the verb is a main clause form and the other when the verb is a relative clause form.

(2.43) Negative Prefixes

          ti-   Main Clause Negation
          -ta-   Relative Clause Negation

The negative prefix *ti-* always appears at the very left edge of the verb. On the other hand, the relative negative prefix follows the relative prefix vowel *a-* and the plural morpheme *ba-*.

(2.44)   a.   Remote Past Negative

        tii-n-dá[baz-ire   'I did not count'

        t-o-rá[baz-ire   'you did not count'

        t-a-rá[baz-ire   's/he did not count'

        ti-tu-rá[baz-ire   'we did not count'

        ti-mu-rá[baz-ire   'you$_{pl}$ did not count'

        ti-ba-rá[baz-ire   'they did not count'

    b.   Remote Past Negative Relative

        a-ta-rá[baz-ire   'one who did not count'

        a-ba-ta-rá[baz-ire   'ones who did not count'

        a-ta-rá[bón-ire   'one who did not find'

        a-ba-ta-rá[bón-ire   'one who did not find'

2.7   Tense Aspects of Runyankore

The following chart summarizes the tense/aspects of Runyankore and the prefixes and suffixes that are used to indicate them. The tonal patterns are discussed in Chapters 3 and 4. There are two major categories of tone pattern: the lexical tone patterns and the melodic tones patterns. The lexical tone patterns are the result of the interaction of limitations and constraints on tones on the word and the high tones that are associated to some segmental morpheme. The melodic tone patterns are those that have a high tone that is not associated to a particular segmental morphemes but rather is a function of the tense/aspect of the verb. If a tone melody is indicated it means that toneless verbs have a high tone on the first tone-bearing unit mentioned (usually V2) and high-toned verbs have a high tone on the second tone-bearing unit mentioned. See Chapter 4 for a more complete explanation. Examples are provided in the appendix.

(2.45) Tense/Aspect Formations in Runyankore

Tense	Formation	Tone Melody
Infinitive	*oku* + STEM	
Remote Past	SP + *ka* + STEM	
Remote Past Neg.	*ti* + SP + *rá* + PSTEM	
Remote Past Relatives	Rel + SP + *á* + PSTEM	V2/default
Remote Past Neg. Relatives	Rel + SP + *ta* + *rá* + PSTEM	
Yesterday Past	SP + PSTEM	V2/final
Yesterday Past Neg	*ti* + SP + PSTEM	V2/final
Yest. Past Rel.	Rel + SP + PSTEM	
Yest. Past Neg. Rel.	Rel + *ta* + SP + PSTEM	V2/final
Hodiernal	SP + *á* + PSTEM	
Hodiernal Neg	*ti* + SP + *á* + *ka* + PSTEM	
Hod. Relatives	Rel + SP + *á* + PSTEM	
Hod. Neg. Rel.	Rel + SP + *tá* + *ka* + PSTEM	
Recent Past	SP + *á* + STEM	
Recent Past Neg	*tí* + SP + *a* + STEM	High Neg.
Rec. Past. Rel.	Rel + SP + *á* + STEM	
Rec. Past. Neg. Rel.	Rel + SP + *tá* + *á* + STEM	
Habitual	SP + STEM	V2/final
Habitual Neg.	*ti* + SP + STEM	V2/default
Hab. Rel.	Rel + SP + STEM	
Hab. Neg. Rel.	Rel + SP + *tá* + STEM	V2/final
Present Prog.	*ni* + SP + STEM	V2/final
Present Prog. Neg	*ti* + SP^H + *ku* + STEM	
Pres. Prog. Rel.	*arí* + INF	
Pres. Prog. Neg. Rel.	*atári* + INF	

Continued

(2.45) Continued

Future	SP + *rí* + *á* + STEM	
Future Neg	*ti* + SP + *rí* + STEM	
Fut. Rel.	Rel + SP + *rí* + STEM	n/a
Fut. Neg. Rel.	Rel + SP + *ta* + *rí* + PSTEM	n/a
Perstitive	*ni* + SP + *ci* + STEM	V2/final
Perstitive Neg	*tí* + SP + *ci* + STEM	High Neg.
Pers. Rel.	*aciri* + INF.	n/a
Pers. Neg. Rel.	Rel + SP + *tá* + STEM	High Neg.
Perstitive Neg (long)	*tí* + SP + *a* + STEM	High Neg.
Conditional	SP + *ka* + *á* + STEM	
Conditional Neg	*tí* + SP + *ka* + *á* + STEM	
Cond. Rel.	Rel + SP + *kú* + PSTEM	
Cond. Neg. Rel.	Rel + *tá* + *ku* + STEM	High Neg.
Counterfactual	SP + *ka* + *á* + PSTEM	
Counterfactual Neg	*ti* + SP + *ka* + *á* + PSTEM	
Hortative	*ká* + SP^H + ROOT + *e*	V2/final (V2 w/ OP)
Hortative Negative	SP + *tá* + STEM	High neg.
Subjunctive	SP + ROOT + *e*	V2/final
Subjunctive w/ OP	SP + OP + ROOT + *e*	V2/default
Hypothetical	*kú* + SP + *ra* + ROOT + *e*	V2/default
Hypo. Negative	*kú* + SP + *ta* + *ra* + ROOT + *e*	V2/default

2.8   Abbreviations

The following table provides a list of the abbreviations that will be used throughout this
dissertation.

(2.46) Abbreviations

    a. Nominal

CL1	Class 1 prefix
CL2	Class 2 prefix, and so on
NOM	Nominalizing suffix, *-i*

    b. Verbal inflectional prefixes

REL	Relative
INF	Infinitive (same as class 15)
COP	Copula, present progressive
1s, 2s, 3s	Person and number
CL3	Class prefix
NEG	Negative
REM	Remote past, *-ka-*
PST	Past, *-á-*
FUT	Future, *-rí-*
PERST	Perstitive, *-ci-*
HAB	Habitual tense

    c. Macrostem prefixes

OP	Object prefix
OP$_7$	Class 7 object prefix, etc.
REFL	Reflexive, *-é-*

    d. Verb stem prefixes

RED	Reduplicant
√count	Verb Root
APPL	Applied, *-ir-*
RECIP	Reciprocal, *-an-*
CAUS	Causative, *-y-, -is-*
FV	Default final vowel, *-a*
PERF	Perfective suffix, *-ire*
SUBJ	Subjunctive suffix, *-e*

CHAPTER 3

LEXICAL TONE IN RUNYANKORE

3.1   Introduction

The discussion of tone in this dissertation is divided into two chapters. This chapter will deal with the tonal principles that apply specifically to high tones that are associated to specific tone bearing units in the lexicon. These tones are associated with particular morphemes, e.g., some verb roots, the reflexive [-é-], the object prefixes, and some tense/aspect prefixes. Based on the interaction of these tones, we can specify general principles about the interaction of morphological structure and tone. The most important generalization that we will make, which will be carried over to other chapters in this dissertation, is the fact that only one high tone is allowed on the verb macrostem in the output. The main question we shall be addressing, therefore, is what principles are responsible for choosing which of the high tones in the input will survive in the output. A second important observation will be that constraints that refer to specific morphological parameters will rank higher than those that have no such parameters.

   In this chapter, we exemplify those verb tenses that have surface high tones that are contributed by the input segmental morphology. If none of those input morphemes has a high tone, then the verb will surface as toneless. We shall refer to these verb tenses as "lexically toned". This is in contrast to those verb tenses that have high tones that are provided as part of the tense/aspect morphology and not by some input segment. This high tone has distinct properties that are the subject of the following chapter. Most of the

constraints on tonal association in this chapter are related to whether or not a specific tone-bearing morpheme retains its high tone in the output. However, in verb tense/aspects with morphologically inserted high tone, we will need to specify to which tone-bearing unit they are associated. These tones are the subject of Chapter 4 and are referred to as "melodic tenses". In this chapter, we limit ourselves to the lexically specified high tones.

Before we examine the interaction of high tones, we shall set out a few preliminaries. The significant ones among these are the propositions that tones do not spread (in Runyankore) and that they do not shift. We shall also assume that explicit low tones play no role in the phonology of Runyankore. This will be the focus of §3.2.

In §3.3, we discuss the problem of phrase-final high tones. A boundary tone (which is part of the intonational contour signaling the end of the utterance) is responsible for the retraction of a final high tone and the falling contour of long penultimate high tones.

Next in §3.4, we briefly examine the tonal properties of nouns. Like verbs, the number of high tones on a noun is extremely restricted—there may be only a single (or no) high tone on the verb stem.

Finally, in §§3.5–3.8 we consider the tonal properties of verbs. Because the verb in Runyankore may contain many morphemes there is the potential to have a large number of input high tones. It turns out that the principles that choose between these high tones are complicated by a number of high-ranking constraints that prefer the high tones of particular morphemes over others. In the end, however, the overriding generalization will be that there may be only one high tone on the verb macrostem. The choice of which high tone survives will fall to constraints specific to particular morphemes and then to general constraints on tonal association and alignment.

3.2   General Principles

Before beginning our general discussion of tone in Runyankore, we shall lay out a few principles about the behavior of tone in the language. Because this chapter focuses upon the phonological alternations that take place, we will wish to set aside these predictable facts about tone in Runyankore. Some of them, like the lack of tone spreading, are

controlled by undominated constraints. In order to simplify the tableaux in the following chapters, we will assume that any candidates that violate them have already been removed from consideration. The issue of prepausal high tones is more complicated, as it could potentially interact with the constraints presented below. First, however, let us consider the most inviolate constraints in Runyankore. One key assumption is that low tones play no phonological role in Runyankore.

3.2.1   Nonspecification of Low Tones

We assume that only the high tone is an active component in the phonology of Runyankore. There is no evidence that a low tone has any active role. Many other accounts of Bantu languages also suggest that low tones do not play a role in the grammar: Stevick (1969), Odden (1981, 1995). Especially relevant are the closely related languages for which this same approach has been taken: Stevick (1969) for Luganda; Hyman & Byarushengo (1984) for Haya; Downing (1996) for Jita; and Bickmore (1996a) for Ekegusii, amongst others.

One of the most cogent arguments against the specification of low tones relates to the long-distance OCP (obligatory contour principle) effect: there can be only one high tone on the verb macrostem in the output. This principle is true whether or not the high tones are separated by toneless syllables. In the following verbs, there are multiple high tones in the input (including a grammatical floating high tone that is associated to the stem). Even though there are tone-bearing units separating the surface high tone in the output and the formerly high-toned syllables, they are still considered adjacent and therefore subject to the OCP.

(3.1)   Application of Long Distance OCP

        ba-tú-baziir-ir-a-H   →   ba[tubazíírira

        3P[OP-√sew-APPL-FV-HABITUAL   'they sew for us'

        ba-bí-téék-er-an-a-H   →   ba[biteecerána

        3P[OP-√cook-APPL-RECIP-FV-HAB   'they cook for each other'

        a-éé-hiindur-a-H   →   a[yee-hiindúr-a

        3S[REFL-√disguise-FV-HAB   's/he disguises self'

        a-mú-bá-sheendecereza-H   →   a[mu-ba-sheendecereréza

        3S[OP$_{3s}$-OP$_{3p}$√escort-HAB   's/he escorts him/her for them'

If there were low tones associated to these syllables then the two high tones would not be adjacent and we would not expect the OCP to be relevant. This distinction is illustrated in Figure 3.1.
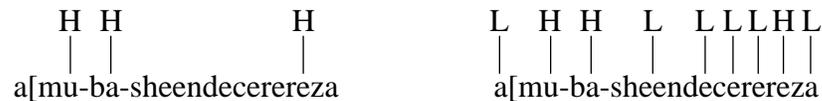
Figure 3.1   Low Tone Underspecification   vs.   Full Specification

    If both high and low tones were fully specified, the high tones would not be adjacent and should not be targeted by the OCP. In other words, the OCP is blocked by the low tones. This would be true if all the low tones were represented by a single, multiply-linked low tone. However, if there is no specification of low tones, then the high tones are adjacent and the OCP can be enforced.

    We can compare these facts another language that fully specifies high and low tones. Odden (1994) cites data from Peñoles Mixtec (originally cited in Daly 1993) that illustrates a rule of low-dissimilation. In this account, the mid tone (marked with a macron

over the vowel) is underlyingly unspecified. Because of this fact, the mid tone presents no barrier to low dissimilation. The low tone on the initial syllable of the word [ndèʔe] is the trigger for low dissimilation. A low tone on the following noun surfaces as a mid tone. Notice that in the last two examples, the rising tone (LH) surfaces as a high tone. This fact suggests that the mid tone is filled in by default if there is no other tone present.

(3.2)   Low Dissimilation in Peñoles Mixtec

ndèʔē-šī ñì̄ʔī̄	→	ndèʔē-šī ñī̄ʔī̄	'she sees the sweat house'
ndèʔē-šī kùčí	→	ndèʔē-šī kūčí	'she sees the pig'
ndèʔē-šī mĭčī̄	→	ndèʔē-šī míčī̄	'she sees the cat'
ndèʔē-šī sǎpú	→	ndèʔē-šī sápú	'she sees the frog'

Similarly, the low tone is unspecified in Runyankore. Whether it is inserted at some late stage in the grammar (i.e., as part of phonetic implementation), or not at all, is a question that we will not address here.

We will find it useful to refer to a low boundary tone. However, we will assume that this tone is intonational in character and therefore functions differently from the high tones discussed here. However, I will assume for the purposes of this discussion that intonation represents a distinct set of patterns that would be superimposed on the tonal contours we are concerned with here (cf. Hyman & Byarushengo 1984 for a related account in Haya).[1]

3.2.2   Tone Spreading

High tones in Runyankore do not spread across syllable boundaries. For example, nouns that contain a high tone invariably have only a single high tone.[2]

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[1] A full account of intonation in Runyankore is beyond the scope of this dissertation. At this point, I suggest that it might be possible to integrate the intonational component into the morphological and phonological components of the grammar that are discussed herein. However, we will not attempt this here.

[2] There are toneless nouns. We will examine them below.

(3.3)   High-toned nouns

        omucúúnjiro   'dam'

        émbwa   'dog'

        ebáruha   'letter'

        ecikáraanjiro   'roasting pan'

        oburíísizo   'pasture'

        kásyoosyo   'hot spring'

Observe that the high tone does not spread to fill in the adjacent empty tone-bearing units. They are not occupied by low tones, as low tones play no role at this stage of the grammar. One may wish to assume that there is some version of Goldsmith's (1990) Well-Formedness Condition (as a constraint) that would require every tone-bearing unit to be associated to a tone. In this work, we posit that such a constraint (or constraints) is outranked by a prohibition against spreading tones.

(3.4)   NOSPREAD

Do not spread a high tone. A high tone's associations should not be extended.
Remain faithful to the input.

The constraint NOSPREAD is a member of the FAITHFULNESS family of constraints—it militates against changes between the input and the output. This constraint could be un-dominated if we assume that it refers only to spreading across syllable boundaries.

It is possible for a high tone to spread to an adjacent mora *within* a long syllable. This is necessary to avoid rising and falling tones, which are generally not allowed (the exception is discussed below). For example, the subject prefixes are toneless, as illustrated by the verb forms in (3.5a). However, when they are followed by the high-toned, past tense morpheme *-á-*, the high tone must spread onto the vowel of (or mora contributed by) the subject prefix, as shown in (3.5b).

(3.5)   a. Remote Past

        /ba-ka-bar-a/ → [bakabara]   's/he counted'

        3S-REM-√count-FV

        /tu-ka-bar-a/ → [tukabara]   'we counted'

        /mu-ka-bar-a/ → [mukabara]   'you_pl counted'

   b. Recent Past

        /ba-á-bar-a/ → [báábara]   's/he has counted'

        3S-PST-√count-FV

        /tu-á-bar-a/ → [twáábara]   'we have counted'

        /mu-á-bar-a/ → [mwáábara]   'you_pl have counted'

In (3.5) the high tone spreads to an adjacent tone-bearing unit (the mora) within a sylla-ble. With one exception (discussed below), there are no rising or falling tones on sylla-bles in Runyankore. And, these only occur on long syllables. This illustrates the violation of NoSPREAD in order to satisfy the more important constraint against rising tones.

(3.6)   NoRISE

      There may not be a rising tone on a syllable.

We will assume that the constraint NoRISE is very highly ranked in Runyankore. The constraint NoFALL also exists in Runyankore and is only violated in certain prepausal cases discussed below.

(3.7)   NoFALL

      There may not be a falling tone on a syllable.

Both the constraints against contour tones may be violated where there is a high tone on the final or penultimate syllable of a word with a long penult. We consider those cases in §3.3.

Some verb forms have adjacent high-toned syllables. We will assume in these cases that each syllable has its own high tone. We will always find that there is a morpheme or word-structure boundary between the syllables containing the high tones—e.g., the high toned verb prefix -*á*- and a high-toned verb root are separated by the macrostem boundary (see Chapter 2 for a general discussion of verb structure). For example, in the recent past the past tense morpheme -*á*- may stand just before a high-toned verb root.

(3.8)   Recent Past with high toned roots

        báá[téeka   'they have cooked'

        ba-á-téek-a   3S-PST-√cook-FV

        báá[bóna   'they have seen'

        báá[téera   'they have beaten'

        báá[káraanga   'they have dry roasted'

For these verb forms, we see that the macrostem boundary (marked by [) separates two tonal domains. Generally, tones in these two domains do not interact. However, there are cases of morphemes that condition the deletion of high tones that follow them across the macrostem boundary (discussed in §3.7 below).

These constraints, NoRise and NoSpread, are only violated in prepausal position. In order to avoid a violation of NoRise within a long syllable, this constraint must outrank NoSpread. Another general fact about high tones in Runyankore is that they do not move from the mora to which they are associated in the input.

3.2.3   No Tone Shift

High tones in Runyankore also do not change their location unless they are in final position (which we will examine below in §3.3). In all other cases, if a high tone is associated

with a particular morpheme and mora in the input it will remain associated to it in the output, or be deleted. In the following chapters (Chapter 4 and Chapter 6) we will discuss high tones that are inserted grammatically to indicate tense/aspect information or as a function of the syntax-phonology interface. These high tones are not associated to a particular mora in the input. Rather their presence is required by the tense/aspect of the verb and their location is defined by the grammar, in the form of morphologically specific constraints. The morphology of certain tense/aspects requires this high tone be inserted. In all but one case the restriction against tone shifting is unviolated. The exception we shall examine involves the retraction of a final high tone that appears in phrase-final position (§3.3 below).

There is a constraint in the correspondence family that requires a high tone to remain associated to the syllable to which it was associated in the input.

(3.9)   NoShift

       An output high tone should remain associated to the syllable to which it was associated in the input.

Because this constraint is virtually unviolable, it ranks so high that we will be able to ignore it. In other words, while there are possibly candidates in the output of GEN that have high tones that have been dislocated from their input morae, we will ignore them because this constraint will weed them out immediately. Finally, as we see in the next section, there are a few constraints that outrank NoShift: namely, those that are responsible for shifting high tones away from the end of the utterance.

3.3   Utterance-Final Tones

Runyankore does not permit the final vowel of an utterance (i.e., in pre-pausal position) to have a high tone. A high tone that might be associated with a pre-pausal tone-bearing unit will be retracted to the preceding syllable. Another pre-pausal effect is the appearance of falling tones on long, phrase penultimate syllables.

63

A level or rising high tone appearing on a long phrase-penultimate syllable can be traced to a final high tone that has been retracted. If the penultimate syllable is short, the high tone could either have been retracted or it could have been originally associated to that tone-bearing unit. In other words, phrase-final high tones are prohibited. However, they are not lost, but are retracted one syllable to the right. This retracted high tone is pronounced either as a level high tone or as a rising tone if it falls on a long syllable. There is no contrast between level and rising tones. However, the rising variant is only found in the penult of a phrase-final word. The words in (3.10a) are shown in the phrasal context to illustrate the final high that retracts prepausally. In (3.10b) we see example of words where the high tone of the stem has retracted to the class prefix. Recall that the class prefixes are toneless (see Chapter 2). Finally (3.10c) illustrates the effect of having a long penult vowel as the locus of retraction: a retracted high tone varies freely between a level high and a rising tone.

(3.10) High Tone Retraction

a.	omu-káma	'chief'
	omu-kamá we	'his/her chief'
	kasúku	'parrot'
	kasukú ye	'his/her parrot'
b.	otú-ro	'sleep'
	obú-ro	'millet'
	ém-bwa	'dog'
	orú-shu	'(a) gray hair'
c.	omw-óózho / omwoózho	'boy'
	amá-árwa / amaárwa	'beer'
	ebi-cóóri / ebicoóri	'maize'
	maréére / mareére	'kite hawk'

Some examples of nouns and verbs illustrating high tone retraction are shown in (3.11) below.

(3.11) Final high tone retraction in nouns

<u>In Isolation</u>   <u>Phrasal</u>

omwaána   'child'   omwaaná muruunji   'good child'

aboózho   'boys'   aboozhó baínji   'many boys'

bateéra   'they beat'   bateerá buremu   'they beat Buremu'

If the penultimate syllable is short, the retracted high tone is pronounced as a simple, level high tone on that syllable.

(3.12) High tone retraction to a short syllable

   a. akábwa   'little dog'
      akabwá nuunji   'good little dog'
   b. okúzhu   'knees'
      okuzhú kwáá buremu   'Buremu's knees'
   c. ecishuunshúra   'comb'
      ecishuunshurá caanje   'my comb'
   d. obúro   'millet'
      oburó bwaa kakúru   'Kakuru's millet'
   e. akwaasíre   's/he caught'
      akwaasiré kaankomáangwa   's/he caught a woodpecker'

The retraction of the final high tone will be attributed to the presence of a boundary low tone (L%, Pierrehumbert 1980, Pierrehumbert & Beckman 1988, and also see Herman 1996a for a discussion of final lowering in Kipare, a Bantu language). In order to have a phonetic manifestation, the boundary tone must associated to some tone bearing unit. However, rather than being neutralized, a final high tone will shift one tone bearing unit to the left.

65

Here, we can see the importance of the constraint MAX(H), which require a high tone in the input to be present in the output.

(3.13) MAX(H)

A high tone in the input must have a correspondent in the output.

The boundary low tone must also have a manifestation. Let us enlist a constraint that requires it to be parsed into the output.

(3.14) PARSE(L%)

The boundary tone, L%, must be associated to a tone-bearing unit in the output.

There needs to be some segment to manifest the low tone. Additionally, the boundary low must remain at the right edge of the utterance.

(3.15) ALIGN(L%, RIGHT, UTTERANCE, RIGHT)

Align the right edge of the low boundary tone with the right edge of the utterance.

This constraint simply requires the boundary low to remain at the edge of the utterance. We shall see below that the boundary low will attempt to associate to a penult, but that various facts about tone association will interact with that desideratum.

At this point, we have the following facts: a final high tone must be retained; a boundary low tone must associate to some tone-bearing unit; and, it should remain at the right edge of the utterance. The surface result of high tone retraction will be a tone located on the penultimate mora of the word. If the syllable is short (i.e., containing a single mora) the result will be a level high tone. However, if the penultimate syllable is long, the high tone will appear only on the second mora of the syllable, resulting in a rising tone. Before continuing with the analysis of final high retraction, we should consider the related edge phenomenon of penultimate fall.

As mentioned above, Runyankore does not usually permit falling tones. However, the long penultimate syllable of an utterance (i.e., the penultimate syllable before a pause) will have a falling tone. We see several examples of falling tones above in such words as *omu-háanda* 'path', *omu-híimbo* 'joy', and *ei-báare* 'stone'. However, the same words in phrase-medial position are pronounced with a level high tone.

(3.16) Penultimate falling tone and phrases

In Isolation		Phrasal	
ecitáanda	'bed'	ecitáánda caanje	'my bed'
obuhúunga	'ugali'	obuhúúnga bwaanje	'my ugali'
obwóoci	'honey'	obwóóci bwaanje	'my honey'
okutéera	'to beat'	okutééra buremu	'to beat Buremu'
abazíira	's/he sews'	abazííra bukaando	's/he sews pants'

Notice also that the falling tone on a penult syllable will be a level high if that syllable appears in antepenultimate position because of the addition of morphemes or clitics to a verb. This is illustrated by the verbs in the infinitive and the subjunctive shown in (3.17).

(3.17) Penultimate falling tone and longer forms

Penultimate High		Antepenultimate High	
okutéeka	'to cook'	okutéécera	'to cook for'
okuhéenda	'to break'	okuhééndera	'to break for'
okutéera	'to beat'	okutéérana	'to beat each other'
okuréeta	'to bring'	okuréétesa	'to cause to bring'
onáabe	'you should wash'	onáábe-je	'you should wash well'
oréebe	'you should see'	oréébe-je	'you should see well'

Both final high retraction and penultimate fall appear in pre-pausal position and are clearly related. The boundary low tone forces the high tone to retract to the left. The constraint MAXH ensures that the high tone is retained in the output. As with final retraction, penultimate fall is related to the lowering influence of the boundary low tone. However, in this case, the penultimate high tone must stay on the penultimate syllable, but not be immediately adjacent to the boundary low tone.

At this point, we should note an interesting fact about these facts. Recall that the final high is retracted to the second mora of a long penultimate syllable: /ebicoorí/ → [eβicoóri] 'maize'. Consider the fact that a high tone *already* associated to the penultimate syllable retracts one more mora to the left: /eibááre/ → [eyβáare] 'stone'. Why doesn't the final high tone retract all the way to the first mora of the long penult? Some Bantuists (Myers 1997 and Bickmore 1996b) have suggested that there is a constraint that requires a high tone to remain adjacent to its lexical source.

(3.18) LOCAL

> If an input tone T has an output correspondent T′, some edge of T must correspond to some edge of T′.

This constraint requires the final high tone to shift only one tone-bearing unit. It cannot shift to the right as it is already at the end of the utterance. Furthermore, it cannot simply disappear because that would incur a fatal MAX(H) violation. The constraint NOSHIFT ranks below these constraints. It is violable because it is more important to move the final high away from the boundary low tone.

Tableau 3.1   o-mw-aaná   'child'

	PARSE(L%)	LOCAL	MAXH	NOSHIFT
☞ a. omwaánà				*
b. omwaaná (L%)	*!			
c. omwáanà		*!		*
d. omwaanà			*!	

The first three constraints are satisfied by the grammatical output. Both PARSE(L%) and LOCAL are exceptionless. Because of this fact, we propose that they are undominated. The grammatical parse violates NOSHIFT. This is necessary in order for the final high tone to be moved to make way for the final low. Another possible candidate [omwaanâ] does not appear in the tableau. We assume that this candidate is ruled out by an undominated constraint against contour tones on short syllables (i.e., you cannot associate two tones to one tone-bearing unit in Runyankore).

The case of penultimate falling tone operates similarly. However, recall that a high tone located on the penult syllable surfaces as a falling tone when the word containing it is final in the utterance. Clearly, this effect is also caused by the lowering conditioned by the final low boundary tone. The difference here is that the high tone displacement will not move the high from off of the penultimate mora unless it is contained within a long syllable. In other words, a high tone on a short penultimate syllable is not relocated or affected by the boundary low tone—there is no phrase-final effect.

What constraints are responsible for the retraction of a high tone off the second mora of a long syllable? Clearly, the presence of a boundary low tone is a significant trigger for the retraction of the high tone to the first mora of the penultimate syllable. However, we must be cautious—the final high tone retracted to the penultimate syllable must not be moved to the first mora of a long penultimate syllable. This is where we see the importance of the constraint LOCAL, which prevents the originally final high tone from moving to the first mora of a long penultimate syllable. The constraint *HL% will force the high tone to disassociated from the second mora of the long syllable.

(3.19) *HL%

> Do not allow a high tone and a boundary low tone to exist on adjacent tone-
> bearing units.

This constraint penalizes a configuration in which a high tone is immediately fol-
lowed by the boundary low tone. The outcome of this analysis is to extend the range of
the low tone. In one way, this allows the final high tone and the penultimate high tones to
retain a degree of distinctness (when the penult syllable is long)—there is a difference
between a retracted final high (rising penult) and a retracted penultimate high (falling pe-
nult). Additionally, it may encode a phonetic desideratum: make contrasts more
perceptible.[3] Of course, final high tones do not surface as falling tones on short penult
syllables. This is because the need to perceive the boundary low is balanced against the
need to keep a high tone adjacent to its underlying source. For this reason, the constraint
*HL% ranks below LOCAL the high tone cannot shift away from that syllable. This rank-
ing is illustrated in the following tableaux.

The first, Tableau 3.2, illustrates the falling tone on the penult syllable. The best can-
didate satisfies all of these constraints.

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[3] Herman (1996a) demonstrated for Kipare that the frequency of a tonal target was lower
the closer the tonal target came to the end of the utterance. Keeping the high tone away
from the boundary low tone could aid in maintaining it at a certain frequency and im-
prove its perceptibility.

Tableau 3.2   garubííndi   'spectacles'

	PARSE(L%)	LOCAL	NOSHIFT	*HL%
☞ a. garubíindì				
b. garubííndì				*!
c. garúbiindì			*!	
d. garubííndi	*!			

The ranking of *HL% below LOCAL prevents a short syllable from shifting the high tone to the antepenultimate syllable. In other words, the only way *HL% can be satisfied is if the high tone is able to disassociate from one of the morae of a long syllable. Candidate (c) illustrate the ranking of NOSHIFT—shifting the high tone off the mora that sponsored it is not permitted. The constraint LOCAL also prevents the retracted final high tone from retracting too far to the left: it has to remain adjacent to its input source. This is shown in Tableau 3.3.

Tableau 3.3   omwaaná   'child'

	PARSE(L%)	LOCAL	MAXH	NOSHIFT	*HL%
☞ a. omwaánà				*	*
b. omwáanà		*!		*	
c. omwaanà			*!	*	
d. omwaaná L%	*!				

From this tableau, we can also see that *HL% ranks below MAXH: it is more important to keep the high tone than it is to avoid having it adjacent to the low boundary tone. Candidate (a) must violate *HL% because to shift the high tone to the first mora of the penult syllable (candidate b) or to delete the high tone (candidate c) would violate more highly ranked constraints. In the case of final retraction, the constraint NOSHIFT must be violated in order to satisfy the PARSE(L%) constraint and MAXH.

When the penult syllable of the word is short and high-toned, the high tone does not shift to the antepenultimate syllable. This suggests that the only time a high tone can shift is when it is associated to the final syllable. This is illustrated in the following tableau.

Tableau 3.4   omu-gurúsi   'old man'

	PARSE(L%)	LOCAL	MAXH	NOSHIFT	*HL%
☞ a. omugurúsì					*
b. omugúrusì				*!	
c. omugurúsi L%	*!				

The constraint NOSHIFT is not violated because it is not necessary to shift the high tone in order to satisfy the MAXH and PARSE(L%) constraints—there are enough morae to go around. Notice that the optimal candidate violates *HL%. However, this is necessary to avoid a violation of NOSHIFT. Tableau 3.4 also illustrates the ranking of NOSHIFT over *HL%.

From this point on, we will assume this analysis, but will not integrate it into the analysis. There are two different models that one could assume with respect to the relationship between these facts and the morphologically restricted constraints (particularly those seen in the next chapter). At this point, we will set aside the problem of the application of the constraints LOCAL and NOSHIFT. The problem is that there are high tones not underlyingly associated a particular tone-bearing unit. Nevertheless, these high tones are also subject to final retraction. These high tones are the subject of Chapter 4. Because these high tones are not associated to a particular tone-bearing unit in the input, the constraints LOCAL and NOSHIFT cannot refer to their input tone-bearing unit.

At one level, this fact represents a serious challenge to the notion that reference to the input tone-bearing unit is sufficient to predict the limited retraction of final high tones. Furthermore, the facts presented here coupled with the tone facts in Chapter 4 challenge the notion that we can correctly predict the outcome with a single level of phonology. The significant problem is that the differences in retraction between a final high tone and a penultimate high tone require the grammar to have access to information about the

association of the tone. Let us set aside this issue until the end of Chapter 4 and the discussion of morphologically positioned high tones. At that point, the distinction between the sources of high tones will be clearer and we shall be better able to address this problem.

One possibility is that these constraints are part of a distinct level that is applied *after* the constraints responsible for morphologically determined tone patterns. At this point, however, we will acknowledge that they apply and rank higher (either within the same component of the grammar or because they follow the morphological component) than the constraints discussed below and in the following chapter.

3.4   Nouns

Nominal roots may be either toneless or have a high tone. The location of the high tone is not predictable on polysyllabic roots. Many nominal stems are derived from verbal roots. In many of these cases, a high tone appears on the first tone-bearing unit when the input verb root is high-toned. Simple nominalizations, such as those involving deverbal suffixes like *-i* or *-o*, retain the high tone of the input root. High-toned verb roots are high on their first tone-bearing unit and this fact carries over to their nouns.

(3.20)   omuhíinji   'farmer'
          CL1.farmer (√híng 'cultivate')
          omukózi   'worker'
          CL1.worker (√kór 'work')
          eciróoto   'dream'
          CL7.dream (√róot 'dream')
          ecikáraanjiro   'roasting pan'
          CL7.roasting pan (√káraang 'dry roast')

Many other nouns, which are not so clearly derived from verbal roots, also have a high tone on the first mora unit of the stem.

73

(3.21)   omu-háanda   'path'

            omu-híimbo   'joy'

            ei-báare   'stone'

            ei-cúmu   'spear'

            ei-kára   'ember, coal'

            ei-ráka   'voice'

            eci-bíra   'forest'

            eci-cére   'frog'

            eci-fúba   'chest'

            eci-háha   'lung'

            eci-híimba   'bean'

However, the high tone of the stem may appear anywhere in the stem, as the nouns in (3.22) illustrate. The nouns in (3.22) are organized by the distance of the high tones from the right edge of the word. Since the high tone does not appear on the final syllable before a pause, the words in (3.22a) are given in their phrase-medial form (as indicated by the ellipsis).

(3.22) Nouns with a final high-toned syllable

omu-kamá ...	'chief ...'
otu-ró ...	'sleep ...'
obu-ró ...	'millet ...'
kasukú ...	'parrot ...'
omw-oozhó ...	'boy ...'
ama-arwá ...	'beer ...'
ebi-coorí ...	'maize ...'
em-bwá ...	'dog ...'
oru-shú ...	'(a) gray hair ...'
mareeré ...	'kite hawk ...'

(3.23) Nouns with a penultimate high-toned syllable

omu-gurúsi	'old man'
eci-cumúrwa	'wood ember'
mushúshu	'shrew'
kabaragára	'small, sweet banana sp.'
kahuumpúri	'smallpox'
kaartúúsii ndaingwa	'tall eucalyptus'

(3.24) Nouns with a antepenultimate high-toned syllable

káboondo	'stomach bag'
eci-téteyi	'woman's dress'
omu-cúúnjiro	'dam'
e-mótoka	'automobile'
otu-tóóñezi	'little dots'
obu-ríísizo	'pasture'

(3.25) Nouns with a pre-antepenultimate high-toned syllable

<div style="margin-left:6em">

eci-káraanjiro   'roasting pan'

aba-gumísiriza[†]   'patient people'

omu-bárashuko[†]   'spring tap'

obw-íízhukura[†]   'ancestry'

ei-híjicizo[†]   'cooking stone'

aka-shórogoto[†]   'potsherd'

[†]These words were found in Taylor's dictionary.

</div>

From these examples, we can see that a high tone appears on a range of syllables, from final to antepenultimate. There are relatively few words in the language that have enough syllables to allow one to distinguish between a pre-antepenultimate syllable and the initial syllable of the stem—the stem would have to have at least five syllables. In most of these cases, the high tone coincidentally falls on the first syllable of the word. From another perspective, a stem high tone can only appear on initial, second, penultimate, or antepenultimate positions. We know of no examples where the high tone appears on the antepenult where that syllable is not also the first or second of the stem. This gap is probably not accidental. The edges of the stem are the most common places for high tone association. When we consider verbs, below and in chapter 4, we shall see that this is true for them as well.

However, despite these difficulties, we conclude that nouns in Runyankore may possess a single high tone or be toneless. Furthermore, the high tone is associated to a single syllable/tone-bearing unit anywhere on the stem. Finally, note that the class prefixes are not specified for tone. They are toneless unless the stem high tone would fall in phrase-final position, in which case, would retract one syllable to the left.[4]

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[4] Recall that the initial vowel of the noun prefix is predictably high-toned when not in phrase-initial position.

3.5   Verbs

As we saw in nouns, there is also an underlying, lexical contrast between toneless and
high toned verb roots, as shown in (3.26). Consider, for example, *oku[shara* 'to go crazy'
and *oku[shára* 'to cut'.[5]

(3.26) Toneless Verbs

       oku[sa   'to grind'

       oku[gwa   'to fall'

       oku[bara   'to count'

       oku[jeenda   'to leave, go'

       oku[reeba   'to see'

       oku[baziira   'to sew'

       oku[shara   'to go crazy'

(3.27) High Toned Verbs

       oku[bóna   'to find'

       oku[téeka   'to cook'

       oku[káraanga   'to dry roast'

       oku[húúrira   'to hear'

       okw[óómbera   'to weed'

       oku[shára   'to cut'

We also find high tone retraction if the root is monosyllabic and high toned. The in-
finitive prefix *oku-* is toneless (as can be seen in (3.26) and (3.27)). However, when the
verb root is high-toned and prepausal, the high tone retracts onto the infinitive prefix.

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[5] Recall that the left bracket symbol ([) marks the boundary of the macrostem. If there are
no object prefixes then the left edges of the macrostem, the stem, and the root all coincide
(see Chapter 2 for more on verb structure). I will separate the object prefix(es) from the
root with a hyphen (-): *oku[bara* 'to count' versus *oku[ba-bara* 'to count them'.

(3.28)   okú[rya   'to eat'

            okú[fa   'to die'

            okú[ñwa   'to drink'

            okú[cwa   'to pick'

            okú[ha   'to give'

            okú[sya   'to ripen, be cooked'

The retraction of a high tone on verbs is accounted for by the same constraint ranking that described final retraction in nouns.

3.5.1   Default Lexical Tone versus Melodic Tone

From a formal perspective, two major categories of verb tenses are found in Runyankore. Those tenses having only tones that are present in the input morphemes are classified as lexically toned.

(3.29) Lexically toned tenses with toneless verb roots

      a. Remote past

        a-ka[bar-a   's/he counted'

        3S-REM[√count-FV

        a-ka[reeb-a   's/he saw'

        a-ka[baziir-a   's/he sewed'

      b. Hodiernal past

        yáá[si-ire   's/he has already ground'

        yáá[baz-ire   's/he has already counted'

        yáá[reeb-ire   's/he has already seen'

      c. Recent past

        n-áá[bara   'I have just counted'

        1S-PST[√count-FV

        n-áá[gura   'I have just bought'

        n-áá[reeba   'I have just seen'

        n-áá[rwaana   'I have just fought'

        n-áá[baziira   'I have just sewn'

      d. Future

        a-ry-áá[mwa   's/he will shave'

        a-ry-áá[reeba   's/he will see'

        a-ry-áá[bara   's/he will count'

        a-ry-áá[baziira   's/he will sew'

As can be seen from the verbs in (3.29), the only high tones found in these tenses are the ones brought in by the morphemes making up the verb. In (3.29a), there are no high tones associated with the input morphemes—neither with the roots nor with the subject and tense/aspect morphology. On the other hand, the verbs in (3.29b, c, d) receive their high tone from the tense/aspect prefix -*á*-. There are several other tense/aspect prefixes that appear with a high tone. We will examine these in detail below.

On the other hand, some verb tenses include floating high tones as part of their morphology—constraints specific to various verb tenses govern the location of the high tone on the verb. Because of this, high tones can appear that are not present in the underlying segmental morphology. We refer to these tenses, which have high tones inserted because of their tense/aspect, as melodically toned. Consider the verb forms in (3.30), none of the input segmental morphemes is underlyingly high toned. Nevertheless, a high tone still appears on the verb.

(3.30) Melodic tenses with toneless verb roots

      a. Habitual

         a[bár-a   's/he counts'

         3s[√count-FV

         a[réeb-a   's/he sees'

         a[bazíir-a   's/he sews'

      b. Yesterday past

         m[baz-íre   'I counted'

         n[gab-íre   'I divided'

         n[guz-íre   'I bought'

      c. Subjunctive

         ó[mwe   'you should shave'

         o[báre   'you should count'

         o[réebe   'you should see'

         o[bazíire   'you should sew'

Notice especially the high tone in the Habitual, in (3.30a). The Habitual does not have a characteristic segmental morpheme. In other words, the high tone that is present in the Habitual cannot be connected to a particular segmental morpheme in the input (compare this with the recent past tense in (3.29c) with the high-toned morpheme -á-). Instead, the high tone must be attributed to the tense/aspect. The grammar of the language requires the insertion of a high tone in this tense. The same is true of the high tone in the yesterday

past. Observe that the same suffix, *-ire*, is present in the Hodiernal Past (3.29b) and does not appear with a high tone. The H is a tone that is inserted by a morphological principle requiring it in this particular tense. Its location is a function of the tense (V2 in toneless verbs, final in high). For the moment, we will set this aside until the next chapter.

This chapter focuses on the tonal pattern on verbs that arises from underlyingly high-toned segmental morphemes and not from the melodic high tone inserted by specific verb tenses (tone melodies). A number of principles regarding tonal location and deletion are discussed below and evidence is provided to demonstrate that the surface tone of a verb in a lexically toned verb tense is predictable from these principles. A crucial constraint in Runyankore is the OCP, which we discuss next.

3.6   The Obligatory Contour Principle in Runyankore

One of the most familiar constraints (both in the derivational literature and in the constraint-based literature) is the Obligatory Contour Principle (see in particular, Leben 1973, McCarthy 1986, Odden 1988, Goldsmith 1990, Myers 1997). The simplest statement of the OCP is given in (3.31).

(3.31) Obligatory Contour Principle

     Adjacent identical elements are prohibited.

As Myers (1997) notes, the OCP has been interpreted as having three different types of effects: (1) morpheme structure constraint; (2) rule blocker; and (3) rule trigger. However, as he shows, within an OT model of phonology all three effects may be subsumed under the appearance of the OCP as a constraint on surface well-formedness. There is ample evidence for its operation in other Bantu languages: Jita (Downing 1996), Chizigula (Kenstowicz & Kisseberth 1990), Runyanbo (Bickmore 1996a, 1996b), Tanzanian Yao (Odden 1998).

The parameterization of the OCP is very relevant for Runyankore because the language imposes strict constraints on the number of high tones that may appear within the

macrostem (see Chapter 2 for a discussion of verb structure). In fact, only one high tone may appear within the verb macrostem. However, several of the morphemes that may make up the verb macrostem are underlyingly high toned. All object prefixes are under-lyingly high toned. The reflexive prefix, -*é*-, is also high toned. Furthermore, the verb root may also be high toned (or toneless). Because Runyankore allows several object pre-fix to appear within the macrostem (up to three have been attested) there is the possibility of up to four high toned morphemes being included within a domain where normally only one is permitted. The data below will show is that only one of these input high tones is retained in the output. First, however, let us consider the evidence that object prefixes are high toned. The verb forms in (3.32) have object prefixes. Note that they are high-toned.

(3.32) Infinitives with object prefixes

oku[mú-reeba	'to see him/her'
oku[tú-reeba	'to see us'
oku[kú-reeba	'to see you'
oku[bá-reeba	'to see them'
oku[gá-reeba	'to see it$_6$'
oku[cí-reeba	'to see it$_7$'

The verbs in (3.33) illustrate the application of the OCP over the macrostem. Each group shows the same verb root with increasingly many object prefixes. Notice that the object prefixes that were high-toned in (3.32) are not always high-toned when there are other high-toned morphemes in the verb.

(3.33)   a.   oku[bóna   'to find'

             oku[ba-bóna   'to find them'

         b.   a-ka[téek-a   's/he cooked' (remote past)

             a-ka[ga-téek-a   's/he cooked them$_6$'

             3S-REM[OP$_6$-√cook-FV

             a-ka[ga-tu-tééc-er-a   's/he cooked them$_6$ for us'

             3S-REM[OP$_6$-OP$_{1p}$-√cook-APPL-FV

             a-ka[ga-ba-tééc-er-a   's/he cooked them$_6$ for them'

         c.   a-ka[shab-a   's/he asked for'

             a-ka[gá-shab-a   's/he asked for it$_6$'

             a-ka[ga-bá-shab-a   's/he asked them for it$_6$'

             a-ka[ga-ba-mú-shab-ir-a   's/he asked them for it$_6$ for her'

         d.   a-ka[shoma   's/he read'

             a-ka[cí-shoma   's/he read it$_7$'

             a-ka[ci-bá-shom-er-a   's/he read it$_7$ to them'

             aka[ji-ba-mú-shom-er-a   's/he read it$_7$ to them for her'

         e.   a-ká[ha   's/he gave'

             a-ka[gá-ha   's/he gave it$_6$'

             a-ka[ga-bá-ha   's/he gave it$_6$ to them'

             a-ka[ga-ba-ku-hé-er-a   's/he gave it$_6$ to them for you'

             a-ka[ga-ba-mu-hé-er-a   's/he gave it$_6$ to them for her'

From these examples, we generalize that only the last of a series of underlying high tones may surface within the macrostem. It does not matter whether that high tone is underlyingly associated to an object prefix or to a high-toned root. Only one high tone on the verb macrostem may surface. The other high tones are deleted. We account for this by appealing to a version of the OCP that scans at the level of the tonal tier, across the entire macrostem. This version of the OCP considers adjacency at a level above the segmental or syllable level. By scanning at the tonal tier level, any high tone in the macrostem will be adjacent to any other. A toneless syllable between two high-toned syllables does not

block the constraint-recall that toneless syllables are not associated to any tone. In basic terms, this constraint prohibits multiple high tones within the macrostem.

(3.34) MSTEMOCP

      Only one high tone is permitted on the macrostem.

    This restriction on the number of high tones on the macrostem begs the question as to which high tones are deleted. The most important generalization is that the high tone that is retained is the last in the series. Whether that high tone is underlyingly associated to an object prefix or to a verb root is not important. To capture this generalization, it also helps to remember that in Runyankore there is no tone spreading or tone shifting—tones do not move from the syllable that sponsors them. Capturing the generalization that the last tone survives is a matter of noting that it is the rightmost tone that is preferred. The rightmost tone can be identified by an alignment constraint, exploiting the fact that constraint violations can be allowed and that the best candidate has the least number of violations.

(3.35) ALIGN(MACROSTEM, R, H, R)

      Align the right edge of the macrostem with the right edge of a high tone. = AL(R)

    Finally, the grammar must ensure that some high tone is retained. The constraint MAXH will prefer forms where tones in the input surface.

(3.36) MAXH

      Every high tone (H) in the input has a correspondent in the output.

The requirement placed by MAXH will ensure that one high tone will be retained. But since only one high tone is retained, we may infer that MSTEMOCP outranks MAXH. This is demonstrated in Tableau 3.5 (vowels that were high in the input are underlined). The

constraints that prevent high shifting and spreading are undominated in Runyankore; for that reason they and the candidates they exclude are not given in the following tableaux.

Tableau 3.5   a-ka [gá-bá-téek-ir-a 's/he cooked them$_6$ for them'

		MStemOCP	MaxH	Al(R)
☞ a.	aka[ga<u>b</u>atéécera		**	**
b.	aka[ga<u>b</u>átéécera	*!	*	**
c.	aka[ga<u>b</u>át<u>ee</u>cera		**	***!
d.	aka[gá<u>b</u>at<u>ee</u>cera		**	***!*
e.	aka[gá<u>b</u>atéécera	*!	*	**
f.	aka[ga<u>b</u>at<u>ee</u>cera		***!	

Candidates (b) and (e) are immediately disqualified by the multiple instances of high tones on the stem. Notice also that in (d) these high tones are not syllable-wise adjacent. However, the constraint MStemOCP scans at the level of the tonal tier across the mac-rostem. Candidate (f), which has lost all three input tones is worse than any of the other remaining candidates by one more MaxH violation. Finally, the decision falls to Al(R), which prefers candidate (a) because the high tone is closer to the right edge of the stem.[6]

These three constraints are crucially ranked, as can be seen when comparing the dis-qualified candidates under each constraint: there is always one that outperforms a passing candidate-candidates (b) and (e) in the case of MaxH and candidates (e) and (f) in the case of Al(R).

(3.37)   MStemOCP >> MaxH >> Al(R)

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[6] A set of candidates provided by Gen has been left out of this, and succeeding tableaux: those with a single, multiply linked high tone. Let us assume that they are ruled out by the high-ranking constraint NoSpread.

This ranking accounts for the high tone patterns arising on the verbal macrostem because of high tones in the input that are sponsored by regular object prefixes and the root. However, in the next section, we examine another type of object prefix, the reflexive, that does not obey these constraints.

3.6.1   Reflexive Object Prefix

The reflexive, which appears in the verbal macrostem, is quite resistant to high tone deletion. Its high tone wins out over the high tones of both the object prefixes and the root. Several example of this are provided below. The examples in (3.38a) illustrate the high-toned nature of the reflexive prefix *-é-*. It is the only high-toned morpheme in these words. The examples in (3.38b) show how the high tone of the reflexive is parsed in the output while the high tone of the root (which is underlined) is lost. Lastly, the examples in (3.38c) contain both an object prefix (which is high-toned as well, see Chapter 2) and the reflexive. Unfortunately, the vowel of the object prefix is always absorbed into the reflexive (by coalescence or glide formation). However, we note that there is still only a single high tone in the output.

(3.38) Reflexive Object Prefix

      a. okw[éé-bara   'to count oneself'

          INF-REFL-count

          okw[éé-reeba   'to see oneself'

          okw[éé-baziirira   'to sew for oneself'

      b. okw[éé-b<u>o</u>na   'to find self'

          okw[éé-t<u>ee</u>ra   'to beat oneself'

          okw[éé-k<u>a</u>raangira   'to dry roast for oneself'

      c. n-ka[b-éé-mwe-er-a   'I shaved them for myself'

          1S-REM[OP-REFL-√shave-APPL-FV

          n-ka[b-éé-bar-ir-a   'I counted them for myself'

          n-ka[by-éé-k<u>a</u>raang-ir-a   'I dry roasted them$_8$ for myself'

The reflexive, *-é-* always retains its high tone superseding the object prefix high tone or the root high tone. Notice also that the high tone of the reflexive is not always the rightmost tone in the input to the macrostem. It may be followed by the high tone of the root. So, the constraint that compels high tone retention in the face of MSTEMOCP and MAXH must outrank them in the constraint hierarchy. This is an example of a particular constraint that refers to a specific morphological category, in this case the reflexive. What we have is a version of the MAXH constraint that specifically refers to the reflexive morpheme.

(3.39) MAXH(REFL)

     The reflexive morpheme should retain its H tone.

In order to ensure that the reflexive high tone is retained over other possibilities this constraint must outrank the constraint that normally picks out which high tone will be retained: ALIGN(HIGH, RIGHT). By outranking it, the preference for a particular tone is

decided before the ALIGN(HIGH, RIGHT) constraint can take a part in the decision. This ranking is shown in Tableau 2.5.

Tableau 3.6   ak[éé-bóna   's/he found her/himself' (distant past)

	MSTEMOCP	MAXH(REFL)	MAXH	AL(R)
☞ a. ak[éé-bona			*	**
b. ak[éé-bóna	*!			*
c. ak[ee-bóna		*!	*	*
d. ak[ee-bona			**!	

The optimal candidate keeps the high tone on the reflexive and sacrifices the root high. Multiple high tones, as in candidate (b), violate the MSTEMOCP, and are fatal. Candidate (c) lost the high tone of -*é*-, resulting in a fatal violation of MAXH(REFL). Finally, overzealous deletion of high tones results in too many MAXH violations, which rules out candidate (d). Unlike reflexives, regular object prefixes do not retain their high tone before a high toned root. The relative ranking of MAXH and MAXH(REFL) is not evident from the data that we have.

In this section, we have examined the interaction of several high toned morphemes that may appear in the verb macrostem. The pattern that appears is a relatively straight-forward one and can be accounted for by an appeal to a small number of constraints. We have also seen an example of exceptionality, the reflexive, and how its high tone is re-tained above all others. To predict this exceptionality the grammar must encode this spe-cific morphological information into the constraint. This is not the only example of tonal patterns that do not fall out from general principles, but that must be partially encoded into the constraint hierarchy. In the next section, we move beyond the verb macrostem and consider a set of prefixes that have an effect on following high tones in the mac-rostem even though they are generally regarded as tense/aspect morphemes and part of the prefixal domain.

3.7   Tense Aspect Prefixes

Now that we have considered high-toned morphemes that appear in the macrostem, let us extend the discussion to include the tense-aspect prefixal domain. Recall from Chapter 2 that the morphemes prefixed to the macrostem encode such information as polarity, subject, tense and aspect. The subject morphemes are underlyingly toneless and will not figure prominently in this discussion. On the other hand, there are both high toned and toneless tense/aspect prefixes. Some of the high toned prefixes have no effect on the high tones that appear in the macrostem. Others can look across the macrostem boundary and condition the deletion of certain high tones within the macrostem. In (3.40), we list most of the major tense/aspect prefixes that appear in Runyankore.

(3.40)	Tense/aspect prefix	Tenses in which it appears
	-ka-	Remote Past Affirmative, Hoderinal Negative, Conditional Affirmative/Negative, Counterfactual Affirmative/Negative
	-rá-	Remote Past Negative, Hypothetical
	-rí-	Distant Future (all forms)
	-á-	Remote Past Affirmative Relative Clause, Hodiernal Affirmative/Negative/Relative, Recent Past (all forms), Future Affirmative, Conditional Main Clause, Counterfactual Main Clause
	-ci-	Perstative Main Clause.

The prefix -á- appears in a large number of verb tenses. The high tone of this prefix does not interact at all with the high tones on the other side of the macrostem boundary.

(3.41) Hoderinal past

             y-áá[kóm-ire   's/he has already tied'

             y-áá[rí-ire   's/he has already eaten'

             tw-áá[bá-mwi-ire   'we have already shaved them'

             tw-áá[bá-reeb-ire   'we have already seen them'

             tw-áá[ba-tééc-e-ire   'we have already cooked for them'

(3.42) Conditional[7]

             ba-ká-á[téeka   'they can cook'

             ba-ká-á[bóna   'they can see'

             ba-ká-á[mú-mwa   'they can shave him'

             a-ká-á[bá-reeba   'he can see them'

Unlike the prefix -á-, some tense/aspect prefixes condition the deletion of high tones on the macrostem. The following examples illustrate the deletion of the root high tone when it is preceded by one of the future prefixes, -rí- or -rá-.

(3.43) Negative future

             tarí[bona   's/he will not find'

             tarí[hiinga   's/he will not cultivate'

              tarí[teeka   's/he will not cook'

             tarí[karaanga   's/he will not dry roast'

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[7] The prefix -ka- is high toned because of the high tone of the prefix -á-.

(3.44) Future Relative

      abarí[bona   'ones who will not find'

      abarí[teeka   'ones who will not cook'

      abarí[karaanga   'ones who will not dry roast'

(3.45) Future negative relative

      atarí[bona   'one who won't ever find'

      atarí[teeka   'one who won't ever cook'

      atarí[karaanga   'one who won't ever dry roast'

(3.46) Distant past negative relative

      atará[bonire   'one who did not see'

      atará[teecire   'one who did not cook'

      atará[karaanjire   'one who did not dry roast'

     While the high tone of the root deletes after these high toned tense prefixes, not every macrostem high tone is subject to deletion. In (3.47) and (3.48) we see a number of cases where the object prefix does not lose its high tone after these tense prefixes.

(3.47) Negative future

    a. tarí[bara   's/he will not count'

        tarí[bá-bara   's/he will not count them'

        tarí[ga-bá-bar-ir-a   's/he will not count them$_6$ for them'

    b. tarí[teeka   's/he will not cook'

        tarí[ba-téécera   's/he will not cook for them'

        tarí[ga-ba-tééc-er-a   's/he will not cook them$_6$ for them'

(3.48) Negative remote past

    a. tará[shom-ire   's/he didn't read'

       tará[jí-shom-ire   's/he didn't read it$_9$'

       tará[ji-bá-shom-i-ire   's/he didn't read it$_9$ to them'

       tará[ji-ba-mú-shom-i-ire   's/he didn't read it$_9$ to them for him/her'

    b. tará[tweec-ire   's/he didn't send'

       tará[ji-twééc-ire   's/he didn't send it$_9$'

       tará[ji-ba-twééc-ire   's/he didn't send it$_9$ to them'

       tará[ji-ba-mu-twééc-e-ire   's/he didn't send it$_9$ to them for him/her'

First, let us consider the cases involving object prefixes and toneless stems in these tenses, given in (3.47a) and (3.48a). In these cases, there is apparently no effect caused by the future prefix *-rá-*. The high tone of the last object prefix is retained and all the preceding high tones are lost on the macrostem. The pattern becomes somewhat more complicated when we consider the behavior of high-tones sponsored by verb roots, represented in (3.47b) and (3.48b). Observe that the high tone of the root is lost after the high-toned tense/aspect markers *-rí-* and *-rá-*. These facts suggest that an OCP-style constraint is forcing the deletion of root high tones across the macrostem boundary, while ignoring object prefixes. Additionally, it must be the case that this version of the OCP only considers immediately adjacent high tones unlike MSTEMOCP which scans at the level of the tonal tier, marking all high tones within the macrostem. For purposes of clarity and to distinguish it from the entire family of OCP constraint, we will refer to this version as STRICTOCP.

At first glance, it may seem that we simply have a ramification of the MAX constraint such that it is parameterized to refer specifically to the object prefixes, the future prefix *-rá-* and to the root high tones separately.

(3.49) MAX family

      a. MAXH-FUT

      b. MAXH-RT

      c. MAXH-OP

Recall that the high tone is only deleted from the root. To accomplish this, we propose that the MAXH constraint focusing on the root high tone is ranked lower than STRICTOCP. Also, the MAXH constraints forcing retention of the high tones of the object prefix and the future prefix must outrank STRICTOCP. This is necessary so that neither of these high tones is deleted. This ranking is shown in (3.50).

(3.50)   MAXH-FUT, MAXH-OP >> STRICTOCP >> MAXH-RT

The following tableau illustrates the application of this proposed ranking to a verb comprising an object prefix, a toneless root, and the future prefix *-rá-*.

Tableau 3.7   tará[jí-shom-ire 's/he didn't read it$_9$'

	MAXH-FUT	MAXH-OP	STRICTOCP	MAXH-RT
☞ a. ta rá [jí shomire			*	
b. ta rá [ji shomire		*!		
c. ta ra [jí shomire	*!			

The prediction of this ranking is simple: keep both the high tones. There is no high toned root to contend with, so MAXH-RT plays no role in this tableau. Now, let us consider a similar pattern, but one involving a high-toned root.

93

Tableau 3.8   t-a-rá-[twéec-ire   's/he didn't send'

	MAXH-FUT	MAXH-OP	STRICTOCP	MAXH-RT
☞ a. ta rá [tweec ire				*
b. ta rá [twééc ire			*!	
c. ta ra [twééc ire	*!			

In Tableau 3.8, the high tone of the root must be deleted in order to avoid a fatal STRICTOCP violation. The high tone of the future prefix cannot be deleted as this too would result in a fatal violation of the MAX constraint requiring its retention, MAXH-FUT. However, this constraint ranking leads to a paradox when we consider the forms of the verb with object prefixes and high-toned roots. In these cases, this ranking makes the wrong prediction. Consider the following tableau.[8]

Tableau 3.9   tará[jí-twéécire   's/he didn't send it$_9$'

	MAXH-FUT	MAXH-OP	STRICTOCP	MAXH-RT
☞ a. ta rá [ji twééc ire		*!		
☀ b. ta rá [jí tweec ire			*	*
c. ta rá [jí twééc ire		*!	**	
d. ta ra [jí tweec ire	*!			*
e. ta rá [ji tweec ire		*!		*

An ungrammatical candidate, (b), is selected over the grammatical form, (a). Clearly, this ranking cannot be correct. The reader may recall that there is also a constraint that prefers the rightmost high tone, ALIGN(HIGH, R, STEM, R). However, as we saw above, this con- straint is ranked below the MAX constraint responsible for the retention of stem high

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[8] The pointing finger (☞) indicates the grammatical form. The symbol ☀ indicates the incorrect candidate chosen by the constraint ranking.

tones. So, considering it in the tableau does not make any difference in the outcome, as shown in below:

Tableau 3.10   tará[jí-twéécire   's/he didn't send it$_9$'

	MAXH-FUT	MAXH-OP	STRICT OCP	MAXH-RT	AL(H, R)
☞ a. ta rá [ji twééc ire		*!			**
💣 b. ta rá [jí tweec ire			*	*	***
c. ta rá [jí twééc ire			**!		**
d. ta ra [jí tweec ire	*!			*	***
e. ta rá [ji tweec ire		*!		*	*****

Here, we have kept ALIGN(H, R) with its relatively low ranking. As one can see, this makes no difference. Reranking this constraint to a higher position in the hierarchy also does not help to isolate the correct form. This can be easily seen if one notes that the best candidate with respect to ALIGN(H, R) is the one that violates two of the MAX constraints. Ranking it too highly, then, would only select candidate (e). Moving it down the hierarchy to below MAXH-OP would select candidate (c), which retains its object prefix high tone.

Since reranking cannot account for this problem, we must consider the role of other constraints. First, however, let us consider the pattern we see with these tense prefixes. Normally, we prefer to keep the high tone of the root, as the rightmost high tone in the macrostem. Furthermore, these tense prefixes essentially ignore the high of the object prefix. When deletion of the object prefix high tone does occur, it is because of the following high-toned root. So, these prefixes specifically target the high tone of the root and ignore the high tone of the object prefixes. The deletion of the high tone in this case is not representative of a general phonological pattern. Rather, we are dealing with a language-specific morphological constraint on sequences of high tones.

Recall that constraints, such as the OCP, under Optimality Theory have come to be considered as constraint families summarizing a set of related constraints with specific

foci. We have already seen good evidence that the constraint compelling the retention of high tones, MAXH, has specific morphological domains in which an instantiation of it ranks higher. So, it is a relatively simple matter to extend this analysis to the OCP.

The prohibition against adjacent high tones specified by the OCP must be limited so as to apply only to these future tense prefixes, *-rí-* and *-rá-*. Essentially, the OCP is a prohibition against adjacent identical elements, in this case, high tones. Remember that object prefix high tones are permitted after these morphemes.

(3.51) OCP-FUTURE/ROOT

$*(H_{Future} \, H_{Root})$ = Penalize adjacent high tones associated with futures tense morphemes and root morphemes.

While this constraint is very specific, it is important to realize that it needs to be. We are dealing with a morphologically determined, language-specific application of the OCP. The fact that its application is limited to root high tones only is evidence that this is so.

Within the constraint hierarchy, we would expect this constraint to be ranked high enough to enforce the selection of the correct grammatical candidates. In fact, because the OCP was only enforced between the future tense prefix and the root, we simply propose that this instantiation of the OCP replace the one previously in service.

Tableau 3.11   t a rá [tweec ire   's/he didn't send'

	MAXH-FUT	OCP-Fut/Rt	MAX-RT
☞ a. ta rá [tweec ire			*
b. ta rá [twééc ire		*!	
c. ta ra [twééc ire	*!		*

When an object prefix intervenes, there is no OCP violation, and thus, the high tone of the root is preserved.

Tableau 3.12   t a rá [jí twééc ire   's/he didn't send it$_9$'

	MAXH-FUT	OCP-Fut/Rt	MAX-RT
☞ a. ta rá [ji twééc ire			
b. ta rá [jí tweec ire			*!
●※ c. ta rá [jí twééc ire			
d. ta ra [jí tweec ire	*!		*
e. ta rá [ji tweec ire			*!

As we can see in the preceding tableau, we need to account for the stem high tones and the deletion of the object prefix high tone. Since the OCP-FUT/RT ignores this high tone, it cannot account for the preference of (a) over (c) in Tableau 3.12. Recall, however, that we already have an account of macrostem level high-tone deletion. If we include these constraints in the above tableau, we can predict the correct output.

Tableau 3.13   t a rá [jí twééc ire   's/he didn't send it$_9$'

	MAXH-FUT	OCP-FUT/RT	MSTEM OCP	MAX(H)	AL(H,R)
☞ a. ta rá [ji twééc ire				*	**
b. ta rá [jí tweec ire				*	***!
c. ta rá [jí twééc ire			*!		**
d. ta ra [jí tweec ire	*!			**	***
e. ta rá [ji tweec ire				**!	

The introduction of the OCP-FUT/RT constraint also allows for the reintegration of the MAX(H)-RT and MAX(H)-OP constraints. We still need to preserve the MAX(H)-FUT constraint so that the high tone on the future prefix is not deleted. But, because we already have encoded the preference for the root high tone into the hierarchy with the directionality constraint, ALIGN(H, R), we do not need to distinguish between the root high tone and the object prefix high tone.

Recall also that directionality (prefer rightmost high tone) was necessary in the case of multiple object prefixes. In this case, it was the rightmost that was preferred. As an example of this, consider the following tableau, which shows the evaluation of a verb in the future tense comprising multiple object prefixes and a toneless root.

Tableau 3.14   t a rá [jí bá mú shom ir ire   's/he didn't read it$_9$ to them for him/her'[†]

	MAXH-FUT	OCP-FUT/RT	MSTEM OCP	MAX(H)	AL(H,R)
☞ a. tará[ji-ba-mú-sho...				**	***
b. tará[ji-bá-mu-sho...				**	****!
c. tará[jí-ba-mú-sho...			*!	*	***
d. tara[ji-ba-mú-sho...	*!			***	***
e. tara[ji-ba-mu-sho...	*!			****	

[†] The combination of the applicative morpheme *-ir-* and the perfective morpheme *-ire* results in [-iire].

In the preceding tableau, the decisions about tone deletion on the macrostem are made by the lower ranking constraints. These constraints are more general—they do not have the same degree of morphological specificity.

In the case of a high toned root accompanied by multiple object prefixes, again the decisions are made by the lower constraints. Basically, the only time the morphologically specific constraints are particularly relevant is when there are no object prefixes.

3.8   Morphemes that Block Future High Tone Deletion

As we saw previously, not every high toned prefix causes deletion of a following macrostem high tone. One of the most common prefixes is a single high-toned vowel *-á-*. When this morpheme precedes a root high tone, there is no deletion.

(3.52) Hodiernal past

        yáá[kómire   's/he has tied'

        náá[ríire   'I have eaten'

        twáá[téécire   'we have cooked'

        twáá[káraanjire   'we have dry roasted'

(3.53) Recent past

        náá[téeka   'I have just cooked'

        náá[bóna   'I have just found'

        náá[cwéera   'I have just spit'

        náá[káraanga   'I have just dry roasted'

(3.54) Recent past relatives

        ayáá[bóna   'one who has found'

        ayáá[kóma   'one who has tied'

        ayáá[téeka   'one who has cooked'

        ayáá[káraanga   'one who has dry roasted'

    The presence of this morpheme also insulates the root high tone from the deletion effects of the future morpheme. In the affirmative future tense, both morphemes appear. Because of glide formation and compensatory lengthening, they surface as [-ryáá-].

(3.55) Affirmative future

        aryáá[bóna   's/he will find'

        aryáá[tééka   's/he will cook'

        aryáá[béiha   's/he will deceive'

        aryáá[káraanga   's/he will dry roast'

99

Recall that the constraint that enforced the deletion of the root high tone, OCP-FUT/RT, considers the immediately adjacent morae and the morphemes they are a part of. Assuming that the high tone of the future prefix -*rí*- and the high tone of the prefix -*á*- fuse, there is still the mora of the prefix -*á*- separating the root high tone mora and the mora of the future prefix. So, OCP-FUT/RT will not penalize the verb forms in (3.55).

3.9   Conclusion

In this chapter, we have examined the pattern of tonal interaction found when lexically specified high tones appear together. In the verbal macrostem, only one high tone may surface. The choice of the high tone is determined by edge relationships (being closer to the right edge of the word) and by specific morphological information (as in the case of the reflexive).

The high tones in the prefix domain tend to have relatively little effect on the high tones that appear in the macrostem. However, we did see two morphemes that caused the deletion of an immediately following root high tone. Morphologically specific constraints are responsible for forcing the retention of the high tones of the future morphemes' high tones. These tone patterns are sufficiently complex that there are constraints that must be specifically restricted to apply only between certain morphemes, specifically OCP-FUT/RT.

(3.56) Constraint rankings and patterns

    a. Phrase-penultimate falling tone

       PARSE(L%), LOCAL >> NOSHIFT >> *HL%

    b. Phrase-final retraction

       PARSE(L%), LOCAL, MAXH >> NOSHIFT

    c. Stem high tone: Reflexive H >> Root H >> Object prefix H

       MSTEMOCP >> MAXH, MAXH(REFL) >> ALIGN(H, R, STEM, R)

    d. Future high tone retention

       MAXH-FUT, OCP-FUT/RT >> MSTEMOCP >> MAX(H) >> AL(H, R)

Notice that the constraints that are most morphologically specific outrank those constraints that are more general. For example, MAXH-FUT and OCP-FUT/RT are both limited to apply only to a small set of morphemes. The constraint MSTEMOCP is more general in application, but it also applies to a specific level of structure in the verb.

The more general patterns, such as the preference for the rightmost high in the macrostem, are conditioned by constraints with few or no morphological limitations. In order for the specific morphological constraints to overrule the general patterns, they must be ranked higher. In the following chapter, we shall examine the morphologically conditioned insertion of a high tone and the constraints responsible for its placement on the verb. We shall continue to see a similar pattern of morphologically specific constraints ranking above those that are less morphologically constrained.

CHAPTER 4

MORPHOLOGICAL TONE

4.1   Introduction

In this chapter, we will discuss morphological tone patterns that appear on verbs because of a high tone that is required by the tense/aspect of the verb. That high tone is not present because of some high-toned segment in the input morphology. Rather, it appears because of the tense/aspect of the verb in question. We shall see that constraints specific to these various tense/aspects rank high enough to condition the appearance of the high tone on the appropriate morae of the verb. While there are several different patterns of tonal association, we will concentrate primarily on the so-called V2/Final pattern. The hallmark of this pattern (which appears in a number of tense/aspect forms) is the presence of a high tone on the verb stem. It appears on the syllable containing the second mora if the input root is toneless and on the final syllable (modulo nonfinality, discussed previously in Chapter 3) if the input root is high toned.

One important feature of the patterns found in Runyankore is the fact that there is a complicated relationship between the constraints responsible for associating the morphological high tone with a particular mora and other constraints on well-formedness, namely NoRise. Because of this, an analysis of this pattern based on noninitiality will be replaced by one that more directly accounts for the location of high tones of specific morae in the verb stem. We shall also briefly examine the problem of opacity and

suggest, following McCarthy 1994, that constraints may be parameterized to consider input features as well.

Ultimately, we shall see that the V2 pattern is the default case for morphologically defined tonal patterns. The grammatically inserted high tone appears on V2 if no higher ranked constraint forces some other action. High-toned roots will be targeted by constraints that operate only when the input is high toned. This will allow the grammar to apply specific principles to high-toned roots. We shall find that the most irregularity is found on verbs with high-toned roots. In the case of toneless roots, the V2 pattern will emerge as the default for the association of floating morphologically inserted high tones.

Several other languages have tone patterns that are similar to those found in Runyankore.[1] The analysis presented below differs from most of them in that we ultimately reject the use of alignment and anti-alignment constraints to explain the morphologically determined patterns that emerge.

This chapter is structured as follows. In §4.2, we introduce the tone patterns that are morphologically conditioned by tense/aspect of the verb. In §4.3, the V2/Final pattern is presented. The section comprises the largest theoretical discussion in this chapter. We will examine a related pattern in Zezuru Shona and consider the alignment/antialignment account proposed for this pattern. Ultimately, we will reject this account because it cannot deal with long vowels, as we shall see in §4.3.8. We will propose that conjoined constraints (referred to as "macroconstraints") are responsible for tone patterns associated to specific tense/aspect verbal morphology. In §4.4, the role of the constraint MSTEMOCP, which was introduced in the preceding chapter, will be considered. This will lead to the discussion in §4.5, where we will consider a tonal association pattern that must rely upon the constraints presented in the preceding chapter to be able to predict the tone pattern found in toneless roots. Finally, for completeness, we will discuss a simple pattern: one high tone on the verb, on the negative prefix. Let us begin the discussion by outlining the tone patterns to be discussed below.

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[1] Some specific examples include Haya (Hyman & Byarushengo 1984, Hyman 1993), and Kinyambo (Bickmore 1989), which are closely related to Runyankore.

4.2 Tonal Patterns

Verb forms in Runyankore exhibit several different morphologically determined tone patterns (which we will refer to as "melodies" to distinguish them from tone patterns appearing on particular, underlyingly high-toned morphemes). One of the key features of the melodic tone patterns found in the verbs is the fact that the location on the verb of the high tone associated with the tense is determined by the tonal quality of the stem. For example, in the yesterday past tense, a high tone appears on the syllable containing the second mora from the left edge of the stem if the verb root is toneless. However, if the verb root is high toned, then the high tone of the tense appears on the final syllable of the stem (in phrase-medial position). We refer to this pattern as the "V2/Final" pattern: V2 when the root is toneless and final when it is high toned. We will use the shorthand "V2" to stand for the syllable that contains the second tone-bearing unit of the verb stem. The tone-bearing unit is the mora. But, if the first syllable of the stem is long (i.e., contains two morae) then the high tone appears on the first syllable. Recall from Chapter 3 that rising tones are prohibited (except in cases of final high tone retraction). Because of this fact, the high must be associated to both morae of a long vowel.

Below we list the two most common patterns that have been discovered. In many cases, the pattern is dependent upon the polarity of the verb (i.e., whether it is positive or negative), whether it is a main clause or relative clause form, and, in the case of subjunctive forms, whether or not an object prefix is present. Below, we exemplify these patterns with the verb roots √reeb 'see' √baziir 'sew' for toneless roots and √kwáát 'catch', √téék 'cook' and √kárang 'dry roast' for high-toned roots.[2] Underlyingly high-toned tone-bearing units are underlined.

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[2] As in Chapter 3, I will use the left bracket, [, to indicate the left edge of the macrostem. If there is an object prefix in the macrostem, a dash will separate it from the root. Recall that the verb stem always begins with the verb root. Underscoring of tone-bearing units indicates that there was a high tone associated to it in the input.

(4.1)   V2/Final Pattern

  a. Yesterday past main clause affirmative

   a[rééb-ire   's/he saw'

   3S[√see-PERF

   ba[kw<u>aa</u>ts-iré ...   'they caught'

  b. Habitual MC aff.

   ba[bazíír-ir-a   'they sew for'

   ba[k<u>a</u>raang-ir-á...   'they dry roast for'

  c. Present progressive MC aff.

   ni-ba[bazíír-ir-a   'they are sewing for'

   COP-3P√sew-APPL-FV

   niba[k<u>a</u>raang-ir-á ... 'they are dry roasting for'

  d. Perstitive MC aff.

   ni-ba-ci[bazíír-ir-a   'they are still sewing for'

   COP-3P-PERST√sew-APPL-FV

   nibaci[k<u>a</u>raang-ir-á ... 'they are still dry roasting for'

  e. Subjunctive MC aff.

   ba[bazíír-ir-e   'they should sew for'

   ba[t<u>ee</u>c-ir-é...   'they should cook for'

  In the verb tenses in (4.1) a high tone appears in V2 position if the verb root is tone-less (the first case) and final syllable if the verb root is high-toned (the second case). We have underlined the tone-bearing units that are high-toned in the input, but that have lost their high tone.

(4.2)   V2/Default

    a. Remote past relative clause aff.

      abaa[bazíire   'the ones who sewed'

      abaa[ká̱raanjire   'the ones who dry roasted'

    b. Subjunctive with object prefix

      o[ji-bazíír-ir-e   'you should sew it$_9$ for'

      o[bi-ká̱raang-e   'you should dry roast them$_8$'

    c. Hypothetical

      kútura[bazíír-ir-e   'if we sew for'

      kútura[ká̱raange   'if we dry roast'

    d. Habitual negative MC

      tiba[bazíír-ir-a   'they don't sew for'

      tiba[ká̱raanga   'they don't dry roast'

    e. Habitual negative RC

      abata[bazíír-ir-a   'the ones who don't sew for'

      abata[ká̱raanga   'the ones who don't dry roast'

The tone pattern exemplified in (4.2) shares the V2 pattern found on toneless roots with the V2/Final pattern. However, if the verb root is high toned, like √*káraang* 'dry roast', then a high tone appears on the syllable to which it was associated in the input. We will see below that the pattern for high-toned roots in these tenses is the same as that described in Chapter 3.

(4.3)   Negative prefix

    a. Recent past negative main clause

        tínaa[baziira   'I have not sewn'

        tínaa[ka̱raanga   'I have not dry roasted'

    b. Perstative negative main clause

        tíínci[baziira   'I am no longer sewing'

        tíínci[ka̱raanga   'I am no longer dry roasting'

    c. Perstative negative relative clause

        atáci[baziira   'one who no longer sews'

        atáci[ka̱raanga   'one who no longer dry roasts'

    d. Negative conditional relative

        atáku[baziire   'one who should not sew'

        atáku[ka̱raanjire   'one who should not dry roast'

The tone pattern exemplified in (4.3) simply forces the association of a high tone to the negative prefix (which is not always high toned as the preceding examples can demonstrate). All other high tones on the verb are deleted. This pattern is discussed in detail below in §4.6.

The first two patterns are related by the fact that they both involve V2 tone-assignment when the input root is toneless. We shall devote most of the discussion to the V2/Final pattern. The V2/Default pattern is closely related to it and will be discussed in light of the V2/Final pattern. Finally, the Negative Prefix pattern will be discussed.

4.3 V2/Final Pattern

The first pattern under examination is found in a number of tense/aspects. In this pattern, a high tone associates to the second mora of the verb stem. Recall that the constraints NoRise and NoFall (Chapter 3) force association with both morae of a long syllable. This is true except penult syllables before a pause. If the input root is high-toned, then a single high tone will appear on the verb stem, associated to the final tone-bearing unit.

First, we see this pattern exemplified in the yesterday past tense form (positive and negative). Note that in part (a) we see toneless roots and in (b) roots that are underlyingly high-toned.[3]

(4.4)   V2/Final pattern: yesterday past tense

      a. a[bazíre   's/he counted'

         a[réébire   's/he saw'

         a[bazíire   's/he sewed'

      b. a[boniré buremu   's/he found Buremu'

         a[teeceiré buremu   's/he cooked for Buremu'

         a[karaanjiiré buremu   's/he dry roasted for Buremu'

(4.5)   V2/Final pattern: yesterday past tense negative

      a. ta[bazíre   's/he did not count'

         ta[réébire   's/he did not see'

         ta[bazíire   's/he did not sew'

      b. ta[boniré buremu   's/he did not find Buremu'

         ta[teeceiré buremu   's/he did not cook for Buremu'

         ta[karaanjiiré buremu   's/he did not dry roast for Buremu'

The characteristic feature of this pattern is the high tone that comes not from a morpheme (with segmental content), but that appears as a part of the tense/aspect morphology. For example, none of the input morphemes in *a[réébire* 's/he saw' is high-toned in the input (cf. *okureeba* 'to see').

Targeting V2 occurs in a number of Bantu languages, including Yao (Odden 1994, 1998), Olusamia (Poletto 1998), Kikamba (Roberts 1995), Haya (Hyman & Byarushengo 1984), KiHunde (Goldsmith 1987), Shona (Odden 1981, Myers 1987, Crowhurst &

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[3] The high-toned examples are provided with an object so that the final associated pattern is not obscured by phrase-final retraction (discussed in Chapter 3).

Hewitt 1997) and others. This can be accomplished with two constraints. We will assume that constraints are parameterized to apply only in certain tenses. In other words, if a word is not morphologically marked as belonging to a particular verb tense, then these constraints ignore it. There is no reranking of constraints in this model. Rather, constraints are limited to apply to only a subset of words in the language.

With the exception of Haya, which patterns like Runyankore, all of these languages preserve the root high tone. On the other hand, Runyankore and Haya do not allow more than one high tone on the verb macrostem. Because of this, the grammar needs to recover the information that there was at some point a high tone in the input. Several possible means by which this can be accomplished are examined below. However, first, let us consider the slightly simpler problem of toneless roots and the V2 high-tone association.

By employing conjoined constraints, macroconstraints, we can pick out specific locations on the verb and target them for high tone association. Macroconstraints (Smolensky 1995, Itô & Mester 1998, Crowhurst & Hewitt 1998) allow the conjoining of two constraints in a Boolean relationship. In the type of macroconstraint used here (and in Crowhurst & Hewitt) both constraints that compose the macroconstraint must receive a "pass" for the candidate in question to satisfy the macroconstraint.

First, let us consider the analysis of the tone pattern in Runyankore using constraint conjunction to specifically encode the position of the high tone given certain input facts: i.e., the tone of the verb root and the tense/aspect of the verb. After we have explained this analysis, we examine the analysis presented by Crowhurst & Hewitt for Zezuru Shona. After examining their proposal, we will see that C&H's analysis of Shona cannot explain all of the possibilities of V2 tone assignment that appear in Runyankore.

4.3.1 Constraint Conjunction

Several researchers in Optimality Theory (Smolensky 1995, Itô & Mester 1998) have proposed that violations of two constraints are worse if they appear in the same location. Smolensky (1995) proposed the following relationship between constraints.

(4.6)   The local conjunction of C1 and C2 in domain D

(C1 & C2) is violated when there is some domain of type D in which both C1 and C2 are violated.

For example the constraints *PL/LAB (labial place of articulation merits a mark) and NOCODA separately evaluate the strings [tab.da] and [tad.ba] equally. Both would incur a single violation of *PL/LAB and NOCODA each. Thus, there would be no way to distinguish between the strings [tab.da] and [tad.ba] (see Tableau 4.1). Suppose, however, that coda labials are more marked in this (hypothetical) language. In other words, it is worse to have both a NOCODA and a *PL/LAB violation in the same place than it is to have both of them singly. (Smolensky 1995) the local domain in this case is the coda. A violation of NOCODA and *PL/LAB in the same place is worse than the violation of either constraint singly. Then, this will result in a mark if the coda (which violates NOCODA) is also a labial (which violates *PL/LAB). Consider the following tableau evaluating these two strings.

Tableau 4.1   [tab.da] vs. [tad.ba] under conjunction

	*PL/LAB &$^\delta$ NOCODA	*PL/LAB	NOCODA
a. tab.da	*!	*	*
b. tad.ba		*	*

In this tableau, the domain of the macroconstraint (δ) is the coda. In evaluating this tableau, the conjoined constraint rules out candidate (a) because it has a violation of *PL/LAB and NOCODA. Notice that the simple constraints alone cannot distinguish between these candidates—they both violate them equally. But, only [tab.da] has a violation of *PL/LAB and NOCODA in the same place, the domain δ. In this approach, both halves of the constraint conjunction must be violated for the entire constraint to be violated. As C&H points out, this corresponds more closely to a type of *disjunction*. In contrast, they

110

present a formulation of constraint conjunction that considers a mark as equivalent to a "False" in a classical Boolean truth table for conjunction.

According to Crowhurst & Hewitt (1997), constraint conjunction is the conjoining of two constraints by a Boolean logical operator. So, the evaluation of the conjoined constraint is subject to the same truth conditions as two propositions joined by a logical connector. This relationship can be summarized in the following table. A violation in an argument of a constraint conjunction is logically the same as a False in the truth table to the left. Thus, any violation will result in a mark for the entire constraint conjunction.

(4.7)   Table (5) from Crowhurst & Hewitt (1997)

	A. Boolean Conjunction				B. Constraint Conjunction		
	Prop A	&	Prop B		Const A	&	Const B
i.	T	T	T	☞			
ii.	F	F	T		*	*	
iii.	T	F	F			*	*
iv.	F	F	F		*	*	*

In other words, for a candidate to satisfy a conjoined constraint it must satisfy both Constraint A and Constraint B. Also note that the failure of both constraints is no worse than the failure of just one. So, C&H define Conjunctive Co-ordination as follows.

(4.8)   Conjunctive coordination

A candidate CAND passes a conjunction A $\&^{cat}$ B iff CAND passes constraint A *and* CAND passes constraint B.

The conjunction can only hold if constraints A and B share a particular category (CAT) in common. C&H define this as the *focus of the constraint*. Because of this, the

choice of constraint to be conjoined is restricted in this model.[4] Both constraints must have the same type of focus. Crowhurst & Hewitt define the focus as a constraint as follows:

(4.9)   FOCUS (of a constraint):

      The focus of any constraint is the argument that identifies the category restricted by the constraint.

A constraint's focus is identified by the universally quantified argument. Many constraints have an element in their statement with universal quantification ("every", "any", etc). For example, in the ALIGN family of constraint, the first element is quantified over universally ($\forall$: "for every") and the second, existentially ($\exists$: "some", "there is"). (McCarthy & Prince 1993)

(4.10) GENERALIZED ALIGNMENT (McCarthy & Prince 1993)

      Align Cat1, Edge1, Cat2, Edge2 $=_{\text{def}}$
        $\forall$ Cat1 $\exists$ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.
      where
        Cat1, Cat2 $\in$ PCat & Gcat
        Edge1, Edge2 $\in$ {Right, Left}

This relationship also holds between the elements of the Faithfulness set of constraints under Correspondence.

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[4] This appears to be an issue that Smolensky (1995) did not formalize explicitly. C&H's notion of the focus of a macroconstraint does provide a more constrained model of constraint conjunction.

(4.11) Correspondence constraints (McCarthy & Prince 1995)

> MAX-IO   **Every** segment in the input has a correspondent in the output.
>
> DEP-IO   **Every** segment in the output has a correspondent in the input.

In (4.11), the first element in the correspondence relationship is universally quantified (boldfacing added to indicate the quantification). Because every constraint should have a FOCUS, the only constraints that can be conjoined are those that share the same focus. For example, the following two constraints both focus on the same thing, a syllable.

(4.12) NOCODA

> ALIGN (σ, RIGHT, VOWEL, RIGHT)
> "Every syllable ends with some vowel."

(4.13) σ-TO-FOOT

> LINK(σ, FOOT)
> "Every syllable is associated to some foot."

Because these constraints have the same focus, they can be conjoined in the following constraint.

(4.14) Conjunction: NOCODA & σ-TO-FOOT

> "[A]ny syllable must be coda-free *and* associated to a foot." (C&H 1997)

This constraint means that it would be worse for a syllable to have a coda and fail to be footed. For the specific application of constraint conjunction, let us examine the account from Zezuru Shona provided by C&H and then continue on to Runyankore and the V2/Final pattern.

4.3.2   V2 Association and Constraint Conjunction

In order to predict correctly the V2 pattern, we must focus on the second mora and then confirm that there is a high tone associated to it. This is a case where the ability to conjoin constraints proves useful. Keep in mind that each macroconstraint has a specific focus. However, there may be more than one focus in a word. So, if the focus of a macroconstraint is the mora, then each mora in a candidate will be a focus for the macroconstraint. I propose that a macroconstraint is responsible for V2 tone assignment. This macroconstraint has two halves. The first focuses upon the first mora of the verb stem. Remember that alignment constraints are only satisfied by exact edge-alignment. Consider the following constraint.

(4.15)   ALIGN(μ, L, STEM, L)

>   Align every mora with the left edge of the stem (only the first mora will pass this
>   constraint).

This constraint is satisfied only by the first mora of the stem. All other morae in the stem will violate it to some degree or another. Recalling that each mora in the word is tested, we can then conjoin this constraint with one that will force a high tone to follow the mora in focus.

(4.16)   ALIGN(μ, R, μ́, L)

>   Align the right edge of every mora with the left edge of a high toned mora; i.e.,
>   require the following mora to be high toned.

This constraint requires a mora to be followed by a high tone (V2 if the mora in question is the first in the stem). If we conjoin these two constraints their focus will be the mora because it is the element that is quantified over universally in each of the alignment constraints.

(4.17) Macroconstraint for V2 tone assignment (V2)

   AL(μ, L, STEM, L) &^{μ} AL(μ, R, μ́, L)

This macroconstraint will favor candidates that have a high tone associated to the second mora of the verb stem. The best candidate will satisfy both halves of the constraint conjunction. Recall that only the first mora of the word can satisfy ALIGN(μ, L, STEM, L). As we shall see, the issue of rising high tones can be dealt with by the higher ranked constraint NORISE. In evaluating the following tableau, keep in mind that each mora is evaluated against each of the constraints. The patterns of violations under the AL(μ, L, STEM, L) constraint will be the same for every candidate. So, the crucial constraint is the one that tests whether a high tone is associated to the following mora. Note that candidates (a) and (b) both satisfy this for the first mora of the word. It is NORISE that distinguishes between them.

Tableau 4.2   a-reeb-ire-H   3S-√see-PERF-YEST.PAST   's/he saw'

	NORISE	AL(μ, L, ST, L)	&	AL(μ, R, μ́, L)
☞ a. a[rééb-ire		μ1: √ μ2: *! μ3: *!	√ * *	μ1: √ μ2: *! μ3: *!
b. a[reéb-ire	*!	μ1: √ μ2: *! μ3: *!	√ * *	μ1: √ μ2: *! μ3: *!
c. a[reeb-íre		μ1: √ μ2: *! μ3: *!	* * *!	μ1: *! μ2: √ μ3: *!

Here is how to read this tableau. The conjoined constraint looks at every mora of the stem (which I have numbered as μ1, μ2, etc.) and asks it two questions: (1) are you the first mora, and (2) do you have a high tone after you? Every non-initial mora in the stem will

115

fail the first half of the conjunction—each candidate is the same with respect to this constraint. The second half of the constraint conjunction is passed only if the mora in focus has a high tone immediately after it. At this point, recall the notion of "compression" expressed by Crowhurst & Hewitt (1997) as

> "the assumption that conjunctions are evaluated categorically, a given focal element may violate the conjunction only once, so that two penalties (one for each constraint) against the same syllable . . . count as a single macro-violation".

So, a mora that fails either half of the conjunction counts as a failure and failing both is no worse. One mark is assigned to the constraint conjunction for each mora in the stem that fails one or both halves of the constraint conjunction. On one point I differ from C&H's presentation of macroconstraints. According to them, constraint conjunctions are categorical. However, in the case of Zezuru Shona that they examine, there is only one focal element (the high tone) in the word in question. As I have formulated the macroconstraint in (4.17), the mora is the focus. There are several morae in the candidates. Because of this, the macroconstraint V2 will be evaluated gradiently.[5]

Both halves of the constraint conjunction must be true. Notice, however, that only the first mora of the stem can pass the first half of the conjunction. Because of this, all other morae in the stem will fail. So, essentially, the decision falls to the second half of the conjunction. A mora that is the focus of the constraint will pass this half only if it is followed by a high tone. But, in order to pass the entire constraint conjunction, both halves of the constraint conjunction must pass. The only cases where this is true are found in candidates (a) and (b). Because only the first mora in the word will satisfy the first half of the conjunction all other morae are automatically ignored.

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[5] This follows the assumption made by C&H that "[w]hole candidates, however, may be assessed multiple penalties, up to one for reach token of CAT present for that candidate."

An incorrectly located high tone, as in candidate (c), will pass the second half of the constraint conjunction for some mora. But, note that while μ2 satisfies this constraint, it fails the first half of the conjunction (by not being the first mora in the word). So, overall, this mora receives a mark. In the end, we simply apply the same violation calculus that we would apply to any gradient constraint. Because candidates (a) and (b) have one fewer violations than candidate (c), they pass the constraint conjunction. Ultimately, the candidate with a level high tone will be selected as optimal because it also passes the NoRise constraint: candidate (a).

This analysis also has another interesting outcome. Recall that in previous analyses of this tonal pattern, the location of the high tone was predicted by separate constraints in a ranking that conspired to place it on the second tone-bearing unit. However, under this analysis, the location of the high tone is predicted by a single, albeit conjoined, constraint. This constraint represents a specific directive from the morphological component of the language: put a high tone on such-and-such mora. Recall that this tone pattern is only found within a subset of the tenses of Runyankore. Therefore, the V2 pattern does not represent a general phonological fact about the language. There is no prohibition against stem-initial high tone, for example. They are found in the infinitive (citation form), the remote past tense, etc. The V2 pattern represents a *morphological* fact about particular verb tenses in Runyankore. By unifying the phenomenon into a single macro-constraint we capture the fact that this is simply just a fact about the language that the speaker must learn.

Primarily because of the difficulties posed by verbs with long initial syllables, but also for the reasons just outlined, we reject the alignment/anti-alignment analysis of the V2 tone pattern. Because of this, we have no evidence for the ranking or even the existence of the anti-alignment constraint. The null hypothesis is that it plays no role in the grammar. The analysis presented by C&H for the final association found in these verb tense/aspects is thereby brought under suspicion as it relies upon the alignment and non-initiality constraints. In the next section, we will examine the final association pattern in Runyankore and propose that it too will be accounted for by a single macroconstraint.

4.3.3   Final Association in Runyankore

The following verbs illustrate the final tone pattern found on high-toned roots. These same verb tenses show the V2 pattern discussed above when the input root is toneless. These examples are presented in phrase-medial form to avoid obscuring the final-association pattern because of final high-tone retraction (discussed in Chapter 3). Note that there is only one high tone on the verb stem in the output.

(4.18) Final high tone pattern

    a. Yesterday Past

        a[b<u>o</u>n-iré ...   's/he found ...'

        3S[√find-PERF-H

        a[t<u>ee</u>ceiré ...   's/he cooked for ...'

        a[k<u>a</u>raanjiiré ...   's/he dry roasted for ...'

        tu[k<u>a</u>raanj-ir-a-iné ...   'we dry roasted for each other ...'

        1P[√dry roast-BEN-APPL-PERF-H

        tu[t<u>ee</u>c-er-a-iné ...   'we cooked for each other ...'

        tu[f<u>u</u>ñ-ir-a-iné ...   'we herded for each other ...'

    b. Habitual

        ba[g<u>a</u>-t<u>ee</u>c-er-á ...   'they cook them$_6$ for ...'

        3P-OP6[√cook-APPL-FV

        ba[k<u>a</u>raanjir-á ...   'they dry roast them for ...'

    c. Perstative

        naa-ci[t<u>ee</u>c-er-á buremu   'he is still cooking for Buremu'

        naa-ci[k<u>a</u>raanj-ir-á buremu   'he is still dry roasting for Buremu'

The primary issue here is to ensure that there is a single high tone associated to the final syllable of the verb. Each verb root in (4.17) is high toned. However, this high tone is lost in the output (this is consistent with the observation made in Chapter 3 that only one high tone may be associated to the verb macrostem in the output, we will address this

issue further below in §4.4). The verb tenses in (4.17) take a V2 high tone if the input root is toneless. Thus, it is important to get final association and not V2 association if the input root is high toned. The key piece of information to determine the placement of the melodic tone is the tonal quality of the input root. We must rely upon the high tone to be a trigger for final association. Since there is no low tone to trigger V2 association, we will rank the constraints for final association above those for final association. The goal will be to force final association only if the root is underlyingly high-toned. If the root is toneless, i.e., unmarked, then the V2 tonal association constraint will apply.

Because the analysis of V2 tone association no longer relies upon the alignment/anti-alignment constraints, it is necessary to come up with another way to describe the final high-tone association. In Crowhurst & Hewitt's analysis, the anti-alignment constraint plays a center role in the evaluation of the final tone pattern found in Zezuru Shona. In the model proposed by C&H, final association was predicted by the fact that all the candidates left after *FLOAT had pared down the candidate set also failed the left alignment/anti-alignment constraints. But, if we no longer rely upon the collocation of alignment and anti-alignment to accomplish the V2 pattern, we must question whether it still provides the best account for the final association pattern.

Recall that the macroconstraint ultimately responsible for the V2 association pattern could be seen as a specific instruction to assign a high tone to a particular mora. Let us take a similar approach to the problem of final association. Could a macroconstraint make the following statement: iff there is a high tone on the first syllable in the input then there is a high tone on the final syllable in the output. In other words, just in case (iff) there is a high tone associated to the initial mora of the stem then there should be a high tone associated to the final mora of the stem.[6]

The first constraint asks whether there is a high tone on the initial syllable in the input.

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[6] Let us set aside for a moment the problem of opacity. For the meantime, let us simply mark the high tone as being present in the input. In a following section (§4.5.1) we shall examine proposals for parameterizing constraints in this way.

(4.19) ALIGN(STEM, LEFT, μ́_{Input}, LEFT)

> The left edge of the stem must align with the left edge of some mora that is high
> toned in the input.

Only high-toned stems will satisfy this constraint because only they will have a high tone on the first mora of the stem in the input.[7] Recall that the stem begins with the root. The second half of the macroconstraint requires a high tone at the edge of the stem.

(4.20) ALIGN(STEM, RIGHT, H, RIGHT)

> Align the right edge of any stem with the right edge of some high tone.

At this point, one might ask why the constraint in (4.20) could itself not be parameterized to apply only to stems containing roots that are high in the input. First of all, remember that the final syllable of the verb is not part of the root—there is always a final morpheme attached to the verb root. So, we could not refer to rightward association to the root. Thus, we must refer to the verb stem. But, we cannot state that the verb stem is underlyingly high-toned. The verb stem is part of the morphological structure of the verb that is created by GEN and is thus not present in the input. One possible way around this problem would be to extend the parameterization of the ALIGNMENT constraint family so that it may refer to specific information about the input. However, I propose that this can be accomplished most simply by constraint conjunction.[8]

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[7] Note that this constraint is also a true generalization about verb roots: the high tone of the root is always associated to the first mora of the verb stem: e.g., *oku[ká̱raangirana* 'to dry roast for each other'.

[8] The most radical solution would be to have a separate level for the construction of morphological constituents like STEM, MACROSTEM, etc. This approach is appealing as it basically amounts to the level ordering approach of Lexical Phonology.

The conjoining of these two constraints produces a macroconstraint that requires a verb stem with a high-toned input root to have a high tone associated to the final tone-bearing unit of the stem.

(4.21)   Constraint conjunction for final association

ALIGN(STEM, LEFT, µ́$_{Input}$, LEFT) &^{Stem} ALIGN(STEM, RIGHT, H, RIGHT)

The focus of this macroconstraint is the verb stem—both halves of the macroconstraint focus on the verb stem. Unlike the constraint for V2 association, which considers every mora in the stem, this constraint is categorical because there is only one verb stem within the verb. Let us test this macroconstraint with the following tableau.

Tableau 4.3   a-káraang-ire-H   3S-√dry roast-PERF-YEST.PAST   's/he dry roasted'

		MSTEMOCP	AL(ST,L)	&^{STEM}	AL(ST,R)	MAXH
☞ a.	a[karaanj-iré				√	
b.	a[káraanj-iré	*!			√	
c.	a[karáánj-ire			*!	*!	
d.	a[káráánj-ire	*!		*	*!	
e.	a[káraanj-ire H			*!	*!	*

Why is it necessary to conjoin these two constraints in a macroconstraint? This allows the grammar to treat these two conditions as a unit. Otherwise, they would interfere with the V2 association macroconstraint. The constraint that requires an initial high tone marks every candidate whose input root is toneless. Because all these candidates will be marked, the macroconstraint is irrelevant and the decision passes down the hierarchy to the V2 constraint. This is illustrated in the following tableau. Keep in mind that in the evaluation candidate under the V2 constraint, each mora is evaluated separately. So, each violation under ALING(µ, L, STEM, L) is independently fatal. After we consider this tableau, we will examine the question of the evaluation of the constraint constituents of

macroconstraints. Specifically, we must ask how to evaluate a focal element that is as *bad* as all others.

Tableau 4.4   a-reeb-ire-H   3S-√see-PERF-YEST.PAST   's/he saw'

	NoRise	FINAL			V2			MaxH
		Al-H(St,L)	&Stem	Al-H(St,R)	Al(μ, L, St, L)	&μ	Al(μ, R, μ, L)	
☞ a. a[rééb-ire		*	*	*	√***	***	√***	
b. a[reéb-ire	*!	*	*	*	√***	***	√***	
c. a[reeb-íre		*	*	*	√***	****!	*√**	
d. a[reeb-ire		*	*	*	√***	****!	****	*
e. a[réeb-ire		*	*	*	√***	****!	****	
f. a[reeb-iré		*	*		√***	****!	**√*	

Because it is toneless, √*reeb* 'see', every candidate will violate the final association macroconstraint. In other words, this constraint is irrelevant in the case of toneless verb roots. Candidate (f) provides the evidence that the final association constraint must be a macroconstraint (as opposed to two separate constraints). This candidate does satisfy the constraint ALIGN(STEM, R, H, R). If this constraint were not conjoined to the constraint requiring a high tone in the input, this candidate would be selected. Thus, the decision falls to the V2 macroconstraint.

As promised above in §4.3.1, we can now consider the role of the violation of a categorical constraint in a macroconstraint. The constraint ALIGN-H(ST, LEFT) is a categorical constraint: there is only one stem in a verb. A key question is whether the violations of this constraint sustained by the candidate set in Tableau 4.4 constitute true violations in terms of the macroconstraint. In other words, do the candidates pass this constraint because they all fail it: they are all equally good. Or, do they all fail the constraint (and

register as a "false" in the Boolean sense) because they are all equally bad. This question is crucial because candidate (f) in Tableau 4.4 must be ruled out by this constraint.

C&H are not explicit on this issue. However, I submit that they implicitly accept that any violation of a categorical constraint qualifies as a Boolean "false" in their Tableau (24).

Tableau 4.5   Tableau (24) from C&H (Stress placement in Diyari)

Input: /{ñanda}$_\alpha$ {na}$_\beta$ {mat̯a}$_\gamma$/

	FTMIN(σ)	INIT-F	&$^{\text{Morph}}$	FINAL-F	DEP-IO(FT)
☞ a. (ñánda)-na-(màt̯a)		(*β)	*β ☝	(*β)	**
b. *(ñánda)-(nà-ma)-t̯a		(*γ)	*β*γ (	(*β*γ)	
c. *(ñánda)-(nà)-(màta)	*!				***

Notice that candidates (a) and (b) both incur a violation of the macroconstraint for the morpheme marked β. However, β in the surviving candidates equally violates Final-F. If we did not consider the violation of Final-F of candidate (b) to be equivalent to a Boolean "false" then candidate (b) would register only a single violation of the macroconstraint, for morpheme γ. However, this would mean that candidate (b) would be the selected parse because the decision would fall to DEP-IO(FT). Based on this tableau, we will interpret a violation of part of a macroconstraint to be a Boolean "false" if there is no *better* candidate available. So, in Tableau 4.5, there is no better parse in terms of morpheme β for the constraint FINAL-F. Similarly, in Tableau 4.4, all the candidates incur a single violation of ALIGN-H(STEM,L). But, there is no better candidate available. So, the violation is counted as a "false" in terms of the evaluation of the macroconstraint.

Consider the difference between the roles of a constraint or macroconstraint that pare down the candidate set and the constraint that is simply part of a larger macroconstraint. In evaluating a constraint, the best candidate survives because there is nothing better. It may have violations, but the point is that constraint violation is minimal in this candidate. However, the constituents of a macroconstraint consider *not* the candidates but the *foci*

within the candidate. Thus, a violation is a violation. The best focal element receives a value of True. Normally, there is only a single value for evaluation: a mark. However, in the case of focal elements, in order to predict the Boolean outcome, we must assign both true and false values. There is a difference between a unary and a binary system. Within a constraint conjunction, a value of False (i.e., the *focus* does not pass the constraint) is a false value. If there is a better candidate, it is awarded a value of True. But, there is no gradient value of true of false in a Boolean truth table, nor should there be in a constraint conjunction. If the focal element in every candidate violates part of the macroconstraint, they are assigned a truth-value of False. The simple question is: does the *focus* in this candidate satisfy the constraint: "yes" or "no"?

Now, let us consider the role of this macroconstraint when the input root is toneless. The ranking of the Final Association macroconstraint above the V2 macroconstraint will also select the correct parse when the input is high toned. This is demonstrated in the following tableau.

Tableau 4.6   a-káraang-ire-H   3s-√dry roast-PERF-YEST.PAST   's/he dry roasted'

		FINAL			V2			
	MSTEMOCP	AL-H(S,L)	&^{Stem}	AL-H(ST,R)	AL(μ, L, ST, L)	&$^\mu$	AL(μ, R, μ, L)	MAXH
☞ a. a[karaanj-iré					√****	*	***√*	
b. a[kaáraanj-iré	*!				√****	*	***√*	
c. a[karaanj-iré			*!	*	√****	*	**√**	
d. a[karaanj-ire H			*!	*	√****	*	*****	*
e. a[káraanj-ire H			*!	*	√****	*	*****	

The advantage to this analysis is that we can isolate a specific tone patterns with a single constraint conjunction. Thus, the constraint conjunction expressed as

AL(μ, L, STEM, L) &^{μ} AL(μ, R, ΰ, L) is connected explicitly to the V2 tone pattern. The tense/aspect coindexing is then a relatively simple matter: this constraint is coindexed morphologically to apply when the verb is in the appropriate tense/aspect form (Yesterday Past, Habitual, Subjunctive, etc.).

As we have postulated above, the macroconstraint controlling high-toned roots ranks higher than the V2 constraint, which controls toneless roots. Consider that the V2 pattern is common to a number of verb tense/aspects that have different association patterns with high-toned roots:

(4.22) Verb tense using the V2/Final pattern

      a. Yesterday past main clause affirmative

      b. Habitual MC aff.

      c. Present progressive MC aff.

      d. Perstative MC aff.

      e. Subjunctive MC aff.

(4.23) Verb tense using the V2/Default

      a. Remote past relative clause aff.

      b. Habitual negative MC

      c. Habitual negative RC

      d. Subjunctive with object prefix

The V2 pattern is common to both of them. The account presented above allows for the V2 pattern to appear as a default pattern in all of these tenses. In the V2/Final Pattern the macroconstraint responsible for final tone association outranked the V2 macroconstraint. In the next section we will see evidence that there is a melodic tone—specifically because we must ignore it under certain circumstances.

To summarize, the macroconstraints controlling V2 and Final association do so by forcing tonal association to a particular tone-bearing unit of the verb. One of the goals of

the macroconstraint account is to directly address the issue of morphological tone place-ment. It is difficult to argue that the V2/final pattern is in fact a product of a conspiracy of well-formedness constraints. There is no general prohibition against stem-initial high tone assignment (refer to chapter 3 for examples of such). Furthermore, while the V2 pattern may have a diachronic explanation, lying in the full specification of low tones in proto-Bantu, it is not the case that the synchronic language learner can have any access to this information. Thus, this proposal addresses directly the issue of morphological tonal assignment by encoding the pattern of association directly via the macroconstraint. Mor-phological principles are distinct from general phonological rules of well-formedness. In this way, the macroconstraint account captures the idiosyncratic nature of these facts directly.

In contrast, the account of the complex tone pattern (which mostly mirrors the V2/Final pattern in Runyankore) presented by Crowhurst & Hewitt (1998) breaks the to-nal association pattern down into a number of ranked constraints, including both anti-alignment constraints and macroconstraints. In the following sections, we will examine their proposal. After having presented it, we will consider the facts of Runyankore that demonstrate that the anti-alignment model cannot correctly predict all the possible out-comes in Runyankore.

4.3.4   Zezuru Shona Complex Tone Pattern

The complex tone pattern in ZS (Zezuru Shona) involves a pattern very similar to that found in Runyankore and we will find it useful to examine their proposals. In toneless roots, a floating high tone associates to the second syllable of the stem and associates to the following syllable (as long as it is non-final). If the root is high toned, then the float-ing high tone associates to the final syllable. The root high spreads up to two syllables to the right, as long as that does not make it directly adjacent to the final high. Some exam-ples of this are given with verbs stems in (4.24).

126

(4.24) Complex tone pattern in Zezuru Shona

      a. Toneless roots

         bik-ís-a   'cook-CAUS-FV'

         bik-ís-ír-a   'cook-CAUS-APPL-FV'

         bik-ís-ís-ir-a   'cook-CAUS-INTENS-APPL-FV'

         veréng-a   'read-FV'

         veréng-és-er-a   'read-CAUS-APPL-FV'

      b. High-toned roots

         tór-es-á   'take-CAUS-FV'

         tór-és-er-á   'take-CAUS-APPL-FV'

         tór-és-és-er-á   'take-CAUS-INTENS-APPL-FV'

Crowhurst and Hewitt (1997) present an analysis of the so-called complex tone pattern in Zezuru Shona. However, in order to understand the nature of their analysis, it is important to review first some of their theoretical proposals. In the constraint hierarchy for Zezuru Shona, one of the operative constraints is formed by the conjunction of two familiar constraints, ALIGN(H, L) and OCP. First, however, let us consider the key constraints in C&H's analysis.

4.3.5 Toneless Root in ZS Complex Tenses

As in Runyankore, toneless roots in ZS complex tenses have a high tone on the second tone-bearing unit of the verb stem. Analyses of this type of stem-initial tone-bearing unit avoidance have generally involved an anti-alignment or non-initiality constraint (cf. Poletto 1998 for Olusamia, Bickmore 1996b, Odden 1998 for Yao). The constraints that C&H use to account for it are as follows.[9]

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[9] These constraints are very similar to those suggested such authors as Cassimjee & Kisseberth (1998), Odden 1998, Myers 1997. For example, Odden's (1998) PARSEH corresponds to Myers' *FLOAT. Nearly all writers on Bantu tone use a similar set of alignment constraints.

(4.25) Constraints responsible for V2 assignment in ZS Shona

    a. *FLOAT   A tone must be associated with a syllable (cf. Myers 1995).

    b. H-LEFT   ALIGN(H, LEFT, VERBSTEM, LEFT)

    c. H-RIGHT   ALIGN(H, RIGHT, VERBSTEM, RIGHT)

    d. NONINITIAL-H   The initial syllable of a verb stem is not associated to H. (compare this with *ALIGN(H, R, STEM, R) Bickmore 1996b, Poletto 1998).

The constraint NONINITIAL-H functions as an anti-alignment constraint that penalizes the association of a high tone to the initial tone-bearing unit of the verb stem.[10] They both penalize the association of a high tone with the first tone-bearing unit of the verb stem. The ranking of NONINITIAL-H above H-LEFT will prefer a high tone that appears on the second tone-bearing unit of the verb stem. The constraint *FLOAT ensures that the high tone will actually be parsed into the stem.

    C&H lay aside the problem of tone spreading in their analysis.[11] The following tableau summarizes the tone association for toneless verbs (repeated from C&H (46)).

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[10] The formulation of the constraint as NONINITIAL-H suggests some kinship with nonfinality and extrametricality. However, it should be noted that the left edge of the stem rarely corresponds to the left edge of the verb. Apart from imperatives (*bára* 'count'), which appear as a bare stem, verb stems are always preceded by segmental material: object prefixes, tense/aspect morphology, person/number morphology, the negative prefix, for example.

[11] There is no tone spreading in Runyankore. So, it is not a crucial issue in this discussion either.

Tableau 4.7   Input: {ve re nge se ra, H}

	*FLOAT	NONINIT-H	H-LEFT	H-RIGHT
☞ a. ve ré nge se ra			*	***
b. ve re ngé se ra			**!	**
c. ve re nge se rá			**!**	
d. vé re nga se ra		*!		****
e. ve re nge se ra H	*!			

The optimal candidate minimally misaligns the high tone with the left edge of the stem, satisfying NONINIT-H and minimally violating H-LEFT. The constraint H-RIGHT plays no role in the case of verbs with toneless roots, however, it will be important later.

Accounting for the pattern in high-toned roots is not as simple. The key constraint here is the OCP, which penalizes adjacent high-toned syllables. However, simply ranking the OCP higher (so that it actively rules out candidates) is not enough, as illustrated from the following tableau (from C&H (53)).[12]

Tableau 4.8   Input: {tó-es-er-a, H}

	NONINIT-H	OCP	H-LEFT	H-RIGHT
☞ a. tó re se rá	*		***!	
●⃛ b. tó re sé ra	*		**	*
c. tó ré se ra	*	*!	*	**

Observe that the OCP cannot distinguish between these candidates. But, C&H point out that the intended optimal candidate is the one that passes both the OCP and H-LEFT,

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[12] C&H assume that higher ranked constraints prevent the deletion or shift of the root high tone and compel the association of the floating high with some tone-bearing unit. For this reason, the marks under H-LEFT and H-RIGHT only take the position of the floating high into account. In a complete tableau, the number of violations caused by the root high will always be the same for candidates that survive down to this point in the constraint hierarchy.

"modulo noninitiality." As C&H put it "A candidate which passes the OCP but H-LEFT is as bad as one which fails both." It is exactly for these two constraints that they propose a conjoined constraint. Bear in mind that we face similar problems with Runyankore, which has the same type of tone pattern. In the following section, we will examine the proposals for constraint conjunction.

4.3.6   Constraint Conjunction and Final Association in Zezuru Shona

Recall that we were unable to correctly predict final tone assignment in ZS (see Tableau 4.8) However, by making use of constraint conjunction Crowhurst & Hewitt were able to formulate an analysis that would predict final tone association when there was a high-toned root. It was based upon the following macroconstraint.[13]

(4.26) H-LEFT $\&^H$ OCP

> A high tone should be left-associated to the stem *and* not violate the OCP (i.e., not be adjacent to any other high tone).

The superscript "H" next to the Boolean connector indicates that a high tone is the focus of this conjoined constraint. The following tableau illustrates the ranking of this constraint. It will also make its role in predicting the correct outcome clearer.

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[13] The focus of this macroconstraint is the high tone. Following C&H's formulation of the notion of focus, we can see that the first half of the macroconstraint could have the high tone as the universally quantified member in its formulation (ALIGN(H, L, STEM, L)). However, it is not entirely clear that the OCP for high tones would universally quantify over high tones. Does the high tone itself violate the OCP? Or, do we consider there to be a violation of the OCP when a particular configuration is true?

Tableau 4.9   Input: {tór-es-er-a, H}

	NONINIT-H	H-LEFT	&^{H}	OCP	H-RIGHT
☞ a. tóreserá	*	(**!*)	*		
b. tóreséra	*	(**!)	*		*!
c. tórésera	*	(*)	*	(*!)	*!*

Each of the candidates fails NONINIT-H, but that is to be expected given that the input already has a high tone associated to the stem-initial syllable. The decision then falls to the conjoined constraint. Let us examine carefully the mechanism proposed by C&H for the evaluation of conjoined constraints. First, all three candidates fail the constraint and this tends to obscure the important fact about the evaluation of conjoined constraints. The reason for the failure of candidate (c) may not be obvious. In fact, the OCP half of the conjoined constraint is responsible. The best candidate for the constraint H-LEFT is counted as not failing the constraint—its single violation is not fatal, hence the lack of a fatal mark, !, in the cell.[14] When a constraint is gradient, the presence of violation does not automatically mean that that half of the conjoined constraint is logically false. Rather, the best candidate is awarded the Boolean value "true". All the candidates presented fail the macroconstraint. So, ultimately, the best candidate ends up being the one with the most rightwardly associated high tone because the decision falls to the constraint H-RIGHT.

Another possible candidate would involve the failure to parse the floating high tone into the verb. However, there is a high-ranking constraint, *FLOAT, that will rule out this candidate.

How, then, does this constraint apply to toneless roots? It should be able to make the same prediction that the non-conjoined constraint analysis made. The following tableau is again drawn from C&H, (57).

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[14] We will mark the subviolations within the macroconstraint with a superscripted exclamation point: *!. This will indicate that this candidate receives a False for this half of the constraint conjunction.

Tableau 4.10   Input: {vereng-es-er-a, H}

	NONINIT-H	H-LEFT	$\&^H$ OCP	H-RIGHT
☞ a. veréngesera		(*)		***
b. verengésera		(**!*)	*!	**
c. verengeserá		(**!**)	*!	
d. vérengesera	*!			****

Candidate (d) immediately fails because of its NONINIT-H violation. Candidate (a) passes the conjoined constraint. Its single violation of H-LEFT is construed as non-fatal. It is therefore optimal despite the multiple violations of H-RIGHT. At this point the reader may wonder why the violation of H-LEFT by candidate (a) is not considered fatal. After all, candidate (d) would be superior to it in terms of H-LEFT. Therefore, we would expect candidate (a) to incur a mark under the conjunction of H-LEFT $\&^H$ OCP. Then, all three surviving candidates would be equal with respect to the macroconstraint. The optimal candidate would be candidate (c), which is best under H-RIGHT.

The key assumption made by C&H here is that once a candidate suffers a fatal violation, it is knocked out of the running entirely. In other words, once a candidate suffers a fatal violation it is no longer considered and no more marks are assigned to it (so that the marks under H-RIGHT for candidate (d) would be merely expository). Thus, in Tableau 4.10, candidate (d) would not be considered by the macroconstraint, thus allowing candidate (a) to pass the macroconstraint despite its single violation of H-LEFT.

Another important point to note about candidate (a) in Tableau 4.10 is that it passes the macroconstraint despite its violation of H-LEFT, which is a gradient constraint. In this case, we assume that candidate (a) does not incur a violation under the macroconstraint because it is the best with respect to the H-LEFT half of the macroconstraint. This issue will arise again in §4.3.3 below where we shall see the role of a single constraint violation in a categorical half of a macroconstraint.

This approach to constraint evaluation inserts a measure of seriality to the model because it forces the grammar to proceed in a stepwise fashion down the constraint

hierarchy, eliminating candidates as it goes. Otherwise, ungrammatical candidates would be selected by the grammar. This points out a difference between their analysis of ZS and the one presented here for Runyankore. The morphological macroconstraint model proposed here does not need to ignore other possible parses once they have been removed from the grammar. Consider Tableau 4.4 above, in this tableau, the candidates that are rejected pose no threat to predicting the correct outcome of the macroconstraint. This is a relatively minor issue, but it is another difference that falls out from the different accounts.

4.3.7 An Analysis (and Reanalysis) of the V2/Final Pattern in Runyankore

In this section, we will examine how this proposal will work in Runyankore. We shall find that it cannot explain every type of V2 association. In the V2 pattern, the high tone provided by the verb tense associates to the syllable containing the second tone-bearing unit. This formulation is important because it is possible for the high tone to appear on the first syllable of the stem, provided that it contains a long vowel.[15] After we have had a chance to test the alignment/antialignment (noninitiality) approach we will re-examine the V2 problem and propose a novel approach based upon constraint conjunction. First, consider the following.

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[15] The fact that the vowel be bimoraic underlyingly turns out to be very important. As is common in many Bantu languages, coda nasals contribute weight to a syllable. However, they are not counted as tonally moraic. Hyman (1992) discusses this problem. Following his analysis, I will assume high-ranking constraints restrict the types of morae high tones may associate to. Thus, the mora contributed to a syllable by a coda nasal will not count for tonal association. This is a long-standing problem in Bantu and deserves more serious consideration.

(4.27) V2 tone pattern and syllable length

    a. Short initial syllables

        m[baz-íre   'I counted'

        n[gab-íre   'I divided

        n[gurúc-ire   'I jumped'

        n[damúc-ize   'I greeted'

        n[teréc-ire   'I offered beer'

    b. Long initial syllables

        n[dééb-ire   'I saw'

        n[shúúm-ire   'I descended'

        n[sííb-ire   'I fasted'

        m[pééc-ire   'I carried'

    c. Coda nasals

        n[gaamb-íre   'I said'

        n[jeenz-íre   'I went'

        m[baamb-íre   'I stretched a drum'

        m[paanj-íre   'I made'

In (4.27a), the high tone associates to the V2 position, within the second syllable. In contrast, (4.27b) demonstrates that if the V2 mora is in the first syllable (because it is long) the high tone will extend over the entire syllable (note that this would violate the anti-alignment constraint discussed above). Finally, the verb forms (4.27c) illustrate a peculiarity about Runyankore where coda nasals do not count as possible tone-bearing units (see fn. 9).

One common analysis of the V2 pattern uses alignment and antialignment constraints to force the high tone to associate to the second mora in the word (cf. Bickmore 1996b, Crowhurst & Hewitt 1997, Poletto 1998). One constraint forces the high tone to align to the left edge of the stem:

(4.28) ALIGN(H, LEFT, STEM, LEFT)

Align any high tone with the left edge of the verb stem. AL(L)

This constraint is outranked by an anti-alignment constraint that keeps the high tone off of the first tone-bearing unit:

(4.29) *ALIGN(H, LEFT, STEM, LEFT)

Do not align any high tone with the left edge of the verb stem. *AL(L)

(4.30) *ALIGN(L) >> ALIGN(L)

Do not align at the left edge, but get as close to it as possible.

Since *ALIGN(L) ranks above ALIGN(L), the high tone is located one tone-bearing unit to the right of the leftmost tone-bearing unit of the stem, i.e., V2 position.

The following tableau illustrates this ranking with a verb in the habitual, which takes a floating melodic high tone.

Tableau 4.11   tu-baziir-ir-a-H   1P-√sew-APPL-FV-HABITUAL   'we sew for'

		*ALIGN(L)	ALIGN(L)
☞ a.	tu [bazíírira		*
b.	tu [báziirira	*!	
c.	tu [baziiríra		**!*
d.	tu [baziirirá		**!**

This tableau demonstrates the effect of *ALIGN(L) outranking ALIGN(L). The optimal form has a high tone on V2. The optimal candidate, (a), has a single violation of ALIGN(L). The best candidate with respect to ALIGN(L) is ruled out because perfect left alignment is fatal (in this tense).

However, as we shall see in the next section, there is a case of V2 association in Runyankore for which the alignment/anti-alignment analysis is ineffectual. Some grammatical forms violation anti-alignment.

4.3.8   Problematic Case of V2 Association

We should now consider a set of problematic facts about the V2 pattern in Runyankore. The main issue here is that the constraint system as we have outlined it above cannot properly predict the correct form in all cases. Specifically, a problem arises when we consider verbs that have a long vowel in the first syllable of the stem.

(4.31) V2 Tone Pattern and Long Stem-Initial Syllables

n[dééb-ire	'I saw'
n[shúúm-ire	'I descended'
n[sííb-ire	'I fasted'
m[pééc-ire	'I carried'

The problem is this: the constraints as they are set up will prefer the candidate that associates the high tone to the second mora and not the first. If we consider the mora to be the tone-bearing unit, then the following tableau predicts that the high tone should fall on the second mora of the stem.

Tableau 4.12   a-reeb-ire-H   3S-√see-PERF-YEST.PAST   's/he saw'

	*ALIGN(L)	ALIGN(L)
☞ a. a[reéb-ire		*
b. a[reeb-íre		**!

However, recall that rising tones are not permitted in this position: the correct form should be *aréébire* with a high tone on both morae of the initial syllable. Recall that the only place one may find a rising tone in Runyankore is on the penultimate syllable at the

136

end of an utterance, see Chapter 3. Candidate (a) in Tableau 4.12 is not really the gram-
matical output. We should include the constraint NoRISE (introduced in Chapter 3),
which ranks relatively high, in the tableau.

Tableau 4.13   a-reeb-ire-H   3S-√see-PERF-YEST.PAST   's/he saw'

	NoRISE	*ALIGN(L)	ALIGN(L)
☞ a. a[rééb-ire		*!	
b. a[reéb-ire	*!		*
●✵ c. a[reeb-íre			**

This tableau makes the wrong prediction by selecting candidate (c) as the grammatical
output. The correct parse is candidate (a). However, this candidate, while it passes
NoRISE is ruled out because it violates *ALIGN(L). If we assume that the constraint
against rising tones is highly ranked, then the outcome cannot be otherwise. One alterna-
tive is to move NoRISE to a lower position in the constraint hierarchy.

Tableau 4.14   a-reeb-ire-H   3S-√see-PERF-YEST.PAST   's/he saw'

	*ALIGN(L)	ALIGN(L)	NoRISE
☞ a. a[rééb-ire	*!		
●✵ b. a[reéb-ire		*	*
c. a[reeb-íre		**!	

But, this still does not produce the correct form, which is *a[réébire* 's/he saw'. The con-
straint NoRISE must rank sufficiently high so as to rule out a rising tone on pre-
penultimate syllables.

We achieve nothing by assuming that the syllable is the tone-bearing unit. If this were
the case, given the above constraint set, the length of the initial syllable would be irrele-
vant and the high tone would always end up on the second syllable, regardless of NoRISE
and other constraints, which is contrary to fact.

There are potentially two solutions to this problem. The first is to appeal to the notion of level ordering and simply stipulate that any rising tones are made into level tones at a different level of the grammar. This would be consistent with a derivational account of Runyankore. Under such an account, the morphologically governed principles of tone assignment would apply during a cycle that would take place before the rules eliminating falling and rising tones, which would be post-cyclic. Of course, this solution simply ignores the problem of rising tones and shunts the problem off to another component of the grammar. We would have to weaken OT by adding serialism to the theory. Furthermore, we have already seen that there are some rising tones permitted by the grammar (see Chapter 3). Moving this issue to a level corresponding to the post-lexical domain would beg the question why this contrast appears.

If we wish to deal with this problem directly and to maintain a strict OT account—without appeal to seriality—then we must discover how to target a particular mora without excluding the possibility of initiality. This will permit a high tone to be associated to both morae of a long syllable. The use of antialignment constraints in this context simply cannot be justified given these types of data.

As we have seen, we cannot rely just upon the anti-alignment constraint because it cannot distinguish between the candidates that also pass the more important constraint against rising tones.

4.4 Stem Level OCP-Effects

Recall from Chapter 3 that only a single high tone is permitted to appear on the verb macrostem. This will be true of those tenses with morphologically assigned high toned as well. In most cases, the high tones of all other high-toned morphemes in the stem are deleted on the surface, in preference to the high tone of the melodic tense (as encoded by MELPARSE).

(4.32) Multiple high tone deletion from stems

        ba-tú-baziir-ir-a-H   →   ba[tu-bazíírira

        3P-1P-√sew-APPL-FV-HABITUAL

        they sew for us'

        tu-cí-heek-ire-H   →   tu[ci-héécire

        1P-CL7-√carry-PERF-YEST.PAST

        'we carried it$_7$'

        n-bá-é-bar-ir-a-H   →   m[bee-baríra

        1S-3P-REFL-√count-APPL-HABITUAL

        I count them for myself'

        ti-tu-zí-é-reeb-ir-a-H →   titu[zee-réébera

        NEG-1P-CL10-REFL-√see-APPL-FV-HABITUAL

        'We don't see them for ourselves'

The multiple occurrences of high tones on the macrostem (which includes object prefixes and the stem) are ruled out by the high ranking of MSTEMOCP. In all cases of high tone deletion in (4.32), the high tones that are deleted are not adjacent to the high tone on the surface. At least one tone-bearing unit separates the melodic high and the object prefix: the first syllable of the stem. We know that MSTEMOCP ranks near the V2 constraint. At this point, however, we do not know their respective rankings.

Tableau 4.15   ba-tú-baziir-ir-a-H   3P-OP-√sew-APPL-FV-YEST.PAST   'they sew for us'

	MSTEMOCP	V2
☞ a. ba[tu-bazíírira		
b. ba[tú-bazíírira	*!	*
c. ba[tú-baziirira		*!
d. ba[tu-báziirira		*!
e. ba[tu-baziirira		*!

Candidates (c) and (e) have failed to parse the melodic high tone onto the stem and thus fatally violate V2 (and MELPARSE if we include it). Note that for candidate (c) it does not matter whether the high tone is sponsored by the object prefix or by the tense. In the first case, the melody high tone was not parsed onto the stem. In the second case, it is not associated with the stem. Candidate (b), which retains both high tones on the surface, fails because of its MSTEMOCP violation. Finally, candidate (d) fails because of the misalignment of the melodic high tone.

4.5   V2/Default Pattern

The next major melodic tone pattern examined here has a very interesting property. Toneless roots appear with a high tone on the V2 syllable as in the preceding section. However, high-toned roots have the same high tone pattern as seen in the lexically specified tenses, as discussed in Chapter 3. We do know that a high tone is still inserted if the input root is toneless, giving the V2 pattern. For example, in (4.33) we see toneless roots in the remote past relative form of the verb. Notice that a high tone appears on the V2 syllables regardless of the presence or type of object prefix.

(4.33) Remote past relatives with toneless roots

a. No Object Prefixes

abaa[bazíre	'ones who counted'
abaa[réébire	'ones who saw'
abaa[bazíire	'ones who sewed'
abaa[ramúcize	'ones who greeted'
abaa[bazííraine	'ones who sewed for each other'

b. Object Prefix

abaa[ba-bazíre	'ones who counted them'
abaa[ba-gaambíre	'ones who spoke to them'
abaa[ba-réébire	'ones who saw them'
abaa[ba-gabúriire	'ones who served them'

c. Reflexive Prefix

aya[ye-bazíre	'one who counted oneself'
aya[ye-bazííriire	'one who sewed for oneself'
aya[ye-gabúriire	'one who served oneself'

On the other hand, consider the same verb tense with high-toned inputs, given in (4.34). Here, the high tone does not appear in one consistent location. If there is no object prefix, the high tone appears on the root syllable. The same is true if there is a regular object prefix. However, if there is a reflexive object prefix, [-é-], then the high tone appears on it. Recall that there is a hierarchy of preference with respect to stem high tones: reflexive >> root >> object prefix (cf. Chapter 3).

(4.34) Remote past relatives with high-toned roots

      a. No object prefixes

         abaa[kómire   'ones who tied'

         abaa[téécire   'ones who cooked'

         abaa[káraanjire   'ones who dry roasted'

      b. Object prefix

         abaa[ba-bónire   'ones who found them'

         abaa[ga-téécire   'ones who cooked them$_6$'

         abaa[bi-káraanjire   'ones who dry roasted them$_8$'

      c. Reflexive prefix

         aya[yé-riire   'one who ate oneself'

         aya[yé-bonire   'one who found oneself'

         aya[yé-karaanjiire   'one who dry roasted for oneself'

The same pattern is found in the negative habitual. The examples in (4.35) and (4.36) are organized in the same way as the preceding examples: no object prefix, object prefix, reflexive prefix. Again, when the input root is toneless the morphological high tone appears on V2. If the root is high tone, the default lexical tone pattern surfaces.

(4.35) Habitual negative toneless roots

      a. tiba[barána   'they don't count each other'

         tiba[bazíira   'they don't sew'

      b. tiba[t<u>u</u>-bazíírira   'they don't sew for us'

         tiba[t<u>u</u>-céérereza   'they don't cause us to be late'

      c. tib[<u>ee</u>-bazíírira   'they don't sew for themselves'

         tib[<u>ee</u>-héécera   'they don't carry for themselves'

(4.36) Habitual negative high-toned roots

     a. tiba[téécera   'they cook for themselves'

        tiba[káraanjira   'they dry roast for themselves'

     b. tiba[tu̱-bónereza   'they don't punish us'

        tiba[tu̱-shécererira   'they don't laugh at us'

     c. tib[éé-ḵaraanjira   'they don't dry roast for themselves'

        tib[éé-te̱ecera   'they don't cook for themselves'

This pattern is also found in the subjunctive when there is an object prefix present.[16]

(4.37) Subjunctive with object prefix and toneless roots

     a. o[ji-bazíire   'you should sew it$_9$'

        o[ba-gaamb-ír-e   'you should speak (to/for) them'

     b. o[ye-réebe   'you should see yourself'

        o[ye-bazíír-ir-e   'you should sew for yourself'

(4.38) Subjunctive with object prefix and high toned roots

     a. o[ci-héende   'you should breaks it$_7$'

        o[bi-káraange   'you should dry roast them$_8$'

     b. o[yé-teere   'you should beat yourself'

        o[yé-karaanjire   'you should dry roast for yourself'

These facts suggest that the tone pattern in toneless roots is the V2 pattern. However, when the input root is high-toned, we find the same pattern that we found in the so-called lexical verb tenses discussed in Chapter 3. In these verb tenses, the only high tones in the output are those that are underlyingly provided by one of the input morphemes. The

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[16] But not when *no* object prefix is present (the V2/Final pattern appears instead). This odd patterning appears across a range of Bantu languages.

constraint ranking favors root high tones over object prefix high tones. But, the reflexive high tone wins out over the root high tone. This is exactly the pattern in (4.34)–(4.38).

We propose that in this set of verb tenses, only the toneless verb roots are actually subject to the constraint that forces the association of melodic high tones: the V2 constraint. On the other hand, there is no corresponding constraint that refers to high-toned inputs (unlike the V2/Final pattern where there is a specific constraint that targets high-toned roots). For verbs with high-toned roots, the default pattern emerges. Since there is no constraint for high-toned inputs, the default constraint discussed in the preceding chapter would apply. The result is that root high tones are normally retained. The exception would be the case of the reflexive prefix, which wins out over the root high tone. This might suggest that the V2 macroconstraint ranks below the constraint requiring the retention of the reflexive high tone. For example, this would correctly predict the cases with high-toned roots, as in Tableau 4.16.

Tableau 4.16   a-ya-yé-bón-ire   'one who found oneself' (tentative)'
                    REL-PST-REFL-√find-PERF

	MStemOCP	MaxH-Refl	V2
☞ a. aya[yé-bonire			*
b. aya[yé-bónire	*!		*
c. aya[ye-bónire		*!	*
d. aya[ye-boníre		*!	

However, the V2 constraint does apply in this tense/aspect. If we examine a verb that has a reflexive prefix and a toneless root, the ranking proposed in Tableau 4.16 makes the wrong prediction:

Tableau 4.17   a-ya-ye-bazíír-i-ire   'one who sewed for oneself'
              REL-PST-REFL-√sew-APPL-PERF

	MStemOCP	MaxH-Refl	V2
☞ a. aya[ye-bazííriire		*!	
💣 b. aya[yé-baziiriire			*
c. aya[yé-bazííriire	*!		

This leads to a paradox. While candidate (a) is the actual grammatical form, the ranking needed in Tableau 4.15 selects candidate (b). We have assumed that the V2 constraint should rank below the constraints MStemOCP and MaxH-Refl (as in Tableau 4.16). There is a general tendency for morphologically specific constraints to be ranked higher than the more generally true constraints, the constraints responsible for the default patterns. We saw this in Chapter 3 where the constraints MAX-H(Ft) and OCP(Fut/Rt) outranked the unqualified MAX(H) constraint (see §3.7). Similarly, in this chapter, the more specific FINAL macroconstraint (it refers just to high-toned inputs) outranks the V2 constraint (which does not consider the tone quality of the input).

This would suggest that the V2 constraint should rank higher than the constraints on general tonal association. This reranking is shown in Tableau 4.18.

Tableau 4.18   a-ya-ye-bazíír-i-ire   'one who sewed for oneself'
              REL-PST-REFL-√sew-APPL-PERF

	V2	MStemOCP	MaxH-Refl
☞ a. aya[yebazííriire			*!
b. aya[yébaziiriire	*!		
c. aya[yébazííriire		*!	

This also demonstrates that MStemOCP outranks MaxH-Refl. Otherwise, candidate (c) would be preferred. However, since the reflexive prefix is part of the macrostem the constraint MStemOCP forces deletion of its high tone.

The problem with this analysis is that we now cannot account for the high-toned inputs. We have assumed that there is no specific macroconstraint that targets the high toned roots (thus allowing the default pattern to emerge). However, with the reranking given in Tableau 4.18 we cannot select the correct output form for high-toned inputs. This is demonstrated by the following tableau, which shows the effect of this ranking given a high-toned input.

Tableau 4.19   a-ya-yé-bón-ire REL-PST-REFL-√find-PERF 'one who found oneself'

	V2	MStemOCP	MaxH-Refl
☞ a. aya[yé-b<u>o</u>nire	*!		
b. aya[yé-bónire	*!	*	
c. aya[y<u>e</u>-bónire	*!		
💣 d. aya[y<u>e</u>-b<u>o</u>níre			*

While candidate (a) is the grammatical form, the output selected by this ranking puts a high tone on the V2 syllable.

In the V2/Final pattern, the constraint ranking assumes that the final association pattern appeared because of a particular marking on the verb root (i.e., the high tone). The V2 pattern emerged when there was nothing to trigger the final association pattern. So, as far as the specific verb tense/aspects where this pattern appeared were concerned, the V2 pattern was the default. In the tone pattern exhibited in this section, we find the tone pattern assigned to verbs with high-toned roots follows the lexical tone principles outlined above and in Chapter 3. Recall that the tone principles outlined in Chapter 3 refer only to the high tones that are associated to segmental morphemes in the input. In this tone pattern, the V2/Default, these principles emerge when the input root is high-toned. If the input root is toneless, then the V2 pattern appears.

As we saw above, we cannot simply fail to have a constraint that refers to high-toned roots as this would result in V2 association in all cases. Furthermore, we cannot rank a version of the V2 constraint lower than the lexical default constraints because this would effectively prevent the V2 pattern from ever emerging. It is necessary to ignore the tone

melody if the input root is high toned. This approach captures the generalization that high-toned roots surface with the lexical tone pattern in this verb tense.

Inputs with toneless roots will preserve the morphological high tone and surface with the V2 pattern. In the preceding section, we questioned whether there was actually a need to specifically include a high tone as part of the tense/aspect morphology for melodic tenses. This pattern provides the evidence that in fact we need to be able to refer to this tone independently of the constraints that account for its position. Only by explicitly deleting it in the right circumstances (i.e., with high-toned roots) and letting it persist in others (the toneless roots, the default) can we force this pattern to emerge.

(4.39) General tone principles

    a. V2/Final pattern

       Final association if input root is high toned

       V2 association if it is toneless

    b. V2/default pattern

       (default pattern if the root is high toned)

       V2 association if it is toneless

For the verb tenses exhibiting the V2/default tone pattern there is a constraint that targets only high-toned roots and disallows the parsing of the melodic high tone. Like the preceding constraints referring to tone patterns on specific tense/aspect forms of the verb, this constraint is a macroconstraint. It must combine the same constraint that tests whether the input contains a high-toned root. We repeat that constraint from (4.19)

(4.40) ALIGN(STEM, LEFT, $\acute{\mu}_{\text{Input}}$, LEFT)

    The left edge of the stem must align with the left edge of some high tone that is present in the input.

The second half of the macroconstraint prevents the melodic high tone from being parsed.

(4.41) *H-MELODIC

A melodic high tone is marked.

(4.42) NOMELODICHIGH

ALIGN(STEM, LEFT, µ́$_{Input}$, LEFT) &^{Stem} *H-MELODIC

The effect of this constraint is the force the retention of lexical tones if the root is high toned. The V2 constraint will not apply in these cases because the melodic high tone cannot remain associated to the verb stem. In a way, this constraint acts like a filter that deletes the melodic high tone before it can be placed on the V2 syllable. Because it prefers the lexical tones, the final output with be the one with the best *lexically* present high tone. The *best tone* is the one preferred by the various alignment constraints. This constraint will definitely rank above MELPARSE—otherwise the melodic high would surface.

Tableau 4.20   a-ya-yé-bón-ire H   REL-PST-REFL-√find-PERF   'one who found oneself'

	NoMelH						
	Al-H(St, L)	&Stem	*H-Melodic	MStemOCP	V2	MaxH-Refl	MelParse
☞ a. aya[yé-bonire H							*
b. aya[ye-bónire H						*!	*
c. aya[yé-bónire H				*!			*
d. aya[yé-boníre		*!	*	*			
e. aya[ye-boníre		*!	*			*	
f. aya[yé-bónire		*!	*	*	*		

Candidates (d) and (e) both violate the constraint NoMelodicHigh because there is a melodic high tone on the verb stem. The candidates that pass it vacuously pass V2 because there is no melodic high tone present in the candidate. Candidate (c) has multiple high tones on the stem and therefore fatally violates MStemOCP. Candidates (a) and (b) both violate MelParse, but they must in order not to violates NoMelH. Finally, the decision falls to MaxH-Refl, which prefers candidate (a) because it has retained the high tone on the reflexive prefix. Candidate (f), which is included for completeness, is just like candidate (c) except that the high tone that is on the syllable *bó* is the melodic high. It fatally violates NoMelH.

Does this constraint ranking have any effect when the input root is toneless? We need to allow the V2 constraint to apply and force the deletion of the other high tones on the macrostem. The following tableau illustrates how this is accomplished.

149

Tableau 4.21   a-ya-ye-bazíír-i-ire-H   'one who sewed for oneself'
REL-PST-REFL-√sew-APPL-PERF

	NoMelH			MStemOCP	V2	MaxH-Refl	MelParse
	Al-H(St, L)	&Stem	*H-Melodic				
☞ a. aya[ye-bazííriire	*	*	*			*	
b. aya[yé-bazííriire	*	*	*	*!			
c. aya[yé-baziiriire	*	*			*!		*

<mark>Every candidate in</mark>

Tableau 4.21 violates NoMelH because the input root is toneless. The decision then falls
to the constraint responsible for V2 association. Candidate (c) fatally fails this constraint.
Finally, candidate (a) is selected over candidate (b) because multiple high tones on the
macrostem are not permitted. The constraint MaxH-Reflexive ranks low enough to not
make a difference in this case.

Finally, I propose that the constraint MelParse is actually just the constraint MaxH,
which we saw in Chapter 3. The difference between these is just that MaxH is broader in
that it requires *any* high tone in the input to be present in the output. The melodic high
tone is part of the tense/aspect of the verb and is included as part of the input. So, deletion
of it in the output would violate MaxH as well as MelParse. In the last two preceding
talbeaux, the constraint MelParse actually ranks below MaxH-Refl. In chapter 3, we
saw that these two constraints were unranked with respect to each other. Replacing
MelParse with MaxH in these tableaux does not change the outcome in any way. For
example, Tableau 4.22 repeats Tableau 4.20 but with MaxH in place of MelParse

Tableau 4.22   a-ya-yé-bón-ire H   REL-PST-REFL-√find-PERF   'one who found oneself'

	NoMelH			MStemOCP	V2	MaxH-Refl	MaxH
	Al-H(St, L)	&Stem	*H-Melodic				
☞ a. aya[yé-bonire H							**
b. aya[ye-bónire H						*!	**
c. aya[yé-bónire H				*!			*
d. aya[yé-boníre		*!	*	*			*
e. aya[ye-boníre		*!	*			*	**
f. aya[yé-bónire		*!	*	*	*		*

Candidate (b) is still worse than candidate (a) because it has an extra MAX violation: deletion of the high tone from the reflexive morpheme causes two MAX violations: one for MAXH-REFL and one for MAXH. If we are truly dealing with the default lexical pattern described in chapter 3, then we should expect these constraints to be involved in selecting the grammatical candidate. Therefore, I propose that there is no MELPARSE constraint. Its functions are easily subsumed under MAXH.

4.5.1   Opacity and Tonal Association

As promised in §4.3.3, we now turn to a consideration of the problem of the opacity of the trigger of tonal association. Recall that there can only be a single high tone on the verb macrostem. Because of this, any root high tone disappears when a final tone is required by the tense/aspect. The opacity problem is posed by the deletion of the root high tone. The opacity arises because the trigger, the root high tone, is not present on the surface. So, surface level constraint evaluation cannot distinguish between these two different classes of verbs.

We are concerned with the opacity of the trigger in the case of final association. In the other cases commonly explored in constraint-based accounts of this type of phenomenon, the trigger of final association, the root high tone, is still present in the output (Shona in Crowhurst & Hewitt 1997, also discussed in Bickmore 1996).

The model we have tacitly assumed is based upon a model constraint schema proposed by McCarthy (1995). Essentially, the proposal is to allow a constraint to be parameterized according to whether it is concerned with input states, output states, or indifference to this distinction.

In recent years, the question of opacity in Optimality Theory has lead to a number of proposals that seeks to account for this problem. The model considered here will be the constraint schema that allows for two-level constraints-those that examine the input and/or the output. (McCarthy 1994) By allowing constraint to be concerned with specific levels, we can focus on information about the input that is lost in the output. In the case of Runyankore, this information is the fact that the input root is high toned. Thus, the deletion of the high tone in the output does not prevent the grammar from "knowing" that the root is a high-toned root. Let us examine McCarthy's (1994) proposal for the two-level constraint schema.

4.5.2   Two-Level Constraints

McCarthy (1994) begins his discussion of opacity with a familiar process in Tiberian Hebrew: post-vocalic consonant spirantization.

(4.43) Spirantization in Tiberian Hebrew

     a. After a vowel:

       /malakm/ → [məlāxīm]   'kings'

     b. After an epenthetic vowel:

       /malk/ → [melex]   'king'

     c. After a deleted vowel:

       /malakē/ → [malxē]   'kings of'

The first two examples are relatively straightforward: /k/ becomes [x] after a vowel, whether it is underlying or inserted by epenthesis. However, the case involving a deleted vowel results in a surface-level opacity.

    In serial, rule-based models of phonology, the solution to this problem was to order the rules so that the rule of syncope, which deletes the second /a/ of /malakē/, follows the rule of spirantization. But, in a model of phonology like Optimality Theory, we normally only consider the well-formedness of outputs. Because of the opacity involved in (4.43), simply looking at surface well-formedness cannot suffice.

    McCarthy's solution was to propose a constraint schema that allows the grammar to specify the levels at which certain conditions on the constraint must hold. (McCarthy 1994) Essentially, this schema simply provides a fuller decomposition of the conditions imposed by a phonological constraint.

(4.44) Canonical constraint schema (McCarthy 1994)

*	Condition	Level
α		
β		
Linear Order		
Adjacency		

The interpretation of constraints is governed by the conditions specified in the constraint schema for each constraint given above. The elements in the schema are referred to as follows. The conditions on α and β are featural. The conditions on linear order are either α first, β first, or indifferent to the ordering of the elements α and β (as in the case of a mirror image rule). The conditions on adjacency allow for strict linear adjacency and various types of non-strict adjacency (for example, consider the constraint discussed previously, MSTEMOCP, which considered tonal tier adjacency within the macrostem of the verb). The level parameter allows for the specification of these values at the input (i.e., underlying) or surface level. Like the other conditions, it may also be indifferent to the level.

Now, we can consider how this constraint schema applies in a case of opacity like that found in Tiberian Hebrew. Assume that there is a constraint that is responsible for the spirantization of stops after vowels.

(4.45) NO-V-STOP

The sequence vowel + stop consonant is prohibited.

This constraint can account for the first two cases of spirantization in

(4.43): after a vowel and after an epenthetic vowel. But, in the case found in above, /malakē/ → [malxē], this constraint cannot predict the spirantization of /k/ because there is no vowel on the surface that would rule out [k] in favor of [x]. This is exactly where the kind of level-specification that the above constraint schema. It allows us to specify that this constraint should be indifferent to the level at which the vowel lies.

(4.46) Constraint schema for No-V-Stop in Tiberian Hebrew (McCarthy 1994)

*	Condition	Level
α	V	Indifferent
β	[–son, –cont]	Surface
Linear Order	α > β	Indifferent
Adjacency	Strict	Indifferent

The interpretation of (4.46) is that the constraint is violated if a surface stop α "or its un-derlying correspondent" is immediately preceded by a vowel. So, there is a violation if the stop, on the surface, is preceded by a vowel, either on the surface or in the input (as in the opaque case of /malakē/ → [malxē].

The introduction of this formalism into the theory allows for constraints that take ad-vantage of the correspondence relationships that are imposed by Correspondence Theory, CT (McCarthy & Prince 1995). Recall that with CT containment was abandoned-the in-put literally deleted it is no longer present but "unparsed." Recall that the major issue facing an account of opacity in Runyankore was the root high tone, which could not be present on the surface. This pattern is very similar to that found in Tiberian Hebrew, where the trigger of spirantization is deleted in the output.

4.5.3   Two-Level Constraints in Runyankore

The answer to the problem posed above in §4.3.3 with respect to final tone association in Runyankore can be found in the ability to allow constraints to refer to their input as well. We repeat the relevant half of the constraint conjunction below:

(4.47)   Align(Stem, Left, $\acute{\mu}_{Input}$, Left)

This constraint specifically requires the high tone in question to be present in the input by requiring the first mora of the verb stem to be high toned in the input. For element α we refer to the verb stem. Since the verb stem is constructed for the grammar (i.e., it is not

present in the input), the level is "output". The high tone, β in the schema, must be pre-sent in the input. Whether it is present in the output is irrelevant, but we need to explicitly require its presence in the input. This tests whether the input root is lexically high toned.

(4.48) Constraint schema for final high tone constraint

*	Condition	Level
α	Stem	output
β	H	input
Linear Order	n/a	
Adjacency	n/a	

The constraint in (4.47) refers to the mora because it is still present in the output and aligned with the edge of the stem. We cannot refer to the high tone alone because it is no longer present in the output in the grammatical forms.

The problem of opacity is relatively uncomplicated if we allow the grammar the op-tion of constraints that can have elements parameterized for reference to input informa-tion. One alternative would be to allow the presence to two macrostem high tones at some level of the grammar (viz., the one responsible for the placement of the high tone on the final syllable). Then, at a later stage, one of the high tones would be deleted (the left-most). This analysis will surely work. This is because it is just a translation into optimal-ity theoretic terms of the standard analysis of the problem in autosegmental phonology (cf. Goldsmith 1987 for a related analysis and Hyman 1993 for an analysis of Haya using a two-level phonological analysis). Simply put, either the grammar has the ability to ex-amine the input or the grammar has multiple stages.

This section concludes the significant theoretical discussion of verb tone patterns in Runyankore. The other tone patterns that exist are discussed in the following section. However, the basic theoretical constructs (viz., conjoined constraints and two-level con-straints) remain the same.

4.6 Negative Prefix High Tone Pattern

The final pattern that we will consider is quite simple. It is found only in a number of negative verbs forms. In this pattern, there is a single high tone on the negative prefix and no other high tones on the verb. Root and object prefix high tones are all lost.

    This pattern appears in the following verb tenses.

(4.49) Recent past negative main clause

a.	tí-n-aa[bara	'I have not counted'
	NEG-1s-PST[√count	
	tínaareeba	'I have not seen'
	tínaabaziira	'I have not sewn'
b.	tínaab<u>o</u>na	'I have not found'
	tínaat<u>ee</u>ka	'I have not cooked'
	tínaak<u>a</u>raanga	'I have not dry roasted'
c.	tínaa[b<u>a</u>-reeba	'I have not seen them'
	tínaa[y<u>e</u>-reeba	'I have not seen myself'
	tínaa[b<u>a</u>-t<u>ee</u>cera	'I have not cooked for them'
	tínaa[b<u>u</u>-b<u>a</u>-t<u>ee</u>cera	'I have not cooked it$_{14}$ for them'

(4.50) Perstative negative main clause

      a. tíínci[bara   'I am no longer counting'

         NEG-1S-PERS[√count

         tíínci[reeba   'I am no longer seeing'

         tíínci[baziira   'I am no longer sewing'

      b. tíínci[bona   'I am no longer finding'

         tíínci[teeka   'I am no longer cooking'

         tíínci[karaanga   'I am no longer dry roasting'

      c. tínaaci[ba-bara   'I am no longer counting them'

         tínaac[ee-bara   'I am no longer counting myself'

         tínaaci[bu-teeka   'I am no longer cooking it$_{14}$'

         tínaac[ee-teecera   'I am no longer cooking for myself'

(4.51) Perstative negative relative clause

      a. atáci[bara   'one who no longer counts'

         atáci[reeba   'one who no longer sees'

         atáci[baziira   'one who no longer sews'

      b. atáci[bona   'one who no longer finds'

         atáci[teeka   'one who no longer cooks'

         atáci[karaanga   'one who no longer dry roasts'

         atáci[ba-bara   'one who no longer counts them'

         atáci[ba-reeba   'one who no longer sees them'

      c. atáci[gu-baziira   'one who no longer sews it$_3$'

         atáci[ba-bona   'one who no longer finds them'

         atáci[ga-teeka   'one who no longer cooks them$_6$'

         atáci[bi-karaanga   'one who no longer dry roasts them$_7$'

158

(4.52) Negative conditional relative

  a. atáku[bazire   'one who should not count'

    atáku[reebire   'one who should not see'

    atáku[baziire   'one who should not sew'

  b. atáku[b<u>o</u>nire   'one who should not find'

    atáku[t<u>ee</u>cire   'one who should not cook'

    atáku[k<u>a</u>raanjire   'one who should not dry roast'

  c. atáku[b<u>a</u>bazire   'one who should not count them'

    atáku[b<u>a</u>b<u>o</u>nire   'one who should not find them'

    atáku[b<u>a</u>reebire   'one who should not see them'

    atáku[b<u>a</u>t<u>ee</u>ceire   'one who should not cook for them'

In this verb tenses, only a high tone appears on the negative prefix. Observe that all other high tones are deleted: root, object prefix and even reflexive high tones. To account for this tone melody, I propose that there are simply two constraints that rank sufficiently high to force only a single high tone to surface on the negative prefix.

(4.53) NEG-H

  Associate a floating melodic high tone to the negative prefix.

(4.54) VERB-OCP

  Adjacent high tones within the domain of the verb are prohibited.

 These two constraints rank above any other constraints that may force the retention of high tones that are lexically specified.

Tableau 4.23   ti-n-aa-ci-é-tééc-er-a-H   'I am no longer cooking for myself'
NEG-1S-PST-PERS-REFL-√cook-APPL-FV-NEG.PERS

	NEG-H	VERB-OCP	MAXH-REFL	MAXH
☞ a. tínaaceeteecera			*	**
b. tínaacééteecera		*!		*
c. tínaacéétéécera		*!		
d. tinaacééteecera	*!			*

This tonal pattern is quite straightforward: every other high tone must give way to the negative prefix high tone. Because the pattern is so simple and unviolated, we assume that these constraints rank above any other constraints that would tend to preserve the other high tones in the input.

This pattern illustrates the tendency for morphologically conditioned or limited constraints to rank near the top of the constraint hierarchy. This case is an example *par excellence* in that it applies to both toneless and high-toned roots, any object prefix, and across the entire verb. No other MAXH constraint can compete against it.

4.7   Problematic Issues for Optimality Theory

One potentially problematic issue that we have put off until this point involves the problem of melodic high tones and the retraction of final and penultimate high tone discussed in chapter 3. The reader may recall that in chapter 3 we discussed the fact that final high tones are not permitted in Runyankore. Similarly, penultimate high tone on a long syllable must surface as a falling tone in phrase-finally as well. Within the discussion of lexically specified tone in chapter 3, there was nothing problematic about this account. However, consider one of the key constraints necessary to distinguish between the patterns that differentiate final and penultimate retraction. It is repeated in the following.

(4.55) LOCAL

> If an input tone T has an output correspondent T′, some edge of T must corre-
> spond to some edge of T′.

Observe something crucial about the formulation of this constraint: it relies upon the location of the input tone. The constraint LOCAL prohibits tones from shifting more than one slot away from their original position. However, in the case of melodic high tones, we cannot rely upon LOCAL to actually prevent this. This is because there is no input edge of tone T. In the input, the most we can state is that the melodic high tone floats as part of the morphological specification of the verb tense/aspect. We certainly cannot know what its location is.

When we consider shorter verbs, this issue is exacerbated by the relatively few positions that are available for high tone association. For example, in verb stems with only two syllables, the high tone always appears on the first one.

(4.56) Habitual

    a. Toneless verbs

       á[gwa   's/he falls'

       a[bára   's/he counts'

       a[réeba   's/he sees'

    b. High-toned verbs

       á[rya   's/he eats'

       a[bóna   's/he finds'

       a[teéka   's/he cooks'

First, one may wish to observe that the contrast between high-toned and toneless verbs is lost when the stem contains fewer than three morae. If the stem has three morae, then the resulting tone pattern is distinguishable by the difference between a falling and a rising tone on the verbs penultimate syllable.

Particularly vexing is the appearance of the melodic high tone on the subject prefix when the verb root is monosyllabic. The necessity of tone association overrides the overall tendency for the high to appear on the stem at all.

The simplest explanation for this pattern is simply to assume that there are separate components of the phonology. At one level, the melodic high tone is associated to a particular mora, V2, final, etc. The effects of phrase-final retraction are not implemented until *after* the positioning of the high tone. A later component of the phonology then repositions the high tone according to the principles outlined in chapter 3 for retraction. From an explanatory perspective, this account makes sense because of the complete regularity of final retraction. Furthermore, it explains why the melodic high tone appears where it does without having to resort to the complicated theoretical constructs like output-to-output correspondence.

4.8   Summary

In this chapter, we have reviewed the morphologically defined tonal patterns that appear on verbs in Runyankore. We have found that the V2 pattern is the most unmarked of the melodic tone patterns. It only emerges when there is nothing else to do with the melodic high tone. When the input verb root is high toned itself the association of the melodic high tone depends upon the tense/aspect of the verb. In some cases, the melodic tone is discarded (i.e., its association is penalized) and the most basic pattern emerges.

We propose that these aspects of the morphology-phonology facts in Runyankore can be neatly accounted for by making use of the power of constraint conjunction. This allows the grammar to poll the input for specific information and then require a particular output based on these facts. In this model of OT morpho-phonology the macroconstraint is equivalent to a specific directive from the morphological component of the grammar. For example, the macroconstraint V2, (4.17), amounts to an instruction to place a high tone on a specific tone-bearing unit. Similarly, the FINAL macroconstraint, (4.21), encodes a specific instruction from the morphology: if the root is high, put the melodic high

on the final syllable. Of course, the operation of an OT grammar means that these constraints just prefer certain candidates over others.

4.8.1   Summary of Tone Patterns, Constraints and Tense/Aspects

The following table summarizes the constraints that are responsible for morphological association and the tense/aspect to which they apply.

(4.57) Morphological tone constraints and tenses

Constraint	Verb Tenses	
V2	Remote Past Relatives	Present Prog.
	Yesterday Past	Perstitive
	Yesterday Past Neg.	Hortative
	Yest. Past Neg. Rel.	Subjunctive
	Habitual	Hypothetical
	Habitual Neg.	Hypo. Negative
	Hab. Neg. Rel.	
FINAL	Yesterday Past	Present Prog.
	Yesterday Past Neg.	Perstitive
	Yest. Past Neg. Rel.	Hortative
	Habitual	Subjunctive
	Hab. Neg. Rel.	
NoMELODICHIGH	Remote Past Relatives	Hypothetical
	Habitual Neg.	Hypo. Negative
	Subjunctive w/ OP	
NEG-H VERB-OCP	Recent Past Neg	Cond. Neg. Rel
	Perstitive Neg	Hortative Negative
	Pers. Neg. Rel	

163

In general, the V2 macroconstraint ranks below the other macroconstraints. In this way, it is the default pattern when there is a melodic high tone. Recall that the constraint NOMELODICHIGH forces verbs with high-toned roots to fail to parse the melodic high tone. In this case, the V2 constraint will have nothing to align (no melodic H) and so the lexical default constraints (discussed in Chapter 3) apply.

(4.58) Constraint ranking

NOMELODICH, MSTEMOCP >> FINAL, NEG-H, VERB-OCP >> V2 >> MAXH-REFL, MAXH

The constraint NOMELODICH outranks any constraints that would target the melodic high tone and verbs with high-toned roots. It must outrank any constraints that would condition the melodic high to associate to a particular location in the verb. The default lexical pattern then can emerge. The constraint MSTEMOCP ranks very high as well because it is not violated. The constraint FINAL, which focuses in on verbs with high-toned roots, ranks above V2. The constraint V2 ranks relatively low so that it only applies to the remaining candidates, as the default association pattern for melodic high tones on toneless roots.

CHAPTER 5

REDUPLICATION IN RUNYANKORE

5.1   Introduction

The complex verbal morphology of the Bantu verb has provided rich soil for investigation into the behavior of morphological and prosodic elements in phonology. During the past fifteen year's study into the nature of reduplication (Wilbur 1973a, b, Marantz 1982 et seq.) much work has also been done in the realm of Bantu verbal reduplication (Odden & Odden 1983, Mutaka & Hyman 1990, Downing 1994a, b). Much of this recent work has been inspired by developments in the theory of phonology, including Optimality Theory (Prince & Smolensky, McCarthy & Prince 1993) and Correspondence Theory (McCarthy & Prince 1995).

The focus of this chapter is the set of constraints on reduplication in Runyankore that predict the correct shape and placement of the reduplicant morpheme. Beyond a simple account of reduplication in Runyankore, several topics will be of special interest. First, we shall see that Runyankore has gaps in the paradigm of verbal reduplicants. In these cases, no reduplicated form is possible. I propose that this is the result of the selection of the null parse as the optimal output when the reduplicant has no licit means to satisfy the minimality constraint. Secondly, there is an asymmetry between the location of the causative morpheme -*y*- in the reduplicant (the copied or matching segments) and the underlying base (the source for the copying). As seen in (5.1), the causative lies in the prefinal position of the verb. Reduplication of a non-causative form in (5.2) illustrates the

copying of segments from base into the reduplicant (underlined). The copying involves adjacent segments, *reeb-*, and the vowel *-a*, which is required by the grammar. However, in the reduplicated form of a causative, the copying skips the segments *-ir-* in the reduplicant, as in (5.3).

(5.1)   oku-reeb-a   'to see'

           INF-√see-FV

           oku-reeb-y-a   'to betray'

           INF-√see-CAUS-FV

(5.2)   a-reeb-ire   's/he saw'

           a-<u>reeba</u>-reeb-ire   's/he saw over and over'

(5.3)   a-reeb-ize ← a-reeb-ir-y-e   's/he betrayed' (yesterday)

           a-<u>reebya</u>-reeb-ize ← a-RED-reeb-ir-y-e

           's/he betrayed over and over'

The morpheme *-y-*, located in pre-final position, interacts with the *r* of *-ire* to produce *z*. Thus, it is adjacent to the *r* in the base. However, the *-y-* appears next to the *b* of *reeb* in the reduplicant.

In this chapter, I provide an account of the main features of Runyankore reduplication and demonstrate the relationship that exists between the reduplicant (the copied segments) and the base (the segments that are copied from). I will demonstrate that a set of constraints on well-formedness (Prince & Smolensky 1993, McCarthy & Prince 1993, 1995) can predict the unusual copying of the causative morpheme into the reduplicant, despite surface discontinuities. As I show, this analysis depends on the ordering of the causative morpheme with respect to the other morphemes in the input to the phonology. This ordering allows us to account for the asymmetry between the surface reduplicant and the base and the failure of the morpheme to appear in the reduplicant in some verbs.

This discussion is organized as follows: in §5.2, I provide a short description of reduplication in Runyankore. Section 5.3 examines how a set of ranked constraints might account for the properties of reduplication in this language. This section includes an extensive discussion of the problem of subminimal bases. In §5.4, I review the segmental mutations that occur, and their interaction with reduplication in §5.5.

Before continuing, the reader may wish to review the discussion of the structure of the verb in Runyankore as well as the basic assumptions about tone, as presented in Chapter 2. To recap briefly, the verb comprises an inflectional portion and a macrostem. The macrostem includes any object prefixes and the verb stem. If there are no object prefixes the left edge of the macrostem coincides with the left edge of the stem. The stem contains the verb root and is the locus of reduplication. Verb roots may be either toneless or high toned. In general, only one high tone is permitted on the verbal macrostem (the stem plus any object prefixes).

5.2   A Description of Verbal Reduplication in Runyankore

Verbal reduplication in Runyankore involves affixing a reduplicant morpheme (RED) to the verb stem. The meaning of reduplication in Runyankore is one of repetition, usually expressed as "over and over". It also has a sense of an action done poorly, offhandedly, or incompletely. For brevity's sake, I will use ellipsis (…) after the verb to indicate this additional meaning.

Reduplication involves infixing the reduplicant at the beginning of the verb stem—so that the reduplicant is also part of the stem. As we shall see from tonal evidence in section 5.2.1 below, the stem is an important domain for tonal association. The placement of high tones in Runyankore dictates that the reduplicant be within this domain. The reduplicant is formed by copying a [CVC], [CVVC], or [CVVNC] sequence from a base (either the stem or the macrostem if the stem is insufficiently long) and attaching the vowel *-a*—the final segment of the reduplicant is always *-a* (for example, see (5.4e)). In the infinitive, the copying of the CVC elements is exact—all the features are copied obeying constraints on faithfulness of identity between the base and the reduplicant (McCarthy

167

and Prince 1995). I underline the reduplicant and use the left bracket, [, to indicate the left boundary of the macrostem.[1]

(5.4)   a. oku[reeb-a   'to see'
             CL15[√see-FV[2]
             oku[<u>reeba</u>-reeb-a   'to see …'
             CL15[RED-√see-FV
         b. oku[shek-a   'to laugh'
             oku[<u>sheka</u>-shek-a   'to laugh …'
         c. oku[kwáat-a   'to touch'
             oku[<u>kwááta</u>-kwaat-a   'to grope'
         d. oku[bagar-a   'to weed'
             oku[<u>baga</u>-bagar-a   'to weed …'
         e. oku[shohor-a   'to go out'
             oku[<u>shoha</u>-shohor-a   'to go out…'

In forms of the verb with the perfective suffix *-ire* (required by some past tenses and some moods, such as the hortative), the reduplicant fails to copy a segmental alternation conditioned in the base by the high vowel of the morpheme *-ire*. These are seen in (5.5), where an infinitive is contrasted with a verb form having the perfect suffix.

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[1] Recall (cf. Chapter 2) that the verb stem begins with the root. The macrostem includes the verb stem and any of the object prefixes that precede it. If there are no object prefixes, the macrostem and stem begin at the same point.

[2] Infinitives are also nouns (cf. gerunds in English) and are members of class 15.

(5.5)   a. oku[heek-a   'to carry'

            a-káá[hééc-ire   'he should carry' (hortative)

            a-káá[hééka-heec-ire   'he should carry …'

         b. oku[bar-a   'to count'

            a[baz-íre   's/he counted (yesterday)'

            a[bará-baz-ire   's/he counted …'

         c. oku[huut-a   'to drink from a bowl'

            a[húús-ire   's/he drank from a bowl'

            a[húúta-huus-ire   's/he drank from a bowl …'

         d. oku[jeend-a   'to go'

            a[jeenz-íre   's/he went'

            a[jeendá-jeenz-ire   's/he went …'

         e. oku[kwáat-a   'to catch'

            a[kwaas-íre   's/he caught'

            a[kwaata-kwaas-íre   's/he caught …'

The last consonant of the stem mutates (palatalizes or spirantizes[3]) before the vowel *i* of
-ire. However, this effect is not copied to the reduplicant, where the last consonant re-
mains faithful to the input. This will be discussed in §5.4 below.

   This is not particularly problematic. However, a further complication involves the af-
fix *-y-*, which marks the causative or the facultative (to VERB with). The causative mor-
pheme *-y-* occurs on the stem-final consonant, as shown in (5.6) with labial-final roots to
avoid the consonant interaction that would obscure the causative.

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[3] These two different consonant-vowel interactions will be discussed below, in §5.4

(5.6)   a. oku[gab-a   'to divide'

            oku[gab-y-a   'to divide with'

        b. oku[kam-a   'to milk'

            oku[kam-y-a   'to enable to give milk'

        c. oku[rim-a   'to cultivate'

            oku[rim-y-a   'to cause to cultivate'

        d. oku[shutam-a   'to sit'

            oku[shutam-y-a   'to cause to sit'

However, if the final consonant of the verb is not a labial the morpheme *-y-* conditions consonant mutation, namely spirantization, as shown in (5.7).

(5.7)   a. oku[gur-a   'to buy'

            oku[guz-a   'to sell'

        b. oku[taah-a   'to enter'

            oku[taas-y-a   'to bring in'

        c. oku[hik-a   'to arrive'

            oku[hisy-a   'to cause to arrive'

        d. okw[óog-a   'to wash'

            okw[óoz-y-a   'to wash (tr.)'

As noted above, this morpheme always appears just before the last vowel of the verb. Thus, in the perfective, it mutates not the last consonant of the root (as in (5.7)), but the consonant [r] of the perfective suffix *-ire*. The causative forms in (5.8) contrast an infinitive, with the final vowel *-a*, and a perfective (the yesterday past tense), with the final morpheme *-ire*.

(5.8)   a. oku[róob-y-a   'to wet down'

           a[roob-íze   's/he wet down'

        b. oku[hunam-y-a   'to quiet'

           a[hunám-ize   's/he quieted'

        c. oku[reeb-y-a   'to betray' (lit. 'cause to see')

           a[rééb-ize   's/he betrayed'

The causative is obscured by the spirantization of the [r] of the perfective. Neverthe-less, its effects are evident. A general principle requires the causative morpheme to ap-pear on the last consonant of the verb stem.

The behavior of the reduplicant with respect to the causative morpheme interests here because the causative morpheme or its effects appear in the reduplicant, as well as in the base, as illustrated in (5.9).[4]

(5.9)   a. oku[hika   'to arrive'

           oku[hisya   'to cause to arrive'

           oku[<u>hisya</u>-hisya   'to cause to arrive …'

        b. oku[taaha   'to enter'

           oku[taas-y-a   'to bring in'

           oku[<u>taasya</u>-taas-y-a   'to bring in …'

        c. okw[óoga   'to wash'

           okw[óoz-y-a   'to wash (tr.)'

           okw[<u>óózya</u>-yooz-y-a   'to wash … (tr.)'

However, as shown in (5.10), the spirantizing/palatalizing effects of the affix *-ire* are *not* copied to the reduplicant.

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[4] We will discuss the appearance of the glide in *okwóózyayoozya* below in §5.3.6.

(5.10) a. okw[óoga   'to bathe'

              a[yoj-íre   's/he bathed'

              a[<u>yoga</u>-yoj-íre   's/he bathed …'

        b. oku[cúunda   'to churn'

              a[cuunz-íre   's/he churned'

              a[<u>cuunda</u>-cuunz-íre   's/he churned …'

        c. oku[mera   'to germinate'

              bi[mez-íre   'they$_8$ germinated'

              bi[<u>merá</u>-mezire   'they$_6$ germinated …'

Finally, recall from (5.8), that the causative *-y-* always appears just after the last conso-
nant of the word. Because this shifts the causative *-y-* away from the edge of the first
CVC of the base, one expects no palatalization or spirantization in the reduplicant. How-
ever, as the following reduplicated forms demonstrate, even if the causative *-y-* is no
longer adjacent to the copied CVC from the base (because it has shifted to pre-final posi-
tion), its presence or effects are still found in the reduplicant.

(5.11) a. oku[bara   'to count'

              oku[baza   'to cause to count'

              a[<u>bazá</u>-bar-ize ← bar-ir-y-e 's/he caused to count'

        b. oku[hika   'to arrive'

              oku[hisya   'to cause to arrive'

              a[hic-íre   's/he arrived'

              a[<u>hiká</u>-hic-ire   's/he arrived …'

              a[<u>hisyá</u>-hic-ize   's/he caused to arrive …'

        c. oku[guza ← gur+y+a   'to sell' ('cause to buy')

              a[gur-íze   's/he sold'

              a[<u>guzá</u>-gur-ize   's/he sold …'

172

The reduplicant copies the *-y-* of the causative morpheme, even though it is no longer contiguous with the other copied segments in the base.

The main problem to be accounted for in this discussion relates to the reduplication pattern and the asymmetry between the perfective and the causative and their respective effects on the reduplicant and base. Once the principles of reduplication have been introduced, an account of the interaction of reduplication and segmental phonology can be undertaken. The copying of segmental features into the reduplicant from the base will be shown to be a consequence of the hierarchy of constraints responsible for copying of segments and features.

5.2.1   Reduplication and the Stem

These data suggest that the reduplicated material is taken from the left edge of the stem. The reduplicant is prefixed to these segments. However, I have assumed thus far that the reduplicant is in fact prefixed within the stem. In other words, the left edge of the reduplicant and the left edge of the stem coincide (see McCarthy & Prince 1993b for a further discussion of alignment).[5] I will show independent evidence from the placement of tones in the language that argues for an analysis that includes the reduplicant in the stem.

The data in (5.12) show reduplication of high-toned verbs. The lexical high tone stays at the left edge of the stem. There can be only a single high tone on the verb macrostem (MSTEMOCP is the relevant constraint).

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[5] As discussed in §§5.3.4–5.3.5 below, the base of reduplication can be expanded to include object prefixes to satisfy minimality. In this case, the reduplicant is within the macrostem.

(5.12)   a.   oku[shára   'to cut'

              oku[<u>shára</u>-shara   'to cut over and over'

         b.   oku[rúma   'to bite'

              oku[<u>rúma</u>-ruma   'to bite over and over'

         c.   oku[káraanga   'to dry roast'

              oku[<u>kára</u>-karaanga   'to dry roast over and over'

Another principle of tone assignment (one that is morphologically conditioned) requires toneless verbs to have a high tone on the syllable that contains the second mora of the stem[6] (the V2 pattern, explained in Chapter 4) in certain verb tenses. As the habitual forms in (5.13) demonstrate, the high tone of the habitual stays on the V2 syllable in both plain and reduplicated forms of the verb.[7]

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[6] If this mora is in either position of a long penult, the result is a falling tone (cf. Chapter 3).

[7] Two details must be noted: (1) coda nasal consonants are not counted in calculating V2, even though they lengthen a preceding vowel (see Chapter 4 for a discussion of this issue in more detail) and (2) a high tone retracts from a final syllable, owing to phrase-final position (see Chapter 3, section 3.3).

(5.13)   a. a[bazíira   's/he sews'

             a[<u>bazá</u>-baziira   's/he sews …'

         b. a[shohóra   's/he goes out'

             a[<u>shohá</u>-shohora   's/he goes out …'

         c. a[haandíika   's/he writes'

             a[<u>haandá</u>-haandiika   's/he writes …'

         d. a[gurúka   's/he jumps'

             a[<u>gurá</u>-guruka   's/he jumps …'

         e. a[ramútsya   's/he greets'

             a[<u>ramá</u>-ramutsya   's/he greets …'

         f. a[jeénda   's/he goes'

             a[<u>jeendá</u>-jeenda   's/he goes …'

The domain of these tonal principles is the stem as defined in Chapters 3 & 4, above (see also Poletto 1996). To predict consistently the location of this high tone, the reduplicant must be counted as part of the stem. The reduplicant, as shown by the tonal evidence in (5.12) and (5.13), is within the morphological stem.

5.2.2   Minimality of the Reduplicant

The reduplicant is not simply a copy of segments from the stem. It must satisfy a requirement of minimal and maximal size. The reduplicant should be binary at some level of analysis. As the data discussed below demonstrate, these well-formedness requirements may be satisfied in a number of ways, and, not necessarily by the reduplicant being exactly equivalent to a foot. In other words, the constraint REDFT is not an unanalyzable constraint in Runyankore (see §5.3.6 on vowel-initial stems).

5.2.2.1   Monosyllabic Roots

If the stem is at least two syllables in length, of the form CV(V)CV, then the reduplicant will be disyllabic. However, if the base for the reduplication is too short, as in a verb like

oku[sa 'to grind' that has a monosyllabic stem, there may not be sufficient segmental material to create a binary reduplicant. If the base contains a glide, as in (5.14), then reduplication may take place. The glide is moraic in the input and can contribute a mora to the reduplicant, allowing it to be binary (two morae). In other words, the root "to shave" is underlyingly √*mu* and that the grammar requires glide formation and compensatory lengthening (i.e., the mora of the vowel [u] is preserved but reassociated to the vowel [a]). However, if the base does not contain a glide, then a binary reduplicant cannot be created, as seen in (5.15).

(5.14) a. oku[mwa   'to shave'
            oku[<u>mwaa</u>-mwa   'to shave …'
        b. nibá[rya   'they are eating'
            niba[<u>ryáá</u>-rya   'they are eating …'

(5.15) a. okú[fa   'to die'
            *oku[<u>fá</u>-fa, *oku[<u>fáa</u>-fa   'to die …'
        b. oku[za   'to go to'
            *oku[<u>za</u>-za, *oku[<u>zaa</u>-za   'to go out …'
        c. oku[sa   'to grind'
            *oku[<u>sa</u>-sa, *oku[<u>saa</u>-sa   'to grind …'
        d. oku[ñ-a   'to defecate'
            *oku[<u>ña</u>-ñ-a, etc.   'to defecate …'
        e. oku[h-a   'to give'
            *oku[<u>ha</u>.h-a, etc.   'to give …'
        f. oku[ta   'to place'
            *oku[<u>ta</u>-t-a, etc.   'to place …'

Note that in (5.14), we might expect the final vowel of the verb to be long, because of glide formation and compensatory lengthening, illustrated in (5.16). However, long vowels never appear at the edge of the word. This appears to be a high ranked constraint in

the language. But, because the reduplicant is word-internal, glide formation and compensatory lengthening will produce a long vowel and thus satisfy the binary requirement.

(5.16) Glide formation and compensatory lengthening

$$\begin{array}{ccc} \mu\ \mu & & \mu\ \mu \\ |\ \ | & & \searrow\!\diagdown \\ \text{m u a} & \Rightarrow & \text{m w a} \end{array} \qquad \text{'shave'}$$
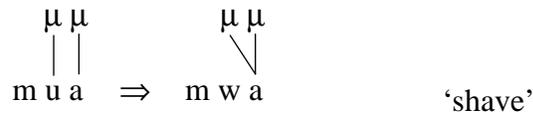
    One strategy that the language uses to satisfy the binarity requirement on reduplicants is to recruit the object prefix into the reduplicant, as in (5.17).

(5.17)   a. oku[bú-sa   'to grind'
             náá[bú-sa   'I ground it$_{14}$'
             náá[<u>búsa</u>-bu-sa   'I ground it$_{14}$ …'
         b. okú-rya   'to eat'
             oku[bú-rya   'to eat it$_{14}$'
             oku[<u>búrya</u>-bu-rya   'to eat it$_{14}$ …'
         c. okú[ñwa   'to drink'
             oku-[gáñwa   'to drink it$_6$'
             oku-[<u>gáñwa</u>-gañwa   'to drink it$_6$ …'

Here, the base corresponds to the macrostem, which includes the object prefix. The base of reduplication in these cases has been expanded in order to satisfy minimality constraints. The base of reduplication now includes the object prefix instead of just the verb stem. This interaction shows that the base of reduplication can change along with changing lengths of input material for reduplication. Thus, the base of reduplication will be as much of the input as is necessary, and possible, to achieve a well-formed reduplicant. Because of this fact, we will not attempt to define the base of reduplication solely in terms of some particular morphological or prosodic element. Rather, the base of reduplication will be understood in terms of the string of segments to which segments in the

reduplicant correspond. Therefore, we will not state that the base of reduplication is the stem or the macrostem. Rather, the base falls out from the constraints and their ranking that force the certain conditions on the reduplicant. As we shall see in §§5.3.3 and 5.3.4, these constraints permit some parts of the verb to be the base of reduplication (e.g., the object prefixes) while excluding others from the base (e.g. all affixes not in the macrostem).

5.2.2.2   Vowel-Initial Roots

When the root of the verb begins with a vowel, the reduplicant will as well. For example, in (5.18), the reduplicant in the verb *okwíiba* 'to steal' is *-íba-*. The macrostem boundary lies between morae of a long syllable when the first mora is contributed by the prefix (e.g., *oku-* INFINITIVE). The first mora is morphologically part of the prefix even though in quality it is the same as the following vowel. This is also why the base in "to steal …' has two short vowels—there are only two morae in the reduplicant. A consonant appears in both the reduplicant and the base if syllable structure requires an epenthetic consonant at the beginning of the reduplicant, as in *a[yiba-yíba* 's/he steals'. Several examples of vowel initial roots are given in (5.18).

(5.18)   a. okwíiba   'to steal'
            okwí[íba-yiba   'to steal …'
            a[yiba-yíba   's/he steals …'
        b. okwíita   'to kill'
            okwí[íta-yita   'to kill …'
            a[yita-yíta   's/he kills …'
        c. okwáánduura   'to rescue'
            okwá[ánda-yaanduura   'to rescue …'
        d. okwóómbera   'to weed'
            okwó[ómba-yoombera   'to weed …'

178

In the infinitive forms, the syllable containing the reduplicant is formed from the infinitival prefix *oku-* and the reduplicant. However, the surface segments corresponding to the infinitive do not appear in the base. Furthermore, the epenthetic [y] at the beginning of the base does not appear in the infinitive reduplicant—the parse **oku[yíba-yiba* would be ungrammatical.

We have now reviewed the basic facts of Runyankore verbal reduplication. More details will emerge within the analysis, but these should be sufficient background to aid in the understanding of the constraint rankings discussed below. In the next section, I will provide evidence for the basic ranking of constraints responsible for predicting the most common type of reduplicant in Runyankore. Later sections will then deal with less-than-canonical forms of the reduplicant.

5.3   A Ranked Constraints Approach to Reduplication

This account of the reduplication of Runyankore verbs will use a set of ranked constraints that will evaluate the well-formedness of surface forms (Prince & Smolensky 1993). Following McCarthy & Prince (1995), I will also assume that there is a set of constraints on faithfulness between input-output and between input-reduplicant. A family of surface-to-surface faithfulness constraints is crucial for an analysis of reduplication as well. These constraints ensure that the reduplicant, which is phonologically empty in the input, contains segments that are similar to (subject to other constraints on well-formedness) the base or the input to the base (reduplicant-base faithfulness and input-reduplicant faithfulness, respectively).

5.3.1   The Reduplicant as Binary Foot

As we saw in section 5.2, the reduplicant is always binary at some level of analysis—disyllabic or bimoraic. Following Downing (1993), the constraints on the length of the reduplicant are that it must be a foot and that feet are binary.[8]

(5.19) REDUPLIANT=FOOT

      The reduplicant must be a trochaic foot. (RED=FT)

(5.20) FOOTBINARITY

      Feet must be binary (at some level of analysis). (FTBIN)

The RED=FOOT constraint requires that the reduplicant be a trochaic foot.[9] Along with the constraint on binarity of feet, FTBIN (Prince & Smolensky, 1993), RED=FOOT requires reduplicants to be a foot. The requirement that the foot be a trochee limits the reduplicant to a subset of the possible foot types. Specifically, it rules out iambs (CVCVV). We won't specify whether the trochee should be syllabic (CVCV, CVVCV) or not (CVV) because both are possible. The location of the reduplicant is specified by constraints that require it to prefix to the stem-base and to be anchored with the left edge of the stem-base. Specifically, the reduplicant must be anchored to the left edge of the macrostem.

(5.21) ALIGN(RED, LEFT, MSTEM, LEFT)

      Align the left edge of any reduplicant with the left edge the macrostem.
      (ALIGN-L)

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[8] In constraint definitions, an abbreviation appears at the end of the definition in parentheses. I will use it in the following tableaux and text. These abbreviations are usually the same as those found in the OT literature.

[9] Beth Hume pointed out the usefulness of specifying the type of foot that the reduplicant should be.

180

(5.22) LEFT-ANCHOR(RED, BASE)

> Any element at the left edge of the reduplicant has a correspondent at the left edge
> of the base. (ANCH-L)

ALIGN-L requires the left edge of the reduplicant to align with the left edge of the macro-stem. The result of this is that the reduplicant is always included in the stem (as shown by tonal assignment). The anchoring constraint ANCH-L requires the reduplicant to anchor to the left edge of the base. Since the reduplicant is also part of the stem, the reduplicant will be anchored not with the stem on the surface but with the base, which is defined in terms of the input stem or macrostem. Because the reduplicant is phonologically empty, there is no segmental material to be copied. Thus, the segmental material at the left edge of the base coincides with the segments at the left edge of the verb root, which is the leftmost morpheme in the stem. This ensures that the reduplicant can be included in the stem on the surface. The fact that the segments copied are also part of the stem supports the correspondence relationship between the input stem and the output reduplicant.

The constraints on reduplicant well-formedness must outrank the constraints that would require total copying of all elements in the base to the reduplicant.

(5.23) MAX BASE-REDUPLICANT

> Every element of the base has a correspondent in the reduplicant. (MAXBR)

The MAXBR (McCarthy and Prince 1995) constraint requires every segment in the base also to appear in the reduplicant. However, if the base is longer than a foot the entire base cannot be copied into the reduplicant. In such a case, only the segments necessary to satisfy FTBIN and RED=FT are copied in the reduplicant. The longest possible trochaic foot will be preferred (i.e., CVVCV is preferred over CVV because it maximizes copying). Thus, the following ranking must hold.

(5.24) RED=FT, FTBIN, ALIGN-L, ANCH-L ≫ MAXBR

This ranking is demonstrated in the following tableau. The curly braces "{ }" represent the boundaries of a foot (which I will mark only when necessary for clarity). I will be assuming that the word is not exhaustively footed and the lack of curly braces indicates that the reduplicant is not footed (violating RED=FT, but not FTBIN).

Tableau 5.1   /oku + káraang + a + RED/   'to dry roast …'

	RED=FT	FTBIN	ALIGN-L	ANCH-L	MAXBR
☞ a. oku[{<u>kára</u>}-karaanga					aanga
b. oku[<u>ká</u>-karaanga	*!				raanga
c. oku[{<u>káraanga</u>}-karaanga		*!			
d. oku[ká-{<u>raanga</u>}-raanga			*!		
e. oku[{<u>ráánga</u>}-karaanga				*!	ka
f. oku[{<u>káraa</u>}-karaanga	*!				
g. oku[{<u>káá</u>}-karaanga					raanga!

Candidate (a) succeeds because it satisfies all the constraints on reduplicant well-formedness. Runyankore is very strict regarding the formation of reduplicants and will only admit a few exceptions. Candidate (b) fails because the reduplicant is not a foot. Candidate (c) fails because the foot constructed over the reduplicant is not binary. Candidate (d) fails because the reduplicant is misaligned with respect to the left edge of the stem. Candidate (d) demonstrates that ALIGN-L dominates MAXBR: there are no violations of MAXBR in this candidate; yet it is still ungrammatical. Candidate (e) fails because the reduplicant is not anchored with the left edge of the base, *karaanga*. Candidate (f) fails because it is not a trochaic foot (it is an iamb). Finally, candidate (g) fails because it does not maximize copying from the base.

The following verbs have a stem that is longer than two syllables. The last vowel of the reduplicant is invariably *a*, regardless of the quality of the corresponding vowel in the base.

(5.25)   oku[<u>rama</u>-ramutsya   'to greet …'

oku[<u>reemba</u>-reembesereza   'to comfort …'

oku[<u>shoha</u>-shohora   'to go out …'

Is the last vowel of the reduplicant copied from the stem (as is suggested in Tableau 5.1) or only the first CVC or CVVC? Some constraint requires the reduplicant to end in the vowel *a*, regardless of the vowel in the input. What would compel this requirement? Downing (1993) argues that reduplicants in Kikuyu and KiNande also end in the vowel *a* because the reduplicant must be a "Canonical Stem" defined by Downing as follows:

(5.26) Canonical Stem

a. Prosodic constraint: Must be a syllabic trochee.
b. Morphological constraint: Must look like a verb stem by ending with Final Vowel /-a/.

One potential difficulty with this understanding of reduplication lies in identifying what a canonical stem is. Generally, the stem is considered to be the verb root, derivational affixes (such as *-ir-* 'for' and *-an-* 'each other') and a final vowel which contributes information about the mood and tense of the verb. For example, in most indicative present tenses, the final vowel is *-a*, indicative. However, in the subjunctive, the final vowel is *-e*. In fact, the terminology "final vowel" might be an unfortunate misnomer because the perfective morpheme, *-ire*, occupies the same space as the final vowels *-a* and *-e*. Perhaps "terminal morpheme" would be a better choice. But, "final vowel" is accepted in the literature on Bantu morphology and phonology and I will retain it for tradition, if not for

perspicacity. The verbs in (5.27) end in the perfective morpheme *-ire*; yet, the reduplicant still ends in the vowel *-a*.[10]

(5.27)   akáá[heeka-heec-ire   'he should carry …'
          a[bará-baz-ire   's/he counted …'
          a[húúta-huuts-ire   's/he drank from a bowl …'
          a[jeendá-jeenz-ire   's/he went …'

Similarly, the following reduplicated forms of the verb end in the vowel *-e*, which indicates the subjunctive mood. Again, the quality of this vowel is not copied.[11]

(5.28)   o[teeka-teék-e   'you should cook …'
          o[rééba-reeb-e   'you should see …'
          o[náába-naab-e   'you should wash …'
          o[bará-bar-e   'you should count …'

As the words in (5.27) show, the final vowel of the reduplicant is invariably *-a* and cannot have its origins linked to the surface final vowel (final morpheme).

   The notion of canonical stem seems to be derived from the statistical preponderance of verb stems that have the form [CVC-a]. Of course, these are not the only types of verb stems that appear in the language. A constraint that requires the reduplicant to be a canonical stem collapses the constraints RED=FT and FTBIN together with the final vowel requirement. But, as we shall see below, we will need to decompose the RED=FT constraint in order to account for a prosodically misaligned reduplicant. Furthermore, there is

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[10] The spirantizing effects of the suffix *-ire* are not copied into the reduplicant. We will take up this issue below in §5.4.

[11] The placement of the high tone in the subjunctive (in the absence of an object) is the V2/final tone pattern. Observe that the morphological high tone on the underlyingly toneless verbs (√*reeb* 'see', √*naab* 'wash', and √*bar* 'count') appears on the reduplicant, indicating its location within the stem.

ample evidence that FTBIN is a constraint we expect to find in any language, while the notion of canonical stem relates to facts about Bantu morphology.

Thus, while the canonical stem represents a meaningful observation about common verb forms in Bantu languages, we do not wish to compress these constraints under the rubric of a constraint requiring the reduplicant to be a canonical stem. At this point, rather than appealing to the notion of canonical stem, I will simply use a constraint that requires the last vowel of the reduplicant to be the vowel *a*.[12]

(5.29) ALIGN(RED, RIGHT, [a], RIGHT)

Align the right edge of a reduplicant with the right edge of the vowel [a].
(REDFV)

This constraint requires the final sound of the reduplicant to be the vowel *a*. As we shall find later in monosyllabic verbs, this mora for this vowel must have a corresponding segment in the base. However, as we demonstrated by reduplicated forms like *oku[shoha-shohora* 'to go out …' the corresponding segment need not have the same features as *a*. The correct features for *a* are filled in by GEN. In order for this to result in a grammatical form, the REDFV constraint must outrank a constraint penalizing the alteration of a segment's features between the reduplicant and the base: IDENTBR.

(5.30) IDENTBR

The features of a segment should remain the same in the base and reduplicant.

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[12] Perhaps the canonical stem falls out from the relatively high ranking of these constraints in Bantu morpho-phonology.

Tableau 5.2   /oku + shohora + RED/ 'to go out …'

	REDFV	ANCH-L	MAXBR	IDENTBR
☞ a. oku[{shoha}-shohora			-ra	*
b. oku[{shoho}-shohora	*!		-ra	
c. oku[{hora}-shohora		*!	sho-	

Candidate (b) fails because the reduplicant does not end in the vowel *a*, violating REDFV. Candidate (a) succeeds despite an IDENTBR violation—the mora contributed by the *o* of the base appears as the vowel *a* in the reduplicant. This is necessary to satisfy the REDFV constraint. Recalling Downing's analysis of reduplication, the last vowel of the reduplicant must be *a* because of the requirement that the reduplicant be a canonical stem. In this analysis, the last vowel of the reduplicant is always *a*. But, that segment corresponds to a segment in the base. In other words, the *-a* is **not** epenthetic (i.e., freely inserted by GEN). Rather, the feature values of the copied segment are altered in GEN and it happens that the altered form that is preferred ends in the vowel *a*. Recall that the output of GEN represents a multitude of possible changes to the input (in OT, infinitely many). So, *shohora* has the output reduplicants *shoha, shohe, shohi, shoho, shohu,* etc. The constraint REDFV penalizes all reduplicants but *shoha*. Candidates (a) and (b) have the same number of MAXBR violations because the final vowel of the reduplicant corresponds to a segment in the base. But, candidate (a) violates IDENTBR because the features of the vowel have been changed. This aspect of the analysis will be crucial in later sections when we discuss subminimal stems that cannot form reduplicants. Epenthesis is *not* a means by which the reduplicant can be augmented to satisfy FTBIN. This is evidence that the final vowel of the reduplicant, which must be *-a*, must have a correspondent in the base.

In the case of a long verb, such as *oku-reembesereza*, 'to comfort', several segments from the base are not copied in the reduplicant. This results in some number of MAXBR violations. However, the constraints on reduplicant form outrank MAXBR.

Tableau 5.3   /oku + rembesereza + RED/   'to comfort …'

	FTBIN	RED=FT	MAXBR
☞ a. oku[{<u>reemba</u>}-reembesereza			
b. oku[{<u>reembe</u>}<u>sa</u>-reembesereza		*!	ereza
c. oku[{<u>reembesa</u>}-reembesereza	*!		ereza

The more that a candidate satisfies MAXBR the worse it does with respect to RED=FT and/or FTBIN. This is further evidence for ranking the reduplicant form constraints above MAXBR.

5.3.2   Object Prefixes

Further evidence for the ranking of these constraints can be found by examining a stem containing an object prefix. At this point, we will examine only verbs with roots that are at least CVC. The shorter roots, C and CV like √*s* 'grind' and √*gu* 'fall', have some interesting properties related to minimality and will be examined below, in section 5.3.3. In the cases where the root is at least CVC, the object prefix is never included within the reduplicant. The object prefix, though within the macrostem, precedes the reduplicant. The placement of the object prefix within the macrostem is controlled by the ranking of a constraint specifying that the left edge of any object prefix should align with the left edge of some macrostem, formalized below as (5.31).

(5.31) AL(OP, L, MS, L)

        Align the left edge of any object prefix with the left edge of some macrostem.

    This constraint should outrank the constraint aligning the reduplicant with the left edge of the macrostem, ALIGN-L. This would be the case because the object prefix (normally, see section 5.3.5 below for the exception and discussion) precedes the reduplicant.

187

(5.32)   oku[bí-<u>bara</u>-bara   'to count them$_8$ …'

          oku[bi-<u>kára</u>-karaanga   'to dry roast them$_8$ …'

          oku[ji-<u>tééka</u>-teeka   'to cook it$_9$ …'

We can examine this ranking in a tableau of candidates.

Tableau 5.4   /oku + bi + bara + RED/   'to count them$_7$ over and over'

	RED=FT	FTBIN	ALIGN-L	AL-L(OP, MS)	MAXBR
☞ a. [bí-<u>bara</u>-bara			**		
b. [<u>bíba</u>-bi-bara				***!*	ra
c. [{<u>bíbara</u>}-bi-bara		*		**!****	
d. [<u>bíbara</u>-bi-bara	*			**!****	

Candidate (a) is the optimal parse of this verb because it does not include the object pre-fix in the reduplicant. This is true despite its violations of ALIGN-L. Candidates (b)–(c) include, in some way, the object prefix in the reduplicant. Candidate (b) violates MAXBR because there are segments in the base that are not in the reduplicant. Candidate (c) in-corporates too many segments from the base, more than necessary to satisfy the redupli-cant minimality constraints. Because of this, it is more difficult for it to satisfy the ALIGN-L(OP, MS) requirement. Including this extra segmental material in the reduplicant violates the constraint on reduplicant form, either FTBIN, as in candidate (c), or RED=FT in candidate (d).

Now consider a verb root with a long base. Here we see the interplay between the alignment constraints.

Tableau 5.5   /... bi + karaanga + RED/   'dry roast them₈ …'

	RED=FT	ALIGN-L	AL-L(OP, MS)	MAXBR
☞ a. [bi-<u>kára</u>-karaanga		**		anga
b. [<u>biká</u>-bi-karaanga		***!*	****	raanga
c. [<u>bi</u>-bi-káraanga	*		**!	karaanga

There is no need to rank the alignment constraints with respect to one another (or, per-haps we cannot know the ranking) because the alignment of the morphemes that is pre-ferred is the one that violates both constraints the least. In the best situation, candidate (a), the object prefix appears first in the macrostem.

This section has provided an account of reduplication when the base is the verb stem and it is at least two syllables in length. Below, we consider the difficulties introduced by vowel-initial stems and stems that are shorter than two syllables. First, we consider verb roots that begin with a consonant-glide sequence to examine the role of glide formation and compensatory lengthening. And, only monosyllabic roots that have a consonant and a glide can reduplicate.

5.3.3   Reduplication of Monosyllabic Roots

Monosyllabic roots are subject to constraints on reduplicant length as well as constraints on the insertion segmental material. The constraints are so restrictive that some mono-syllabic roots do not have a corresponding reduplicated form. In this section, we see how monosyllabic roots reduplicate and how they are able to recruit segmental material from the object prefix in order to fulfill minimality constraints.

Some monosyllabic roots have reduplicated forms because they contain high vowels (or glides) which allow for compensatory lengthening in the reduplicant. A syllable with a long vowel may constitute a binary foot, fulfilling both the FTBIN and RED=FT con-straints. Some examples are provided in (5.33).

(5.33)   a. oku[mwa   'to shave'

             oku[<u>mwaa</u>-mwa   'to shave …'

         b. nibá[rya   'they are eating'

             niba[<u>ryáá</u>-rya   'they are eating …'

         c. okú[cwa   'to pluck, be cut off'

             oku[<u>cwáá</u>-cwa   'to pluck, be cut off …'

         d. oku[gwa   'to fall'

             oku[<u>gwaa</u>-gwa   'to fall …'

The reduplicants of the verbs in (5.33) are able to satisfy the constraint on reduplicant form because the base is of the form [Cia] or [Cua]. In the input these roots comprise a consonant and a high vowel: √*mu* 'fall', √*rí* 'eat', √*cú* 'pluck', √*gu* 'fall'. With the addition of the final vowel, these high vowels must surface as glides because of the constraints on diphthongs in Runyankore. In the case of the simple infinitives, we do not find the long vowel normally associated with glide formation in Bantu languages. A highly ranked constraint against long nuclei at word boundaries deletes one of the morae of the final syllable of the input, which we will see below. In order to compel glide formation and compensatory lengthening we need to force the high vowel to loose its association with a mora. Furthermore, that mora should be retained and link to the following non-high vowel. Following Rosenthall's (1994) account of glide formation in Luganda, I invoke the constraint NoRISE to penalize a tautosyllabic high vowel, non-high vowel sequence. We cannot rule out all diphthongs. Unlike Luganda, Runyankore does have diphthongs: *okubaizha* 'to carve' ([okuβeyža]), *okuboigora* 'to bark', etc. However, these diphthongs always fall in sonority. The constraint NoRISE prevents diphthongs like [uo] while ignoring diphthongs that fall in sonority.

(5.34) NoRISE

Tautosyllabic vowel sequences must not rise in sonority (cf. Rosenthall 1994).

$$\sigma$$

$$\mu \quad \mu$$

$$V_i \ V_j \qquad \text{Son } V_i < \text{Son } V_j$$
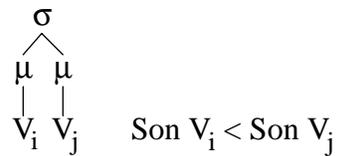
In Runyankore, the best solution to alleviate a violation of NoRISE is to preserve the morae as well as the features of the high vowel. In order to satisfy a constraint requiring the preservation of morae in the output, MAX-μ, the mora associates to the following vowel, resulting in compensatory lengthening.

(5.35) Compensatory lengthening

$$\mu \qquad \mu$$

$$[+\text{hi}] \quad [-\text{hi}]$$
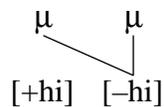
Without the mora, the first segment is pronounced as the glide -*y*- or *w*. Thus the input /ria/ surfaces as [ryaa], modulo final shortening. Word-internal glide formation with compensatory lengthening is illustrated in Tableau 5.6.

Tableau 5.6   /oku + og + a/ 'to wash'

	NoRISE	MAX-μ
☞ a. okwooga		
b. okwoga		*!
c. okuoga	*!	

Candidate (a) is optimal because there is no falling diphthong and the mora is preserved in the output. Candidate (b) lost the mora originally associated with the *u* of the infinitive

prefix *oku-* and thus violates MAX-µ. Finally, candidate (c) violates NoRISE with the diphthong [uo].

Word-internally, MAX-µ and MAX prevent the deletion of a mora and a segment, demonstrating that they are ranked above IDENT-µ, which would require a mora to retain its features. However, as noted above, there are no long vocoids at the word boundary. There are no long vocoids at the edge of a word in Runyankore (as well as in other Bantu languages, for evidence of this effect in Kikerewe, see Odden, 1996a). The first set of words in (5.36) shows a long vowel after a glide. However, if the glide-vowel sequence is word-final, the vowel is never long, as shown in (5.36b)

(5.36)	a.	oku[byaama	'to sleep'
		oku[cweera	'to spit'
		oku[myoora	'to twist'
		oku[rwaana	'to fight'
	b.	okú[rya	'to eat'
		oku[gwa	'to fall'
		oku[cebwa	'to be mashed'
		oku[reebya	'to betray'

The prohibition against long vocoids at the edge of the word in Runyankore will assign marks to any long vocoid at the word boundary.[13] The constraint is shown in (5.37).

(5.37) *VV]

  No long vocoids (vowels or vowel + glide sequences) at the edge of the word.

It is for this reason that no words in Runyankore end in long vowels, glides or diphthongs (which are phonologically long). This constraint must outrank MAX-µ in order to ensure that the mora that would lengthen the final vowel is deleted.

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[13] Hume 1997 has also observed this fact to be true of Leti, a Austronesian language.

Tableau 5.7   /oku + rí + a/   'to eat'

	*VV]	MAX-μ
☞ a. okúrya		*
b. okúryaa	*!	

Taken together, we see that NoRISE and *VV] are not obviously ranked with respect to one another. However, they both outrank MAX-μ, as illustrated in Tableau 5.8.

Tableau 5.8   /oku + ri + a/   'to eat'

	NoRISE	*VV]	MAX-μ
☞ a. okurya			*
b. okuryaa		*!	
c. okuria	*!		

In reduplication, the vowel that fulfills the REDFV constraint is long because the mora of the root vowel is retained, satisfying MAX-μ.[14]

Tableau 5.9   /oku + rí + a + RED/   'to eat …'

	NoRISE	*VV]	MAX-μ	RED=FT
☞ a. oku[ryaa-rya			*	
b. oku[rya-rya			**!	*
b. oku[ryaa-ryaa		*!		
c. oku[ria-rya	*!			

---

[14] Note that forms like *okw[óózya-yoozya* 'to wash …' the reduplicant cannot be *-oozyaa-* because this would violate the constraint that requires the reduplicant to be a trochaic foot.

Tableau 5.9 illustrates the ranking of these constraints with reduplication. The output candidate is (a) because it must retain a mora from the input is able to satisfy the constraints RED=FT and be a well-formed reduplicant. Next, we will examine verbs whose roots comprise a single consonant.

5.3.4   Monosyllabic Roots and Reduplicative Failure

Consider again the monosyllabic roots that have no reduplicated form, repeated from (5.15) in (5.38).

(5.38)   a. okú[fa   'to die'
            *oku[fá-fa, *oku[fáa-fa,   'to die …'
            *o<u>kufa</u>[kúfa, *oku[fáya-fa,
            *oku[fáfafa

      b. oku[za   'to go to'
            *oku[za-za, etc.   'to go out …'

      c. oku[sa   'to grind'
            *oku[sa-sa, etc.   'to grind …'

      d. oku[ñ-a   'to defecate'
            *oku[<u>ña</u>-ñ-a, etc.   'to defecate …'

      e. oku[h-a   'to give'
            *oku[<u>ha</u>.h-a, etc.   'to give …'

      f. oku[ta   'to place'
            *oku[<u>ta</u>-t-a, etc.   'to place …'

No parse of the forms in (5.38) can be considered grammatical—there just is no reduplicated form of this verb. All of the following are illicit means by which a reduplicant may achieve minimality: (1) add segmental or prosodic material not present in the base, (2) incorporate segments from the prefixal domain and (3) multiply copy segments from the base (as in *oku[*fáfafa*).

194

5.3.4.1   The Null Parse

Because these forms of monosyllabic roots have no means to satisfy the binarity require-ment, the only possible alternative (i.e., the grammatical 'output') is the null parse. The null parse has no morphological structure associated with the segments. According to Prince & Smolensky (1993),

> [f]ailure to achieve morphological parsing is fatal. An unparsed item has
> no morphological structure, and cannot be interpreted, either semantically
> or in terms of higher morphological structure. This parallels the phonetic
> uninterpretability of unparsed segmental material. A phonological Null
> Parse renders a word unusable as an element in a Phonological Phrase. . . .
> This is the structural correlate of phonetic invisibility. (49)

Because the null parse is assigned no morphological structure, it violates no con-straints on morphological well-formedness, just as a word without the RED morpheme in the input vacuously satisfies all the constraints pertaining to RED. Thus, with the proper ranking, it is possible for the null parse to be the optimal candidate. The constraint MPARSE penalizes the failure to assign morphological structure. Itô, Kitagawa & Mester (1995) exploit this constraint in their explanation of Japanese reversing argot (*zujaa-go*). Some words cannot appear in a reversed form: *kurisumasu* 'Christmas' **masukurisu*, **sumasukuri*; *akademi:* 'academy' **mi:akade*, **demiaka*, **mi:aka*. Those words are ana-lyzed as having a null output. Constraints ranked higher than MPARSE rule out the ill-formed parses. The following tableau is taken from their discussion.

Tableau 5.10   Tableau (80) from Itô, Kitagawa & Mester.
              Jazz-Argot of kurisumasu 'Christmas'

Base	Argot	Pros Form	Cross Anchor.	Faithfulness (B,A)		
				Mx-Sg	MParse	Mx-μ
☞ a. (kuri)su(masu)	Ø				*	
b. (kuri)su(masu)	(<u>masu</u>)(kuri)su	*!				
c. (<u>kuri</u>)su(<u>masu</u>)	(<u>masu</u>)(<u>kuri</u>)			su!		*

As Itô, Kitagawa & Mester demonstrate, the best output is the one lacking any morphological structure—candidate (a). It vacuously satisfies the constraints PROSFORM and CROSSANCHOR. Because the alternatives, candidates (b) and (c), fail constraints ranked higher than MPARSE they are not optimal.

Similarly, we shall see that verbs with subminimal bases will result in morphologically unparsed structures, which are not interpretable. Thus, the constraint MPARSE in Runyankore will rank below other constraints on reduplicant well-formedness. MPARSE will also rank below the constraints that penalize the illicit means of forming reduplicants mentioned above and reviewed in the following sections. The result is that subminimal bases have no resources available to them for the creation of well-formed reduplicants.

It is important to note that the ranking of MPARSE should not rule out legitimate reduplicants. It should at least outrank MAXBR with the addition of a null-parse candidate and the constraint MPARSE.

Tableau 5.11   /oku + káraang + a + RED/   'to dry roast …'

	RED=FT	FTBIN	ALIGN-L	ANCH-L	MPARSE	MAXBR
☞ a. [{<u>kára</u>}-karaanga						aanga
b. [<u>ká</u>-karaanga	*!					raanga
c. [{<u>káraanga</u>}-karaanga		*!				
d. [ká-{<u>raanga</u>}-raanga			*!			
e. [{<u>ráánga</u>}-karaanga				*!		ka
f. Ø					*!	

From Tableau 5.11 we can at least conclude that MPARSE outranks MAXBR. Otherwise, the verb whose base is longer than two syllables would have the null parse as its optimal output in reduplication. Further evidence related to the ranking of MPARSE will appear below, in section 5.3.6, with respect to reduplicants that are not quite feet but are still licit.

    In the sections that follow, we will examine several possible strategies used in other Bantu languages for the formation of reduplicants from subminimal bases and see how the constraint ranking of Runyankore prevents them from being used by the language. Finally, we will examine one way in which a subminimal base can be augmented to two syllables and result in a well-formed reduplicant—object prefix recruitment.

5.3.4.2   Ruling Out Identical Surface Forms

One potential interpretation of these failures to reduplicate is that the reduplicated form of the verb *oku[sa* 'to grind' is the same as the unreduplicated form. In other words, if the output of reduplication is an empty string the reduplicant surfaces (i.e., MPARSE is satisfied), but contains no segmental material. Aside from the obvious problem of speakers ever being able to tell that reduplication has occurred, there is the serious issue of the complete failure of this parse to obey the constraint on reduplicant well-formedness

RED=FT. This demonstrates that RED=FT outranks MPARSE, which requires the morpheme to surface. This is demonstrated in Tableau 5.12.

Tableau 5.12   /oku + sa + RED/   'to grind over and over'

	RED=FT	MPARSE
a. oku[Ø-sa	*!	
☞ b. Ø		*

Candidate (a) fails because the reduplicant is not a foot. However, the candidate that has no morphological parsing at all, candidate (b), is successful, despite its violation of MPARSE.

5.3.4.3   Integrity—No Multiple Copying

Let us consider the first impossible parse *oku[sasa-sa* 'to grind …'. This parse copies the base more than once to arrive at a binary reduplicant. The strategy of multiply copying segments is not unknown in other Bantu languages. Mutaka and Hyman 1990 provide several examples from Kinande, as shown in (5.39) below.

(5.39)   e-ri.sw-a   'to grind'   e-rí.sw-a.sw-a.sw-a

            e-rị̀.tw-a   'to cut'   e-rị̀.tw-a.tw-a.tw-a

            e-rí.ta-a   'to bury'   e-rí.ta-a.ta-a.ta-a   [e-rí.ta.ta.ta]

            e-rí-ya-a   'to go'   e-rí.ya-a.ya-a.ya-a   [e-rí.ya.ya.ya]

However, Runyankore cannot use this strategy in order to produce a reduplicant of sufficient length. The constraint responsible for the prohibition of such forms as *oku[sasa-sa* is a member of the INTEGRITY family of correspondence constraints. In this case, the integrity of segments is between the base and the reduplicant, the version of the constraint that appears in Appendix A of McCarthy and Prince 1995:

(5.40) Integrity — "No Breaking"

No element of S1 has multiple correspondents in S2.

For $x \in S_1$ and $w, z \in$ of S_2, if $x \, \Re \, w$ and $x \, \Re \, z$, then $x = z$.

In the case of Runyankore, S_1 is the base and S_2 is the reduplicant. The INTEGRITY constraint holds between the base and the reduplicant.

(5.41) BR-INTEGRITY

No element of the base has multiple correspondents in the reduplicant.

So, for a verb like *oku[shohora* 'to go out' the correspondence relationships between the reduplicant and the base would be as follows.

(5.42)   oku[$\underline{sh}_1\underline{o}_2\underline{h}_3\underline{a}_4$-sh$_1o_2h_3o_4$ra   'to go out …'

However, a form like *oku[sasa-sa* '$^?$to grind …' would present violations of BR-INTEGRITY because there would be multiple correspondents of segments in the base in the reduplicant.

(5.43)   *oku[$\underline{s}_1\underline{a}_2\underline{s}_1\underline{a}_2$-s$_1a_2$

Both *s*'s in the reduplicant are coindexed with the *s* of the base. Violation of BR-INTEGRITY is always fatal in Runyankore. The constraint prohibiting it lies at or near the top of the hierarchy. Because the null parse is superior, MPARSE must rank below BR-INTEGRITY.

199

Tableau 5.13   /oku + sa + RED/   'to grind …'

	BR-INTEGRITY	MPARSE
a. oku[$\underline{s}_1\underline{a}_2\underline{s}_1\underline{a}_2$-s$_1a_2$	*!*	
☞ b. Ø		*

Candidate (a) has multiple copies of segments from the base in the reduplicant, thus fatally violating BR-INTEGRITY. Candidate (b) has no surface manifestation of the reduplicant. It does not violate any of the REDFORM constraints. It does violate MPARSE. However, the lower ranking of MPARSE makes this candidate optimal. Consider the formulation of those constraints once again. They are of the form, "if there is a reduplicant, it must have X quality", where X is being a foot, or ending in the vowel *a*, or being properly anchored with the base. The total deletion of the reduplicant means that these constraints are not even evaluated; they are satisfied vacuously.

5.3.4.4   Segmental Epenthesis

Another illicit means of reduplicating single-consonant verbs involves the insertion of an extra segment into the reduplicant: *oku[saCa-sa* or *oku[saya-sa*. Similarly, we cannot just lengthen the vowel *a* of the reduplicant to give *oku[saa-sa*.[15] This last form could also be ruled out by BR-INTEGRITY but we will also wish to rule out the possibility that the second mora is not coindexed with any segment in the base. Similarly **oku[sasa-sa* could just result from the insertion of *sa* into the reduplicant, without any reference to the base. Again, we should account for both possibilities.

This form of reduplication is possible in other Bantu languages. A specific example is Siswati. The following data illustrate the augmentation of the reduplicant with epenthetic material in order to bring it up to minimal size.

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[15] This forms one of the arguments against the approach that inserts the final vowel of the reduplicant. Every mora in the reduplicant must have a correspondent in the base.

(5.44)   a.   -phá   -<u>phayí</u>-pha   'give'

               -wa   -<u>wayi</u>-wa   'fall'   (Downing1994)

         b.   ku-<u>khayi</u>-kha   'to pick a little'

               ku-<u>dlayi</u>-dla   'to eat a little'   (Herman 1996)

In Siswati, the solution to obtaining a well-formed reduplicant is to insert epenthetic material. The insertion of these segments violates some faithfulness constraint. However, they are ranked so low as to prefer epenthesis over other possible solutions to minimality. Downing's (1994) account of reduplication in Siswati ranks FILL-σ and FILLONS below the constraint that requires a reduplicant to be a foot (RED=FOOT).

The failure of epenthesis to create a well-formed reduplicant in Runyankore suggests that we cannot add a mora to the reduplicant that is not contributed by the base. It is at this point that we can further explain the claim made above in §5.3.1 that the final vowel of the reduplicant has a correspondent in the base. It is not the purpose of REDFV to insert a vowel [a] at the end of the reduplicant. REDFV only ensures that the vowel in that position be [a]. Otherwise, we might expect a form like *oku[_saa_-sa to be grammatical. But, we cannot insert a mora into the reduplicant that is not present in the base. The monosyllabic verbs such as *oku[rya* 'to eat' already have two morae in their base (< /oku + <u>ri + a</u>/). However, such monosyllabic verbs as *oku[sa* 'to grind' and *okú[fa* 'to die' have only one mora in the base. This means that they are insufficiently long to satisfy the constraints on reduplicant size without inserting a mora. This is prohibited by a constraint that requires any segment in the reduplicant to have a correspondent in the base, given in (5.45).

(5.45) DEP INPUT-REDUPLICANT

        A segment present in the reduplicant must have a correspondent in the input.
        (DEPIR)

This constraint will also play a role in the evaluation of reduplicants of vowel-initial bases in section 5.3.6.

In order to prefer the null parse over a parse like *oku[_saya_-sa the constraint DEPIR must outrank the constraint compelling morphological parsing: MPARSE.

Tableau 5.14   /oku + sa + RED/   'to grind …'

	DEPIR	MPARSE
a. oku[saCa-sa	*!*	
☞ b. Ø		*

The ranking illustrated in Tableau 5.14 selects candidate (b), the null parse, as optimal. It is worse to insert segments into a reduplicant that have no correspondents in the base than it is to fail to parse the structures at all. Candidate (b), Ø, also does not violate any of the REDFORM constraints because the reduplicant is not present in the output. Since the constraints on reduplicant form must evaluate a reduplicant according to its closeness to the input, the base, minimality, etc., the lack of a reduplicant means that they incur no violations.[16]

5.3.4.5   Prefix Exclusion

Another illicit means of expanding the reduplicant to fulfill minimum size requirements would be to include segmental material from the prefix domain, which precedes the macrostem. For example, *o-_kusa_-kusa is never permitted because the reduplicant contains material from a prefix that is outside of the macrostem. Whatever constraints are responsible for exclusion of such forms stand quite high in the constraint hierarchy. The string *o-_kusa_-kusa has several different interpretations, depending upon which string of segments _ku_ one considers to be the infinitival prefix.

---

[16] One could also imagine a candidate where the reduplicant is parsed, but empty. In other words, the output would be the same as the unreduplicated verb. However, we will follow the interpretation that the morpheme is present even if it has no overt segmental content. In this case, the reduplicant would fail the well-formedness constraints: it's not a foot, it's not a trochee, and so on.

In one interpretation, the first instance of *ku* is the infinitival prefix. The structure would look something like this:

```
                    MACROSTEM
                  /     |     \
          PREFIX       RED    INFLSTEM
             |        /           |
            ku      sa          kusa
```
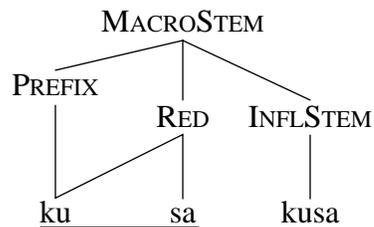
Figure 5.1.   o[kusa-kusa 'to grind …'

Alternatively, one could image *o-kusa-kusa* being parsed as follows:

```
              VERB
             /    \
                   MS
                  /   \
        PREFIX   RED    INFLSTEM
           |    /          |
          ku  sa         kusa
```
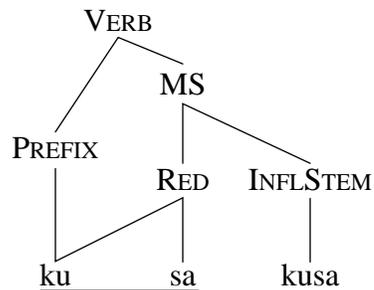
Figure 5.2.   oku[sa-kusa

In Figure 5.1 and Figure 5.2 the string *ku* is a morpheme associate of both the prefix and the reduplicant. McCarthy and Prince (1995) define a morpheme associate as follows.

203

(5.46) **Morpheme Associate**.

A segment (autosegment) x is an *associate* of morpheme M_k if x *or some corre-spondent* of x is an exponent of M_k. For this, we write, x α M_k.[17]

According to McCarthy and Prince (1995) there is a constraint that penalizes multiple exponence of segments. In other words, if a segment is a morpheme associate of one morpheme then it should not be the morpheme associate of another, distinct, morpheme. This constraint would penalize cases of haplology and instances of coalescence involving segments whose inputs represent distinct morphemes (we shall see a grammatical form in Runyankore violate this constraint below). The formal description of the constraint is given in (5.47).

(5.47) MORPHDIS (Morphemic Disjointness)

x α M_i $\rightarrow$ x $\not\alpha$ M_j for instances of morphemes $M_i \neq M_j$ and for x a specific seg-mental (autosegmental) token.

"Distinct instances of morphemes have distinct contents, tokenwise."

Under the interpretations given in Figure 5.1 and Figure 5.2, the inclusion of the infini-tive prefix within the reduplicant constitutes a violation of MORPHDIS. This constraint outranks MPARSE in the constraint hierarchy of Runyankore. In other words, it is worse to overlap the prefix and the reduplicant, morphologically, than it is to fail to assign mor-phological structure at all. Given the choice between null parsing and overlapping of segments, the grammar will choose the null parse as the output, shown in Tableau 5.15.

---

[17] I will substitute the Greek letter alpha (α) here for the symbol used by McCarthy & Prince.

Tableau 5.15   /oku + sa + RED/   'to grind …'

	MORPHDIS	MPARSE
☞ a. Ø		*
b. o[ku_{pr}sa-kusa	*!	

Candidate (a), the null parse, is selected as optimal because the alternative parse, (b), violates MORPHDIS by incorporating the infinitive prefix *ku* into the reduplicant.

Another possible interpretation of the parse **okusakusa* (< *oku+sa+*RED) is that the first instance of *-kusa-* is the reduplicant and the second instance of *ku* is the prefix. Factoring in several possible macrostem boundary locations, we can examine the following outputs of GEN.

(5.48)   o[kusaku_{pr}sa

             o<u>ku</u>[saku_{pr}sa

             o<u>kusa</u>[ku_{pr}sa

             o<u>kusa</u>ku_{pr}[sa

Each of these candidates seriously misaligns the infinitive and the reduplicant. The constraints responsible for the ordering of these morphemes both outrank the MPARSE constraint. These constraints try to align the edges of the morphemes with the proper edges of the macrostem.

(5.49) ALIGN(PREFIX, R, MACROSTEM, L)

        Align the right edge of any prefix with the left edge of a macrostem. (AL(PRE, R, MS, L))

(5.50) ALIGN-LEFT

        Align the left edge of any reduplicant with the left of a macrostem. (ALIGN-L)

Both of these constraints outrank the constraint that compels morphemes to surface. The high ranking of prefix alignment relates to the fact that the macrostem never contains prefixes. This ranking is demonstrated in Tableau 5.16 using the parses from (5.48).

Tableau 5.16   /oku + sa + RED/   'to grind over and over'

	AL(PRE,R,MS,L)	ALIGN-L	MPARSE
☞ a. Ø			*
b. o[kusa-ku$_{pr}$sa	*!***		
c. o<u>ku</u>[<u>sa</u>-ku$_{pr}$sa	*!*	**	
d. o<u>kusa</u>[ku$_{pr}$sa	*!*	****	
e. o<u>kusa</u>ku$_{pr}$[sa		*!*****	

Tableau 5.16 demonstrates that the null parse is superior to other possible parses that severely misalign the morphological constituents. The ranking of the constraints AL(PRE,R,MS,L) and ALIGN-L is not relevant. We do know, however, that they both outrank MPARSE. The ranking of constraint AL(PRE,R,MS,L) is illustrated below (see Tableau 5.20). Because of the structure of the verb in Runyankore, it is simply not possible to reduplicate verb roots comprising of a single consonant.

5.3.5   Alleviating Subminimality through Object Prefix Recruitment

There is a means by which the minimality constraint FTBIN can be satisfied in monosyllabic roots lacking a glide—an object prefix can be 'recruited' into the reduplicant, as in (5.51a). If an object prefix is present, its segments appear twice—in the reduplicant and before the base. The words in (5.51b–c) also suggest that object prefix incorporation is the preferred strategy, even if the underlying verb root has a vowel.

(5.51)   a.   oku[búsa   'to grind'

              náá[búsa   'I ground it$_{14}$'

              náá[<u>búsa</u>-busa   'I ground it$_{14}$ …'

         b.   okúrya   'to eat'

              oku[búrya   'to eat it$_{14}$'

              oku[<u>búrya</u>-burya   'to eat it$_{14}$ …'

         c.   okú[ñwa   'to drink'

              oku[gáñwa   'to drink it$_6$'

              oku[<u>gáñwa</u>-gañwa   'to drink it …'

However, only monosyllabic verbs may recruit the object prefix into the reduplicant. Verbs with stems of two or more syllables never include the object prefix into the reduplicant: *oku-jiba-jibara* 'to count them …'.

As we have seen above, there are two morphemes competing for initial position within the macrostem: the object prefix and the reduplicant. They are competing because there are two constraints that are active within the constraint hierarchy.[18] One tries to enforce the same alignment with the reduplicant, (5.50), repeated below as (5.52). Another constraint states that the object prefix should align its left edge with the left edge of the macrostem, (5.53).

(5.52)   ALIGN-LEFT

         Align the left edge of any reduplicant with the left of a macrostem.

(5.53)   ALIGN-L(OBJECT PREFIX, MACROSTEM)

         Align the left edge of any object prefix with the left edge of the macrostem.
         (AL-L(OP, MS))

---

[18] By "active" I mean only that they are ranked sufficiently high so as to affect the outcome of some parse, as opposed to a constraint ranked so low as to never effect the outcome of some parse in the language in question.

This is shown in Tableau 5.17 (repeated from Tableau 5.4). Any candidate that misaligns the object prefix and the reduplicant is eliminated by some other constraint on reduplicant well-formedness.

Tableau 5.17   /oku + bi + bara + RED/   'to count them₇ over and over'

	RED=FT	FTBIN	ANCHL	AL-L	AL-L(OP,MS)	MAXBR
☞ a. [bí-<u>bara</u>-bara				**		
b. [<u>bíba</u>-bibara					***!*	**
c. [{<u>bíbara</u>}-bibara		*			**!****	
d. [<u>bíbara</u>-bibara	*				**!****	

From a common-sense point of view, it would seem that the constraint aligning the object prefix with the left edge of the macrostem would outrank ALIGN-L. In fact, ALIGN-L(OP, MS) must be active in Runyankore because there must be some way to predict where the object prefix will appear in the verb when no reduplicant is present. The ranking of these constraints allows us to order the two morphemes without having to name them both. This is helpful if we consider the possibility that either one may be present. If we must position the reduplicant relative to the object prefix, then we would also need a second constraint positioning the reduplicant when no object prefix is present. The ordering of these morphemes falls out from the overall constraint hierarchy—from optimizing the output.

Despite this ranking, the reduplicant can sometimes precede the object prefix. Specifically, it will precede the object prefix in the cases of monosyllabic verbs with object prefix where this morphological ordering surfaces as optimal. The constraints of minimality will force incorrect ordering of the reduplicant and the object prefix in order to arrive at a satisfactory reduplicant. As with *okusakusa, several interpretations of the string (this time grammatical) *obusabusa* 'to grind it₁₄ …' are possible. These are illustrated in the following figures. Two likely candidates are shown in Figure 5.3 and Figure 5.4.

```
                    MACROSTEM
                   /
                 RED
                /   |        \
             OP      |         STEM
             |       |          |
             bu      sa        busa
                                   Base
```
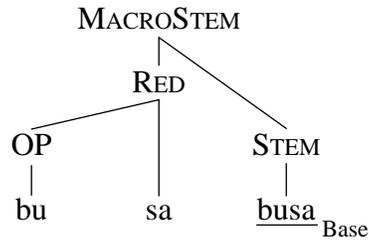
Figure 5.3   oku[<u>busa</u>-busa 'to grind it$_{14}$ …'

```
                    MACROSTEM
                  /      |        \
               RED       OP      INFLSTEM
               |         |          |
              busa      bu          sa
                        _____   Base
```
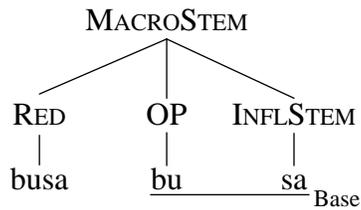
Figure 5.4   oku[<u>busa</u>-busa 'to grind it$_{14}$ …'

In Figure 5.3, the object prefix aligns exactly with the left edge of the macrostem. However, by incorporating the object prefix morpheme into the reduplicant, this parse incurs a violation of MORPHDIS. An alternative parse, shown in Figure 5.4, locates the object prefix after the reduplicant. This would violate object prefix alignment, AL-L(OP, MS), but such a violation saves the candidate from a worse violation of MORPHDIS.

Tableau 5.18   /oku + bu + sa + RED/ 'to grind it$_{14}$ over and over'

	MORPHDIS	AL-L(OP, MS)
☞ a. [busa-bu$_{OP}$sa		****
b. [bu$_{OP}$sa-busa	*!	

Tableau 5.18 illustrates the ranking of MORPHDIS over the object prefix and reduplicant alignment constraints. Candidate (b) is well aligned with respect to the reduplicant and the object prefix. By incorporating the object prefix into the reduplicant, it satisfies both alignment constraints. However, this type of morphemic overlap is marked by MORPHDIS. It is worse to overlap the reduplicant and the object prefix. Therefore, candidate (a) wins, despite its violations of ALIGN-LEFT(OP, MS). Again, the relative ranking of ALIGN-LEFT(OP, MS) and ALIGN-L is not apparent from this tableau.

Finally, we need to ensure that the correct parse of *oku + bu + sa + RED* is optimal and not the null parse. The crucial issue involves the ranking of MPARSE and the constraint responsible for the placement of the object prefix within the macrostem: ALIGN([OP, [MS). Thus far, we do not know the relative ranking of MPARSE, and ALIGN([OP, [MS). However, if we compare the alternatives *oku[busa-busa* and Ø with respect to these two constraints, the ranking becomes clear.

Tableau 5.19   /oku + bu + sa + RED/ 'to grind it$_{14}$ …'

	MPARSE	AL-L(OP, MS)
☞ a. [busa-bu$_{op}$sa		****
b. Ø	*!	

Tableau 5.19 presents evidence that MPARSE ranks above AL-L(OP, MS). Of course, we should expect it to—it is better to misalign the object prefix rather than to fail to parse the input.

In concluding this section, let us consider Tableau 5.20, which presents a fuller picture of these constraints and candidates possible for this verb.

Tableau 5.20   /oku + bu + sa + RED/ 'to grind it$_{14}$ …'

	MORPH DIS	BR-INTEG	DEP BR-μ	RED=FT	AL-LEFT	M-PARSE	AL-L(OP,MS)
☞ a. [busa-bu$_{op}$sa							****
b. [bu$_{op}$sa-busa	*!						
c. [buØ-sa				*!	**		
d. [bu-sa-sa				*!	**		
e. [bu-saya-sa			*!		**		
f. [bu-s$_1$as$_1$a-s$_1$a		*!*			**		
g. Ø						*!	

Tableau 5.20 Candidate (a) is optimal, even though the object prefix is misaligned by four segments. The alternative location for the object prefix, in Candidate (b), violates MORPHDIS. Candidates (c) and (d) have defective reduplicants—they are not feet. Candidate (e) fails due to the insertion of a mora into the reduplicant that was no present in the input. Candidate (f) fails because of its violations of BR-INTEGRITY. Lastly, candidate (g) fails because the grammar tolerates misalignment of object prefixes better than wholesale non-parsing.

5.3.6   Vowel-Initial Stems

Vowel-initial stems also undergo reduplication. The forms in (5.54) do not obey REDFT if we assume that the reduplicant is of the form VCV. The segments *ega* do not form a foot because the foot is {*kwééga*}. The onset cluster and the first mora of the syllable *kwéé* are excluded from the reduplicant. These segments correspond to the infinitival prefix *ku*, which on the surface appears as *kwμ* (with glide formation and compensatory lengthening). We assume this because these segments do appear in the base: **okwééga-kweega*.

(5.54)   o.kwé<u>é.ga</u>-ye.ga   'to learn …'

           o.kwa<u>a.ra</u>-ya.ra   'to spread out …'

           o.kwo<u>o.tsya</u>-yo.tsya   'to burn …'

           o.kwí<u>í.ba</u>-yi.ba   'to steal …'

In (5.54), the glide *y* separates the final *a* of the reduplicant from the initial *e* of the base. Observe that the epenthetic *y* is not copied into the reduplicant: **oku[yéga-yega*. Why is this alternative parse ungrammatical? It satisfies the constraints on foot form and MAXBR—all the segments in the base also appear in the reduplicant. We may note that the reduplicant in the grammatical parse, *okwéégayega*, assuming it is *ega*, is more similar to the input to the base than it is to the surface form of the base. Such a requirement would be enforced by a constraint that is a member of the DEP family of correspondence constraints. The reduplicant should not have any segments that are not in the input: DEPIR. Because the epenthetic *y* in the base does not appear in the reduplicant, we can conclude that DEPIR outranks MAXBR, which would require the [y] to appear in the reduplicant.

(5.55)   DEPIR >> MAXBR

Tableau 5.21   /oku + eg + a + RED/   'to learn …'

	DEPIR	MAXBR
☞ a. o.{kwé[<u>é.ga</u>}-ye.ga		*
b. o.ku.[{<u>yé.ga</u>}-ye.ga	*!	

Candidate (a) is optimal because the reduplicant is more faithful to the input: /oku + ég + a + RED/. One should note that the reduplicant in (a) is not a well-formed foot, i.e., either it violates constraints on foot form or it violates the constraint that the reduplicant be a foot. Again, this can be taken as evidence that the constraint DEPIR outranks the

constraint RED=FT and FTBIN. Recall that these two constraints outrank MAXBR. So, we have the following constraint ranking.

(5.56)   DEPIR >> RED=FT, FTBIN >> MAXBR

Words whose bases begin with a consonant encounter no impediment to well-formedness in DepIR:

Tableau 5.22   /oku + bar + a + RED/ 'to count …'

	DEPIR	RED=FT	FTBIN	MAXBR
☞ a. oku[{bara}-bara				
b. oku[{ba}-bara			*!	**
c. oku[ba-bara		*!		**

The constraint DEPIR only prevents the insertion of epenthetic segments into the reduplicant—segments that have no correspondent in the input. We have already seen this effect in the case of subminimal verbs. The constraint DEPIR outranks the constraints on reduplicant well-formedness because they are not sufficient to compel epenthesis. In other words, a well-formed reduplicant is not as important as preserving the faithfulness of the reduplicant to the input. This is illustrated with a vowel initial base/root in Tableau 5.23.

Tableau 5.23   /oku + eg + a + RED/ 'to teach …'

	DEPIR	RED=FT	MAXBR
☞ a.. okwe-<u>ega</u>-yega		*	*
b. oku-<u>yega</u>-yega	*!		
c. okwe-<u>ege</u>-ega	*!	*	*

The optimal candidate, (a), is superior to (b) because it does not introduce epenthetic material into the reduplicant that was not present in the base, violating DEPIR. Because of

the relatively high ranking of DEPIR the ill-formed reduplicant of candidate (a) is still better that the well-formed reduplicant of candidate (b).

Naturally, we should be concerned about the possibility that an ill-formed reduplicant can be optimal—what filters out other ill-formed reduplicants that also satisfy DEPIR? For verbs with bases that range over two syllables, the best candidate also satisfies MAXBR the most fully, as shown in Tableau 5.24.

Tableau 5.24   /oku + ara + RED/   'to spread out …

		DEPIR	RED=FT	MAXBR
☞ a.	okwa-<u>ara</u>-yara		*	*
b.	okwa-<u>a</u>-yara		*	**!*
c.	oku-<u>yara</u>-yara	*!		

Candidate (c) is immediately disqualified by its violation of DEPIR because the *y* at the beginning of the reduplicant is not present in the input. Candidates (a) and (b) both violate RED=FT, so the decision passes down the constraint MAXBR. Candidate (b) copies fewer segments from the base than does candidate (a). Thus, candidate (a) is the better parse. This accounts for shorter bases; however, there are such verbs as *okwoombera* 'to weed', which have longer bases.

Tableau 5.25   /oku + ombera + RED/ 'to weed …'

		DEPIR	RED=FT	MAXBR
☞ a.	o{kwo-<u>omba</u>}-yoombera		*	*!*
💣 b.	o{kwo-<u>ombe</u>}ra-yoombera		*	
c.	oku-{<u>yoomba</u>}-yoombera	*!		

Tableau 5.25 points out a potential problem with long vowel-initial bases. The actual grammatical candidate is (a). However, as one can see from the marks, candidate (b) fares better than (a)—candidate (b) satisfies MAXBR better because all of the segments in

the base appear in the reduplicant. In the case of consonant-initial verbs, such candidates would loose out quickly because of their violations of RED=FT and FTBIN. But, similar candidates, like (c), are not grammatical because of their violations of DEPIR.

The superiority of candidate (a) over candidate (b) can be explained if we consider the possibility of a different interpretation of RED=FT. RED=FT can be analyzed as two separate alignment constraints.[19] One requires the left edge of the reduplicant to coincide with the left edge of some foot and another requiring the left edge of the reduplicant to coincide with the right edge of the same foot.[20]

(5.57)   RED=FT $\leftrightarrow$ ALIGN-L(RED, FT$_a$) & ALIGN-R(RED, FT$_b$) & FT$_a$ = FT$_b$

The foot mentioned in each alignment parameter must be the same foot to avoid copying four syllables (i.e., two feet) from a very long base, e.g., *oku[karaanjira* 'to dry roast for'. Tableau 5.26 illustrates the evaluation of such a word in terms of the expanded notion of RED=FT.[21]

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[19] See also Chapter 4 for a discussion of the implementation of constraint conjunction.

[20] A similar solution is discussed by Downing (1994), footnote 14, as suggested by John McCarthy to her. However, the addition of the identity clause here ensures that the reduplicant is only a single foot.

[21] The ampersand (&) in Tableau 5.26 stands for conjunction of the three constraints under it. The constraint RED=FT equals the constraint conjunction of these three constraints.

Tableau 5.26   /karaanira + RED/   'dry roast over and over'

	FTBIN	RED=FT	&		
			Al-L(Red,Ft$_a$)	Al-R(Red,Ft$_b$)	Ft$_a$=Ft$_b$
☞ a. {kara}karaanjira					
b. {karaanjira}karaanjira	*!				
c. {karaa}{njira}karaanjira		*			*!
d. {karaa}nja-karaanjira		*		n!ja	

Candidate (a) is optimal, with a reduplicant that is exactly equal to a foot. Candidate (b), while passing the RED=FT constraint, fails the more highly ranked FTBIN constraint because the foot that contains the reduplicant is three syllables. Candidate (c) violates the portion of the RED=FT constraint that requires the identity for the foot to which the edges of the reduplicant are aligned. Finally, candidate (d) fails because the reduplicant is misaligned with respect to the right edge of the root. The misalignment is by three segments, which are indicated in the tableau. This interpretation allows for the evaluation of reduplicants that do not exactly fit into a foot. This is precisely the case when we consider vowel-initial roots. The reduplicant that comes closest with respect to RED=FT will be optimal. This interpretation allows for a more subtle evaluation of RED=FT. Under this construction of RED=FT, we can reevaluate Tableau 5.25 as follows, including FTBIN, which must rank above RED=FT.

Tableau 5.27   /oku + ombera + RED/ 'to weed …'

	FTBIN	RED=FT	&			MAXBR
			AL-L	AL-R	=	
☞ a. o{kwo-omba}-yoombera			***			**
b. o{kwo-ombe}ra-yoombera		*	***	*!*		
c., o{kwo-ombera}-yoombera	*!		***			*

In this tableau, we can now correctly predict the optimal candidate. Candidate (c) fails because the foot subsuming the reduplicant is three syllables long thus fatally violating FTBIN. The feet in candidates (a) and (b) are both binary. The reduplicant does not exactly match the foot edges in either candidate. However, under the interpretation of RED=FT given in (5.57) candidate (b) fails because it ends up violating RED=FT because of its more serious misalignment with respect to the foot. It violates the ALIGN-RIGHT(RED,FT) portion of the RED=FT macroconstraint because the segments *ra* of the reduplicant extent beyond the right edge of the reduplicant. Candidates (a) and (b) both have violations of ALIGN-LEFT(RED,FT) but because they have the same number, they tie and do not count for a violation. It is the ALIGN-RIGHT(RED,FT) violation in candidate (b) that causes it to fail RED=FT. Candidate (a) comes as close as possible to satisfying RED=FT and is the optimal parse.

5.3.6.1   Onsets and Reduplication of Vowel-Initial Verbs

Unlike the infinitive reduplicants, there are cases when reduplicants are well-formed because of epenthesis, despite DEPIR. Consider the third person singular forms of reduplicated verbs in the yesterday past tense:

(5.58)	a[yega-yejíre	's/he learned …'
	a[yeta-yetsíre	's/he called …'
	a[yita-yitsíre	's/he killed …'

In (5.58), a glide appears both between the reduplicant and the base and between the reduplicant and the subject prefix *a*-. This is evidence that the Onset constraint is ranked above the constraint against inserting segments, DEPIR. When the reduplicant was preceded by the infinitive prefix *oku*-, the high vowel could surface as a glide and allow the first vowel of the reduplicant to be part of the syllable. However, the prefix in (5.58), *a*-, cannot surface as a glide. If a glide is not introduced by GEN, the output would be **a.ega-yejíre*. So, the intrusion of a glide into the reduplicant occurs in order to avoid a fatal violation of ONSET.

(5.59)   ONS >> DEPIR >> FTBIN >> RED=FT >> MAXBR

Tableau 5.28 illustrates this ranking using the verb *okwééga* in the habitual.

Tableau 5.28   /ba + ég + a + RED/   'they learn …' (habitual)

	ONS	DEPIR	RED=FT	MAXBR
☞ a. ba[{yéga}-yega		*		
b. ba[.{éga}-yega	*!			

Candidate (a) is selected despite its DEPIR violation because the candidate (b) violates ONS, which outranks DEPIR. In other words, it is better to insert a segment than to allow an ill-formed syllable. The satisfaction of MAXBR is felicitous, but irrelevant because of the high ranking of ONS.

5.3.6.2   Prefix Exclusion in Vowel-Initial Verbs

Notice also that the reduplicant cannot copy segments from the prefix in order to avoid onset violations. Some Bantu languages allow segments from the prefixal domain (the morphemes preceding the macrostem, see Chapter 2 on verb structure) to appear in the reduplicant and the base. For example, Kihehe (Odden & Odden 1996) allows such pre-fixal material as the infinitive prefix *ku-* or *kw-* or subject prefixes to appear twice.

(5.60)   kw-[ita]-kw-[íita]   'to spill a bit'

            k-[ogopa]-k[óogópa]   'to be afraid a bit'

            n-gw-[itite]-n-gw-[iítite]   'I poured it a bit'

In (5.60), the infinitive prefix *ku-* appears twice. Similarly, the subject prefix *-n-* (first person singular) appears twice along with the object prefix *-gw-* (< /gu/). Kihehe requires the reduplicant to left-align with a syllable edge (ALIGN (RED, L, SYL, L)). However, as

the data in (5.54) above show, this requirement is not enforced in Runyankore. In fact, no prefixal material can appear in the reduplicant, even under size-duress (see Section 5.3.3 for more on minimality).

Just as the prefix could not be included in the reduplicant to satisfy minimality (see section 5.3.4.5), the infinitive prefix cannot be included in the reduplicant to satisfy constraints on reduplicant well-formedness. The first obstacle is the high ranking constraint MOPRHDIS (see (5.47)), which would mark a structure where this prefix overlapped with the reduplicant. The constraint MORPHDIS outranks RED=FT

Tableau 5.29   /oku + ég + a + RED/   'to learn …'

	MOPRHDIS	RED=FT
☞ a. o{kw-é́éga}-yega		**
b. o[kw_{pr}é́éga}-kwéega	*!	

Candidate (b) violates MOPRHDIS by having segments that correspond to two different morphemes. So, even though it violates RED=FT by misalignment, candidate (a) is optimal.

It is also possible that the one of the output parses locates the infinitive in the base and copies its segments in the reduplicant. This result is a prosodically well-formed reduplicant: candidate (b) in Tableau 5.30.

Tableau 5.30   /oku + ég + a + RED/   'to learn …'

	AL(PREFIX,R,MS,L)	RED=FT
☞ a. o{kw_{pr}[é́éga}-yega		**
b. o{[kwé́éga}-kw_{pr}éega	*!*****	

However, as this tableau demonstrates, candidate (b) seriously misaligns the prefix: the prefix should be prior to the macrostem. Because AL(PREFIX,R,MS,L) outranks RED=FT

it is worse to misalign the prefix than it is to misalign the reduplicant within a foot. So, candidate (a) wins despite its misaligned reduplicant.

5.3.6.3   The Reflexive

Many verbs with a verb stem longer than VCV seem to include the vowel *e* as the first vowel of the stem. This vowel can be identified with the reflexive affix *-e-*. Thus, it is omitted and the reduplicant will copy from the first consonant ignoring the first vowel as in (5.61).

(5.61)   a.   ay-e[<u>yama</u>-yamwiíre   's/he yawned …'

           ay-e[<u>sherá</u>-sherecire   's/he hid …'

           a-ye[<u>shonga</u>-shongoíre   's/he sang …'

           a-ye[<u>cama</u>-camúra   's/he gets excited …'

     b.   okw-éé[<u>shonga</u>-shongora   'to sing …'

           okw-éé-[<u>cura</u>-cureenga   'to be busy …'

While not all these words have a clearly reflexive meaning, the speaker in this case seems to identify the vowel [e] with the reflexive. The words below in (5.62) include some other vowel-initial roots, beginning with all the vowels (but [u]). All of these verbs do have reduplicants that include the initial vowel of the root.

(5.62)   a-[<u>yama</u>-yamííre   's/he shouted at …'

            a-[<u>yerá</u>-yereize   's/he waved …'

            a-[<u>yeengá</u>-yeenjiire   's/he gave salt to cattle …'

            a-[<u>yená</u>-yenejeiza   's/he rekindled …'

            a-[<u>yora</u>-yorecíre   's/he showed …'

            a-[<u>yiba</u>-yibwiire   's/he removed …'

            a-[<u>yoomba</u>-yoombéra   's/he weeds …'

            a-[<u>yogá</u>-yojire   's/he bathed …'

            a-[<u>yora</u>-yorecire   's/he showed …'

    This section concludes the discussion of the prosody of reduplication in Runyankore. In the following sections, I will introduce features of the consonantal phonology that illustrate the importance of input-reduplicant constraints.

5.4   Consonantal Phonology and Reduplication

In this section, I will present two types of segmental interaction in Runyankore—palatalization and consonant mutation. Palatalization occurs whenever a velar is followed by a front vowel, *i* or *e*. Mutation refers to a morphologically conditioned set of consonantal alternations. It is limited to non-labial, non-nasal consonants preceding a small set of morphemes: the causative morpheme -*y*-, the perfective suffix, -*ire*, and the nominalizing suffix, -*i*. Note at the outset that not all instances of [i] and [y] cause consonant mutation.

5.4.1   Runyankore Consonantal Phonology

Runyankore has the following surface consonants:

(5.63) Runyankore Consonants

Labial	Coronal	Palatal	Dorsal	Glottal
p	t		k	h
b	d*		g	
f	s	sh		
v	z	zh		
		c		
		j*		
	r			
m	n	ñ	ng*	

*These sounds are probably present only on the surface.

The sounds [r], [d] and [z] are variants of one another. The glide [r] appears in intervo-calic position: *oku[rima* 'to cultivate'. The voiced stop [d] appears in post-nasal position: *okúú-n[dim-ir-a* 'to cultivate for me'. Finally, the fricative [z] appears before the mutat-ing high vowels: *oku[jeenda* 'to go' versus *a[jeenz-íre* 's/he went (yesterday)'; *oku[bara* 'to count' *a[baz-íre* 's/he counted'. The sound [j] is an allophone of [g] before front vow-els. The sound [h] surfaces as [p] when it is preceded by a nasal. There are five vowels [a e i o u]. A number of consonantal alternations may take place in Runyankore. Most of these are a species of coronalization (Hume 1994) or spirantization.

5.4.2   Coronalization of Dorsals

The dorsal stops [k] and [g] must surface as [c] and [j], respectively, when followed by a front vowel, i.e., [i] or [e][22]. For example, the suffix *-ir-*, 'for [benefactive]', forces a pre-ceding dorsal to surface as an alveopalatal affricate. This suffix does not cause mutation. Notice also that it harmonizes in height to a preceding mid vowel.

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[22] The main exception to this is the subjunctive vowel *-e*: [akaraánge] 's/he should dry roast', [ateéke] 's/he should cook'. A morpheme boundary is not sufficient to block palatalization because it *is* conditioned by the suffix *-ire*.

(5.64) a. oku-heek-a   'to carry'

            oku-heec-er-a   'to carry for'

        b. oku-shweek-a   'to cover'

            oku-shweec-er-a   'to cover for'

        c. oku-tsiindik-a   'to push'

            oku-tsiidic-ir-a   'to push for'

        d. oku-buung-a   'to set a bone'

            oku-buunj-ir-a   'to set a bone for'

        e. oku-nog-a   'to pick'

            oku-noj-er-a   'to pick for'

        f. oku-sig-a   'to leave'

            oku-sij-ir-a   'to leave for'

The verbs in (5.64) illustrate the palatalization of dorsals by a following front vowel. When a dorsal sound, [k] or [g], is followed by a front vowel, the [−anterior] value of the vowel [i] must be shared by the consonant. This is accomplished via the linking of the vocalic [Coronal, −anterior] features to the place node of the dorsal, replacing it. The resulting sound is an alveo-palatal [c] or [j].

INPUT:

```
        /k,g/                    /i/
          |                       |
        Root                    Root
          |                       |
       C-Place                 C-Place
          |                       |
       Dorsal                  V-Place
                                  |
                               Coronal
                                  |
                              [-anterior]
```

SURFACE:

```
       [č, ǰ]                    [i]
          |                       |
        Root                    Root
          |                       |
       C-Place                 C-Place
            \                     |
             \                 V-Place
              \                   |
               _____ Coronal
                                  |
                              [-anterior]
```

Figure 5.5   Coronalization of Dorsals (Clements & Hume 1995)

The constraint that requires this configuration (the shared V-Place Coronal node) will be referred to as CORONAL.

(5.65) CORONAL

*Dorsal consonant–Coronal vowel. (A dorsal sound must not be followed by a coronal vowel).

The dorsal surfaces as an alveo-palatal because the markedness constraint preferring these sounds before front vowels outranks the constraint requiring input-output faithfulness, IO-FAITH, as illustrated below. Loss of the dorsal specification from the consonant

and linking of the vowels coronal specification is the best strategy to alleviate the violation of the constraint CORONAL.[23]

Tableau 5.31   's/he dry roasted' (3S + √dry roast + PERFECTIVE)

	CORONAL	IO-FAITH
☞ a. akaraanjíre		*
b. akaraangíre	*!	

The dorsal sound /g/ must surface as [j] when followed by a front vowel. Candidate (a) obeys this constraint. Candidate (b) does not. Because this constraint outranks Input-Output Faithfulness, candidate (a) is superior to (b). Another, more restricted, type of consonant/vowel interaction takes place in Runyankore, and is discussed in the following section.

5.4.3   Consonant Mutations in the Causative and Perfective

Unlike coronalization, which is widespread and regular throughout Runyankore, the spirantization of non-labials is conditioned only by a small set of morphemes. These morphemes are the causative[24] *y*, the perfective suffix *-ire*, and the nominalizing suffix *-i* (e.g., √*kor* 'work', *omukozi* 'worker'). Historically, all three had the superhigh vowel *$*i̧$. Runyankore no longer contrasts the Proto-Bantu superhigh vowels, *$*i̧$ and *$*u̧$, with the high vowels (i.e., they have merged to [i] and [u], respectively). However, the spirantizing effects of the superhigh vowels persist in Runyankore. Because the high front vowel [i] in these three spirantizing affixes is the same as a nonspirantizing [i], we must resort to a morpho-phonological constraint that requires these sounds to surface as coronal fricatives when followed by the vowel [i] in one of these morphemes. First, let us consider the actual consonantal alternation conditioned by these morphemes.

---

[23] Thank to E. Hume for her suggestions toward simplifying this constraint.

[24] The effect of this morpheme is to change an intransitive verb to a transitive verb and a transitive verb to a causative verb. "Causative" is its usual designation in Bantu studies.

(5.66) Consonant mutations induced by the morpheme [-ire]

t → s	a[huut + ire		a[húús-ire	's/he slurped' (yest.)
r → z	a[bar + ire		a[baz-íre	's/he counted
sh → s	a[héesh + ire	→	a[hees-íre	's/he forged'
zh → z	a[beizh + ire		a[béíz-ire	's/he carved'
k → c	a[heek + ire		a[hééc-ire	's/he carried'
g → j	a[híing + ire		a[hiinj-íre	's/he cultivated'

The data in (5.66), illustrate the spirantizing effect of the perfective on coronals. The first generalization that appears is that the target is coronal sounds and the result (output or surface form) is either [s] or [z], depending on the voicing of the input segment. Dorsal sounds surface as palatals. As we will see shortly, this is necessary to satisfy CORONAL. The first two sounds in question may seem less like a natural class until one considers the fact that [r] and [d] are positional variants of each other.[25]

While the vowel [i] of the perfective is moraic, the causative morpheme appears to lack syllabic weight (no examples of vowel lengthening induced by this morpheme have been found). Its effects are slightly different.[26]

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[25] The sound [d] only appears after a stop and alternates with [z] in the same way that [r] does: *okujéenda* 'to go', *ajeenzíre* 's/he went'

[26] The sounds [sh], [zh],and [c] do not participate in this process because of suppletive principles that substitute the alternative causative affix [-is-]: *oku[beizh-is-a* 'to cause to carve', *oku[raash-is-a* 'to cause to shout', *oku[cac-is-a* 'to cause to mince'.

(5.67) Consonant mutations induced by the causative

t → s	oku[haata + y		oku[haasya	'to cause to peel'
r → z	oku[bara + y		oku[baza	'to cause to count'
k → s	oku[hika + y	→	oku[hisya	'to cause to arrive'
g → z	okw[ooga + y		o[kwoozya	'to wash (tr.)'
h → s	oku[taaha + y		oku[taasya	'to cause to enter'

The coronal consonants [t] and [r] spirantize as with *-ire*. However, the dorsal sounds [k] and [g] become palatalized coronals. Why do they not become [c] and [j]? The coronalization constraint refers only to front vowels. The causative is analyzed as the glide [y]. There is no evidence that the causative is /i/ or has a mora associated with it. Because of this, coronalization ignores the combination of a dorsal sound and the causative. However, spirantization does not ignore this combination.

Ignoring for the moment the regular process of coronalization of dorsals, we can state the generalization about the forms in (5.66) and (5.67) as "coronal sounds should surface as fricatives before *-ire*." The constraint responsible for this is given in (5.68).

(5.68) SPIRANTIZE

A non-labial non-nasal in the input should be pronounced as a [+anterior] fricative when followed by *y* causative, *-ire* perfective, or *-i* agentive.

The coronal sounds [t] and [r] both spirantize. The alveopalatal fricatives [š] and [ž] become [s] and [z]. The dorsal sounds [k] and [g] also fall within the domain of SPIRANTIZE. However, they are also within the domain of CORONAL. Recall that CORONAL involves front vowels, while SPIRANTIZE refers to the specific set of morphemes. By ranking CORONAL above SPIRANTIZE we can force regular coronalization of dorsals before *-ire* and still have SPIRANTIZE'd dorsals before the causative glide *y*. Both constraints must outrank IO-Faithfulness to compel these surface alternations.

Tableau 5.32   /a + karang + ire/   3s + √dry roast + PERF   's/he has dry roasted'

	CORONAL	SPIRANTIZE	IO-FAITH
☞ a. a[karaanjíre		*	*
b. a[karaangíre	*!	*	
c. a[karaansíre	*!		*

Tableau 5.33   /oku + hik + y + a/   'to cause to arrive'

	CORONAL	SPIRANTIZE	IO-FAITH
☞ a. oku[hisya			*
b. oku[hicya		*!	*
c. oku[hikya		*!	

Tableau 5.32 and Tableau 5.33 illustrate the priority of coronalization over spirantization. By outranking SPIRANTIZE, the constraint CORONAL forces a dorsal sound to surface as a coronal spirant and not as an alveolar affricate. In Tableau 5.33, neither candidate violates CORONAL because the constraint refers only to front vowels. Candidate (b) fails the higher ranked SPIRANTIZE because it has an alveo-palatal sound.

There is one combination of sounds that results in a type of fusion: [r + y] surfaces as [z], not [zy]. There is no surface prohibition on [zy] combinations: e.g., *okwoozya* 'to wash (tr.)'. The preceding [zy] combination is also the result of a causative-induced spirantization. Just in this case of [r] + Causative do we find coalescence of the /r/ and the /y/. In fact, [ry] does occur in Runyankore.

(5.69)   okúrya   'to eat'
            obúryo   'justice'
            eryóoya   'feather'
            eryoocezo   'oven'

The combination [zy] is basically restricted to [g]s preceding the causative [y], with a few other words possible.

(5.70)   okwoozya   'to wash (tr.)'   ← √og 'wash (i.)'

           okuzhwaanzya   'to mix (tr.)'   ← √zhwaang 'mix (i.)'

           okunózya   'to crush (tr.)'   ← √nog 'crush (i.)'

           nyoomweebazyo   'yesterday'

           omushwáanzya   'a cheat' (n.)

With these other combinations possible, it appears that the fusion must be a result of the sound [r] combining with the causative, [y]. Just like spirantization, this is a morphologically conditioned fact and not a general phonological alternation in the language. In order to account for this in a systematic way within Optimality Theory, we must be able to formulate a correspondence constraint that looks something like (5.71). I will use the notation '$z_{\{r+y\}}$' to indicate the input correspondents to a segment.

(5.71) FUSE[ry]

$$/r + y_{causative}/ \Leftrightarrow [z_{\{r+y\}}]$$

In other words, /r/ plus /$y_{causative}$/ in the input corresponds to [z] in the output, abbreviated as FUSE[ry]. The segment [z] in the output represents the fusion of the [r] and the [y] of the input. We cannot have a blanket prohibition on the sequence [zy] on the surface because such forms exist. In a procedural model, fusion could take place after spirantization, but even then, we would need to remember that the [z] being fused with [y] was originally an [r]. The constraint FUSE[ry] penalizes anything that was [r] + [y]$_{causative}$ in the input that is not [z] on the surface.

The constraint FUSE[ry] must outrank UNIFORMITY for the fusion to be grammatical. Recall that the UNIFORMITY family of constraints penalizes all types of fusion and coalescence.

229

(5.72) UNIFORMITY

"No Coalescence". No element of S_2 has multiple correspondents in S_1. For x,
y ∈ S_1 and z ∈ S_1, if xℜy and yℜz, then x=y. (McCarthy & Prince 1995, p. 371)

This particular instance of fusion must be allowed in the language. Notice also that
FUSE[ry] does not violate MAX because there *is* a correspondent to *y* on the surface. This
is precisely why it violates UNIFORMITY, which penalizes an element in the output with
multiple correspondents in the input (IO-UNIFORMITY to be precise). This ranking is il-
lustrated in Tableau 5.34.

Tableau 5.34   /oku + bar + y + a/   'to cause to count'

	FUSE[ry]	UNIFORM
☞ a. oku[baz$_{\{r+y\}}$a		*
b. oku[barya	*!	

5.4.4   The Position of Glides within the Verb

The causative [y] has another property that is relevant to reduplicative identity—the glide
always appears just after the last consonant of the verb. We shall see below, in §5.5.2,
that this will be relevant in the discussion of the reduplicated forms of these words. The
causative *y* always tries to stay near the right edge of the word, as shown by the infinitive
and perfective forms of the verb in (5.73). The perfective [-ire] becomes [-ize] because of
the causative—[-ir-y-e] → [-ize].

(5.73)   oku[reeb-y-a   'to betray'   a[rééb-ize   's/he betrayed'

            okw-éé[taas-y-a   'to intrude'   ayee[tááh-ize   's/he intruded'

            oku[roob-y-a   'to wet down'   a[roob-íze   's/he wet down'

The passive morpheme, *-w-*, also behaves in this fashion.

(5.74)   a. oku[reeb-<u>w</u>-a   'to be seen'

             a[rééb-ir-<u>w</u>-e   's/he was seen'

         b. oku[káraang-<u>w</u>-a   'to be dry roasted'

             bi[karaanj-ír-<u>w</u>-e   'they$_8$ were dry roasted'

         c. oku[biingwa   'to be driven away'

             e[biinj-ír-<u>w</u>-e   'it$_9$ was driven away'

Hyman (1995) reports a similar phenomenon in Cibemba, a Bantu language spoken in Zambia. In Cibemba, the causative and passive morphemes also appear at the edge of the word, as shown in the data from Hyman in (5.75). The first column represents the passive form of the stem and the third column, the passive perfective (*-ile*).

(5.75)   cít-w-a   'be done'   cít-il-w-e

            fúl-w-a   'be forged'   fúl-il-w-e

            tém-w-a   'be cut'   tém-el-w-e

The causative morpheme *y* behaves the same way. The forms in parentheses in (5.76) are the phonetic form—the combination of the causative with the perfective results in [sh].

(5.76)   kúm-y-a   'touch'   kum-is-y-e   (kum-ish-e)

            luf-y-a   'lose'   luf-is-y-e   (luf-ish-e)

            lis-y-a   'make cry'   lis-is-y-e   (lish-ish-e)

            saam-y-a   'make sparkle'   saam-is-y-e   (saam-ish-e)

Odden (1996a) also reports a similar phenomenon within Kikerewe:

(5.77)   ku-bóhw-a   a-boh-íl-w-é   'he was tied'

            ku-lihw-a   a-lih-íl-w-é   'he was paid'

            ku-kúgw-a   a-kug-íl-w-é   'he was found'

            ku-manyw-a   a-many-íl-w-é   'he was known'

Given this, we can generalize a constraint aligning a glide with the left edge of the verb.

(5.78) ALIGN(GLIDE, RIGHT, WORD, RIGHT)

       Align the right edge of a glide with the left edge of the word. AL(GLIDE,R)

However, not every glide appears at the edge of the word; the main exception involves high vowels that surface as glides because of glide formation. These glides do not shift away from their original position.

(5.79)   okucúmura   acum<u>wi</u>íre   'be disobedient'

            okucúúndagura   acuundag<u>wi</u>íre   'to shake repeatedly'

            okweehámura   ayeham<u>wi</u>íre   'to yawn'

            okugabura   agab<u>wí</u>ire   'to serve, feed'

            okuhabura   ahab<u>wí</u>ire   'to advise, guide'

            okukúura   ak<u>wi</u>íre   'to weed, pull out'

            okushaaruura   asháár<u>wi</u>ire   'to complete a harvest'

The verbs in (5.79) illustrate the appearance of the glide *w* in word-medial position. Yet, we have already seen that some glides shift toward the end of the word. Why should some and not others? One difference between these glides may account for this distinction. The glides that shift are morphemes of a single segment. On the other hand, the glides that do not shift are just one segment in a larger morpheme. Some aspect of linear

ordering permits glide morphemes to shift while forcing glides that are part of a larger morpheme to stay put. We will see below that it *is* necessary to order the causative morpheme with respect to the other morphemes in the input.

One issue remains: why does the glide not appear in absolute final position? It is generally true in Runyankore that there are no long vocoids at the edge of a word. This fact is captured by the constraint *VV], originally given in (5.37). The optimal output locates the glide one segment to the left of the right word edge in order to avoid violating *VV]. This means we have the following ranking.

(5.80)   *VV] ≫ ALIGN(GLIDE,R)

The ranking in (5.80) will ensure that a glide will be as close to the right edge of the word as possible without actually being at the right edge. This ranking is illustrated in the following tableau.

Tableau 5.35   /a + reeb + w + ire/   's/he was seen'

	*VV]	AL(GLIDE,R)
☞ a. a[rééb-ir-w-e		*
b. a[rééb-w-ire		**!*
c. a[rééb-ire-w	*!	

The optimal candidate in Tableau 5.35 locates the glide one segment to the left of final position. Placing the glide in final position violates *VV] and is fatal, as in candidate (c). Placing the glide anywhere else in the word creates excess marks under ALIGN-LEFT(GL, WD), as in candidate (b).

Finally, in this section, we must consider the cases where the effect of the glide appears on the surface, but the glide itself has been obscured because of fusion. Consider the following cases of causatives of [r]-final verb roots.

(5.81)   oku[baza ← oku + bar + y + a   'to cause to count'

          oku[guza ← oku + gur + y + a   'to cause to buy' (i.e., sell)

          oku[kúza ← oku + kur + y + a   'to cause to grow up' (i.e., rear)

          oku[zwáaza ← oku + zwár + y + a   'to dress (tr.)'

In each of the verbs in (5.81), the glide from the input has fused with the final [r] of the verb root. Because of this, there is no violation of the glide alignment constraint. The evaluation of one of these forms is given in Tableau 5.36.

Tableau 5.36   /...bar + y + a/ 'cause to count'

	*VV]	AL(GLIDE, R)	FUSE[ry]	UNIFORM
☞ a. -baz$_{\{r+y\}}$a		*		*
b. -baray	*!			
c. -barya		*	*!	
d. -bayra		**!		

Candidate (b) violates *VV] and is immediately removed from consideration. Candidates (a), (c), and (d), all compete based on the alignment of the glide [y] and its interaction with the [r] of the root √*bar*. Candidates (c) and (d) have two violations of AL(GLIDE, R) and FUSE[RY] while candidate (a) has only one. As we shall see more clearly below, it is necessary to evaluate the glide alignment constraint with respect to the position of the surface glide and its surface correspondents—hence the bracketed subscript notation on the last [z] of candidate (a). It is necessary to know where the [z] comes from to evaluate candidates.

While it is difficult to see, *VV] must outrank UNIFORMITY. If it did not, the violation of UNIFORMITY posed by the fusion candidate (candidate (a) in Tableau 5.36) would mean that the optimal candidate would be (b), -*baray*. In other words, it is not the case the one can have a word-final glide to prevent a violation of UNIFORMITY.

With this background in place, we may now examine the interaction of two mor-
phemes that give rise to coronalized and spirantized segments: the causative and the per-
fective. It is specifically in these cases where the necessity of correspondent alignment
becomes clear.

5.4.5   Consonant Alternations in the Causative Perfective

The combination of the causative and the perfective morpheme creates some unexpected
results. Remember that both morphemes condition spirantization and that the perfective
morpheme, *-ire*, also conditions the regular appearance of alveo-palatals on the surface.
In the verb forms in (5.82), the *y* of the causative can be seen in second-to-last position
fused with the *r* of the perfective in the yesterday past tense.

(5.82)   a. oku[baza ← bar+y+a   'to make count'

             a[bar-íze ← a+bar+ir-y-e   's/he made count (yesterday)'

         b. oku[sháza ← shar+y+a   'to slice with'

             a[shar-íze ← a+shar+ir-y-e   's/he sliced with'

         c. oku[heza ← her+y+a   'to finish (tr.)'

             a[her-ize ← a+her+ir-y-e   's/he finished (tr.)'

Notice that the final /r/ of these roots fails to surface as [z] despite SPIRANTIZE. The sound
/r/ never appears as [z] before the perfective plus causative morpheme combination, *-ize*.
The surface form always ends with *-rize* and not *-zize*. A sequence like [ziz] is a viola-
tion of a species of the OCP. I will account for this using a constraint against these sorts
of sequences: OCP-Z.[27]

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[27] Whether this represents a general constraint in Runyankore is open to debate. There is
a small set of words in Taylor's dictionary that contain the string [ziz]: *ecizizi* 'phlegm',
okuziza 'to forbid', *omuzizi* 'repulse; a day's work'. In fact, *okuziza* appears to be related
to the word *okuzira* 'to be taboo' by causativization via *-y-* (← *oku-zir-y-a*). The root √*zir*
derives from the proto-Bantu Root *gįl (cf. Meinhof & Warmelo 1932); *gį > zi in Run-
yankore. However, there would be no alternation in the root-initial consonant now. This
spirantization is historical and not part of the synchronic grammar. There is no reason to
suppose that the speaker would postulate /rir/ as the underlying representation (in fact,

(5.83) OCP-z

     The sequence [ziz] is marked.

The constraint OCP-z will penalize the sequence *-ziz* and prevent forms like **abazize* from appearing on the surface. Because it specifically prevents SPIRANTIZE from ruling out a parse, OCP-z must outrank SPIRANTIZE.

Tableau 5.37   /...ire + y/   Perfective + Causative

	OCP-z	SPIRANTIZE
☞ a. -rize		*
b. -zize	*!	

Even though candidate (a) in Tableau 5.37 fails SPIRANTIZE, it superior to candidate (b), which violates OCP-z.

    At this point, we may reprise the issue of alignment of correspondents. Recall that the constraint AL(GLIDE, R) must be evaluated with respect to surface correspondents and not just literal copies of a segment. This is so because we must be able to tell which segment has been fused with the causative *-y-*. Consider Tableau 5.38. The candidates locate the fused correspondent of the input /r+y/ in two possible locations to demonstrate the ranking of the glide alignment constraint, the OCP-z constraint and the fusion constraint with respect to the Spirantize constraint.

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the root √*rir* means 'cry'). Perhaps there is a morphological restriction on the number of times spirantization can take place in a verb. Nevertheless, it is still a true generalization that a word may contain two morphologically conditioned spirantizations. The perfective form of this root is given as *-zirize* which shows the lack of spirantization on the root-final consonant *r*.

Tableau 5.38   -ire + y   Perfective + Causative

	AL(GLIDE, R)	FUSE[ry]	OCP-z	SPIR
☞ a. -riz$_{\{r+y\}}$e	*			*
b. -ziz$_{\{r+y\}}$e	*		*!	
c. -rirye	*	*!		*
d. -z$_{\{r+y\}}$ire	**!*			

As one can see, the top three constraints in Tableau 5.38 are not ranked with respect to one another. However, they do outrank SPIRANTIZE. The optimal candidate misaligns the glide correspondent by one segment, but obeys fusion and OCP-z. Candidate (d) seriously misaligns the glide correspondent and fails on that count; Candidate (c) does not obey fusion. Candidate (b), while just as good as candidate (a) in alignment and fusion violates OCP-z which forbids the sequence *-ziz*. Notice that candidate (b) does obey SPIRANTIZE while candidate (a) does not. The top three constraints are not ranked here and may not be rankable with the data that are available within the study of reduplication. We should also note that FUSE[ry] outranks MOPRHDIS. Otherwise, the fusion of the perfective *-ire* and the causative *y* could not occur.

Thus far we know the following ranking information:

(5.84)	CORONAL ≫ SPIRANTIZE ≫ IO-FAITH	Tableau 5.32,
		Tableau 5.33
	FUSE[ry] ≫ UNIFORMITY	Tableau 5.34
	*VV] ≫ AL(GLIDE, R)	Tableau 5.35
	OCP-z ≫ SPIRANTIZE	Tableau 5.37

Using the rankings in (5.84), let us evaluate a verb with an *r*-final root in the causative perfective.

Tableau 5.39   /a + bar + y + ire/   's/he caused to count'

	*VV]	AL(GLIDE, R)	OCP-z	SPIR	UNIFORM
☞ a. a[bar-iz$_{\{r+y\}}$e		*		*	*
b. a[baz- iz$_{\{r+y\}}$e		*	*!		*
c. a[baz$_{\{r+y\}}$-ire		**!*			*
d. a[baz-ire-y	*!				

Alignment constraints eliminate the misaligned glides of candidates (c) and (d). Candidate (b) violates OCP-z, which outranks SPIRANTIZE. Finally, despite one alignment violation and a violation of SPIRANTIZE and UNIFORMITY, candidate (a) emerges as the best parse of the input. In Tableau 5.39, we have ignored the constraint CORONAL because it would not have played a significant role in the evaluation of the candidate parse for the input provided. However, let us consider verbs with a dorsal segment as the final consonant of their root.

(5.85)   a.   oku[ramusya ← ramuk + y + a   'to greet'
             a[ramuc-ize ← ramuk + y + ire   's/he greeted' (yesterday)
       b.   oku[nózya ← nóg + y + a   'to beat up, thrash'
             a[noj-íze ← nóg + y + ire   's/he beat up, thrashed'

The input to the macrostem (left of the right bracket) is given to the right of the verb. Observe that in the infinitive, the causative forces spirantization of the dorsal stop, [k] or [g]. However, in the yesterday past, the [i] or the morpheme *-ire* forces these dorsal sounds to surface as alveo-palatals. This is forced by CORONAL, which you will recall outranks SPIRANTIZE. Finally, the causative shows itself in the fusion of /r/ and /y/ giving [z] on the surface. We can evaluate a form like (5.85a) in the following tableau, which is similar to Tableau 5.39, but includes the constraints CORONAL and IO-IDENT.

Tableau 5.40   /a + ramuk + y + ire/   's/he greeted'

	*VV]	AL(GLIDE, R)	FUSE[ry]	OCP-z	UNIFORMITY	CORONAL	SPIRANTIZE	IO-ID
☞ a. -uc-iz$_{\{r+y\}}$e		*			*			**
b. -uk-iz$_{\{r+y\}}$e		*			*	*!		*
c. -uc-irye		*	*!				*	*
d. -uc-irey	*!							*

The first fact apparent from Tableau 5.40 should be that the constraint OCP-z does not affect the outcome in anyway, given these candidates. Candidate (d) fails immediately because it violates *VV], by having a long vocoid at the end of the word. Candidates (a)–(c) all have one violation each of the glide alignment constraint, so the decision passes down the hierarchy. Candidate (c) failed to fuse the [r] and the causative -*y*- and this extra mark disqualifies it. In passing FUSION, both (a) and (b) violate UNIFORMITY. But, the final blow to candidate (b) is its failure to have a alveo-palatal before the vowel [i], violating CORONAL. Thus, candidate (a) is optimal. Candidate (a) has at least two violations of IO-ID but this constraint is ranked sufficiently low so as to be irrelevant.

This exploration into the realm of morphological consonant-vowel interaction has now laid the groundwork for an exploration of the interaction of these effects and reduplication discussed in the next section.

5.5   Base-Identity, Input-Identity and Reduplication

Finally, we can consider the relationship between the base and the reduplicant in instances when there is a causative morpheme -*y*- present. The important issue under consideration here revolves around the question of reduplicant and base identity. What is the relationship of identity that holds between the reduplicant, the input and the base?

239

5.5.1   Input-Reduplicant Faithfulness

What we find in Runyankore is that the reduplicant tends to resemble more closely the input and not the surface form of the base in the reduplicated form. The data presented thus far tend to obscure this fact owing to the similarity between the input and the base. However, if we consider verb forms exhibiting a large divergence between the input and the base, we will discover that the reduplicant tends to conform more closely to the input while the base diverges from the input. In the reduplicated words in (5.86), the reduplicant (underlined) resembles more closely the stem of the infinitive—palatalization and mutation effects are not copied from the base.

(5.86)   a. oku[heeka   'to carry'
             akáá[heec-ire   'he should carry'
             akáá[heeka-heec-ire   'he should carry …'
         b. oku[bara   'to count'
             a[baz-íre   's/he counted (yesterday)'
             a[bará-baz-ire   's/he counted …'
         c. oku[huuta   'to drink from a bowl'
             a[húúts-ire   's/he drank from a bowl (yesterday)'
             a[húúta-huuts-ire   's/he drank from a bowl …'
         d. oku[jeenda   'to go'
             a[jeenz-íre   's/he went (yesterday)'
             a[jeendá-jeenz-ire   's/he went …'
         e. oku[kwaata   'to catch'
             a[kwaas-íre   's/he caught (yesterday)'
             a[kwaata-kwaas-íre   's/he caught …'

This suggests that the constraint ranking is such that the phonotactic constraints responsible for selecting coronalized or spirantized forms of consonants (CORONAL or SPIRANTIZE) must rank above the constraints requiring base-reduplicant identity. Because

240

of this ranking, the base undergoes consonant mutation or coronalization and need not be identical to the reduplicant. The constraint requiring faithfulness to a base form must rank above the base-reduplicant identity constraints. Because we must compare the reduplicant with the input base, the relevant constraint is a member of the I(nput)-R(eduplicant)-Faithfulness family.

(5.87) INPUTREDUPLICANT-FAITHFULNESS ≫ BASEREDUPLICANT-IDENTITY

In other words, it is more important for the reduplicant to resemble the input than it is for the reduplicant to be like the base. This is illustrated in Tableau 5.41.

Tableau 5.41   /a + jeend + ire + RED/   'he went …'

	IR-FAITH	BR-IDENTITY
☞ a. a[jeendá-jeenz-ire		*
b. a[jeenzá-jeenz-ire	*!	

The optimal candidate in Tableau 5.41 is the one which most closely resembles the input, /jeend/. The spirantizing effects of the perfective morpheme cannot be copied into the reduplicant because of this fact. Similarly, the coronalized dorsals in the base cannot be copied into the reduplicant. Consider the reduplicated verbs in (5.88).

(5.88)   a[hééka-heec-ire   's/he carried …'
             a[teeka-teec-íre   's/he cooked …'
             a[sheká-shec-ire   's/he laughed …'
             a[yega-yej-íre   's/he taught …'

Each of these verb roots ends in a dorsal sound, /k/ or /g/. The base has a coronalized sound, [c] or [j], required by CORONAL and the following front vowel in *-ire*. However, the dorsal sound is retained in the reduplicant. The constraint requiring the coronalization

of dorsals followed by a front vowel must rank above the constraint requiring base-reduplicant identity. This is illustrated below in Tableau 5.42, where CORONAL ranks above BR-IDENTITY.

Tableau 5.42   a - RED - heek - ire   's/he carried …'

	CORONAL	BR-IDENTITY
☞ a. a[heeka-heec-ire		*
b. a[heeka-heek-ire	*!	

The reduplicant in the optimal candidate in Tableau 5.42 must obey the constraint CORONAL despite the fact that the result is a violation of base-reduplicant identity.

The constraints IR-FAITH and CORONALIZE must both outrank the constraint requiring base reduplicant identity, BR-ID. However, they cannot be ranked with respect to each other as shown by Tableau 5.43 where the optimal form violates neither.

Tableau 5.43   /a + heek + ire + RED/   's/he carried …'

	IR-FAITH	CORONAL	BR-IDENTITY
☞ a. a[heeka-heec-ire			*
b. a[heeka-heek-ire		*!	
c. a[heeca-heec-ire	*!		

The constraints on reduplicant form and location along with the constraint requiring spirantization both outrank the constraints on base-reduplicant faithfulness. This is illustrated in Tableau 5.44.

Tableau 5.44   /a + jeend + íre + RED/   's/he went …'

	SPIRANTIZE	IR-FAITH	BR-IDENTITY
☞ a. a[jeendá-jeenz-ire			*
b. a[jeenzá-jeenz-ire		*!	
c. a[jeendá-jeend-ire	*!		

Although candidate (a) violates the constraints on base-reduplicant identity, it satisfies the higher ranked constraints SPIRANTIZE and the constraint on input-reduplicant faithfulness. Candidate (b) copies the spirantized segment [z] of the base in the reduplicant—satisfying BR-ID. However, IR-FAITH outranks BR-ID. Because the reduplicant has a segment with a feature value different from the input, it incurs a violation here and fails. Candidate (c) satisfies both IR-FAITH and BR-ID but fatally fails to show spirantization of the segment [d], failing SPIRANTIZE.

Tableau 5.44 tells us that reduplicant resists the copying of features that appear in the base caused by the consonant-mutating effects of the [i] of the perfective suffix *-ire*. For this reason, the constraint requiring input-reduplicant faithfulness ranks higher than the constraints requiring faithfulness between the reduplicant and the surface form of the base. In a theory of ordered derivational rules, the reduplication would precede any phonological interaction between the high vowel and preceding consonants. Lastly, consider the reduplicated form of the verb *okureenjeza* 'to wink at, hint', given in (5.89).

(5.89)   oku[reenjeza   'to wink at, hint'
            /oku + √reng + er + y + a/
            oku[reenga-reenjeza   'to wink at, hint …'

Here is an example of palatalization occurring within a verb root because of a front vowel. The underlying form of the root is √*reng*. The reduplicated form demonstrates this. Without the front vowel *e*, there is nothing in the reduplicant to force coronalization.

5.5.2   Single-Segment Morpheme Copying: Causative Complexities

The addition of the causative morpheme to the verb creates an additional level of complexity in the relationships between the input, the output and the reduplicant. We would expect, given the results seen above (especially in Tableau 5.44) to find that the causative morpheme simply appears at the right edge of the word and that there is no copying of it in the reduplicant. However, the system is more complicated than that. Consider the following reduplicated verbs that also involve the causative morpheme *y* in (5.90).

(5.90)   a.   oku[taaha   'to enter'
              oku[taas-y-a   'to bring in'
              oku[<u>taasya</u>-taas-y-a   'to bring in …'

         b.   okw[óoga   'to wash'
              okw[óoz-y-a   'to wash (tr.)'
              okw[<u>óózya</u>-yooz-y-a   'to wash … (tr.)'

These data illustrate the appearance of the spirantizing effect of the causative in the reduplicant. However, we are not witnessing merely the copying of the surface form of the base in the reduplicant. Consider the following forms of verbs in the yesterday past tense, which have the morpheme *-ire*.

(5.91) a. oku[guza ← gur+y+a   'to sell' ('cause to buy')

         a[gur-íze   's/he sold'

         a[<u>guzá</u>-gur-ize   's/he sold …'

     b. oku[hika   'to arrive'

         oku[his-y-a   'to cause to arrive'

         a[hic-íre   's/he arrived'

         a[<u>hiká</u>-hic-ire   's/he arrived …'

         a[<u>hisyá</u>-hic-ize   's/he caused to arrive …'

     c. okwo[osya ← (ok + y + a)   'to roast, burn'

         okwo[<u>osya</u>-yosya   'to roast …'

         a[yoc-íze   's/he roasted'

         a[<u>yosyá</u>-yoc-ize   's/he dry roasted …'

In (5.91a), the reduplicant is [guza] even though the corresponding input is [guri]. The [z] is the result of the fusion of the causative and the final [r] in the reduplicant. It could be viewed as the product of SPIRANTIZE. However, SPIRANTIZE is a surface constraint that makes no reference to the input. On the surface, the last [r] of the reduplicant is followed by the vowel [a], which is not spirantizing. Consider also (5.91b), where the past tense form of arrive is *a-hiká-hicira* but the causative past is *a-hisyá-hic-ize*. Here, the [sy] in the reduplicant is clearly not a copy of the alveo-palatal [c] from the base. In fact, the appearance of [sy] is conditioned by the addition of the causative morpheme *-y-* to the verb. Something compels the copying of the causative into the reduplicant. The constraint responsible for enforcing copying between the input and reduplicant could ensure that as much from the input is copied as possible, within the constraints of RED=FT and FTBIN. The constraint MAXIR is responsible for the copying of the causative, not MAXBR. As we have seen, the causative, or its correspondent, is no longer adjacent to the last corresponding segment in the base on the surface. The optimal form copies the input most closely: IR-FAITHFULNESS ranks higher than BR-FAITHFULNESS. For the spirantization effect to surface, MAXIR and SPIR must outrank IR-FAITH. In other words, we must ensure that as much as possible is copied from the base and that it be subject to SPIRANTIZE.

245

Tableau 5.45   /a + hik + y + ire + RED/   's/he caused to arrive …'

	MAXIR	SPIRANTIZE	IR-FAITH
☞ a. a[hisya-hic-iz_{r+y}e	re		*
b. a[hikya-hic-iz_{r+y}e	re	*!	
c. a[hica-hic-iz_{r+y}e	rey!		
d. a[hika-hic-iz_{r+y}e	rey!		

As Tableau 5.45, illustrates, MAXIR and SPIR must outrank IR-FAITH. Candidates (a) and (b) sustain two violations each of MAXIR because we cannot exceed a foot in the reduplicant. However, candidates (c) and (d) fail to copy the causative *y* in the reduplicant, incurring an extra MAXIR violation. Finally, candidate (b) fails next to (a) because it violates SPIRANTIZE.

When we add the conditions that the reduplicant be a foot, that feet be binary and that the reduplicant end in the vowel a we have the following, fuller tableau.

Tableau 5.46   /a + hik + y + ire + RED/   's/he caused to arrive …'

	REDFV	RED=FT	FTBIN	MAXIR	SPIR	IRFAITH
☞ a. a[<u>hisya</u>-hic-iz_{r+y}e				**		*
b. a[<u>hikya</u>-hic-iz_{r+y}e				**	*!	
c. a[<u>hikyi</u>-hic-iz_{r+y}e	*!			**	*	
d. a[{<u>hici</u>}<u>ze</u>-hic-iz_{r+y}e	*!	**				
e. a[{<u>hicize</u>}-hic-iz_{r+y}e	*!		*			
f. a[<u>hika</u>-hic-iz_{r+y}e				***!		*

Remember that MAXIR compels the copying of as much from the base as possible. The optimal candidate in Tableau 5.46 has copied the segments [h-i-k-y-i]. Candidate (c) has

copied all these segments, but because the last vowel of the reduplicant is not [a], it cannot be optimal (despitse passing input-reduplicant faithfulness). Candidates (c)–(e) also violate various constraints on reduplicant well-formedness and are disqualified early on. Candidate (f) did not copy the segment [y] from the base. Thus, it has one more mark under MAXIR than does candidate (a). Finally, comparing candidates (a) and (b) reveals that SPIRANTIZE must be obeyed by all correspondents of the causative *-y-*.

One may object to the ordering of the causative morpheme after the root in the input that is implicit in this analysis. However, there is evidence that the causative *-y-* must be within the range of segments copied—there is no long distance copying of this segment. If the causative (or its effects) could be copied long-distance, we would expect to find evidence of the causative even in reduplicants of verbs longer than CVCV, such as those in (5.92)

(5.92)   a. oku[ramutsya ← ramuk + y + a   'to greet'
             a[ramá-ramucize ← ramuk + y + ire   's/he greeted …'
         b. oku[futanwa ← futan + w + a   'to be chewed'
             oku[futa-futanwa   'to be chewed …'

Notice, however, that the reduplicants in these verbs show no evidence of the causative or the passive morpheme, which behaves like the causative. The fact that the causative is not adjacent to the last segment copied from the input accounts for this. Otherwise, we would expect a form like or *a[ramyá-ramucize*.

5.6   Conclusion

The goal of this chapter was to present a thorough account of verbal reduplication in Runyankore. In doing so, I have provided another example of a binary footed reduplicant in a Bantu language.

Beyond that, these data represent another possibility in the typology of Bantu reduplication: the null-parse under minimality constraints. Another issue of importance is the

ranking of constraints governing Input-Reduplicant correspondence. In a language like Runyankore, with its various consonant-vowel interactions, we can see the role of input-reduplicant correspondence constraints. Featural correspondence with the base is not sufficient to provide a grammatical reduplicant. Rather, in the reduplicant must bear a close featural similarity to the input. This fact can be obscured by the copying of segments which condition the same consonantal alternations in the base and the reduplicant, viz., the causative.

Further research into reduplication in Runyankore as well as other Bantu languages will help to sort out the relationship between prosodic constraints on reduplicant well-formedness and the phonotactic constraints involving consonant-vowel interaction.

CHAPTER 6

SYNTAX AND TONE IN RUNYANKORE

6.1 Introduction

The interaction between phonological phenomena and other "levels" of the grammar is well documented. In fact, it is taken as a given that phonological structure and morphological structure are related. In the past several years, the study of the interaction of syntax and phonology has burgeoned to include research in such disparate languages as Italian, Chinese, Japanese, and several Bantu languages. (Napoli & Nespor 1986, Kaisse 1985, Selkirk 1986, Odden 1990, 1997) In this discussion, we examine two different principles in the tonal phonology of Runyankore. Both occur at the phrasal level (i.e., they are only manifest in a phrasal context) and both appear in a limited range of syntactic environments. One principle is responsible for the deletion of a high tone, the other, for the insertion of a high tone. Ultimately, we shall see that their application is related to the syntactic and prosodic structure of the utterance.

This chapter is organized as follows. First, we contrast two of the significant theories of the syntax/phonology interface: the direct reference theory and the indirect reference theory. Then, we present two different phrase-level tone rules in Runyankore. One deletes a high tone from a noun (HDEL) and the second inserts a high tone onto a noun (HINS). In §6.1.3, we examine in detail the range of HDEL and demonstrate that only nouns may be targeting by it. In §6.3.4, we examine HINS in more detail and show that other lexical categories (verb, conjunction, preposition, quantifier) may be the recipient

of a high tone because of HINS. Finally, in §6.4, we show that separate models of the interface between syntax and phonology must account for HINS and HDEL. HINS is best accounted for by reference to the edges of phonological phrases constructed on syntactic edges. On the other hand, HDEL must have access to specific syntactic information to be able to pick out just the nouns that are possible targets for it.

6.2   Theories

Several studies have examined the relationship between various phonological processes in languages and the syntactic conditions under which these processes may occur. In particular these have been Napoli & Nespor (1979) for Italian *Raddoppiamento Sintattico*, Selkirk (1980) for French, Kaisse (1985) for various languages, Nespor & Vogel (1986) for Italian, Selkirk (1986) for Chimwi:ni vowel shortening; Odden (1987, 1996) for Kimatuumbi.

The various approaches to the syntax-phonology interface can be roughly divided into two approaches. One approach (that favored by Selkirk 1980 and Nespor & Vogel 1986) builds prosodic structures (e.g., phonological phrases) on syntactic structures. The prosodic structure then functions as the domain for the application of phonological rules. Thus, prosodic structure mediates between syntax and other phonological rules—phonology makes "indirect reference" to the syntactic structure. The second, the "direct reference theory" (Napoli & Nespor 1979, Kaisse 1985 and Odden 1990, 1997) allows phonological rules to make "direct reference" to the syntax. We examine aspects of these two theories below.

6.2.1   Direct Reference Theory

According to Kaisse (1985), various phenomena associated with the syntax-phonology interface can be explained by allowing direct reference to syntactic information by phonology. I will briefly review a few of the examples that Kaisse cites in her 1985 discussion. The first of these will be the familiar case of "syntactic doubling" from Italian (discussed at length in Napoli & Nespor 1979 and Nespor & Vogel 1986)

6.2.1.1   Italian Raddoppiamento Sintacttico

Several dialects of Italian possess a phonological process referred to as *Raddoppiamento Sintacttico* (RS) ('syntactic doubling'). RS involves the germination of the initial consonant of a word when it stands in a particular syntactic configuration to a preceding word.

(6.1)   Raddoppiamento sintacttico

    a. Maria è più [k:]alda che mai.   AP

       'Maria is hotter than ever.'

    b. Ho visto tre [k:]ani.   NP

       'I saw three dogs.'

    c. Mario ha [f:]attu tutto.   VP

       'Mario did everything'   (= Napoli and Nespor 1979: [20])

In each of the sentences above, the initial consonant of a particular word is lengthened. Napoli & Nespor (1979), Nespor & Vogel (1986), and Kaisse (1985) have introduced theories developed to account for this phenomenon. All of these theories relate the appearance of RS to some aspect of the syntactic structure of the utterance, as opposed to a purely sociolinguistic or phonological account.[1]

6.2.1.2   The Left-Branch Condition and c-command

Napoli & Nespor (1979) refer directly to syntactic structure in formalizing the relationship that must hold between two words in order for RS to take place. The Left-Branch condition describes this relationship. In basic terms, a word *a* must be on the left edge of

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[1] Napoli & Nespor (1979) indicate that RS is common in many varieties of Italian. They limit themselves to the Sicilian and Tuscan varieties, which they claim have the same syntactic environment (p. 813).

the constituent that contains *b* in order for RS to apply to word *b*. Consider the phrase in Figure 6.1.[2]

```
                              X″
                    /                    \
              specifier                   X′
                              /    /    |    \         \
                  complement   X   complement  (complement)  . . .
            a.        a         b
            b.                  a         b
            c.                            a         b
```

Figure 6.1   Italian maximal projection

In this phrase, RS can only hold between the words in lines (a) and (b) of Figure 6.1, where the word labeled (*a*) is on the left edge of the constituent that contains the word labeled (*b*). If there were no complement preceding the head of the phrase (X), then RS could occur in Figure 6.1c. Specifiers always allow RS with a following word, as illustrated in (6.1).

The structure of the adjective phrase in Figure 6.1a is given in Figure 6.2. Here, the word *più* 'more' is on the left branch of the constituent that contains the following word *calda* 'hot' and so, RS occurs.

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[2] Space constraints do not permit a full description of the Left-Branch Condition. Readers are referred to Napoli & Nespor 1979 and Kaisse 1985.
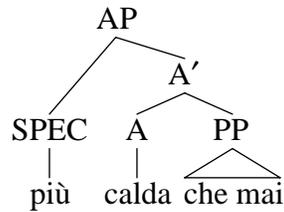
Figure 6.2   'hotter than ever'

Kaisse reanalyzes the Left-Branch Condition in terms of the syntactic relationship Domain c-command. The goal is to capture in a simpler fashion the relationship that exists between the two words in question. She interprets this in terms of X-bar syntactic theory.

(6.2)   Domain c-command

In the Structure $[_{X^{Max}} \ldots \alpha \ldots]$, X^{Max} is defined as the domain of α. Then α c-commands any β in its domain.

Domain c-command gives special status to the following: heads and non-lexical items (things dominated by something other than an X'', like determiners, auxiliaries, and complementizers). For example, consider again the environment for RS in (6.1). In (6.1a), provided as a tree in Figure 6.2, the word *più* 'more' occupies the specifier (SPEC) position in the adjective phrase. In this case, we interpret α of the domain c-command relationship as the SPEC *più* 'more'. Thus, α domain c-commands the word *calda* 'hot', i.e., β. RS can take place between words in this configuration when they are at the left edge of the constituent that contains them. (Kaisse 1985) For the other examples in (6.1), the same syntactic relationship holds between the words: $[[tre]_{Spec} [cani]_{N}]_{NP}$ and $[[ha]_{Spec} [fattu \ tutto]_{V'}]_{VP}$.

Kaisse (1985) also examines some other familiar examples of external sandhi from French, Kimatuumbi, Gilyak, and Ewe. In these examples, the c-command relationship holds between words in an external sandhi configuration.

6.2.2   Indirect Reference Theory

In this section, we examine a theory of the interaction between syntax and phonology that can be described as "indirect". In this model, the end-based model of Selkirk (1986), information about syntactic structure is not directly available to phonological rules. Rather, syntactic structures are the basis for the creation of prosodic structure (see Selkirk 1986 for a discussion of the levels of prosodic structure). It is within a particular prosodic domain that a phonological rule will apply.

6.2.2.1   End-Based (Selkirk)

The Bantu language Chimwi:ni exhibits a vowel length alternation, exemplified in (6.3), from Kisseberth & Abasheikh (1974).

(6.3)   Chimwi:ni vowel shortening

ku-wa:fiq-a	'to agree, to approve'	ku-wafiq-an-a	'to agree with one another'
xa:t̠ima	'the end'	xat̠ima-ye	'its end'
x-so:m-a	'to read'	x-som-esh-añ-a	'to teach'
jo:hari	'jewel'	johari-ye	'her jewel'
ku-re:b-a	'to stop'	ku-eb-eł-an-a	'to stop for one another'
ku-łe:ł-ez-a	'to loosen something'	ku-łeł-ez-ek-a	'to be able to be loosened'

The general principle illustrated by the data in (6.3) is that a long vowel shortens in pre-antepenultimate position (PAS, pre-antepenultimate shortening in Kisseberth & Abasheikh). As the data in (6.4) illustrate, PAS also applies in the phrasal context as well: a long vowel in pre-antepenultimate position must surface as short.

(6.4)   Chimwi:ni phrasal vowel shortening

shika:ni	'(pl.) seize!'	shikani munt^hu uyu	'(pl.) seize this man!'
soma:ni	'(pl.) read!'	somani chuwo ichi	'(pl.) read this book!'
pełeka:ni	'(pl.) send!'	pełekani xati izi	'(pl.) send these letters!'
mu:nt^hu	'person'	munt^hu uyu	'this person'
iko:pa	'glass'	ikopa iyi	'this glass'
ma:yi	'water'	mayi malada	'fresh water'
chi:nt^hu	'thing'	chint^hu shpiya	'something new'
xfu:nguła	'to open'	xfunguła xalbi	'to open one's heart'
xsu:la	'to want'	xsula uki	'to want honey'

In her analysis of Chimwi:ni, Selkirk (1986) suggests that PAS follows from a pro-sodic analysis of the Chimwi:ni sentences. A stress rule (similar to the rule found in Latin) stresses the antepenultimate or the penult syllable; and, only stressed syllables can be long. The rule of PAS shortens a long vowel found in pre-antepenultimate position.

(6.5)   Stressless shortening (SS)

$$\begin{bmatrix} V: \\ -\text{'(main) stress'} \end{bmatrix} \quad \rightarrow \quad V$$

Since only antepenult or penult vowels in the phrase receive stress, only they may be immune from stressless shortening. Any other long vowel is therefore shortened. The key issue then becomes the question of identifying the phrasal domain to which these rules apply. There is some range of syllables to which the rule assigning stress refers. A successful theory will predict which syllables are assigned stress and therefore made immune to the rule of Stressless Shortening.

According to Selkirk, the relevant fact here is the role of domain ends. Selkirk observes that there is not necessarily one syntactic constituent that defines the domain α for stress assignment.
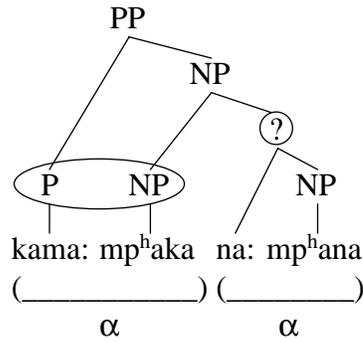

Figure 6.3   Selkirk (16):   'like a cat and a rat'

Selkirk's solution to this problem is to propose that the derived domain is a constituent of the *phonological* representation of prosodic constituents. The relation between syntactic structure and prosodic structure is defined by reference to the ends of syntactic constituents. The choice of specific of a syntactic constituent, whether XMax or Word, is a language-specific parameter, as is the specific end, right vs. left.

The prosodic constituents that are relevant for the computation of phonological rules are created based on the syntax following the end parameters setting.

(6.6)   End parameter settings (Selkirk (23))

    i.   ]Word   Word[
    ii.]Xmax   Xmax[

Thus, the mapping of the Chimwi:ni phrase *panzize cho:mbo mwa:mba* would be as follows.

```
                              VP
                        ?
                    V        NP              NP

        a.  pa(:)nzize  cho:mbo        mwa:mba
        b.  . . . . . . . . . . . . . . .]XMax  . . . . . . . .]XMax
        c.  (_____)      (_____)
                    PPh                    PPh
```

Figure 6.4   Prosodic domains built from XMax

The end setting parameter identifies the right end of the maximal projections, as shown in line (b). Based on these edges, the phonological phrase (PPh) domains are created. The PPh domains are the domains of the application of the rules of stress assignment and stressless shortening described above.

Another important claim of the end-based theory is that it is able to pick out phonological domains that are not part of any single syntactic constituent. For example, consider Selkirk's analysis of Figure 6.3 given here as Figure 6.5.
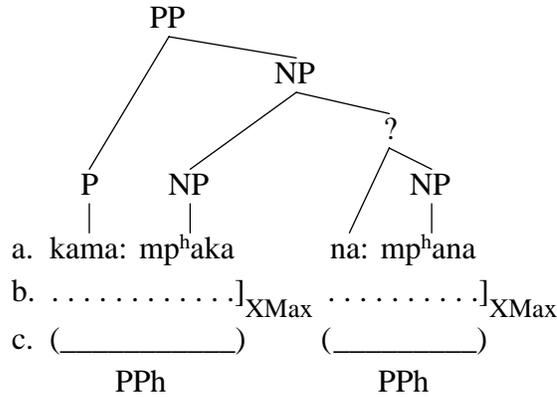
Figure 6.5   Selkirk (27)

Notice that the first PPh constituent constructed on line c. of Figure 6.5 encompasses the preposition and the following NP, although these are not a single constituent of syntactic structure. Thus, the end-based account is, according to Selkirk, handles these facts because it can describe these ranges of words in terms of phonological phrases.

    The direct and indirect reference theories both refer specifically to certain elements of syntactic structure. However, the major difference between them is whether syntactic structural information is accessible to phonological rules. The direct-reference model, by allowing a rule to "know" things about syntactic structure, allows for a tighter relationship between syntactic structure and phonology. Syntactic relationships may also hold between elements of a phrase that are not directly adjacent as long as the correct relationship holds between them. We shall see below that there is just such a case in Runyankore. On the other hand, the indirect-reference theory allows for the possibility that syntactic relationships may not be as crucial as the edges of syntactic units. Because of syntactic structure, this model predicts that such prosodic constituents as the phonological phrase may cut across syntactic constituents or break up strings that are related in the syntax. With respect to tone insertion, we shall see that this is true in Runyankore.

6.3   General Facts in Runyankore

There are two phonological processes in Runyankore that show tone-syntax interactions: high tone insertion (HINS) and high tone deletion (HDEL). Both are conditioned by factors external to the word, i.e., syntactic or prosodic (depending upon the rule). While these two processes are very simple, they have complicated domains of application. The following sections will describe the occurrence of both HINS and HDEL. First, in sections 6.3.1–2, we provide a very basic overview of HDEL and HINS. In section 6.3.3, we shall consider larger phrases and the apparent exceptions to HDEL. These sections will also allow us to demonstrate that HINS occurs in a wider range of environments and to a wider range of lexical categories.

6.3.1   Tone Deletion

We begin with the more restricted of the two processes under consideration, high tone deletion, HDEL. HDEL causes the deletion of a high tone from the head noun just in case the following word is high toned and stands in a particular relationship with the head. Specifically, if a high toned noun is followed by a high-toned adjective or possessive pronoun (a plural), then the high tone of the noun stem disappears on the surface (high tone sponsors, i.e., underlyingly high toned, vowels are underlined).

The reader may wish to review some of the word-level tone rules that are discussed in Chapter 3 (§3.2). The two important tone facts to keep in mind is the fact that final high tone retract to the penult syllable in pre-pausal position and that high tones on long penult syllables become falling tones before a pause.

As the phrases in (6.7)–(6.8) show, the high tone of the noun stem does not surface when a following high-toned adjective or possessive follows.[3]

---

[3] I will underscore a tone-bearing unit that has lost a high tone and will boldface (**á**) a tone bearing unit that has received a high tone by insertion. So CVC<u>V</u>CV is pronounced CVCÝCV prepausally. And CVCÝCV is pronounced CVCVCV prepausally. A vowel marked like [á] indicates an underlying high tone still present on the surface: there is no difference between the phrase medial and the prepausal forms. Recall the additional complication of prepausal tone retraction, which is discussed in Chapter 3.

(6.7)   a. omw-áana   'child'

            CL1.child

            omw<u>aa</u>na waítu   'our child'

            CL1.child CL1.our

            omw<u>aa</u>na waáñu   'your_{pl} child'

            omw<u>aa</u>na waábo   'their child'

       vs. omwáána waanje   'my child'

        b. enkóko   'chicken'

            enk<u>o</u>ko yaítu   'our chicken'

            enk<u>o</u>ko yaáñu   'your_{pl} chicken'

            enk<u>o</u>ko yaábo   'their chicken'

       vs. enkóko yaanje   'my chicken'

        c. omukamá waanje   'my chief'

            omukam<u>a</u> waítu   'our chief'

            embúzi yaanje   'my goat'

            emb<u>u</u>zi yaítu   'our goat'

            embwá yaanje   'my dog'

            embw<u>a</u> yaítu   'our dog'

            obwóóci bwaanje   'my honey'

            obw<u>o</u>oci bwaítu   'our honey'

(6.8)   eriinó …   eriin<u>o</u> ruháango   'large tooth'

            ebitóosha   ebit<u>oo</u>sha biháango   'large mushrooms'

            emótoka   em<u>o</u>tokaa mpáango   'large automobile'

            embwá …   embw<u>aa</u> nkúru   'old dog'

The following phrases illustrate an important point about HDEL. Observe first that the high tone of the head noun 'child' is not deleted before a toneless adjective, *muruunji*

'good'. But, when there is a high-toned element in the constituent that follows the head noun, the high tone of the head does delete.

(6.9)   omwáána muruunji   'a good child'

           omw<u>aa</u>na muruunji munóonga   'a very good child'

           omuh<u>ii</u>nji muruunji munóonga 'a very good farmer'

           embw<u>aa</u> nuunji munóonga   'a very good dog'

The phrases in (6.9) show that HDEL actually must look at the following phrase. The range of phrasal elements that can appear with an adjective or a possessive preposition as the head is extremely limited. Only the word *munóonga* 'very' can follow an adjective within an AdjP. This structure is shown within the noun phrase in (6.10).

(6.10)   [[omwaana]$_{N''}$ [muruunji munóonga]$_{AdjP}$]$_{NP}$

              child   good   very

           'a very good child'

With the examples in (6.9), we see the effect of the high tone within the adjective phrase. Later, we shall see that only the immediately following constituent is relevant for HDEL. The significant point is that the following *constituent* and not just the immediately following word is relevant for HDEL. Of particular interest in these phrases is the fact that the high tone of the noun heading the NP is lost even if the immediately following word is toneless. The high tone on the word 'very' *munóonga* is sufficient to condition the deletion of the high tone on the preceding noun.

In fact, HDEL, only targets a noun. For example, HDEL does not apply to the adjective heading the Adjective phrase modifying the noun. Consider the phrases in (6.11). HDEL does not delete a high tone on an adjective that is followed by a high toned modifier (viz. *munóonga* 'very').

(6.11)   enkaitoo nkúru munóonga   'very old shoes'

            enk<u>o</u>koo nkúru munóonga   'very old chickens'

            enk<u>o</u>koo ntó munóonga   'very young chickens'

            omuh<u>ii</u>nji mukúru munóonga   'very old/important farmer'

            omw<u>aa</u>na mukúru munóonga   'very old/important child'

            omw<u>aa</u>na muháángo munóonga   'very big child'

To summarize the basics, HDEL targets only a head noun before either an adjective or a possessive pronoun. Below, we shall examine the syntactic structures where HDEL does not take place and contrast them to the ones where it does. In doing so, we shall gain a clearer picture of the exact formulation of the process of HDEL. In the following sections, we discuss the principle that inserts a high tone onto a toneless head noun. This will allow us, in the end, to see that the two different principles, high deletion and high insertion, operate within different domains.

6.3.2   Tone Insertion

Compared to HDEL, the process that inserts a high tone is more widespread: it applies to more lexical categories and appears to have fewer restrictions on its application. High tone insertion (HINS) occurs when a toneless lexical word is followed by a toneless word in the same phrase.[4] As we shall see below, HINS is subject to certain limitations that are particularly relevant for a theory of syntax-phonology interaction. However, for now, just consider some toneless nouns, given in (6.12), followed by a modifying toneless adjective, given in (6.13).[5]

---

[4] Ultimately, we shall see that the set of categories that HINS can target is limited by syntactic facts about the language. Specifically, adjectives will never be targeted by HINS because there is not toneless word that can follow them within the adjective phrase.

[5] For more data related to the tonal qualities of nouns in isolation, see Chapter 3, §3.4.

(6.12)   omuuntu   'person'

            omuguha   'rope'

            eihuri   'egg'

            enkaito   'shoe'

            omuhoro   'panga'

            omuguzi   'buyer'

(6.13)   a. omuuntú muruunji   'good person'

            omuguhá miruunji   'good rope'

            eihurí riruunji   'good egg'

            enkaitó nuunji   'good shoe'

         b. omuguhá muraingwa   'long rope'

            omuhoró muraingwa   'long panga'

            omuguzí muraingwa   'tall buyer'

However, if the following adjective is high toned, HINS does not take place, as shown in (6.14).

(6.14)   omuuntu mugúfu   'short person'

            omuguha mugúfu   'short rope'

            amahwa magúfu   'short thorns'

            omurimi mukúru   'old/important farmer'

            omuuntu mukúru   'old/important person'

            omuguzi mukúru   'old/important buyer'

    HINS also occurs before singular possessive pronouns, which are toneless. These are the singular forms: 'my', 'your_sg', and 'his/her'. Some examples are given in (6.15):

(6.15)   a.   omuguz**í** waanje   'my buyer'

             omuguh**á** gwaanje   'my rope'

             eihur**í** ryaanje   'my egg'

       b.   omuguh**á** gwaawe   'your_{sg} rope'

             enkait**ó** yaawe   'your_{sg} shoe'

             eihur**í** ryaawe   'your_{sg} egg'

       c.   enkait**ó** ye   'his/her shoe'

             eihur**í** rye   'his/her egg'

             omurim**í** we   'his/her farmer'

As with high-toned adjectives, HI<small>NS</small> fails if the following possessive is high toned, shown in (6.16).

(6.16)   a.   omuguzi yaítu   'our buyer'

             omuguha gwaítu   'our rope'

             eihuri ryaítu   'our egg'

       b.   omuguha gwaáñu   'your_{pl} rope'

             enkaito yaáñu   'your_{pl} shoe'

             eihuri ryaáñu   'your_{pl} egg'

       c.   omuguha gwaábo   'their rope'

             enkaito yaábo   'their shoe'

             eihuri ryaábo   'their egg'

There is also no HI<small>NS</small> even if the high tone on the noun is separated by several tone-bearing units from the final syllable of the noun. This is illustrated in (6.17).

(6.17)   omwáána muruunji   'good child'

           e-báruha nuunji   'good letter'

           CL9.letter CL9.good

           e-mótoka nuunji   'good automobile'

           eci-káraanjiro caanji   'my roasting pan'

The examples in (6.17) illustrate the long-distance blocking of HINS by a high tone on the noun stem. The lexical high tone of the noun need not be on the final or penultimate syllable to block HINS. If this were the case, we might appeal to Meeussen's rule (i.e., the OCP) to account for the blocking of HINS.[6] But, in a form like *eci[káraanjiro* 'roasting pan' the high tone is at least two tone-bearing units away from the target of HINS. In other words, the high tone on the first syllable of the noun stem is sufficient to block HINS.

So far, HINS has appeared almost as a complement to HDEL. While the latter deletes a high tone before another high tone, the former inserts a high tone onto the head noun just in case there is not a following high-toned word. As we see below, HDEL and HINS turn out to have somewhat different domains of application.

Unlike tone deletion, tonal insertion *does* target verbs. The verb stem must be toneless and followed by a toneless word.

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[6] Kikerewe has an analogous H-insertion rule, but it is blocked only when the high tone is on the preceding syllable. (Odden, p.c.)

(6.18) High-tone insertion and blocking

      a. yááka[ramutsya   's/he has just greeted'

         yááka[ramutsy**á** buremu   's/he has just greeted Buremu'

         yááka[ramutsya kakúru   's/he has just greeted Kakuru'

      b. yááka[téécera   's/he has just cooked'

         yááka[téécera buremu   's/he has just cooked for Buremu'

         yááka[téécera kakúru   's/he has just cooked for Kakuru'

         yááka[shééndecereza buremu   's/he has just escorted Buremu'

         yááka[shééndecereza kakúru   's/he has just escorted Kakuru'

The examples in (6.18) show that the target and the trigger must both be toneless. A high tone anywhere on the verb stem or on the trigger will block HINS. In (6.18a), HINS is blocked in the third example because of the high tone on the proper noun *kakúru* 'Kakuru'. In (6.18b), we see that the high tone on the verb stem is sufficient to block HINS. Remember that we are only concerned with high tone on the verb stem. The high tone on the tense/aspect prefix *-á-* has no blocking effect. This is also evident in (6.19a–b).

(6.19)   a.   n-áá[reeb-a   'I have just seen'

             1S.PST[√see-FV

             náá[reeb-**á** buremu   'I have just seen Buremu'

             náá[teecer**á** buremu   'I have just cooked for Buremu'

        b.   ti-n-áá[reeb-a   'I have not seen'

             NEG-1S-PST[√see-FV

             tináá[reeb-**á** buremu   'I have not seen Buremu'

             tináá[teecer**á** buremu   'I have not cooked for Buremu'

        c.   ba[bara   'they count'

             3P[count

             ba[bar**á** buremu   'they count Buremu'

             ba[reeb**á** buremu   'they see Buremu'

        d.   a-ka[reeba   'they saw' (remote past)

             3S-REM[see

             a-ka[reeb**á** kagoma   's/he saw the bataleur eagle'

             aka[barir**á** buremu   's/he will count for Buremu'

             aka[gur**á** magaro na makáasi   's/he will count pliers and scissors'

In the following section, we shall examine some syntactic domains where HDEL does not occur. At the same time, we shall highlight the areas where HINS takes place that are broader than the targets already presented. The picture that emerges is one where HDEL and HINS target very similar locations (i.e., words) but where HINS has a relatively wider range of application than HDEL, which we shall see is restricted to nominal phrases.

6.3.3   Exceptions to HDEL

Several different categories of following word do not fall within the domain of application of HDEL. From what we have seen, only nouns are targeted for high-tone deletion. In the following section, we consider cases where a noun is immune to HDEL. This will help define the range of the application of HDEL. At the same time, we consider the range of HINS to illustrate its wider and more general range of application. Numbers are

particularly interesting because they fail to condition HDEL but *do* condition HINS. Furthermore, HINS will apply to any eligible lexical category: nouns, verbs, and prepositions.[7] Below follow data for several of these categories. Ultimately, we shall see that only nouns that are followed by high-toned adjectives or possessives are subject to HDEL. However, it will be useful to review the other words in the phrase that do not condition HDEL so that we can later distinguish between those that condition HDEL and those that do no. In the following sections we consider these phrasal elements:

- Numbers
- Quantifiers
- Determiners and demonstratives
- Possessive phrases
- Multiple word phrases

The first of these to be considered will be numbers.

6.3.3.1 Numbers and Phrasal Tone

Numbers quantifying a noun do not condition HDEL on that noun. However, they do condition HINS. Numbers in Runyankore (and in Bantu generally) have some interesting properties. First, there is a morphological difference between the numbers 1–5 and 6–9: their prefixes and tone are different. The number 1–5 have a class prefix (in citation form it is class 5, *i-*) and agree with the noun they quantify (*ebi-coori bi-shatu* 'three (ears of) corn'). The number 6–9 do not have a separable prefix.

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[7] Unfortunately, adjectives never appear in the correct location to allow HINS to target them.

(6.20) Numbers (citation form)

e-mwe	'one'
i-biri	'two'
i-shatu	'three'
i-na	'four'
i-taano	'five'
mukáaga	'six'
mushaanzhu	'seven'
munáana	'eight'
mweenda	'nine'
ikúmi	'ten'

The numbers from six to nine do not have a high toned prefix. Numbers inside of a noun phrase are given in (6.21)–(6.23). Notice the agreement prefix on the number 1–6. When the noun is toneless, a high tone can be inserted into it (as long as the following number is toneless). Because the numbers 2–5 have a high tone on their prefix, there is no HINS here. Finally, note that there is no HDEL.

(6.21)

omuunt' ómwe	'one person'
abaantu bá-biri	'two people'
abaantu bá-shatu	'three people'
abaantu bá-na	'four people'
abaantu bá-taano	'five people'
abaantu mukáaga	'six people'
abaant**ú** mushaanzhu	'seven people'
abaantu munáana	'eight people'
abaant**ú** mweenda	'nine people'

(6.22)   enkók' émwe   'one chicken'

              enkók' í-biri   'two chickens'

              enkók' í-shatu   'three chickens'

              enkók' í-na   'four chickens'

              enkók' í-taano   'five chickens'

              enkóko mukáaga   'six chickens'

              enkóko mushaanzhu   'seven chickens'

              enkóko munáana   'eight chickens'

              enkóko mweenda   'nine chickens'

(6.23)   eciñeebwa cí-mwe   'one peanut'

              ebiñeebwa bí-biri   'two peanuts'

              ebiñeebwa bí-shatu   'three peanuts'

              ebiñeebwa bí-shatu   'four peanuts'

              ebiñeebwa bí-taano   'five peanuts'

              ebiñeebwa mukáaga   'six peanuts'

              ebiñeebwá mushaanzhu   'seven peanuts'

              ebiñeebwa munáana   'eight peanuts'

              ebiñeebwá mweenda   'nine peanuts'

The phrases in (6.24) provide some further evidence that HDEL will not target a noun in this environment.

(6.24) Number phrases (6–9)

              abakáma mukáaga   'six chiefs'
              abakáma munáana   'eight chiefs'
              embwáá mukáaga   'six dogs'
              enkóko mukáaga   'six chickens'

270

Compare also the following minimal pairs in which we might expect the contrast to be neutralized by HDEL. In fact, the tonal contrast remains. The lexical high tone of the noun stem is retained in the examples in (6.25).

(6.25) Six

      a. enda mukáaga   'six stomachs' (/enda/)

           endá mukáaga   'six lice' (/endá/)

      b. enzhu mukáaga   'six houses' (/enzhu/)

           enzhú mukáaga   'six gray hairs' (/enzhú/)

On the other hand, HINS does take place before toneless numbers. Because of this there is neutralization if the number is toneless, as in (6.26) and (6.27).

(6.26) Seven and nine and high insertion

      a. end<u>á</u> mushaanzhu   'seven lice'

           end**á** mushaanzhu   'seven stomachs'

      b. end<u>á</u> mweenda   'nine lice'

           end**á** mweenda   'nine stomachs'

(6.27) Seven and nine and high insertion

      a. enzh<u>ú</u> mushaanzhu   'seven gray hairs'

           enzh**ú** mushaanzhu   'seven houses'

      b. enzh<u>ú</u> mweenda   'nine gray hairs'

           enzh**ú** mweenda   'nine houses'

The underlined vowels in *end<u>á</u>* 'lice' and *enzh<u>ú</u>* 'gray hair' indicate that the noun stem is underlyingly high toned, as distinct from *enda* 'stomach' and *enzhu* 'house', which are underlyingly toneless. Because the numbers *mushaanzhu* 'seven' and *mweenda* 'nine' are toneless as well, a high tone appears on the head noun. There would be no high tone

insertion with the numbers one through five because they contain a high tone (see (6.21)–(6.23) above).

To summarize, a following number can create an environment for the application of HINS. However, a following number does not create an environment for HDEL. As we have seen, some numbers (*mukaaga* 'seven' and *mweenda* 'nine') lack high tones. This is evidence that HINS applies in a larger set of contexts than does HDEL. There are high-toned words, which we shall examine later, that fail to condition HDEL. We assume that these words pattern with numbers. Unfortunately, none of the categories of words that fail to condition HDEL have any toneless members, apart from numbers.

In (6.28) we see the numbers twenty through one hundred. Before considering these words, recall that the numbers one through five have high-toned prefixes, which are just vowels in some cases. Because of this, the final vowel of *makúmi* 'ten(s)' undergoes glide formation. Forms for sixty, seventy, eighty, and ninety, which have been borrowed from Luganda, appear to be the more usual form now and will also appear below. These numbers also illustrate a case of HDEL. The word *makúmi* 'tens' loses its high tone before a high-toned word.

(6.28) Runyankore 20–100

	Runyankore	Luganda Borrowings
10	ikúmi	
20	mak<u>u</u>my áábiri	
30	mak<u>u</u>my ááshatu	
40	mak<u>u</u>my áána	
50	mak<u>u</u>my áátaano	
60	mak<u>u</u>mi mukáaga	nkáaga
70	makúmi mushaanju	ñshaanzhu
80	mak<u>u</u>mi munáana	cináana
90	makúmi mweenda	ceenda
100	eigana	cikumi

Recall that 'ten' *ikúmi* is high toned. However, this part of the number phrase is subject to HDEL when followed by a number with a high tone, as are the numbers with initial vowel and 'six' *mukáaga* and 'eight' *munáana*. As we saw above in (6.26) and (6.27) numbers do not condition HDEL on a preceding noun—there is no high deletion when the following number is high toned. One important point to keep in mind is that *ikúmi* 'ten' is a number *and* a noun, class five in the singular, *ikúmi*, and class six in the plural, *makúmi*.[8] As a noun, the word 'ten' appears in the plural when followed by a number (*makumy áábiri* ‹tens two› 'twenty'). It also forces agreement with the following word (in Runyankore numbers only agree between two and five, inclusive). The *a-* is the class six prefix for numbers, the number 'two' agrees in class with the noun/number 'ten' *ikúmi*.

However, a number followed by a number can be a domain for HDEL. Sequences like *maku̲mi mukáaga* 'sixty' differ from phrases like *enkóko mukáaga* 'six chickens' in that the former is subject to HDEL while the latter is not.

```
            NumP
           /    \
        Num      Num
         |        |
      maku̲mi   mukáaga
```
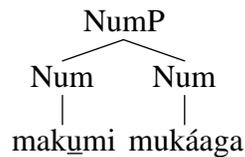
Figure 6.6   Number phrase 'sixty'

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[8] Numbers, like *ikúmi/makúmi* 'ten/s' do not take the initial vowel prefix. Predicting where this prefix appears turns out to be fairly difficult. Taylor (1972) discusses some of the syntactic and semantic facts of the distribution of the initial vowel. See also Hyman & Katamba 1990 for a discussion of the prefix vowel in Luganda.

```
              NP
          NP
          N      NumP
        enkóko  mukáaga
```
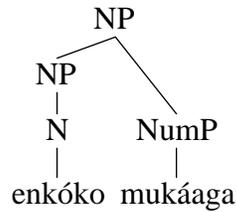
Figure 6.7   Noun phrase 'six chickens'

A high tone anywhere in the number phrase blocks HINS on a noun that precedes the number. This is illustrated in (6.29). Although *enkaito* 'shoe(s)' is toneless, it is not targeted by HINS.

(6.29) Number phrases 60–90

enkaito makumi mukáaga	'sixty shoes'
enkaito makúmi mushaanzhu	'seventy shoes'
enkaito makumi munáana	'eighty shoes'
enkaito makúmi mweenda	'ninety shoes'

Below, under (6.30) are the numbers 100 through 900. Note that the combining form for 'hundred' *magana* is toneless. When the following word is also toneless (the numbers 'seven' *mushaanzhu* and 'nine' *munáana*) the word 'hundred' is targeted for HINS, as in seven hundred and nine hundred.

(6.30) Runyankore numbers 100–900

	Long Form	Short Form
100	cikúmi	
200	magan' áábiri	bíbiri
300	magan' ááshatu	bíshatu
400	magan' áana	bíina
500	magan' áátaano	bítaano
600	magana mukáaga	rukáaga
700	maganá mushaanzhu	rushaanzhu
800	magana munáana	runáana
900	maganá mweenda	rweenda

Unlike the hundreds numbers, the numbers in the thousands are the target for HDEL, shown in (6.31). This is because the word 'thousand' *orukúmi* is high toned. When the following word, the unit, is high toned, then the word 'thousand' loses its high tone. Recall that the number one through five have high-toned initial vowels. So, the only place where 'thousand' does not lose its high tone is when it stands by itself, or is followed by the numbers seven or nine.

(6.31) Thousands

orukúmi	'thousand'
enk<u>u</u>m' ííbiri	'two thousand'
enk<u>u</u>m' ííshatu	'three thousand'
enk<u>u</u>m' íina	'four thousand'
enk<u>u</u>m' íítano	'five thousand'
enk<u>u</u>mi mukáaga	'six thousand'
enkúmi mushaanzhu	'seven thousand'
enk<u>u</u>mi munáana	'eight thousand'
enkúmi mweenda	'nine thousand'

However, if the word *na* 'and' is part of the number, then the number preceding *na* 'and' is insulated from HDEL.[9]

(6.32) Six as a number-phrase head

a.	nkáága n'éémwe	'sixty-one'
	nkáaga n'ííbiri	'sixty-two'
	nkáága na mukáaga	'sixty-six'
	nkáága n<u>á</u> mushaanzhu	'sixty-seven'
b.	rukáága na mukáaga	'six hundred and six'
	rukáága n<u>á</u> mushaanzhu	'six hundred and seven'
	rukáága na ikúmi	'six hundred and ten'
	rukáága na mukumy áábiri	'six hundred and twenty'

There is a difference between a series of number words in a number phrase and the type of phrasal number given in (6.32). When the word *na* 'and' appears in the number, we there is a significant break that prevents the application of HDEL.

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[9] We will discuss the appearance of the high tone on *na* 'and' in greater detail below.

To summarize the discussion of numbers: nouns are not targeted for HDEL when a high-toned number follows them. However, HINS does target a noun if it is toneless and the following number is toneless. This suggests that HDEL and HINS do not have the same targets. The structure of a number phrase (*makumi mukáaga* 'sixty') is different from the structure of a noun phrase with a number (*enkóko mukáaga* 'six chickens'). HDEL can operate within a number phrase while it does not target a noun quantified by a number. Next, we consider another post-nominal phrasal element—quantifiers.

6.3.3.2   Quantifiers and HDEL

HDEL does not occur when the word following the head noun of the phrase is the universal quantifier *-óna* "all".[10] The examples in (6.33) illustrate this with phrases comprising a noun and a following universal quantifier.

(6.33)   "All" phrases

aba-káma bó-ona	'all chiefs'
CL2.chief CL2-all	
aboozhó bóona	'all boys'
amaarwá góona	'all beer'
embwá zóona	'all dogs'
enzhú zóona	'all gray hair'
embuzí zóona	'all goats'

We also find the failure of HDEL before another type of quantifier: *-injí* 'many', shown in (6.34).[11]

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[10] Like other words in a noun phrase, quantifiers must also agree with the head noun in class. See Chapter 2 for a summary of noun agreement prefixes and class agreement.

[11] The final high tone of *-injí* retracts in phrase-final position.

(6.34) "Many" phrases

abakáma baínji	'many chiefs'
enkóko ñiínji	'many chickens'
endá ñiínji	'many lice'
abahíínji baínji	'many farmers'

Two other quantifiers that do not condition HDEL on following words are given in (6.35).

(6.35) Other quantifiers

a. -ónka   'only'

omuhííji wéenka	'only a farmer'
ecikópo cóonka	'only a cup'
embwáá yóonka	'only a dog'
obúro bwóonka	'only millet'

b. -ómbi   'both'

ahíínji bóombi	'both farmers'
emisyó yóombi	'both knives'
embáá zóombi	'both dogs'
ebikópo byóombi	'both cups'

Interestingly, the question of HINS does not really come up with these quantifiers because they are all high toned and thus do not create the environment necessary for the insertion of a high tone on a toneless noun phrase head. But, remember that some numbers are toneless and do condition HINS. So, we see that like numbers, quantifiers also fail to cause HDEL on a noun in the phrase.

278

6.3.3.3   Determiners and Demonstratives

Like the quantifiers, a number of other high toned words also fail to condition HDEL. These words are also members of the class of words containing quantifiers, demonstratives, and determiners. The first example includes various types of demonstrative words, as shown in (6.36).

(6.36)   Determiners and demonstratives

a.	abakáma báhi	'which chiefs'
	aboozhó báhi	'which boys'
	embwá zíha	'which dogs'
	enzhú zíha	'which gray hairs'
b.	omukám' óoha	'which chief'
	enzhú zíha	'which gray hairs'
c.	omukám' óogu	'this chief'
	omukám' óogwe	'that chief'
	omukám' ooríya	'that chief'
	omukám' oogwo	'that chief (visible, close)'
d.	abakám' áaba	'these chiefs'
	abakám' áabwe	'those chiefs'
	abakám' áabo	'these chiefs'
	abakám' ábaríya	'those chiefs'
e.	enkók' éeji	'this chicken'
	kaankomáángw' éeji	'this woodpecker'

Like these words, we find that postposed phrasal modifiers of nouns (definite adjectives, relatives, possessives, etc.) also do not condition HDEL.

6.3.3.4   Definite Adjectives and Phrasal Modifiers

There is a distinction between an indefinite adjective and a definite adjective in many Bantu languages. In Runyankore, the pre-prefix vowel is absent in indefinite adjectives. However, if the adjective is definite in meaning, an initial vowel is present. The definite form of adjectives ("the good dog" versus "a/some good dog") is structurally similar to relatives and can be considered sentential in nature, like a relative clause. One possible translation or paraphrase for these forms is "a dog that is good", showing their relationship with relative clauses.

    First, let us consider some definite forms of the adjective. The following forms all include head nouns that are high toned in the input. Observe that they retain their high tone.[12]

(6.37) Definite noun phrases

          ecikóp' éé-cí-bi   'the bad cup'

          emótok' éé-m-bi   'the bad car'

          eríín' éé-ri-háango   'the large cup'

          ebitóósh' éé-bi-háango   'the large mushrooms'

          omwáán' óó-mu-háango   'the large child'

          ebáruh' éé-n-uunji   'the good letter'

The definite form of the adjectives differs from the indefinite in its possession of an initial pre-prefix vowel. However, one thing to note from the data in (6.37) is that this vowel is high toned and that it absorbs the preceding vowel (which, unless high, disappears completely leaving only its mora). Because of this output configuration, it is impossible to tell definitively whether HINS had taken place—the target vowel for HINS will be high

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[12] The initial vowel of the adjective is long because of vowel coalescence with the final vowel of the preceding noun. The high tone is a feature of the initial vowel morpheme. However, it only retains its high tone when it is phrase-medial. This is also discussed in Chapter 2.

already. Significantly, HDEL does no apply even though HDEL *does* apply to nouns followed by high-toned indefinite adjectives, which lack the initial vowel.

Another phrasal complement to a head noun is the relative clause.

(6.38) Relatives

        omu-híínj' á-bazire   'the farmer who counted'

        CL1-farmer REL.CL1-√count-PERF

        omuhíínj' á-bónire   'the farmer who found'

        omukám' á-baziire   'the chief who sewed'

        omukám'á-káraanjire   'the chief who dry roasted'

These phrases are tonally similar to those in (6.37). Again, HDEL does not apply.

6.3.3.5   Prepositional/Possessive Phrases

HDEL also fails to occur when there is a following prepositional phrase within the phrase in question. This fact turns out to be highly relevant later in this analysis, as we shall see that an NP comprising two conjoined NPs behaves differently.

Some examples of prepositional phrases within the noun phrase illustrate the persistence of the high tone on the head noun.

(6.39) Possessive phrases

     a. enkóko y'ómuhíinji   'chicken of the farmer'

         embwáá y'ómwáana   'dog of the child'

         embúzi y'ómuhíinji   'goat of the farmer'

         ecitaandá c'ómwáana   'bed of the child'

     b. embúzi y'ómurimi   'goat of the farmer'

         mareeré y'ómurimi   'hawk of the farmer'

         embíbo zá kaarweenda   'seeds of a karwenda'

         ecikópo cáá kaarweza   'cup of karweza (a thin sauce)'

The head of the whole NP in (6.39) is high toned. Observe that in all the cases this high tone is retained. The difference between (6.39a) and (6.39b) is the presence of a high tone on the stem of the lower noun. In (6.39a), the lower noun is high toned while in (6.39b) it is toneless. However, this apparently makes no difference in the application of HDEL in this construction. The tonelessness of the noun stems in (6.39b) is made somewhat irrelevant by the appearance of a high tone on the initial vowel of the noun or on the vowel of the associative preposition.

6.3.3.6   Multiple Words in the Phrase and HDEL

When a string of adjective, quantifier, and/or possessive words follows the head noun, only the word immediately following the noun is relevant for the application of HDEL. There is a change in emphasis when a quantifier appears first; however, the basic meaning of the phrase remains the same. In (6.40), the high tone of the noun stem only deletes when the high-toned adjective is the immediately following word.

(6.40) Complex noun phrases with "many"

    a. abakáma báínji baruunji   '*many* good chiefs'

       abakáma baruunji baínji   'many good chiefs'

    b. abakáma báínji bakúru   '*many* old chiefs'

       abak<u>a</u>ma bakúru baínji   'many old chiefs

(6.41) Complex noun phrases with "all"

    a. abahíínji bóóna baruunji   '*all* good farmers'

       abahíínji baruunji bóona   'all good farmers'

    b. abahíínji bóóna bakúru   '*all* old farmers'

       abah<u>ii</u>nji bakúru bóona   'all old farmers'

In (6.40) and (6.41), the (a) phrases contain a toneless adjective and a high-toned quantifier while the (b) phrases contain a high-toned adjective and a high-toned quantifier. Note that the high tone of the noun only deletes when a high toned adjective *immediately* follows the noun.

    The same relationship holds in the following two sets of data but with a demonstrative instead of a quantifier. Again, note that the high tone of the noun only deletes when the following word is a high-toned adjective.

(6.42) Complex noun phrases with determiners

    a. omukám' óógu muruunji   '*this* good chief'

        omukáma muruunj' óogu   'this good chief'

    b. omukám' óógu mukúru   '*this* old chief'

        omuk<u>a</u>ma mukúr' óogu   'this old chief'

    c. enkók' ééji nuunji   '*this* good chicken'

        enkóko nuunj' ééji   'this good chicken'

    d. enkók' ééji nkúru   '*this* old chicken'

        enk<u>o</u>koo nkúr' ééji   'this old chicken'

The same patterns hold true when the demonstrative or quantifier is replaced with a number, as shown in (6.43).[13]

(6.43) Complex noun phrases with numbers

    a. enkóko mukáágaa nkúru   'six old chickens'

        enk<u>o</u>koo nkúru mukáaga

    b. enkóko mushaanzhuu nkúru   'seven old chickens'

        enk<u>o</u>koo nkúru mushaanzhu

    c. abakáma mukáága baruunji   'six good chiefs'

        abakáma baruunji mukáaga

    d. abakáma mushaanzhu baruunji 'seven good chiefs'

        abakáma baruunji mushaanzhu

    The high tone on the noun only deletes when the triggering word immediately follows the target. If two adjectives follow the noun, only the first one is relevant for the application of HDEL. Compare the two word order variants given in (6.44).

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[13] Note that vowels at the end of a word lengthen before an NC cluster in the following word: *enk<u>o</u>koo nkúru* 'old chicken'.

(6.44) Complex noun phrases with multiple adjectives

    a. ab<u>aa</u>na bató baruunji   'young good children'

        abáána baruunji báto   'good young children'

    b. embw<u>aa</u> nkúru nuunji   'old good dog'

        embwáá nuunjii nkúru   'good old dog'

The high tone of the head noun only deletes when the high-toned adjective, *bató* 'young' or *nkúru* 'old', immediately follows the head noun.

In comparison to HINS, the principles of HDEL are more restricted. HDEL only considers the immediately following phrase.[14] Furthermore, we shall see that HINS can be blocked by a high tone that is *not* in the immediately following word.

6.3.3.7 Verbs and HDEL

Verbs are not subject to the application of HDEL. This sets Runyankore apart from some of the other familiar Interlacustrine languages that do have the deletion of high tones on verbs: Zinza (Odden 1997), Runyambo (Hubbard 1992), Kinyambo (Bickmore 1989), for example. The verb forms in (6.45) illustrate several verb tenses with high tones appearing on the verb despite a following high-toned object.

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[14] For evidence that HDEL considers the following phrase, see (6.9) where the following phrase contains a high tone in its second word *munóonga* 'very'. This high can condition HDEL even if the preceding word in the phrase is toneless: *omw<u>aa</u>na muruunji munóonga* 'a very good child'.

(6.45) Failure of HDEL to target verbs

    a. Infinitive

        oku[téécera kakúru   'to cook for Kakuru'

        oku[shééndecereza kakúru   'to escort Kakuru'

    b. Remote past tense

        akakwááta kaankomáángwa   's/he caught the woodpecker'

        akahééndecereza kaankomáángwa 's/he destroyed the woodpecker'

    c. Yesterday past tense

        aréébire kaankomáangwa   's/he saw the woodpecker'

        akwaasiré kaankomáangwa   's/he caught the woodpecker'

    d. Yesterday past tense negative

        taréébire kankomáangwa   's/he didn't see the woodpecker'

        takwaasiré kaankomáangwa   's/he didn't catch the woodpecker'

    e. Habitual

        arééba kaankomáangwa   's/he sees the woodpecker'

        akwaatá kaankomáangwa   's/he catches the woodpecker'

    f. Perstitive

        naacibazíírira káto   's/he is still sewing for Kato'

        naacikaraanjirá káto   's/he is still dry roasting for Kato'

As the examples in (6.45) illustrate, HDEL does not apply to verbs. From the data presented above, we may generalize that HDEL applies to the head of a noun phrase when a high-toned complement immediately follows the noun. Furthermore, the only complements that trigger HDEL are indefinite adjectives (i.e., ones lacking an initial vowel) or possessive pronouns.

Infinitives, which in some sense are both verbs and nouns (class 15). Because they can take such nominal complements as possessive pronouns and adjectives, they are also subject to HDEL. This is shown in below.

(6.46) Infinitives and HDEL

    a. okutéeka   'to cook'

       okuteeka kwáitu   'our cooking'

    b. okukáraanga   'to dry roast'

       okukaraanga kwáitu   'our dry roasting'

However, when the infinitive functions as a verb HDEL does not take place. For example, when the infinitive has an object, the syntactic relationship between it and the word that follows is not the same as between an infinitive *qua* noun and following word as seen in (6.46). Infinitives followed by objects are illustrated in (6.47).

(6.47) Infinitives as verbs

    a. okutéécera   'to cook for'

       okutéécera buremu   'to cook for Buremu'

       okutéécera kakúru   'to cook for Kakuru'

    b. okutééka kabaragára zaanje   'the cooking of my bananas'

       okutéék' ébihíimba   'the cooking of beans'

    c. okutéécera burem' ébihíimba   'the cooking of beans for Buremu'

       ookutéécera kakúr' ébihíimga   'the cooking of beans for Kakuru'

    d. okutéécera buremu kwaanje   'my cooking for Buremu'

       okutéécera buremu kwáitu   'our cooking for Buremu'

       okutéécera kakúru kwáitu   'our cooking for Kakuru'

6.3.3.8   Concluding Remarks on HDEL

As the preceding sections have detailed, HDEL has a rather limited range of application—it only applies when the following word is high toned, and when that word is of a particular lexical/grammatical category: adjectives and possessives. Numbers, quantifiers, demonstratives, and phrases all fail to trigger HDEL on a preceding noun.

In the next section, we shall examine the limitations on HINS so that we may compare these two principles later.

6.3.4   Extensions to the principle of HINS

As indicated above, the following sections detail the fact that HINS looks not just at the following word in the higher phrase, but at the phrase following the target of HINS. First, we examine the types of phrases that may follow a noun head and the tonal facts that are relevant to them.

In order to explain fully the limitations of HINS, we have to have a good understanding of the syntax. I assume for the purposes of argument an X-Bar syntactic structure approach (Jackendoff 1977, Cook & Newson 1996, and Horrocks 1987, see also Carstens 1993).

In this section, we examine more examples of HINS. In particular, we note the application of HINS to other types of phrasal heads, not just nouns. This section also briefly introduces the phrase structure of Runyankore. While HDEL looks only to an immediately following word for its trigger, HINS scans for high tones within the entire following phrasal unit. Any high tone in a lower phrase is sufficient to block HINS.

First, we examine the possessive prepositional phrase and make note of HINS that targets the possessive preposition that links the possessed and possessor nouns. Second, we examine a toneless quantifier, *buri* 'every' which it acts as a phrasal head (and Quantifier Phrase, QP) that subcategorizes for a noun phrase. This quantifier is contrasted with other quantifiers that occupy this syntactic position but are high toned. Third, in §6.3.3.3, we consider the role of the word *na* 'and/with', which functions as either a preposition or as a conjunction. We shall find that it may be targeted by HINS. Furthermore, it acts as a boundary between HINS domains: a high inserted onto *na* will not block high inserted on a word to the left, assuming the rest of the conditions of HINS hold. Then, in §6.3.4.4, we examine HINS onto toneless verbs.

6.3.4.1 Possessive Phrases

Possessive phrases are prepositional phrases that must agree in noun class with the head noun of the higher phrase. The structure of a possessive phrase in Runyankore is given in Figure 6.8.

rope   of   Kakuru   'Kakuru's rope'
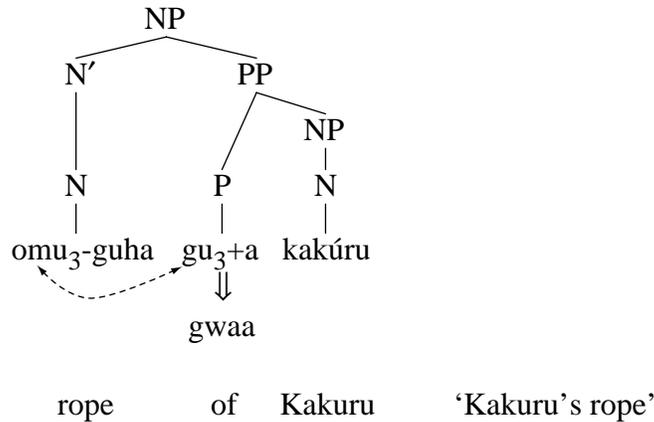
Figure 6.8   Possessive Structure

The preposition (P) comprises two morphemes: the first agrees with the preceding noun (the possessed) as indicated by the dotted line. The second is the vowel *-a*. The vowel *-a* is frequently lost before another vowel via elision. Tonally, we shall find that a high tone appears on the preposition when the following NP is toneless. Structurally, the prepositional phrase (PP) is a sister to the N′ node under NP.

Let us consider a number of tone patterns in the input, varying the tonal character of the possessed and the possessor, giving four variations. The phrases in (6.48)–(6.51) exemplify these four possibilities.

(6.48) L *of* L

     omuguha gwááá buremu   'rope of Buremu'

     ecijere cáá buremu   'foot of Buremu'

     enda yá kapa   'stomach of the cat'

     enkoni yá karweenda   'cane of cypress (wood)'

     eihuri yá buremu   'Buremu's egg'

     ebijere byáá buremu   'Buremu's feet'

When the possessed and possessor nouns are both toneless, a high tone appears on the associative preposition. It is necessary to use words that are consonant-initial to see the high tone on the preposition.

(6.49) H *of* L

     ecikópo cáá buremu   'cup of Buremu'

     omukóno gwááá buremu   'arm of Buremu'

     entééka yá buremu   'cooking (style) of Buremu'

     erííno ryáá buremu   'Buremu's tooth'

     ecicére cáá buremu   'Buremu's frog'

     amaarwáá gá buremu   'Buremu's beer'

The phrases in (6.49) show that the tone of the possessed noun does not affect the appearance of a high tone on the preposition when the possessor (the lower NP) is toneless. Contrast the tone of the preposition when the possessor noun is toneless, (6.48)–(6.49), with cases where the possessor noun in high toned, (6.50)–(6.51), which follow.

(6.50) L *of* H

omuguha gwaa kakúru	'rope of Kakuru'
omuguha gwa kakúru	'rope of Kakuru'
ecijere caa kakúru	'foot of Kakuru'
eipapa ryaa maréere	'wing of a bataleur eagle'
eihuri ya kakúru	'Kakuru's egg'
ebijere byaa kakúru	'Kakuru's feet'

(6.51) H *of* H

omukóno gwaa kakúru	'arm of Kakuru'
ecikópo caa kakúru	'cup of Kakuru'
erííno ryaa kakúru	'Kakuru's tooth'
ecicére caa kakúru	'Kakuru's frog'
amaarwáá ga kakúru	'Kakuru's beer'

The phrases in (6.50) and (6.51) show the *failure* of HINS on the preposition when the following word is high-toned. The tone of the possessor is irrelevant—the tonal quality of the preposition does not change when the possessed noun changes.

However, if there is a high tone anywhere lower in the phrase, then no high appears on the possessive preposition. A high tone in the phrase following the preposition will block HINS on the preposition. One such structure involves a possessive pronoun following the possessor noun. Syntactically, this would appear as in Figure 6.9.

```
                    NP
              N′         PP
                            NP
           N    P      N    PossP
           │    │      │      │
        eipapa rya kagomá yaanje
```
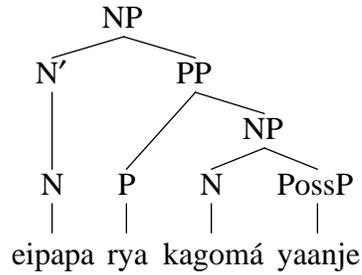
Figure 6.9   "wing of my eagle"

This observation is further confirmed by the phrases in (6.52).

(6.52) Possessive phrase with modified noun

    a. ei-papa ry-a kagom**á** yaanje   'wing of my eagle'
       CL5-wing CL5-of eagle CL9-my

       eipapa rya kagom**á** nuunji   'wing of a good eagle'

       amapapa ga kagom**á** mushaaanzhu

       'wings of seven eagles'

    b. eipapa rya kagoma nk**ú**ru   'wing of an old eagle'

       eipapa rya kagoma ya**í**tu   'wing of our eagle'

       amapapa ga kagoma muk**á**aga   'wing of six eagles'

In all of these phrases, there is a high tone somewhere after the preposition. In (6.52a), a high appears on the last vowel of *kagoma* 'eagle' because of HINS. In (6.52b), the high tone that blocks HINS onto *rya* 'of' appears lexically on a word that follows the possessor noun: *nkúru*, 'old', *yaítu* 'our', or *mukáaga* 'six'. The phrases in (6.53) illustrate what happens if a high tone appears somewhere in the embedded NP. When the NP within the PossP is toneless, a high tone appears on the preposition: *eipapa ryá kagoma* 'wing of a bataleur eagle'. However, if there is a high tone within the embedded NP, HINS cannot

target the preposition. Also, this inserted high tone, or any other high tone within the PossP will block HI_{NS} onto the head noun, as shown in (6.53).

(6.53) Noun phrase and HI_{NS}

a.	eipapa ry**á** kagoma	'wing of a bataleur eagle'
	eipapa rya kagom**á** nuunji	'wing of a good b. eagle'
	eipapa rya kagomaa mpáango	'wing of a big b. eagle'
	eipapa rya kagomaa nkúru	'wing of an old b. eagle'
	eipapa rya kagom**á** yaanje	'wings of my b. eagle'
	eipapa rya kagoma yaítu	'wings of our b. eagle'
b.	amapapa ga kagoma mukáaga	'wings of six b. eagles'
	amapapa ga kagom**á** mushaanzhu	'wings of seven b. eagles'
c.	eipapa rya mareére	'wing of a hawk'
	eipapa rya mareeree mpáango	'wing of a big hawk'
d.	ecaashuri cáá kagoma	'nest of a b. eagle'
	ecaashuri caa kagom**á** nuunji	'nest of a good b. eagle'
	ecaashuri caa kagomaa mpáango	'nest of a big b. eagle'

The examples in (6.53) illustrate the *failure* of HI_{NS} before a possessive phrase. A high tone anywhere in the PossP will be sufficient to prevent HI_{NS} on the head noun of the entire NP, in this case *eipapa* 'wing' or *amapapa* 'wings'.

   HI_{NS} will also target the NP that precedes the PP if there is a toneless adjective in it. In the phrases in (6.53), HI_{NS} targets the highest noun if there is a toneless adjective or possessive pronoun immediately after it. The presence of a high tone in the PossP does not block HI_{NS} in this case.

(6.54) Noun + adjective + possessive phrase

      a. ei-pap**á** ri-ruunji ry**áá** kagoma

         CL5.wing CL5.good CL5.of eagle

         'good wing of the eagle'

      b. enkait**ó** nuunji y'**ó**muuntu muk**ú**ru

         'good shoe of the old person'

      c. amapap**á** gaanje ga mar**é**ere

         'my wings of a hawk'

      d. eñam**á** yaanje y'**é**mpuno

         'my meat of the pig'

The introduction of the adjective or possessive seems to allow for the possibility of HINS targeting both the head noun and the preposition (as in the first example).

Before taking up a fuller analysis of both HDEL and HINS we need to examine in more detail the tonal properties of a noun and noun phrase within another phrase. As we shall see in the next section, principles related to phrasal tone have a broader application than just between two adjacent words. In the next section, we examine the tonal properties of the initial vowel and morphemes that appear to occupy a similar syntactic position.

6.3.4.2 Quantifier Heads

In most noun phrases, the first element is the noun itself, as we have seen above. However, several kinds of words can precede the head noun of an NP. These words occupy the position normally taken by the initial vowel. This class of words seems to include, but is not limited to: *buri* 'each/every'; *ibára* 'any'; *-ndí* 'other'; *-ndíizho* 'other' (different) and some demonstratives.[15] The word *ibára* 'each (type of)' is related to the word *eibára*

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[15] Interestingly, the word *kana* 'owner of' does not seem to be within my informant's command. In fact, it does not appear in Taylor's dictionary of Runyankore-Rukiga either. It is found in the nearby, related language Kikerewe.

'type, kind' as in a particular variety of something: *eibára ry-éente* 'type of cow', *eibára ry-óómurimi* 'type of farmer'. When the noun is preceded by one of these words, it loses its initial vowel. Some various example of this are given in (6.55).

(6.55) Pre-head quantifiers

omu-rimi	'farmer'
bur**í** mu-rimi	'every farmer'
every CL1.farmer	
ibára murimi	'each farmer'
owúúndi murimi	'another farmer'
ondíízho murimi	'another (new) farmer'

Of particular interest in this discussion of tone is the word *buri* 'every'. All other pre-nominal modifiers have a lexical high tone. When the following noun is toneless, the word *buri* appears with a final high tone. However, if the following word is high toned, then *buri* appears as toneless. Both types of noun appear in (6.56).

(6.56) Toneless and high nouns with pre-head quantifiers

      a. Toneless nouns

          burí murimi   'every farmer'

          burí muguha   'every rope'

          buríí nkaito   'every shoe'

          burí ípapa[16]   'every wing'

      b. High nouns

          buri mwáana   'every child'

          buri músyo   'every knife'

          buri ibáare   'every stone'

          buri kabaragára   'every banana (sp.)'

There is a high tone on *buri* 'every' only if the following word is toneless. This also holds true of the following phrase. In other words, just as we saw with noun heads of phrases, we also find that HINS is blocked when the phrase following the word *buri* 'every', contains a high tone.

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[16] The high inserted on the *i* of the word *buri* appears on both morae of the long vowel *ii* because falling tones may appear only in phrase-penultimate position.

(6.57) Quantifier + noun + adjective

      a. buri mw<u>aa</u>na mukúru   'every old/important child'

          buri muh<u>ii</u>nji mukúru   'every old/important farmer'

      b. buri murumi mukúru   'every old/important farmer'

          buri muguha mukúru   'every old rope'

          burii nkaitoo nkúru   'every old shoe'

      c. buri murim**í** muruunji   'every good farmer'

          buri muguh**á** muruunji   'every good rope'

          buri magar**ó** yaanje   'every pliers of mine'

As the phrases in (6.57) illustrate, there is also no HINS on *buri* when there is a high tone on a following adjective or noun, as in (6.57). The cases in (6.57a–b) demonstrate the long-distance blocking of HINS. The high tones on the nouns in (6.57c), which are a product of phrasal high tone insertion, also blocks HINS onto the word *buri*.

In the case of *ibára*, given in (6.58), the high tone is present whether or not there is a high tone on the noun stem.

(6.58) "Each" phrases

      a. Toneless nouns

          ibára murimi   'each farmer'

          ibára muguha   'each (type of) rope'

          ibára muti   'each tree'

      b. High nouns

          ibáraá mbwa[17]   'each (type of) dog'

          ibáraa nkóko   'each (type of) chicken'

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[17] The high tone of [embwá] 'dog' retracts in phrase final position. Additionally, the coda nasal lengthens the preceding vowel.

Unlike the word *buri*, *ibára* is underlying specified for a high tone. Because of this, only *buri* shows a tonal alternation because this word is not a target for HDEL but only for HINS. As mentioned previously, HDEL has a more limited domain of application when compared to HINS.

Some further examples may help to clarify the issue of the immunity of the pre-head words from HDEL. For example, what happens if the following noun is subject to HDEL (because of a following high-toned adjective)? The phrases in (6.59) illustrate this pattern.

(6.59) "Another" phrases

a.	owúúndi murim**í** muruunji	'another good farmer'
	owúúndi murimi mukúru	'another important farmer'
b.	owúúndi mwáána muruunji	'another good child'
	owúúndi mw<u>aa</u>na mukúru	'another important child'
c.	ogúúndi muhor**ó** muruunji	'another good panga'
	ogúúndi muhoro mukúru	'another old panga'
d.	ogúúndi muhor**ó** gwaanje	'another panga of mine'
	ogúúndi muhoro gwaítu	'another panga of ours'

As with *ibara*, the tonal quality of the word *ogúundi* 'another' is not dependent upon the tonality of the following words.

Other types of words also serve as targets for HINS, as we shall see in the following section.

6.3.4.3   Prepositions and Conjunctions

The word *na* 'and/with' functions both as a preposition and as a conjunction. It can be a site of HINS, as long as the following phrase is toneless.

298

(6.60) "And" phrases

        a. n**á** buremu   'with Buremu'

            n**á** magaro   'with pliers'

        b. makáási n**á** magaro   'scissors and pliers'

            kakúru n**á** buremu   'Kakuru and Buremu'

cf.   c. na kakúru   'with Kakuru'

            na káawa   'with coffee'

            magaro na makáási   'pliers and scissors'

The phrases in (6.60a) *na* functions as the preposition 'with'. As long as the following complement to the preposition is toneless, a high tone appears on *na*. In (6.60b), *na* functions as a conjunction, joining the two NPs. Again, it is a site for HI<small>NS</small> if the NP that follows it is toneless. In (6.61), we see some examples of the blocking of HI<small>NS</small> by a high tone somewhere in the following phrase. In the first example, the high-toned adjective *nkúru* 'old' blocks HI<small>NS</small>. In the second example, the high tone inserted onto the noun *magaro* 'pliers' blocks a high tone onto *na* 'and'.

(6.61) Noun + noun + adjective

          makáási na magaroo nkúru   'scissors and old pliers'

          makáási na magar**ó** mushaanzhu 'scissors and seven pliers'
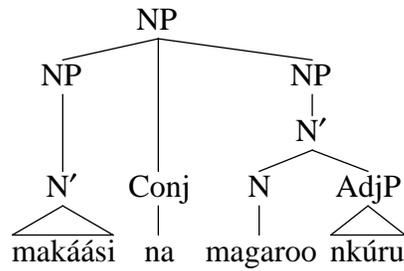
Figure 6.10   makáási na magaroo nkúru   'scissors and old pliers'

However, prepositions and conjunctions do not have entirely the same behavior with respect to HINS. Significant to later analysis, we find that they have different blocking effects when they are located within an NP that is scanned for HINS blocking of a higher word—when they are within an NP complement to a verb. Consider the two sets of data in (6.62).

(6.62) HINS onto verbs

    a. a-ka[reeb**á** kaarweenda n**á** kaartuusi
        3s.REM[see cypress and eucalyptus
        'S/he saw a cypress and a eucalyptus.'

        akagaambir**á** buremu na kakúru   'S/he told Buremu and Kakuru.'
        akareeb**á** kagoma na mareére   'S/he saw an eagle and a hawk.'
        akareeb**á** magaro n'ómuguha   'S/he saw the pliers and rope.'
        akagur**á** magaro na makáasi   'S/he bought pliers and scissors.'

    b. akareeba mareeré n**á** kagoma   'S/he saw a hawk and an eagle.'
        akaguza makáási n**á** magaro   'S/he saw the scissors and pliers.'
        akareeba kaankomáángwa n**á** kagoma
        'S/he saw the woodpecker and the eagle.'

In (6.62a), HINS targets the verb, *akareeba* 's/he saw', despite the later high tone. Block-ing of HINS by a following coordinated NP structure is only accomplished when the high tone is in the immediately following constituent, as in (6.62b). Contrast these facts with the sentences in (6.63).

(6.63) Possessives and HINS

akareeba kagoma y'ómurimi	'S/he saw the eagle of the farmer.'
akareeba kagoma y'ómwáana	'S/he saw the eagle of the child.'
akareeba magaro z**á** buremu	'S/he saw the pliers of Buremu'
akareeba bukaando z**á** buremu	'S/he saw the pants of Buremu'

Here, there is no HINS despite the fact that the word following the verb is toneless, *kagoma* 'bataleur eagle'. The high tone found within the prepositional phrase *is* responsi-ble for the lack of HINS.

The different structures that these two NP complements have would appear to be relevant. Consider first the NP with an embedded PP, in Figure 6.11.
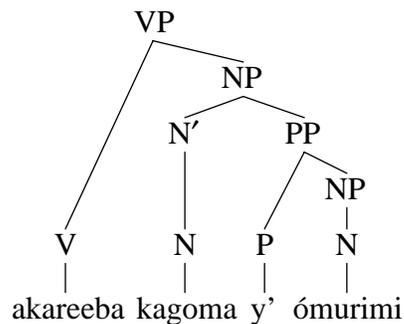
Figure 6.11   'S/he saw the eagle of the farmer.'

301

Here, no high tone appears on the verb because of the high tone on the noun […ómurimi] 'farmer'. Now, consider the phrase where the complement to the VP contains a conjoined NP, in Figure 6.12.
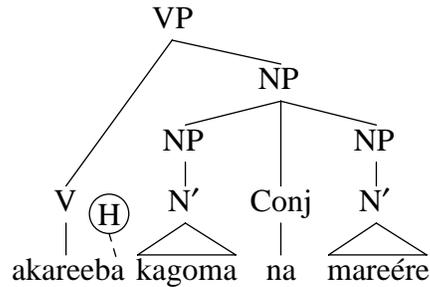
Figure 6.12   'S/he saw the eagle and the hawk.'

Here, a high tone is inserted on the final vowel of the verb. In essence, the high tone that is located within the second NP, 'hawk' *mareére*, is not visible to whatever principles are responsible for HINS. This fact will be significant in the discussion of theories accounting for these tone insertion and deletion facts.

    HINS can also take place on other words apart from verbs, as the examples in (6.64) illustrate.

(6.64) HINS targeting nonverbs

      a. enzhu y**á** buremu na kakúru   'the house of Buremu and Kakuru'
         eipapa ryaa kagoma y'ómurimi 'wing of the b. eagle of the farmer'
         eibabi ryaa kaartuusi y**á** buremu 'leaf of the eucalyptus of Buremu'
      b. bur**í** cijere n'éénkaito   'every foot and shoe(s)'
         bur**í** muguha na makáasi   'every rope and (a) scissors'
         bur**í** kagoma na mareére   'every bataleur eagle and a hawk'

In (6.64a), HINS is blocked before an NP containing a PP with a high tone—HINS cannot target the first word of the NP. In (6.64b), HINS *can* target the first word of the phrase (*buri*) before a conjoined NP as long as the first part of the conjoined NP is toneless. If the order of elements is reversed, HINS is blocked, as shown in (6.65).

(6.65) Blocking HINS

      buri makáási n**á** magaro   'every scissors and pliers'

      buri mareeré n**á** kagoma   'every hawk and bataleur eagle'

HINS cannot target the head of the phrase (*buri*) when the first part of the conjoined NP is high toned. Notice also that HINS does target the conjunction *na* because it stands before a toneless noun (*magaro* or *kagoma*).

Just as we saw blocking of HINS before an NP containing a high-toned prepositional phrase (in (6.63)), we can also expect the failure of HINS on *buri* when its complement NP contains a high-toned prepositional phrase.

(6.66) Long distance HINS blocking

      buri muguha gw**áá** buremu   'every rope of Buremu'

      buri ciibo caa kakúru   'every basket of Kakuru'

      burii nzhu y**á** buremu   'every house of Buremu'

As noted above, these two types of NP have different structures. In both of the models examined in this discussion, there is some reference to syntactic structure. In the following sections we consider how this and other facts can be dealt with by various theories explaining the interaction between phonology and syntax.

6.3.4.4   Verbs

The verb is also a possible site for HINS. There appears to be a greater degree of sensitivity to specific morphological information with respect to a verb. However, the general

principle is that a toneless verb followed by a toneless argument will have a high tone on its final syllable.

   The verbs in (6.67) are in the distant past tense. When the following object of the verb is toneless, a high is inserted onto the final vowel of the verb.

(6.67) HINS onto verbs

a.	akareeba kaankomáángwa	's/he saw the woodpecker'
	akareeb**á** kanyaanaanga	's/he saw the potato caterpillar'
b.	akaramusya kaankomáángwa	's/he greeted the woodpecker'
	akaramusy**á** kanyaanaanga	's/he greeted the potato caterpillar'
c.	akabaziira buraanjíti	's/he sewed the blanket'
	akabaziir**á** bukaando	's/he sewed the trousers'

Compare the verbs in (6.67) with those given in (6.68).

(6.68) Failure of HINS to target high-toned verbs

a.	akakwááta kaankomáangwa	's/he caught the woodpecker'
	akakwááta kanyaanaanga	's/he caught the potato caterpillar'
b.	akahééndecereza kaankomáangwa	's/he destroyed the woodpecker'
	akahééndecereza kanyaanaanga	's/he destroyed the potato caterpillar'

The verbs in (6.68) are high-toned. This high tone blocks the application of HINS. Notice also that the adjacency of the tone bearing units is not necessary to block HINS: there is none on the verb *akahééndecereza* 's/he destroyed'. Further examples of verb tenses that permit HINS are given in (6.69).

(6.69) Verb tenses exhibiting HINS

    a. Recent Past

      yáá[reeb**á** kanyaanaanga   's/he has seen the potato caterpillar'

      yáá[reeba kaankomáangwa   's/he has seen the woodpecker'

    b. Immediate Past

      yáá[kareeb**á** kanyaanaanga   'he has just seen the potato caterpillar'

      yáá[kareeba kaankomáangwa   'he has just seen the woodpecker'

    c. Immediate Past Relatives

      ayáá[reeb**á** kanyaanaanga   'one who has just seen the caterpillar'

      ayáá[reeba kaankomáangwa   'one who has just seen the woodpecker'

    d. Negative Hodiernal Past

      tibáka[reebir**é** buremu   'they had not seen Buremu'

      tibáka[tééceire buremu   'they had not cooked for Buremu'

    e. Present Progressive Negative

      táku[baziirir**á** buremu   'he is not sewing for Buremu'

      táku[káraanjira buremu   'he is not dry roasting for Buremu'

    f. Habitual Relative

      areebiré karoma   'one who sees the bataleur eagle'

      areebire mareére   'one who sees the hawk'

Only the verb stem is relevant for determining whether or not HINS should occur. High tones in the inflectional portion of the verb do not block HINS.[18] Notice, however, that if the verb root is high toned, as in √*téek* 'cook' or √*káraang* 'dry roast' found in (6.69d–e), then HINS is blocked.

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[18] See Chapter 2 for more information on verb structure and Chapter 3 for information on the interaction of prefixal high tones and stem high tones.

Not all verbs are possible targets for HINS. Note that the verb tenses in (6.69) do not have high tones that are required by the tense/aspect morphology.[19] However, there is a set of verb tenses where a high tone is always inserted onto the stem. For example, the yesterday past tense appears with a high tone somewhere on the verb stem regardless of the input tone of the root. In these cases, there is no HINS. In (6.70) and (6.71), the tone-less verb root √reeb 'see' appears in the affirmative and negative forms of the yesterday past tense. The high tone that appears on the stem is part of the verb morphology. Its presence is sufficient to block HINS regardless of the tonal qualities of the following word. Compare the pairs of sentences given in (6.70) and (6.71). The object in the first sentence of each pair is toneless.

(6.70) Yesterday Past Tense Affirmative

       a[réébire kanyanaanga   's/he saw the potato caterpillar'

       a[réébire kaankomáangwa   's/he saw the woodpecker'

(6.71) Yesterday Past Tense Negative

       ta[réébire kanyaanaanga   's/he didn't see the potato caterpillar'

       ta[réébire kankomáangwa   's/he didn't see the wood pecker'

Note that there is no HINS when there is a high tone on the verb stem. In these cases, the input verb root is √reeb 'see', which is underlying toneless. However, the morphologically inserted high tone is sufficient to block HINS.

6.3.5   Contrasting HINS and HDEL in Longer Phrases

Before we conclude the discussion of HDEL and HINS let us compare them on a phrasal level. In particular, the role of following phrasal elements will be important in the

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[19] See Chapter 4 for information the verb tenses that appear with morphologically inserted high tones.

analysis that follows. Only the immediately following constituent is crucial for the application of HINS (we shall see below that it is not just a following word that is relevant). If the word following a toneless head noun is toneless, then a high tone appears on the last vowel of the head noun. For example, consider the pairs of phrases in (6.72). A high tone is inserted onto the noun when it is followed by a toneless modifier and a high-toned word (quantifiers, numbers, or determiner). However, when the following word is high-toned, then there is no HINS.

(6.72) Noun phrases and HINS

a.	omuguhá muruunj' óogu	'this good rope'
	omuguha mukúr' óogu	'this old rope'
b	enkaitó nuunj' éeji	'this good shoe'
	enkaitoo nkúr' éeji	'this old shoe'
c.	enkaitó nuunji mukáaga	'six good shoes'
	enkaitoo nkúru mukáaga	'six old shoes'
d.	emiguhá yaanje mukáaga	'my six ropes'
	emiguha yaítu mukáaga	'our six ropes'
e.	enkaitó zaanjee nkúru	'my old shoes'
	enkaito yaítuu nkúru	'our old shoes'
f.	enzhú yaanjee nkúru	'my old house'
	enzhu yaítuu nkúru	'our old house'

(6.73)	a. emiguhá yaanje yóóna	'all my ropes'
	enkaitó zaanje zóóna	'all my shoes'
	b. emiguhá yaanje mikúru yóóna	'all my old ropes'
	emiguhá yaanje miruunji yóóna	'all my good ropes'
	c. emiguhá miruunji yóonka	'only good ropes'
	abaantú baruunji bóombi	'both good people'

The phrases in (6.73) provide some further examples of HINS. In (6.72) and (6.73), the toneless nouns have a high tone on their final syllable because the following word is toneless. If any high tone in the entire noun phrase were sufficient to block HINS, we would not expect to find the inserted high tone.

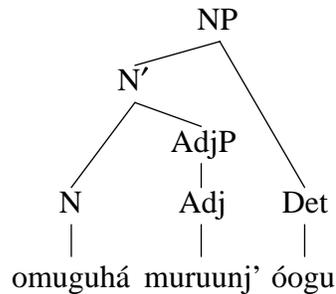The phrases in (6.72) have the structure given in Figure 6.13.

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                        NP
                 N′
                              AdjP
            N          Adj          Det
            |           |            |
          omuguhá    muruunj'      óogu
```

Figure 6.13   omuguhá muruunj' óogu   'this good rope'

When there are multiple words in the noun phrase, the determination of the tone of the head noun is based upon the phrase that follows. What is interesting is that the order of the words that follow (adjectives, quantifiers, determiners, and possessives) is not entirely fixed, though there do seem to be some restrictions. However, there does seem to be a preference for the order that places the adjective first (i.e., immediately after the head noun). Semantically, the post-head position seems to be the more prominent—the emphasis is more likely to be placed there.

(6.74) Noun phrases with adjectives and numbers

    a. enkaito mukáágaa nkúru   'six old shoes'

        enkaitoo nkúru mukáaga

    b. enkait**ó** mushaanzhuu nkúru   'seven old shoes'

        enkaitoo nkúru mushaanzhu

    c. enkait**ó** nuunji mukáaga   'six good shoes'

        enkaito mukáága nuunji

    d. enkait**ó** mushaanzhu nuunji   'seven good shoes'

        enkait**ó** nuunji mushaanzhu

Again, HINS only takes place when the following word is adjectival and toneless. HDEL also only takes place when the head is high toned and the immediately following word is a high-toned adjective.

Interestingly, we might expect any following high-toned adjective or possessive to condition HDEL. However, when these words are not immediately after the head noun, no HDEL occurs. In (6.75a–b), the high tone of the head noun, the first word in the phrase, is not deleted, despite a high tone that appears later.

(6.75) Noun phrases with adjectives and possessives

    a. enzhú zaanje nuunji   'my good gray hairs'

        enzhú zaanjee nkúru   'my old gray hairs'

    b. omwáána waanje muruunji   'my good child'

        omwáána waanje mukúru   'my old/important child'

    c. omw<u>aa</u>na mukúru waanje   'my old/important child'

        enzh<u>uu</u> nkúru zaanje   'my old gray hairs'

Notice that HDEL *does* target the noun when the high-toned adjective immediately follows it, as in (6.75c). Similarly, the phrases in (6.76) suggest that only the following word

is relevant for HINS as well. The words in (6.76c) are not targeted for HINS because of the high-toned word that immediately follows them.

(6.76) Noun phrases and HINS

      a. enkait**ó** zaanje nuunji   'my good shoes'
         enkait**ó** zaanjee nkúru   'my old shoes'
      b. enzh**ú** yaanje nuunji   'my good house'
         enzh**ú** yaanjee nkúru   'my old house'
      c. enkaito záítu nuunji   'my good shoes'
         enkaito záítuu nkúru   'my old shoes'

HINS still takes place when a toneless possessive follows a toneless noun, despite the high-toned adjective later in the phrase: *enkaitó zaanjee nkúru* 'my old shoes'. However, we should consider whether the conditioning factor is a single word, or a phrase. We can test this by adding the word *munóonga* 'very' after the adjective. If HINS still occurs, then the high on *munóonga* would appear not to be relevant. However, if HINS is blocked, then it is not just the following word that is relevant, but the entire phrase. The noun phrases in (6.77) begin with a toneless noun, followed by an adjective phrase containing a toneless adjective and the word *munóonga* 'very'. There is no HINS in (6.77).

(6.77)   Noun phrase and adjective phrase

        enkaito nuunji munóonga   'very good shoes'
        omuguha muruunji munóonga   'very good rope'
        omuhoro muruunji munóonga   'very good panga'
        eipapa riruunji munóonga   'very good wing'

```
                    NP
                   /  \
                  /   AdjP
                 /    /  \
               N    Adj    Adv
               |     |      |
            enkaito nuunji munóonga
```
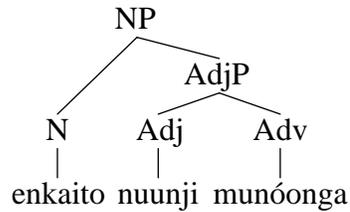
Figure 6.14   'very good shoes'

From the data in (6.77), we can conclude that HINS is blocked when there is a high tone in the following phrase, even if it is not adjacent to the target. The high tone on *munóonga* 'very' is within the AdjP that follows the noun, as illustrated in Figure 6.14. Recall from the data just examined in (6.76) that a high tone later in the phrase does *not* block HINS. That is because the second high-toned modifier in the noun phrases in (6.76) is in a separate adjective (or possessive) phrase: [*enkaitó* [*zaanje*]PossP [*nkúru*]AdjP].

We also see the same limitation placed on HDEL. In all cases in (6.78) with the configuration high–low–high, the high on the head noun persists despite the later high tone on an adjective. This high tone would otherwise condition HDEL.

(6.78) Noun phrase with adjective and quantifier

a.	embwáá nuunji zóonka	'only good dogs'
	ebikópo biruunji byóombi	'both good cups'
b.	embwáá zóómbi nuunji	'both good dogs'
	embwáá zóómbii nkúru	'both old dogs'

In this section, we have examined both HDEL and HINS in phrases with a special concern for the order of elements in the phrase. Only the immediately following phrase (adjective or possessive phrase, e.g.) is relevant for both HDEL and HINS. If that phrase contains a high-toned word (such as the adjective *nuunji munóonga* 'very good') then HINS is blocked.

6.3.6   Summary of HDEL and HINS

The preceding sections outline the appearance of HINS and HDEL. However, we have not attempted to provide a formal account. At this point, however, it should be clear that HINS has a larger set of possible targets and has a wider range of triggering configurations. On the other hand, HDEL only targets nouns when a high-toned possessive pronoun or indefinite adjective immediately follows them. Let us summarize HDEL and HINS, their targets and triggers.

(6.79) Summary of HDEL and HINS

    a. HDEL

        Target: Nouns

        Trigger: High-toned adjectives

                                  High-toned possessives

        Condition: Trigger immediately follows the target

    b. HINS

        Target: Nouns

                                  Verbs

                                  Conjunction (*na* 'and')

                                  Possessive preposition

                                  Quantifier heads (*buri* 'every')

        Trigger: Tonelessness of the immediately following phrase (which must be a sister to the target)

The range of targets for HINS is much greater than that for HDEL. In fact, just about any word can be targeted for HINS. The only type of word clearly missing from the list of targets is adjective. However, there are no complements (i.e., sisters to) an adjective that are toneless. The only adjective complement that appears is the word *munóonga* 'very'. So, the absence of adjectives from the list of targets for HINS may represent a lexical and/or syntactic gap and not a restriction on HINS.

In the following sections, we compare the different theories presented at the outset and show that HINS and HDEL cannot be accounted for under one unified theory that refers only to syntactic or to prosodic structure. In fact, both levels of grammatical representation must be called upon in order to explain these two processes.

6.4   Accounting for HDEL and HINS

Now that we have considered a wide range of the possible instances where HDEL and HINS can take place, let us continue with a discussion of accounting for and predicting these phenomena. What should be apparent from the preceding discussion is that HDEL has a much more restricted range of application: it only applies to nouns followed by a high-toned adjective or possessive. Verbs are not subject to HDEL (unless they are infinitives, which can function as both nouns and verbs, see (6.46) and (6.47) above). On the other hand, HINS has a very broad range of application, targeting nouns, verbs, and prepositions.

As discussed earlier, there are two major theories that can be used to account for these phenomena. The direct reference theory, following Kaisse 1985, Odden 1990, 1996, accounts for these principles in terms of relationships that are directly related to the syntactic structure of the word. An alternative account makes use of Selkirk's (1985) theory of derived domains. Specifically, the interaction between phonology and syntactic structure is mediated by the creation of prosodic domains that are based on syntactic structure. More precisely, these prosodic domains, primarily the phonological phrase (PPh), are defined in terms of edges.

We shall compare these two models for Runyankore for both HINS and HDEL. What is particularly interesting here is the fact that we have two principles with similar, but not identical, domains of application. Does either theory provide a better account of both of these? Ultimately, we shall find that the range of targets of HINS and HINS is in fact quite different. Because of the relatively narrow scope of HDEL we shall see that direct reference to syntactic information is the most perspicacious means to account for the phenomenon. On the other hand, HINS has a very wide range of application. Not only in

terms of the lexical categories of the possible targets, but also in the sense that HINS applies between the last two words of a phonological phrase. Following Selkirk, this phonological phrase will be defined in terms of the right edge of a maximal projection.

6.4.1   Direct Reference Theory

The direct-reference theory (referring to Max-command) appears to be able to account for these HINS and HDEL because of the importance of *heads* of phrases in locating the site for HINS and the target of HDEL. First we will consider the syntactic conditions necessary for the application of HDEL. We shall find that HDEL takes place in a narrowly defined set of syntactic configurations. After we have examined HDEL we shall consider whether this same type of account can deal with the facts of HINS, which is wider in application. We will find that the scope of HINS is not easily defined in strictly syntactic terms. Rather, the edges of certain syntactic constituents will be shown to be boundaries for the application of HINS.

6.4.1.1   HDEL

How might the direct reference theory account for HDEL? Recall that HDEL only takes place when a high-toned noun is immediately followed by an indefinite adjective or possessive within the same phrase. Is there a syntactic relationship that can pick out this type of complement to a noun but ignore those that do not condition HDEL, such as quantifiers, numbers, demonstratives, phrases, etc.?

Hyman & Byarushengo (1984) have suggested this type of relationship for Haya, Hubbard (1992) for Runyambo, and Odden for Kimatuumbi (1996) and Zinza (1997) that the sister to the phrasal head within the X′ phrase is relevant for certain sandhi effects. In Haya, which is closely related to Runyankore, a high tone is deleted in the following contexts: before a high-toned possessive, before a possessive phrase, and before a high-toned adjective. These are exemplified in (6.80)

(6.80) Haya High Tone Deletion (=Hyman & Byarushengo, 1984, p. 73)

    a. ekikômbe   'cup'

        ekikombe kyáitu   'our cup'

        ekikombe kyaa káto   'Kato's cup'

        ekikombe kilúngi   'a beautiful cup'

    b. ekikómbe kyange   'my cup'

        ekikómbe kyaawe   'your (sg.) cup'

        ekikómbe kîli   'that cup (over there)'

        ekikómbe kîmo   'one cup'

As these various phrases involving the word 'cup', *ekikômbe*, illustrate, high tone dele-
tion in Haya involves a similar environment. Hyman & Byarushengo note that demon-
stratives and numerals generally occur later in the noun phrase, after adjectives and
possessives. They hypothesize that adjectives and possessives are in a "tighter" relation-
ship with the noun (the target of high deletion). Their proposal, then, is that these words
stand as sisters to the N under the N′ node, while demonstratives, numbers and the like
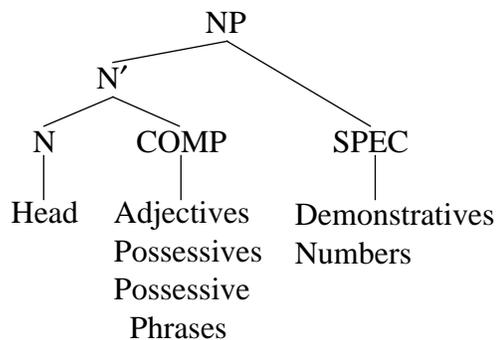are outside of N′ and are expansions of the SPEC node.

Figure 6.15   NP Structure in Haya

315

In Runyambo, a very similar process of high tone deletion takes place on noun and verb heads of phrases when a high-toned complement follows them. This process, dubbed high tone reduction (HTR) by Hubbard, targets both noun and verb heads of phrases. Hubbard proposes that both of these phrasal types map to a structure shown in Figure 6.16.
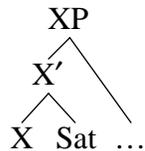
```
        XP
       /\
     X'  \
    /\    \
   X  Sat  …
```

Figure 6.16   Hubbard's Satellite Slot

Apart from nomenclature, this structure is the same as that proposed for Haya in Figure 6.16. However, Hubbard claims that the "Sat" or satellite slot is privileged in the language and is only generated in certain category-specific instances. Thus, in Runyambo, the satellite position only receives an argument (is generated) in the genitive construction.

For Zinza, Odden notes that a similar principle involving high tone deletion on verbs only takes place if the immediately following high-toned word is a complement of the verb. However, high deletion will not be triggered by a post-posed, coindexed object, as shown in (6.81), from Odden 1997.

(6.81) Zinza high deletion

ateekííle	'he cooked for'
ateekiile káto	'he cooked for Kato'
amu$_i$teekíílé káto$_i$	'he cooked for Kato'

Additionally, a post-posed object cannot triggered high deletion in Zinza, as shown in (6.82).

(6.82) Zinza high deletion failure

> bulemo$_i$ y$_i$-áagwa   'Bulemo fell'
>
> y$_i$-áagwa bulemo$_i$ 'Bulemo fell'

Odden assumes that these post-verbal words/phrases do not condition high deletion because they are not within the correct syntactic domain, namely, in the satellite position as a daughter to V′.

Odden (1996) describes principle of vowel shortening in Kimatuumbi wherein a vowel of a phrasal head is shortened when there is a complement in the phrase.

(6.83) Kimatuumbi Vowel Shortening

$$\sigma \rightarrow \sigma \;/\; [_{X'} [_X \text{\underline{\hspace{1cm}}} {}_X] Y _{X'}] \text{ (Y contains phonetic material)}$$

The environment specified in this example is similar to that found in non-HDEL environments: the word Y is a sister to X within X′. Odden points out that certain pre-head words do not undergo shortening.

(6.84) $[_{V''} [_{SPEC} \text{ keénda } _{SPEC}] [_{V'} \text{ akákaláanga } _{V'}] _{V''}]$

> if   he-had-fried
>
> 'if he had fried'

In this example, vowel shortening fails to apply to the word *keénda* 'if'. The solution suggested by Odden is that the demonstrative *keénda* 'if' is under the SPEC node and not within the V′. The relationship between the target and the trigger for vowel shortening here is essentially the same as for the preceding examples. The exclusion of the demonstratives echoes the exclusion of demonstratives from the domain of HDEL in Runyankore that we have seen above and will examine in more detail below.

What should be striking is the similarity between these languages. The application of HDEL in Runyankore follows a pattern similar to that found in Haya. The significant difference is that possessive phrases do not condition HDEL as they do in Haya. Following the work and observations of these three scholars, I propose that the structure of the NP is such that only adjectives and possessive pronouns may occupy the COMP position, i.e., be sisters to the N under the N′ node. The structure of a phrase like 'all old farmers' appears as in Figure 6.17.
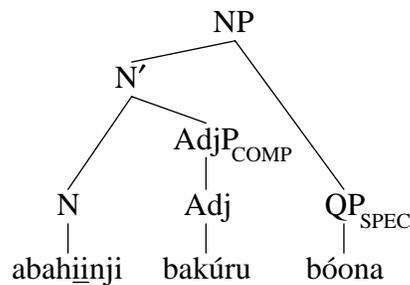

Figure 6.17   'all the old/important farmers'

The nodes corresponding to the COMP and the SPEC nodes are labeled in the tree. In this phrase, the adjective appears as a sister to the N, under N′. In Runyankore, only indefinite adjectives (i.e., those lacking the initial vowel prefix) and possessives can occupy this slot. So, if a phrase has only a quantifier, a number, or some other non-HDEL inducing phrasal element after the noun, then it must appear in a phrase that is sister to N′, as in Figure 6.18. In this example, a quantifier follows the noun. In Figure 6.19, the noun is followed by a definite adjective.
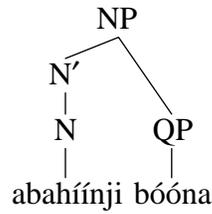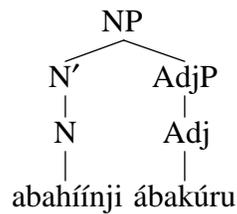
```
              NP
          N′
          |
          N      QP
          |       |
       abahíínji  bóóna
```

Figure 6.18   Noun plus quantifier phrase: 'all the farmers'

```
              NP
          N′      AdjP
          |
          N       Adj
          |        |
       abahíínji  ábakúru
```

Figure 6.19   Noun plus definite adjective: '*the* good farmers'

Under direct reference theory, we can isolate this position by reference to a command relationship. As suggested by Odden 1997, this is one based on the single-bar node: X′-command:

(6.85) X′-command (Odden 1997)

α X-commands β iff the first X′ node which dominates α also dominates β.

In Runyankore, HINS is restricted to occur only when a noun X′-commands a high-toned element. Recall that an adjective phrase can condition HDEL *omuhiinji muruunji*

munóonga 'a very good farmer'. In this case, the sister to the N under N′ contains a high tone. This structure is given in Figure 6.20.
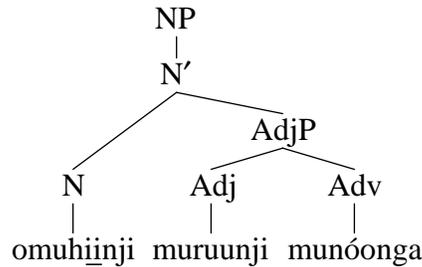
```
                          NP
                          |
                          N′
                           _____
                            \      \
                             \     AdjP
                              \    /    \
                    N         Adj      Adv
                    |          |        |
                omuhiinji  muruunji  munóonga
```

Figure 6.20   'very good farmer'

The noun *omuhíinji* 'farmer' X′-commands everything in the AdjP. Because there is a high tone in that AdjP, on the word *munóonga* 'very', HDEL targets the noun. This type of example is particularly interesting because it shows evidence for a long-distance triggering of a phonological effect. The target, *omuhíinji* 'farmer', and the trigger, *munóonga* 'very' are not adjacent words. The word that separates them, *muruunji* 'good', is toneless and thus cannot be the trigger for HDEL on the noun.

   One may recall that we saw instances above where the order of the elements in the noun phrase did not follow strictly the order described in Figure 6.14 (page 311). I propose that the language allows for the possibility of some reordering of the elements in the phrase. This is discussed in the following section.

6.4.1.2   Phrasal Reorganization and Tone Deletion

Recall that the order of the adjective and the quantifier/demonstrative is subject to some variation. A representative sample from (6.40) is repeated here as (6.86).

(6.86) Reorganized noun phrases

    a. abakáma báínji baruunji   '*many* good chiefs'

        abakáma baruunji baínji   'many good chiefs'

    b. abakáma báínji bakúru   '*many* old chiefs'

        abak<u>a</u>ma bakúru baínji   'many old chiefs

Note that HDEL only targets the noun when the high-toned adjective immediately follows it, as in (6.86d). The reason that HDEL does not occur in (6.86c) is because the high toned adjective is no longer in the same syntactic relationship with the noun *abakáma* 'chiefs'.

Figure 6.21   NP Reorganization

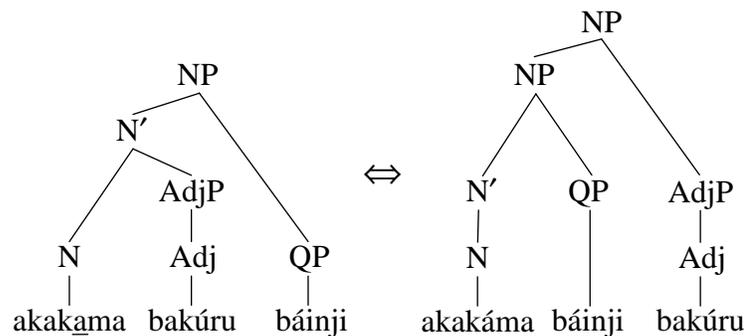The claim made in Figure 6.21 is that there is a systematic relationship between these two sentences. In the version on the right, the AdjP *bakúru* 'old' occupies the SPEC position of a higher NP. The relationship in the second tree is one of adjunction. Whether this is accomplished by a transformation (i.e., by movement) or simply by a parallel type of derivation is not crucial to this analysis.

The significant point, however, is that the adjective phrase in this example no longer stands in the same syntactic relationship with the head noun *abakáma* 'chief'. Because of this, we theorize, HDEL cannot target the head of the phrase.

6.4.1.3   Multiple Adjective Phrases

There may be multiple adjectives or a combination of adjectives and possessives after a noun. Which of these are relevant for the application of HDEL? First, consider the following.

(6.87) Multiple adjectives

<blockquote>

a. abáána baruunji baáto   'good young children'

ab<u>aa</u>na bató baruunji   'young good children'

b. embwáá nuunjii nkúru   'good old dog'

embw<u>aa</u> nkúru nuunji   'old good dog'

c. embwáá yaanje nuunjii nkúru   'my good old dog'

embw<u>aa</u> yáítu nuunjii nkúru   'our good old dog'

</blockquote>

The phrases in (6.87) illustrate the fact that HDEL only considers the immediately following adjective. If a high-toned adjective is separated from the noun by a toneless adjective, HDEL does not occur. For these phrases, I propose that the structure of the noun phrase is the determining factor in the deletion of the high tone. This structure is given in Figure 6.22.
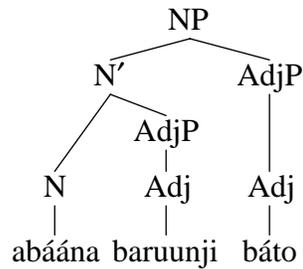
```
                        NP
                      ╱    ╲
                   N′        AdjP
                  ╱  ╲        │
                    AdjP      │
                     │        │
               N     Adj      Adj
               │     │        │
            abáána baruunji  báto
```

Figure 6.22   'young good children'

In the phrase *abáána baruunji báto* 'good young children', HDEL would target the noun *abáána* 'children'. However, because it does not X′-command a high-toned complement, HDEL does not occur. The high-toned adjective *báto* 'young' has no effect on the noun because it is above the N′ node and is not X′-commanded by the noun. Rather, it occupies the SPEC node under the NP.

6.4.2   Contrasting the Domains of HDEL and HINS

Before continuing with this analysis, let us take a moment to compare the differences between HDEL and HINS. One of the important differences between these two is the difference in the domains of their application.

Under the prosodic domain approach to the syntax-phonology interface (Selkirk 1986, discussed in section 6.2.2.1 above), the application of a phonological rule is restricted within a particular prosodic domain. This domain is constructed based upon the edges of a specified syntactic category (usually XMax).

In the case of Runyankore, HDEL and HINS, as seen above, have different domains of application. We have just examined HDEL and have seen that we can refer to its characteristics by referring to the X′-command relationship that holds between the target and the triggering phrase. We shall continue to assume that HDEL only considers what is within the X′ category, while HINS has a wider domain of application, namely one that extends up to the edge of an XMax category.

The Direct Reference Theory can account for the data pertaining to HDEL. However, as suggested above, the contrast between NPs with embedded prepositional phrases and conjoined NPs plays an important role. I repeat examples of these two structures here (from Figure 6.11 and Figure 6.12).
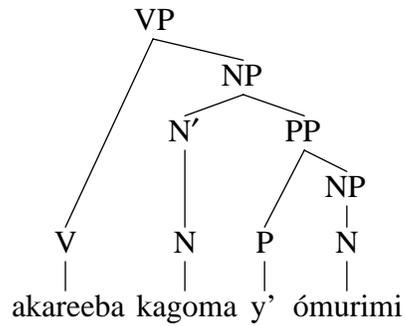
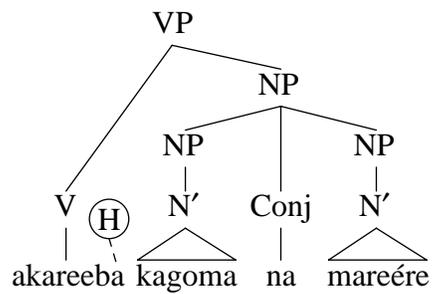Figure 6.23   'S/he saw the eagle of the farmer.'

Figure 6.24   'S/he saw the eagle and the hawk.'

324

Notice that HINS fails in Figure 6.23 (presumably because of the high tone on *ómurimi* 'farmer'). However, it *succeeds* in Figure 6.24, *despite* the high tone on *mareére* 'hawk'. If the requirement is that the verb (the target of HINS) max-command a toneless phrase, then why is HINS not blocked in Figure 6.24? Because the high tone blocks HINS, it would appear that we only want to look as far as the first maximal projection. So, with respect to Figure 6.24, only the NP containing *kagoma* is relevant. However, the Max-command relationship does not permit us to make this kind of distinction. The verb *akareeba* max-commands everything within the following NP, including *mareére*, which has a high tone. This presents a significant problem for an account that would rely solely upon the max-command relationship.

What this issue *does* suggest is that the scansion for high tones only searches as far as the end of the next maximal projection, without regard to embedding. This is exactly the kind of relationship that Selkirk's end-based prosodic theory tackles.

Describing the application of HINS in Runyankore from an edge-based perspective is trivial. In fact, it is possible to explain cases that at first glance appear to be quite difference such as the differences between an NP with an embedded PP and an NP containing two conjoined NPs.

First, let us examine a simple case, exemplified in Figure 6.25.
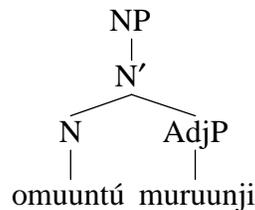
Figure 6.25   'a good person' (/*omuntu murunji*/)

Here, HINS targets the word preceding the word at the end of an XMax phrase (in this case, NP). Following Selkirk, the parameters for the construction of a prosodic domain would be:

(6.88)   HINS parameters

    a. $]_{XMax}$ Insert a boundary at the right edge of an XMax category.

    b. PPh   The edge is the edge of a prosodic phrase.

    c. $\emptyset \rightarrow H / [\_\_\#]_{\omega} [X]]_{PPh}$ Insert a high tone on the right edge of a
        X is toneless   toneless word that stands before the last
                                    element (X' or X^0) of the PPh.

By (6.88a & b), the following domain would be constructed.

Figure 6.26   Domain Mapping onto 'a good person'

Based upon the PPh domain, the principle of HINS in (6.88) can apply, inserting a high tone onto *omuuntu* 'person'.
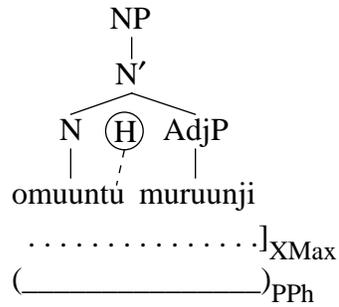
Figure 6.27   HIns onto 'a good person'

According to the specification of HIns given in (6.88c), only the word preceding the last element, word or phrase, of the PPh is targeted for HIns. Because of the structure of Runyankore, the successful target will be the word immediately prior to the last word in PPh. A counterexample would involve a toneless phrase appearing after a word that is a target for HIns. However, because of the conditions on HIns, that following toneless phrase should get a high tone (blocking HIns further to the left). Under a direct reference account, this would block any HIns onto a higher head (whether or not it X′-commands the lower unit). Furthermore, there are no examples of toneless phrases failing to undergo HIns. Unfortunately, adjectives take only *munóonga* 'very' as a complement. Because of the high toned *munóonga* HIns cannot target the adjective. Thus, we cannot test to see whether HIns would also target a toneless adjective. Note, however, that the phrases in (6.89) do not have high tones on the head nouns (*omuguha* 'rope' and *omuhoro* 'panga').

(6.89) Noun + adjective + adverb

             omuguha muruunji munóonga   'a very good rope'
             omuhoro muruunji munóonga   'a very good panga'

Let us consider a longer example to examine the problem of recursive embedded domains. In the phrase in Figure 6.28, a high tone appears on the last vowel of *kagoma* 'bataleur eagle'.
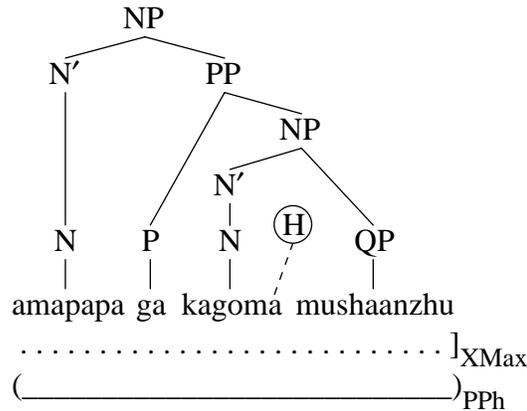
Figure 6.28   'wings of seven bataleur eagles'

All the words in the input to the phrase in Figure 6.28 are toneless. Under the direct reference account, we needed to specify that only the innermost head receives the high tone. However, in the prosodic domain account, all the higher heads of phrases are subsumed within the same prosodic domain. The principles of domain creation in (6.88) scan until the end of the XMax category. Any earlier sites for HINS are effectively ignored because they are not penultimate in the PPh, as required by the principle of HINS as formalized in (6.88c).

Another problematic area for the direct reference account, one whose resolution within that theory is not clear, involves the different behaviors of NPs depending upon their internal structure. These two possibilities are exemplified in (6.90). Recall that HINS will target a word when its NP complement contains a conjoined NP, as long as the first NP within it is toneless; it does not care about the tonal value of the second NP (example

a). On the other hand, a high tone within an embedded prepositional phrase *will* be suffi-
cient to block HINS (example b). See (6.90a) and (6.90b), respectively.

(6.90) Comparing domains of HINS

      a. akareebá kagoma na mareére   'S/he saw an eagle and a hawk.'
      b. akareeba kagoma y'ómwáana   'S/he saw the eagle of the child.'

Because these two types of NP have different internal structures we speculate that it is
these differences that allow the edge computation algorithm in (6.88) to create different
prosodic domains, and thus predict the correct application of HINS.
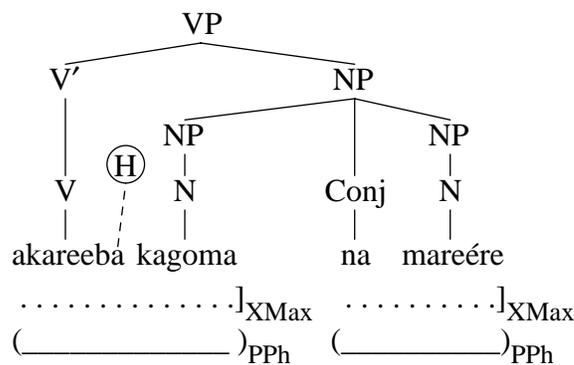
Figure 6.29   'S/he saw an eagle and a hawk.'

In Figure 6.29, the scansion of the VP reveals an edge at the end of the word *kagoma* 'ea-
gle'. Unlike the direct reference theory, which would include the rest of the parent NP in
the XMax domain of the verb *akareeba*, the prosodic phrase ends before the rest of the
conjoined construction. In fact, a second prosodic phrase is created based on the next end
of XMax. When this final NP is toneless, we also find HINS on the conjunction *na* 'and'
(see (6.62) and (6.65) for several examples of HINS onto this word).

Compare the prosodic structure of Figure 6.29 with that found in Figure 6.30.
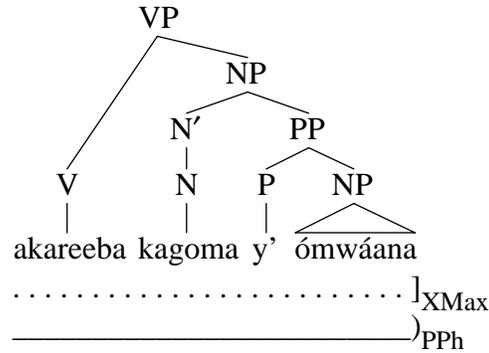
Figure 6.30   'S/he saw the eagle of the child.'

Here, the end of an XMax is not encountered until the end of the entire VP. Because of this, the entire VP maps to one prosodic phrase. In this case, then, the verb *akareeba* is not a possible target for HINS given the principle in (6.88c).

Another piece of evidence that the XMax edge is relevant to domains is the fact that HINS can apply twice within a domain that would be a single max-command domain. Consider the following sentence, repeated from (6.62).

(6.91) Multiple HINS

> a-ka-reeb-**á** kaarweenda n**á** kaartuusi
>
> 3S-REM-saw-FV cypress and eucalyptus
>
> 'S/he saw a cypress and a eucalyptus.'

Note that HINS has targeted both the verb *akareeba* 's/he saw' and the conjunction *na* 'and'. If the syntactic relationship required for the application of HINS were max-command, then the verb *akareeba* 's/he saw' would max-command the rest of the sen-

330

tence and HIₙₛ should only apply once. The sentence in (6.91) has the phrase structure given in Figure 6.31.
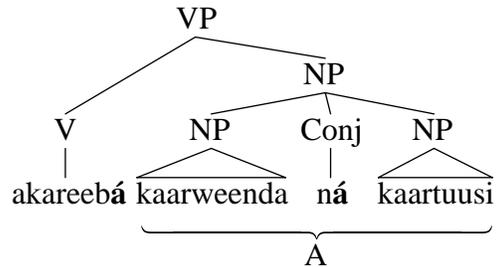
Figure 6.31   'S/he saw a cypress and a eucalyptus.'

The domain "A" is the range of the max-command relationship of the verb *akareeba* 's/he saw'. The problem lies in the fact that the exact same max-command relationship holds in a sentence with a prepositional phrase after the verb, such as the sentence in (6.90b). However , HIₙₛ cannot occur in this sentence, repeated here as Figure 6.32.
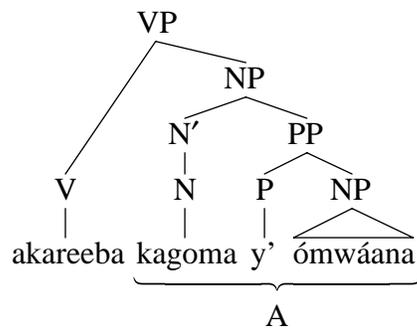
Figure 6.32   'S/he saw the eagle of the child.'

Observe that the max-command domain of the verb *akareeba* 's/he saw', A, is the same in the sentence in Figure 6.32. However, the tonal output is not the same. The failure of HINS to apply (inserting a high tone on the verb) is attributed to the high tone that is present on the object of the preposition *ómwáana* 'child'. Why does this high tone block HINS while the high tone on the conjunction *na* 'and' in Figure 6.31 fail to block HINS? If there is a domain for HINS that includes the verb then it must also include the object of the preposition in Figure 6.32. On the other hand, there must be two separate HINS domains in the sentence where two high toned are inserted, as in Figure 6.31.

Computing the domains of HINS by referring to the max-command relationship makes the wrong predictions, in the case of sentences with a conjunction. The conjunction should not present a barrier to the verb max-commanding the two NPs conjoined by the conjunction. We would expect a parallel behavior between a NP containing two conjoined NPs and an NP containing a noun and a prepositional phrase.

We therefore conclude that the direct-reference account that makes use of the max-command relationship is unable to distinguish between these two structures. On the other hand, the edge-based account is able to distinguish between these two sentences. Notice that the edge of the XMax category in the sentence in Figure 6.32 comes at the very end of the utterance.[20]

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[20] Odden (1998c) discusses a parallel case in Zinza. In his account, a chain of max-command relationships allows the flow of tonal information to move up the tree structure, accomplishing the blocking of HINS on the head of the VP.

```
                    VP
                     |⟍
                     |  NP
                     |  ⟋⟍
                     | N′   PP
                     | |   ⟋⟍
            V        N  P    NP
            |        |  |   ⟋⟍
         akareeba kagoma y'  ómwáana
         . . . . . . . . . . . . . . . . . . . . . . . ]XMax
         _____)PPh
```
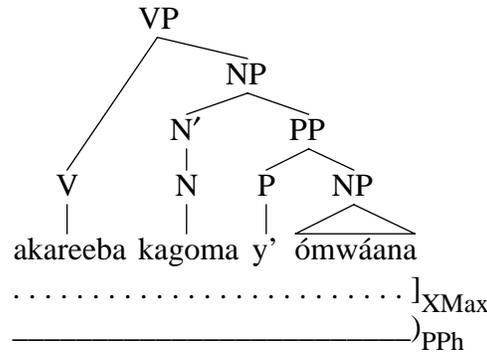
Figure 6.33   'S/he saw the eagle of the child.'

On the other hand, a conjoined NP contains an NP maximal projection within it, and this is logically where the boundary between the two domains for HINS lies.

```
                     VP
                    ⟋ ⟍
                   ⟋   ⟍
                  ⟋     NP
                 ⟋    ⟋ | ⟍
              V     NP  Conj  NP
              |    ⟋⟍   |    ⟋⟍
          akareebá kaarweenda   ná  kaartuusi
          . . . . . . . . . . . . . . . . ]XMax  . . . . . . . . . . ]XMax
```
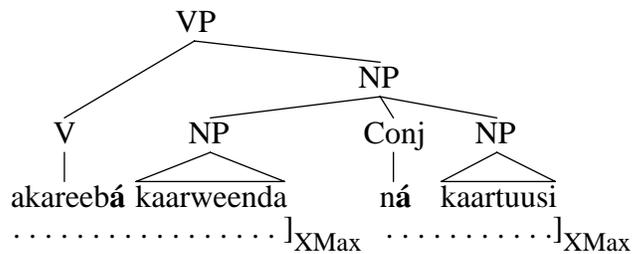
Figure 6.34   'S/he saw a cypress and a eucalyptus.'

In the sentence in Figure 6.34, the right edges of the XMax define the edges of the domains for HINS, viz. the phonological phrase.

The end-based account also allows us to explain why we find HINS on the head noun when there is an intervening toneless modifier, despite a prepositional phrase with a high

tone. Examples of this appear in (6.54). In Figure 6.35, repeated from (6.54), the right edges of the XMax phrases delimit the phonological phrases.
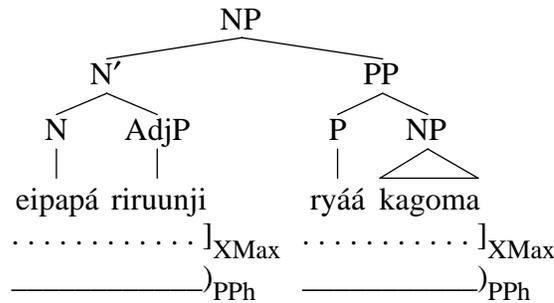
Figure 6.35   'good wing of the eagle'

With the addition of an adjective phrase, *riruunji* 'good', an additional phonological phrase appears. Because of this, the high tone that appears within the PP is not seen from within the N′.

    In this section, we have examined the evidence in favor of the edge-based analysis of high tone insertion. Along the way, we have considered an alternative analysis based upon syntactic relationships. However, as the differences in the data and the application of HINS have shown, the preferred analysis will be the edge-based analysis.

6.4.3   HDEL and the Phrasal Analysis

What is striking about this analysis of the syntax-phonology interface of Runyankore is the proposal that one rule makes reference to syntactic relationships (HDEL) and that another (HINS) depends upon the edges of a prosodic category, the phonological phrase, which is constructed based upon the right edge of a maximal projection. In other words, both the edge-based prosodic domain theory and the direct-reference theory are necessary to account for these two rules.

As we have just seen, the principle of phrasal HINS cannot be as neatly accounted for under the rubric of direct reference. But, on the other side of the theoretical coin, can HDEL be accounted for by means of a prosodic domain?

The main problem with this approach is in determining what, in fact, the prosodic domain for HDEL would be. Let us leave aside the possibility that it also is the phonological phrase—this would force us to allow for the possibility of multiple types of phonological phrases. As an alternative to the phonological phrase we could consider a prosodic unit lower in the hierarchy (as the domain for HDEL lies within the domain for HINS). One possibility is the clitic group or the phonological word. The most compelling counter-evidence to such a claim is the fact that an AdjP comprising a toneless adjective and the high-toned adverb *munóonga* 'very, a lot' can trigger HDEL (recall the examples given in (6.77): *omuhiinji muruunji munóonga* 'a very good farmer'. There does not seem to be any good evidence that these three words constitute a phonological word. We reject the possibility that this phrase comprises a clitic group for similar reasons.

Additionally, we note that HDEL targets only nouns, while HINS targets nouns, verbs, conjunctions, some prepositions and some quantifiers. Thus, there are already specific syntactic constraints on HDEL. In contrast, HINS appears to have no such constraints. Recall that adjectives do not ever get a high tone from HINS because of lexical and semantic gaps: the environment isn't possible given the words and syntax of Runyankore.

6.5   Conclusion

One of the significant debates in the study of the interface between syntax and phonology involves the type of information that is accessible to the phonology of a language from the syntactic structure. The primary question seems to be "can phonological rules make reference to syntactic structure?" Or, is the phonology limited to information that is mediated through levels of prosodic structure created from (restricted) syntactic information.

In Runyankore, the application of the two main phonological principles that must have access to syntactic information suggests that both approaches to the phonology/syntax interface may in fact be necessary. Consider that the principle of HDEL has

such a limited range of application. Because it only applies to nouns when a particular type of complement follows, the principle that directs its application should have access to this type of specific syntactic information. On the other hand, the principle governing HINS appears to be quite broad, targeting any toneless word that comes before another toneless word at the end of some expanse. Recall the facts of coordinated expressions, which are one unit syntactically, but have a break in before the conjunction. These facts support the notion that the *end* of some syntactic domain is relevant. Furthermore, the more general application of HINS at least allows for the possibility that a more general category (in this case, the phonological phrase) defines the domain of application for these rules.

CHAPTER 7

CONCLUSION

We have seen a wide range of phonological phenomena in this discussion. There are, however, a few specific linguistic features that tie them all together in some way. First of all, there is concern with the documentation and analysis of the tonal system of Runyankore, which has not been well studied. Secondly, we have attempted to describe the inter-relationship of the tonal phonology with other aspects of the language. For example, we considered the role of tone in both reduplication and in the interface between syntax and phonology.

In the realm of tone and morphology, we found that the tonal patterns of Runyankore can be described within the OT theoretical framework. However, in order to maintain Parallelism, it is necessary to enrich the model. It must have access to specific information about the input structures (most importantly, the input quality of the verb. Still, considerable difficulties exist when we consider the several layers of phonological principles that must apply to predict the correct tone patterns in the output. Chapter 3 considered the problem of phrase-final high tone retraction. Integrating this into the complete analysis proves to be a difficult task. Chapter 4 demonstrates the further complication of morphologically defined and restricted macroconstraints. On one hand, macroconstraints and morphological reference allow us to encode specific tone association patterns into a single constraint. However, the power of macroconstraints in the grammar may extend the

domain of possible OT phonologies beyond what we would expect to find in human languages. Clearly, this is an issue for future research.

Either way you look at it, dealing with a complete system (in this case, only a subset of the whole system, tone, was considered) requires one to adopt a richer model of phonology than classical OT (which would retain strict parallelism) provides. One of the insights of earlier phonological models is that there are levels to the grammar. Dividing the constraint hierarchy into distinct modules that feed one into the next could greatly simplify the grammar. However, how would this weaken the claims of OT to represent new insights into phonological structure and derivation? Again, this is work to be taken up in the future. Recasting the analyses presented in this dissertation in terms of several levels of H-EVAL could provide some insight into the usefulness of this approach.

With reduplication, we saw evidence that failure (the null parse) is a possible option in some grammatical operations. We propose that this be accounted for by allowing a preference for the null parse being encoded into the constraint hierarchy. When no other possibility exists to create a well-formed reduplicant, the result is reduplicative failure: there is no reduplicated form. Runyankore also shows a tendency to prefer the shape of the input in the reduplicant. Because of this fact, certain types of consonant mutation are not copied into the reduplicant.

Finally, in the realm the syntax-phonology interface, we find two different rules operating in Runyankore. One rule, High Deletion, removes a high tone from a noun when it is followed by a high-toned adjective or possessive. In contrast, a high tone is inserted when there is no other high tone within a phonological phrase. We find that both syntactic and prosodic levels of structure must be referred to in order to account for these rules. The rule of High Deletion has very specific requirements and can only be predicted based upon the syntactic structure of the NP. On the other hand, the rule of High Insertion takes place whenever a appears at the beginning of a phonological phrase that does not contain a high tone in it. Because phonological phrases are constructed from syntactic edges we see a fairly long-distance blocking of high tone insertion.

This dissertation is by no means an exhaustive account of all the grammatical structures in Runyankore. An ultimate goal for this line of research would be to attempt to

fully integrate all of the levels described here into one complete account. In this way, we could test not only parallelism, but also the general structure of an OT grammar.

Beyond examining just Runyankore, a consideration of the phonological systems of neighboring languages (in particular Haya, Kikerewe, Runyoro, and Rutooro) might help to elucidate some of the facts of Runyankore. Additionally, further consideration of the dialects of Runyankore would be of interest.

APPENDIX A

WORD LISTS AND VOCABULARY

We have included a word list for reference. Most of these entries should also be available in Taylor (1959). Note that the transcription system used here differs slightly from the official orthography used in Taylor. For more information, see chapter 2.

A.1 Nouns

omugóre–1–bride
omugurúsi–1–old man
omuguzi–1–buyer
omuhíinji–1–farmer
omukáma–1–chief
omukázi–1–woman
omukózi–1–worker
omunáku–1–poor person
omuriísa–1–herdsman
omurimi–1–farmer
omusheízha–1–man
omushúma–1–thief
omuuntu–1–person
omuvúji–1–driver
omwáami–1–husband
omwáana–1–child
omwíibi–1–thief
omwiishici–1–girl
omwóoro–1–poor person
omwoózho–1–boy
omubiri–3–body
omucira–3–tail
omucúúnjiro–3–dam
omuguha–3–rope

omuháanda–3–path
omuhíimbo–3–joy
omuhoro–3–paanga
omukóno–3–arm
omumíro–3–throat
omunwa–3–lip
omuriro–3–fire
omuryáango–3–entrance
omushána–3–light
omusíri–3–garden
omutana–3–quiver
omuti–3–tree
omutíma–3–heart
omútsyo–3–knife
omútwe–3–head
omúze–3–smallpox
omuzi–3–root
omwaambi–3–arrow
omwáani–3–coffee (beans)
omwéenzhu–3–banana, ripe one
omwíiko–3–plaster trowel
omwóoño–3–salt
eibáare–5–stone

eicúmu–5–spear
eihuri–5–egg
eikára–5–ember, coal
eipapa–5–wing
eiráka –5–voice
eisháamba–5–field, large
eízhu–5–ash(es)
eiziína–5–name
eríino–5–tooth
eríisho–5–eye
eríizi–5–tear
éyhwa–5–thorn
amaárwa–6–beer
amacwaánte–6–saliva
amáizi–6–water
amáte–6–milk
amazhúta–6–oil
ecicweéka–6–piece of something
garubíindi–6–spectacles, binoculars
ebitóosha–7–mushrooms, big
ecaaro–7–village
eceenjero–7–salt lick

340

ecibíra–7–forest
ecibuuzo–7–question
ecicére–7–frog
ecicoori–7–maize
ecicumúrwa–7–ember, wood
ecicúuncu–7–lion
ecifúba–7–chest
eciháha–7–lung
ecihíimba–7–bean
ecihuugúugu–7–butterfly
ecihúungu–7–bird, large, high-flying
ecíibo–7–basket
ecijere–7–foot
ecijíiko–7–spoon
ecikoona–7–crow
ecikópo–7–cup
ecine–7–liver
eciñéebwa–7–peanut
eciñoñi–7–bird, small
ecínya–7–lizard
ecíro–7–night time, one day
eciróori–7–lorry, truck
eciróoto–7–dream
ecishaka–7–wild flower
ecisháka–7–bush, forest
ecitáanda–7–bed
ecitábo–7–book
eciteebyo–7–story
eciti–7–stick
eciyéenzhe–7–cockroach
ebyoondo–8–mud
asifuríya–9–pot
bukaando–9–long trousers
bumosho–9–left side
buraanjiti–9–blanket
buráasi–9–brush
buryo–9–right side
bwíino–9–ink
cay–9–tea
cikóba–9–furry rat
cizhúbwe–9–green grasshopper
coka–9–chalk
cóoka–9–chalk
deréeva–9–driver

ebakúri–9–dish
ebáruha–9–letter
ecáshuri–9–nest
edébe–9–tin
eibabi–9–leaf
embeba–9–rat
embíbo–9–seed
embúga–9–compound, yard
embúzi–9–goat
émbwa–9–dog
emótoka–9–car
empumi–9–blind person
empuno–9–pig
eñama–9–meat
enceende–9–monkey
enda–9–stomach
énda–9–louse
endeverwáamo–9–mirror
eñéna–9–calf
engano–9–wheat
engáro–9–hand
engoma–9–drum
engwe–9–leopard
eñíindo–9–nose
enkaito–9–shoe
enkófiira–9–hat
enkóko–9–chicken
enkoni–9–cane
enkoni–9–stick
énku–9–firewood
enógu–9–food picked from a bowl
enseenene–9–grasshoppers
ensháho–9–sack
entébe–9–chair
eñwa–9–bee
enyaanzha–9–lake
enyonyi–9–airplane
enzhóci–9–bee
enzhóka–9–snake
enzhozho–9–elephant
enzhu, ama-–9–house
enzhúra–9–rain
epáciti–9–packet
esáati–9–shirt

eshábwe–9–thick cream and salt sauce
esyo, ama-–9–herd, a bunch
garon–9–gallon
káamba–9–sisal
kaankomáangwa–9–woodpecker
kaartuusi–9–eucalyptus tree
kaarweenda–9–tree sp. (like a tall cypress)
kaarweza–9–think salt and butter sauce
kabaragára–9–banana (small, sweet)
kabóha–9–ink plant, seeds make dye
kabóhe–9–cattle disease
káboondo–9–stomach bag
kahawa–9–coffee
kanyaanaanga–9–potato caterpillar
kanyoogoómbwa–9–maize caterpillar
kapuriseensi–9–cypress tree
kareebi–9–witness
mabuushu–9–prison
mabuushu–9–prison
magaro–9–pliers
makáansi–9–scissors
mareére–9–kite hawk
muha–9–hyena
muhógo–9–cassava
mushúshu–9–shrew
ñecíro–9–night(time)
ñoomshána –9–daytime
páamba–9–cotton
peterori–9–petrol
orubazhu–11–rib
orububi–11–spider web
orugaando–11–acacia
orujeendo–11–journey
orukúmu–11–finger
orurími–11–tongue
orúshu–11–gray hair
orwiiji–11–door
orwiiko–11–wooden spoon

ruzhuga–11–Adam's apple
akáana–12–tiny child
akacúmu–12–pen
akanwa–12–mouth
akánwa–12–mouth
akatébe–12–stool
akeyko–12–tiny wooden
   spoon
akéyko–12–tiny trowel
akoójo–12–tiny boy

kaamuzíinzi–12–hammerkop
kagoma–12–bataleur eagle
kanyóonza–12–sparrow
kasúku–12–parrot
kásyosyo–12–hot spring
otúku–13–bits of firewood
otúro–13–sleep
otutóóñezi–13–little drops
obuhúunga–14–maize meal
oburíísizo, ama-–14–pasture

obúro–14–millet
obusaza–14–peas
obusyo–14–herds
obutúzi–14–mushrooms, little
obweénje–14–intelligence
obwóoci–14–honey
obwóóngo–14–brain
okugúru–15–leg
okútu–15–ear

A.2   Verbs

Selected stems are provided below. We have also provided a number of verb stems with the perfective suffix, *-ire*. This allows one to see the consonant mutations that take place at the end of verb stems before this suffix. Notice that there are also a number of pairs of intransitive and transitive verbs. Transitivity in these pairs is usually indicated by the suffix *-y-*. This issue is also discussed in Chapter 5 on reduplication.

áka–**acire**–burn (i.)
ambuka—cross river/valley
ámira—scream, shout at
ámiza—shout, make s.o.
ana—set fruit
ánga—hate
ánika—spread out to dry
ara—spread out (tr.)
áta–**asire**–break (e.g., an egg)
aza–**arize**–search
baamba—stretch out a skin,
   crucify
baasa—be able
báasa–**baasize**–be able
báiha—deceive
baizha–**baizire**–carve
bara–**bazire**–count
baziira–**baziire**–sew
bíba–**bibire**–sow
biinga–**biinjire**–drive away
bóígora–**boigoire**–bark, snarl
boizhana—be lonely, left
   alone

bóna–**bonire**–find
bónera—look good
bónereza—punish, discipline
boora–**boire**–look down on
bórogota–**borogoite**–gurgle,
   roar, ramble on
búga—wander
bura—get lost
buunga—set a bone
búuza–**buurize**–ask
byáama—sleep
caca–**cacire**–mince
céérererwa—come late
ceeresa–**ceereise**–cause to be
   late
céña—break (metaphorically)
cócooza–**cocoorize**–chirp,
   investigate
cókoomboka—hop, hobble
cuma–**cumire**–tidy up
cúmika—smolder, make;
   cover with ashes to keep a
   fire

cúmura—remove a stick from
   a fire, be disobedient
cúra—wail
cuumba—smolder
cuumbuuka—rise, as smoke
cúunda–**cunzire**–churn
cúúndagura—shake
   (repeatedly) (tr.)
cwá–**cwiire**–pick, pluck, be
   disowned
cwéékanisa—criss-cross,
   cross over (tr.)
cwéera–**cweire**–spit
ebwa–**ebirwe**–forget
écamura—excited, be; act
   childish
ecureenga—busy, be; fill up
   time with busyness
eekunika—expose oneself,
   make oneself vulnerable
égaana—deny (< Ganda)
éga–**ejire**–learn
égaraata—linger, be vagrant

342

ehakana—deny
ehámura—yawn
éhanaanjisiriza—plead with; offer honest advice
éhiimbajiriza—prop self up; struggle with s.t.; walk with a stick
éjesa–**ejeise**–teach
ékorera—carry on the head
ékuza—boast
énda–**enzire**–want
enejeza–**enejeize**–rekindle
enga—mix a liquid and solid that dissolves
enguka—ripen; burn to solid ash; be yellow
enjera–**enjiire**–take cattle to drink; give cattle salt; ripen
ereeza–**ereize**–wave
érinda–**erinzire**–guard oneself
érwaana–**erwaanire**–resist, defend self
eshera–**esheire**–water (cattle, livestock)
éshongora–**eshongoire**– sing
éta–**etsire**–call
étsiga–**etsijire**–trust
éyiba—slink off
éza–**érize**–bring to fruit
ézhwaangazhwaanzya—get mixed up in things you have not business in
fá–**fiire**–die
fooka—change to, change color (i.)
foora–**foire**–change into, change color (tr.), twist
fúmuka—be pierced, punctured
fúmura—pierce (tr.)
fúmuza—pierce, pass through
fuña–**fuñire**–herd, fold
fúruka—emigrate
furumuka—dash out, evacuate

fúrura—move, relocate (house and goods)
fútana–**futaine**–chew
fuza–**furize**–wet (tr.)
gaamba–**gaambire**–say
gaanga—suffer
gáángaara–**gaangaire**–stiffen (i.)
gáángaaza–**gaangarize**–stiffen (tr.)
gaaniira–**gaaniire**–converse
gaaya–**gaayire**–chew, gnaw
gaba—divide, give away
gabura–**gabwiire**–host, serve, feed, be hospitable
gáma—resist bodily
gáña—writhe, be bitter
gaya—despise
gazha–**gazire**–be useful
góya—cook & stir (millet, e.g.)
gura–**guzire**–buy
gúruka–**gurucire**–jump
guza–**gurize**–sell
gwa–**gwiire**–fall
gwezhejera–**gwezhejeire**–sleep
haanga–**haanjire**–create
habura–**habwiire**–advise, guide
há–**heire**–give
haiga–**haijire**–harvest tubers, dig up
hana—advise
hanaanjisiriza—advise, give honest persistent
handiika–**handiicire**– write
hára—scrape something
hata—do continuously
héédecerera—destroyed, be
heeka–**heecire**–carry something
héenda—break (e.g., wood)
hééreeza—serve, work for, give
héesha–**heesire**–forge metal

héra–**hezire**–disappear (for good)
hera–**hezire**–taunt
héza–**herize**–complete, finish
híiganisa–**hiiganisa**–persecute
híimbya–**hiimbiise**–encourage
híinga–**hiinjire**–cultivate
híirwa–**hiirirwe**–be lucky
híisa–**hiisize**–brew, cook, ripen
hika–**hicire**–arrive
híña–**hiñire**–fold over
hóma—stuff a wall
huña—smell bad
húna—sniff (animals)
hunahuna–**hunahunire**–sniff around (dog)
huunga–**huunjire**–run away, flee
húúrira–**huuriire**–hear
hwa–**hwiire**–be finished
hweera–**hweire**–help, assist
íba—steal
ibika—go under water
ibuka—come out of water, emerge
ibura–**ibwiire**–take out of water (tr.)
iciriza–**iciriize**–believe, agree
íha—dig up, remove from inside
íhuza—collect on a loan, debt
imuka—rise (i.)
imusya—cause to rise
imura—wake
inika–**inicire**–bend
inuka—return at end of day
íruka–**irucire**–run
íta–**itsire**–kill
izha–**izire**–come
izhitsya—come, cause to
jeenda–**jeenzire**–leave, go
jeesha–**jeesire**–harvest (millet)
jira–**jizire**–say something
káanga—frighten

343

kága–**kajire**–smell (tr.)
káma–**kamire**–milk
káraanga–**karaanjire**–dry roast
kóma–**komire**–tie (bag, package)
kúna—entertain, be hospitable
kúña—scrub down
kúnika—turn upside down
kúnisa—decorate, flirt
kúra—grow up
kúúnda–**kunzire**–like
kúura–**kwiire**–weed, pull out
kúza–**kurize**–bring up, rear
kwáata–**kwaatsire**–catch
kweehakaana—deny
máña—know
máñisa—inform, cause to know
mára–**mazire**–finish
mera–**merire**–germinate, to melt
meza–**merize**–germinate; make
meza—use something to help swallow
móka–**mocire**–bark
mwa–**mweire**–shave
myoora–**myoire**–twist
naaba—wash (hands, feet, e.g.)
naabisa–**naabisize**–wash (with soap)
nia–**niire**–defecate
niogana–**niogaine**–jostle, struggle with
niónioza–**nionioize**–annoy a lot
nóga–**nojire**–pick (cotton, coffee, e.g.); be beaten up
nózya–**nojize**–crush, knead; beat up; wear out
ñwá–**ñwiire**–drink
óga–**ojire**–bathe , wash (i.)
óma—be dry (i.)
ómbera–**ombeire**–weed
ómya—dry (tr.)

óna–**onire**–damage crops
onka—nurse, suckle
ora–**oire**–rake leaves
óreka–**orecire**–show
otsya–**ocize**–burn s.t.
ózya–**ojize**–wash clothes
ózya—wash, bathe (tr.)
pima—measure
ráara–**raire**–pass the night *orairé-gye* good morning
raaza–**raarize**–extinguish
ramutsya–**ramucize**–greet
rasha–**rasire**–shoot an arrow
reeba–**reebire**–see
reenga–**reenjire**–weigh
réeta–**reesire**–bring
réétesa–**reeteise**–bring, cause to
rema—tie down drum head, to rule
rémbesereza–**rembeserei-ze**–soothe, comfort (a child, e.g.)
remwa–**remirwe**–be hard, be unable to do something
rira–**rizire**–cry
ruga–**rujire**–come out from
rúma–**rumire**–bite
rwaana–**rwaanire**–fight
rwáara–**rwaire**–be sick
ryá–**riire**–eat: *náaríire* 'I've already eaten' i.e., "I'm assured of something ahead of time."
sa–**seire**–grind, mill
shaarira—be bitter
shaaruura–**shaarwiire**–complete the harvest
shaba–**shabire**–ask
shára–**shazire**–cut, slice
shara—go crazy
shátagurika—shatter, burst into pieces
shecesa—laugh, cause to
shéékura–**sheekwiire**– pound

sheembuka–**sheembucire**–walk slowly, like a sick person
shéémbutsya–**sheembucize**–help to walk
shéémera–**sheemeire**–nice, pleasant, calm; be
shéémeza—nice, pleasant, calm; make
shééndecereza–**sheendece-reize**–escort
shéénjeera–**sheenjeire**–buy beer
sheenjera–**sheenjeire**–give a care package
sheka–**shecire**–laugh
shereka—hide something
shiisha–**siisire**–sin, mess up
shobera—baffle, be difficult for others
shobeza–**shobeize**–wrong someone
shohora–**shohoire**–go out
shoma–**shomire**–read
shomesa–**shomeise**–teach
shusha–**shushire, susire**–seem, appear
shútama–**shutamire**–sit
shuuma—descend
shweeka–**shweecire**–cover
shwéera–**shweire**–marry
siba—tie up
sibya—tie with
síga–**sijire**–leave s.t.
syá–**hiire**–ripen, be cooked
taandika—begin
tagasa–**tagaise**–heat up
tá–**teire**–place (auxiliary)
téeka–**teecire**–cook
teenga—wish
téera–**teire**–beat
téesa–**teesize**–plan, meet, discuss
téma–**temire**–cut (wood)
tereka—offer beer
tésa—spoil someone

téysa–**teysize**–admonish politely, calm someone (children)

tímba–**timbire**–dig

toba—be wet

toizha–**toizire**–tithe

tooña—drip

tóora–**toire**–travel along a path

tóóreza–**tooreize**–copy, imitate

tsiba—tie, lock up

tsiiba—fast

túma–**tumire**–send

tunda–**tunzire**–sell

túura–**twiire**–stay, or dwell

twáara–**twaire**–take

twa–**tweera**–give a present, donation

twéeka—send (through s.t.)

vúga—drive

yaaga—visit a bereaved person

yaamba—help

yaga–**yajire**–melt (i.)

yazya–**yagize**–melt (tr.)

yoomba—shout

za–**jiire**–go to

zhuga–**zhujire**–make sound (animal)

zhwaanga—mix; be mixed, (i.)

zhwaanzya—mix (tr.)

zhwáara–**zhweire**–dress (i.)

zhwáaza—dress (tr.)

zhwa–**zhwiire**–drip, bleed

zhweera–**zhweeriire**–bleed for

zhwiisa—bleed, cause to

zibira—prevent

zíbira–**zibiire**–prevent

zirika—tie around, wrap around, dress nicely

APPENDIX B

VERB FORMS AND CHARTS

B.1   Verb Tense Formation

Tense	Formation	Tone Melody
Infinitive	*oku* + STEM	
Remote Past	SP + *ka* + STEM	
Remote Past Neg.	*ti* + SP + *rá* + PSTEM	
Remote Past Relatives	Rel + SP + *á* + PSTEM	V2/default
Remote Past Neg. Relatives	Rel + SP + *ta* + *rá* + PSTEM	
Yesterday Past	SP + PSTEM	V2/final
Yesterday Past Neg	*ti* + SP + PSTEM	V2/final
Yest. Past Rel.	Rel + SP + PSTEM	
Yest. Past Neg. Rel.	Rel + *ta* + SP + PSTEM	V2/final

Hodiernal	SP + *á* + PSTEM	
Hodiernal Neg	*ti* + SP + *á* + *ka* + PSTEM	
Hod. Relatives	Rel + SP + *á* + PSTEM	
Hod. Neg. Rel.	Rel + SP + *tá* + *ka* + PSTEM	
Recent Past	SP + *á* + STEM	
Recent Past Neg	*tí* + SP + *a* + STEM	High Neg.
Rec. Past. Rel.	Rel + SP + *á* + STEM	
Rec. Past. Neg. Rel.	Rel + SP + *tá* + *á* + STEM	
Habitual	SP + STEM	V2/final
Habitual Neg.	*ti* + SP + STEM	V2/default
Hab. Rel.	Rel + SP + STEM	
Hab. Neg. Rel.	Rel + SP + *tá* + STEM	V2/final
Present Prog.	*ni* + SP + STEM	V2/final
Present Prog. Neg	*ti* + SP^H + *ku* + STEM	
Pres. Prog. Rel.	*arí* + INF	
Pres. Prog. Neg. Rel.	*atári* + INF	
Future	SP + *rí* + *á* + STEM	
Future Neg	*ti* + SP + *rí* + STEM	
Fut. Rel.	Rel + SP + *rí* + STEM	n/a
Fut. Neg. Rel.	Rel + SP + *ta* + *rí* + PSTEM	n/a

Perstitive	*ni* + SP + *ci* + STEM	V2/final
Perstitive Neg	*tí* + SP + *ci* + STEM	High Neg.
Pers. Rel.	*aciri* + INF.	n/a
Pers. Neg. Rel.	Rel + SP + *tá* + STEM	High Neg.
Perstitive Neg (long)	*tí* + SP + *a* + STEM	High Neg.
Conditional	SP + *ka* + *á* + STEM	
Conditional Neg	*tí* + SP + *ka* + *á* + STEM	
Cond. Rel.	Rel + SP + *kú* + PSTEM	
Cond. Neg. Rel.	Rel + *tá* + *ku* + STEM	High Neg.
Counterfactual	SP + *ka* + *á* + PSTEM	
Counterfactual Neg	*ti* + SP + *ka* + *á* + PSTEM	
Hortative	*ká* + SP + ROOT + *e*	V2/final (V2 w/ OP)
Hortative Negative	SP + *tá* + STEM	High neg.
Subjunctive	SP + ROOT + *e*	V2/final
Subjunctive w/ OP	SP + OP + ROOT + *e*	V2/default
Hypothetical	*kú* + SP + *ra* + ROOT + *e*	V2/default
Hypo. Negative	*kú* + SP + *ta* + *ra* + ROOT + *e*	V2/default

B.2   Tense Examples

These examples make use of the following morphemes. While every attempt has been made to keep the forms consistent, there are cases where they verb roots, subject and object prefixes vary. The reader may wish to refer to chapter 2 if they are unfamiliar with Bantu verbal morphology.

(B.1)   Verb roots; Perfective stem form (cf. imbrication); gloss

√bar	bazire	'count'
√baziir	baziire	'sew'
√káraang	káraanjire	'dry roast'
√reeb	reebire	'see'
√bón	bónire	'find'
√téek	téécire	'cook'
√gaamba	gaambire	'speak'

B.2.1   Affirmative Main clause

Infinitive	oku-baziir-a	oku-káraang-a
Object prefix	oku-jí-bariir-a	oku-ci-káraang-a
Reflexive Prefix	okw-éé-baziir-ir-a	okw-éé-karaang-a
Toneless object noun	oku-baziir-ir-á buremu	oku-káraanj-ir-a buremu
High-toned object n.	oku-baziir-ir-a kakúru	oku-káraanj-ir-a kakúru
Remote Past	a-ka-baziir-a	a-ka-káraang-a
	a-ka-jí-baziir-a	a-ka-ci-káraang-a
	a-kéé-baziir-ir-a	a-kéé-káraanj-ir-a
	a-ka-baziir-ir-á buremu	a-ka-káraanj-ir-a buremu
	a-ka-baziir-ir-a kakúru	a-ka-káraanj-ir-a kakúru
Yesterday Past	a-bazí-ire	a-karaanj-íre
	a-ba-ji-bazí-ire	a-ci-karaanj-íre
	a-ye-bazíír-i-ire	a-ye-karaanj-i-íre
	a-bazí-íre buremu	a-karaanj-i-iré buremu
	a-bazí-íre kakúru	a-karaanj-i-iré kakúru
Hodiernal Past	yáá-bazi-ire	yáá-káraanj-ire
	yáá-jí-bazi-ire	yáá-ci-káraanj-ire
	yáá-yé-bazii-r-i-ire	yáá-yé-karaanj-ire
	yáá-bazi-iré buremu	yáá-káraanj-i-iré buremu
	yáá-bazi-ire kakúru	yáá-káraanj-i-ire kakúru

Recent Past	yáá-baziir-a	yáá-káraang-a
	yáá-jí-baziir-a	yáá-ci-káraang-a
	yáá-yé-baziir-ir-a	yáá-yé-karaang-a
	yáá-baziir-ir-á buremu	yáá-káraanj-ir-a buremu
	yáá-baziir-ir-a kakúru	yáá-káraanj-ir-a kakúru
Habitual	a-bazíir-a	a-karaáng-a
	a-ji-bazíir-a	a-ci-karaáng-a
	a-ye-bazíír-ir-a	a-ye-karaánj-ir-a
	a-bazíír-ir-a buremu	a-karaanj-ir-á buremu
	a-bazíír-ir-a kakúru	a-karaanj-ir-á kakúru
Present Prog.	n-aa-bazíir-a	n-aa-karaáng-a
	n-aa-ji-bazíir-a	n-a-ci-karaáng-a
	n-aa-ye-bazíír-ir-a	n-aa-ye-karaanj-ír-a
	n-aa-bazíír-ir-a buremu	n-aa-karaanj-ir-á buremu
	n-aa-bazíír-ir-a kakúru	n-aa-karaanj-ir-á kakúru
Future	a-ry-áá-baziir-a	a-ry-áá-káraang-a
	a-ry-áá-jí-baziir-a	a-ry-áá-ci-káraang-a
	a-ry-áá-yé-baziir-ir-a	a-ry-áá-yé-karaanj-ir-a
	a-ry-áá-baziir-ir-á buremu	a-ry-áá-káraanj-ir-a buremu
	a-ry-áá-baziir-ir-a kakúru	a-ry-áá-káraanj-ir-a kakúru
Perstitive	n-aa-ci-bazíir-a	n-aa-ci-karaáng-a
	n-aa-ci-ji-bazíir-a	n-aa-ci-ci-karaáng-a
	n-aa-cee-bazíír-ir-a	n-aa-cee-karaanj-ír-a
	n-aa-ci-bazíír-ir-a buremu	n-aa-ci-karaanj-ir-á buremu
	n-aa-ci-bazíír-ir-a kakúru	n-aa-ci-karaanj-ir-á kakúru
Conditional	a-káá-baziir-a	a-káá-káraang-a
	a-káá-jí-baziir-a	a-káá-ci-káraang-a
	a-káá-yé-baziir-ir-a	a-káá-yé-karaanj-ir-a
	a-káá-baziir-ir-á buremu	a-káá-káraanj-ir-a buremu
	a-káá-baziir-ir-a kakúru	a-káá-káraanj-ir-a kakúru

350

Counterfactual	n-káá-reeb-ire	n-káá-káraanj-ire
	n-káá-bá-reeb-ir-e	n-káá-ba-káraanj-i-ir-e
	n-káá-yé-reeb-ir-e	n-káá-yé-bon-ire
	n-káá-reeb-iré buremu	n-káá-bón-ire buremu
	n-káá-reeb-ire kakúru	n-káá-bón-ire kakúru
Hortative	ká-tu-bazíir-e	ká-tu-karaáng-e
	ká-tu-ji-bazíir-e	ká-tu-ci-káraang-e
	ká-twee-bazíír-ir-e	ká-twéé-karaanj-ir-e
	ká-tu-bar-é buremu	ká-tu-bon-é buremu
	ká-tu-bar-é kakúru	ká-tu-bon-é kakúru
Subjunctive	o-bazíir-e	o-karaáng-e
	o-ji-bazíir-e	o-bi-káraang-e
	o-ye-bazíír-ir-e	o-yé-karaanj-ir-e
	o-gaamb-ír-e buremu	o-teec-ir-é buremu
	o-gaamb-ír-e káto	o-teec-ir-é káto
		o-ci-tééc-ir-e buremu
		o-ci-tééc-ir-e káto
Hypothetical	kú-tu-ra-bazíir-e	kú-tu-ra-káraang-e
	kú-tu-ra-ba-bazíír-ir-e	kú-tu-ra-ba-káraanj-ir-e
	kú-tu-ra-ye-bazíír-ir-e	kú-tu-ra-yé-karaanj-ir-e

B.2.2   Affirmative subordinate clause

Infinitive	n/a	n/a
Remote Past	a-yaa-bazí-ire	a-yaa-káraanj-ire
	a-yaa-ba-rééb-ire	a-yaa-bi-káraanj-ire
	a-yaa-ye-bazíír-i-ire	a-yaa-yé-karaanj-i-ire
	a-baa-gabur-i-iré buremu	a-yaa-karaanj-i-iré buremu
	a-baa-gubur-i-ire káto	a-baa-karaanj-i-ire káto
Yesterday Past	a-bazi-ire	a-káraanj-ire
	a-bá-baziir-i-ire	a-ba-káraanj-i-ire
	a-yé-baz-ire	a-b-éé-bon-ire
	a-bá-á-baz-iré buremu	a-ba-bón-ire buremu
	a-bá-á-baz-iré káto	a-ba-bón-ire káto
Hodiernal Past	a-yáá-bazi-ire	a-yáá-káraanj-ire
	a-yáá-jí-bazi-ire	a-yáá-bi-káraanj-ire
	a-yáá-yé-baziir-i-ire	a-yáá-yé-karaanj-i-ire
	a-yáá-baz-iré buremu	a-yáá-káraanji-iré buremu
	a-yáá-baz-ire káto	a-yáá-káraanji-ire káto
Recent Past	a-yáá-baziir-a	a-yáá-káraang-a
	a-yáá-jí-baziir-a	a-yáá-ci-káraang-a
	a-yáá-yé-baziir-a	a-yáá-yé-karaang-a
	a-yáá-baziir-ir-á buremu	a-yáá-káraanj-ir-a buremu
	a-yáá-baziir-ir-á kakúru	a-yáá-káraanj-ir-a kakúru
Habitual	a-baziir-a	a-káraang-a
	a-jí-baziir-a	a-bi-káraang-a
	a-yé-baziir-a	a-yé-karaang-a
	a-baziir-ir-a buremu	a-káraang-ir-a buremu
	a-baziir-ir-a kakúru	a-káraang-ir-a kakúru
Present Prog.	arí kubaziira	arí kukáraanga
	a-ba-rí kubaziira	a-ba-rí kukáraanga

352

Future	a-rí-baziir-a	a-rí-karaang-a
	a-rí-jí-baziir-a	a-rí-ci-káraang-a
	a-ry-éé-baziir-a	a-ry-éé-karaang-a
	a-rí-baziir-ir-á buremu	a-rí-karaang-á buremu
	a-rí-baziir-ir-á kakúru	a-rí-karaang-a kakúru
Perstitive	a-cí-ri kubaziira	a-cí-ri kukáraanga
Conditional	a-ya-kú-bazi-ire	a-ya-kú-káraanj-ire
	a-kú-bá-bazi-ire	a-ya-kú-ci-káraanj-ire
	a-ya-kw-éé-baz-ire	a-ya-kw-éé-karaanj-ire
Counterfactual	--	--
Hortative	--	--
Subjunctive	a-ra-bazíir-e	a-ra-káraang-e
	a-ra-ji-bazíir-e	a-ra-bi-káraang-e
Hypothetical	n/a	n/a

B.2.3   Negative Main clause

Infinitive	--	--
Remote Past	t-a-rá-bazi-ire	t-a-rá-karaanj-ire
	t-a-rá-bá-baziir-i-ire	t-a-rá-ba-káraanj-ire
	t-a-ré-é-baziir-i-ire	t-a-ré-é-karaang-i-ire
	t-a-rá-baz-ire buremu	t-a-rá-bón-ire buremu
	t-a-rá-baz-ire káto	t-a-rá-bón-ire káto
Yesterday Past	a-baziire	a-káraanjire
	a-bá-baziir-i-ire	a-ba-káraanj-i-ire
	a-yéé-reeb-ire	a-yé-bon-ire
	a-reeb-iré buremu	a-bón-ire buremu
	a-reeb-ire káto	a-bón-ire káto

353

Hodiernal Past	a-yá-bazi-ire	a-yá-káraanj-ire
	a-yá-zí-bazi-ire	a-yá-bi-káraanj-ire
	a-yá-yé-baziir-i-ire	a-yá-yé-karaanj-i-ire
	a-yá-baz-ire buremu	a-yá-bón-ire buremu
	a-yá-baz-ire káto	a-yá-bón-ire káto
Recent Past	tí-n-aa-baziir-a	tí-n-aa-karaang-a
	tí-n-aa-ji-baziir-a	tí-n-aa-bi-karaang-a
	tí-n-aa-ye-baziir-ir-a	tí-n-aa-ye-karaanj-ir-a
	tí-n-aa-bar-a buremu	tí-n-aa-bon-a buremu
	tí-n-aa-bar-a káto	tí-n-aa-bon-a káto
Habitual	ti-ba-bazíir-a	ti-bá-karaang-a
	ti-ba-tu-bazíír-ir-a	t-a-bi-káraang-a
	ti-be-e-bazíír-ir-a	ti-bé-é-karaanj-ir-a
	ti-ba-bar-á buremu	ti-bá-teec-er-a buremu
	ti-ba-bar-á káto	ti-bá-teec-er-a káto
Present Prog.	t-á-ku-baziir-a	t-á-ku-káraang-a
	t-á-ku-bá-baziir-ir-a	t-á-ku-ba-káraanj-ir-a
	t-á-kw-éé-baziir-ir-a	t-á-kw-éé-karaanj-ir-a
	t-á-ku-baziir-ir-á buremu	t-á-ku-káraanj-ir-a buremu
	t-á-ku-baziir-ir-a káto	t-á-ku-káraanj-ir-a káto
Future	t-a-rí-baziir-a	t-a-rí-karaang-a
	t-a-rí-bá-baziir-ir-a	t-a-rí-ba-káraanj-ir-a
	t-a-ry-éé-reeb-a	t-a-ry-éé-teer-a
	t-a-rí-baziir-ir-á buremu	t-a-rí-karaanj-ir-á buremu
	t-a-rí-baziir-ir-á káto	t-a-rí-karaanj-ir-a káto
Perstitive	tí-ba-a-ci-baziir-a	tí-ba-a-ci-karaang-a
	tí-ba-a-ci-ji-baziir-a	tí-ba-a-ci-ci- karaang -a
	tí-ba-a-c-ee-baziir-ir-a	tí-ba-a-c-ee- karaang -ir-a
	tí-ba-a-ci-baziir-ir-a buremu	tí-ba-a-ci- karaanj -ir-a buremu
	tí-ba-a-ci-baziir-ir-a káto	tí-ba-a-ci- karaang -ir-a káto

Conditional	t-á-ká-á-baziir-a	t-á-ká-á-káraang-a
	t-á-ká-á-bá-baziir-ir-a	t-á-ká-á-ba-káraanj-ir-a
	t-á-ká-á-yé-reeb-a	t-á-ká-á-yé-teer-a
	t-á-ká-á-baziir-ir-á buremu	t-á-ká-á-tééc-er-a buremu
	t-á-ká-á-baziir-ir-a káto	t-á-ká-á-tééc-er-a káto
Counterfactual	tii-n-ká-á-bazi-ire	tii-n-ká-á-káraanj-ire
	tii-n-ká-á-bá-baziir-i-ire	tii-n-ká-á-ba-káraanj-i-ire
	tii-n-ká-á-yé-reeb-ire	tii-n-ká-á-yé-teec-e-ire
	tii-n-ká-á-reeb-iré buremu	tii-n-ká-á-tééc-e-ire buremu
	tii-n-ká-á-reeb-ire káto	tii-n-ká-á-tééc-e-ire káto
Hortative	tu-ta-bazíir-a	tu-tá-karaang-a
	tu-ta-ba-bazíír-ir-a	tu-ta-ba-tééc-er-a
	tu-t-ee-bazíír-ir-a	tu-t-éékaraanj-ir-a
	tu-ta-bazíír-ir-a buremu	tu-ta-káraanj-ir-a buremu
	tu-ta-bazíír-ir-a káto	tu-ta-káraanj-ir-a káto
Subjunctive	--	--
Hypothetical	kú-tu-ta-ra-bazíir-e	kú-tu-ta-ra-káraang-e
	kú-tu-ta-ra-zi-bazíir-e	kú-tu-ta-ra-bi-káraang-e
	kú-tu-ta-ra-ye-bazíír-ir-e	kú-tu-ta-ra-yé-karaanj-ir-e
	kú-tu-ta-ra-rééb-e buremu	kú-tu-ta-ra-káraanj-ir-e buremu
	kú-tu-ta-ra-rééb-e káto	kú-tu-ta-ra-káraanj-ir-e káto

B.2.4   Negative subordinate clause

Infinitive	n/a	n/a
Remote Past	a-ta-rá-bazi-ire	a-ta-rá-karaanj-ire
	a-ta-rá-tú-baziir-i-ire	a-ta-rá-tu-káraanj-i-ire
	a-ta-r-éé-baz-ire	a-ta-r-éé-bon-ire
	a-ta-rá-baz-ire buremu	a-ta-rá-bón-ire buremu

Yesterday Past	a-ta-rééb-ire	a-ta-bon-íre
	a-ta-ba-rééb-ire	a-ta-ba-bon-íre
	a-t-eerééb-ire	a-t-eebon-íre
	a-ta-rééb-ire buremu	a-ta-teec-i-iré buremu
Hodiernal Past	a-tá-ka-baz-ire	a-tá-ka-bón-ire
	a-tá-ka-bá-baz-ire	a-tá-ka-ba-bón-ire
	a-tá-k-éé-baz-ire	a-tá-k-éé-bon-ire
	a-tá-ka-baz-ire buremu	a-tá-kákaraanj-i-ire buremu
	a-tá-ka-baz-ire káto	a-tá-kákaraanj-i-ire káto
Recent Past	a-tá-á-baziir-a	a-tá-á-karaang-a
	a-tá-á-bá-bara	a-tá-á-tukaraanj-ir-a
	a-tá-á-yé-bara	a-tá-á-yé-káraanj-ir-a
	a-tá-á-baziir-ir-á buremu	a-tá-á-bón-ira buremu
	a-tá-á-baziir-ir-a kakúru	a-tá-á-bón-ira káto
Habitual	a-ta-bazíir-a	a-tá-karaang-a
	a-ta-ba-bazíír-ir-a	a-ta-tu-káraanj-ira
	a-ta-ye-bazíír-ir-a	a-ta-yé-teec-ire
	a-ta-bazíír-ir-a buremu	a-tá-karaanj-ir-a buremu
Present Prog.	a-tá-ri ku-bara	a-tá-ri ku-bóna
Future	a-ta-rí-baziir-a	a-ta-rí-karaang-a
	a-ta-rí-bá-bar-a	a-ta-rí-ba-bóna
	a-ta-ry-éé-bar-a	a-ta-ry-éé-bona
	a-ta-rí-bar-a buremu	a-ta-rí-bón-a buremu
	a-ta-rí-bar-a káto	a-ta-rí-bón-a káto
Perstitive	a-tá-ci-baziir-a	a-tá-ci-karaang-a
	a-tá-ci-gu-baziir-a	a-tá-ci-ga-teek-a
	a-tá-c-ee-bar-a	a-tá-c-ee-bon-a
	a-tá-ci-baziir-ir-á buremu	a-tá-ci-karaanj-ir-á buremu
	a-tá-cibaziir-ir-a kakúru	a-tá-ci-karaanj-ir-a kakúru

356

Conditional	a-tá-ku-bazi-ire	a-tá-ku-karaanj-ire
	a-tá-ku-ba-baz-ire	a-tá-ku-ba-bon-ire
	--	--
	a-tá-ku-reeb-iré buremu	a-tá-ku-teec-e-iré buremu
	a-tá-ku-reeb-ire kakúru	a-tá-ku-teec-e-ire kakúru
Counterfactual	--	--
Hortative	--	--
Subjunctive	a-ta-ra-bazíir-e	a-ta-ra-káraang-e
	a-ta-ra-ji-bazíir-e	a-ta-ra-bi-káraang-e
Hypothetical	--	--

B.3   Examples of Melodic Tenses

Space constraints limited the number of examples of the melodic tenses that could be presented in chapters 3 and 4. Here, we provide a number of further examples from these tenses.

B.3.1   V2/Final Tone Tenses

(B.2)   Habitual

 a.   Toneless Roots

  ba[bár-a   's/he counts'

  ba[réeb-a   's/he sees'

  ba[bazíir-a   's/he sews'

 b.   High-toned Roots

  ba[teék-a   's/he cooks'

  ba[karaáng-a   's/he dry roasts'

(B.3)   Yesterday Past

    a. Toneless Roots

        tu[gaamb-ír-eine   'we told each other'

        tu[rééb-eine   'we saw each other'

        tu[jeend-és-eine   'we caused each other to go'

        tu[haañj-ír-eine   'we created for each other'

    b. High-toned Roots

        tu[teec-er-eíne   'we cooked for each other'

        tu[fuñ-er-eíne   'we herded for each other'

(B.4)   Yesterday Past Negative

    a. Toneless Roots

        tii-n[dééb-ire   'I didn't see'

        tii-m[bazí-ire   'I didn't sew'

        tii-n[sháárw-iire   'I didn't complete the harvest'

        tii-n[gurúc-ire   'I didn't jump'

    b. High-toned roots

        tii-n[kwaats-íre   'I didn't catch'

        tii-m[teec-íre   'I didn't cook'

        tii-n[karaañj-íre   'I didn't dry roast'

        tii-n[kom-iíre   'I didn't tie for'

(B.5)   Habitual

    a. Toneless Roots

      ba[bazíir-a   'they sew'

      ba[rééb-er-an-a   'they see for each other'

      ba[gurúc-is-an-a   'they caused each other to be late'

    b. High-toned Roots

      ba[teec-ér-a   'they cook for'

      ba[teec-er-án-a   'they cook for each other'

      ba[karááng-a   'they dry roast'

(B.6)   Perstative

    a. Toneless Roots

      nii-n-ci[réeb-a   'I am still seeing'

      nii-n-ci[bazíir-a   'I am still sewing'

    b. High-toned Roots

      nii-n-ci[téék-a   'I am still cooking'

      nii-n-ci[karaáng-a   'I am still dry roasting'

B.3.2   Melodic Tenses with Object Prefixes

(B.7)   Yesterday Past

    a. Toneless Roots

       tu-ba[haañj-íre   'we made them'

       tu-ci[hééc-ire   'we carried it$_7$'

       tu-ba[baziirí-íre   'we sewed for them'

    b. High-toned Roots

       tu-ci[teec-íre   'we cooked it$_7$'

       tu-ci[hiiñj-íre   'we cultivated it$_7$'

       tu-ba[karaañjí-íre   'we dry roasted for them'

(B.8)   Present Progressive

    a. Toneless Roots

       na-a-ba[teec-ér-a   's/he is cooking for them'

       na-a-ba[réeb-a   's/he is seeing them'

       na-a-ba[jéénd-er-a   's/he is leaving for them'

       na-a-ba[bazíír-ir-a   's/he is sewing for them'

    b. High-toned Roots

       na-a-ba[bón-a   's/he is finding them'

       na-a-ba[teec-ér-a   'she is cooking for them'

       na-a-ba[karaañj-ír-a   's/he is dry roasting for them'

(B.9)   Perstative

    a. Toneless Roots

       na-ci-ba[réeb-a   's/he is still seeing them'

       na-ci-ba[bazíír-ir-a   's/he is still sewing for them'

    b. High-toned Roots

       na-ci-bu[teék-a   's/he is still cooking it$_{14}$'

       na-ci-ba[karaañj-ír-a   's/he is still dry roasting for them'

B.3.3 Imperatives

(B.10) Toneless Roots

a.	sá/sâ	'grind'
	mwá/mwâ	'shave'
	bára	'count!'
	réeba	'see!'
	jéénda	'go!'
	shohóra	'go out!'
	shááruura	'harvest!'
	bazíira	'sew!'
	gáamba	'speak!'
b.	túse	'grind us!'
	múrye	'eat him!'
	mubáre	'count him!'
	turéebe	'see us!'
	tubazíírire	'sew for us!'
c.	yése	'grind yourself!'
	yebáre	'count yourself!'
	yeréebe	'see yourself!'

361

(B.11) High-toned Roots

    a. ñwá/ñwâ   'drink!'

a.	ñwá/ñwâ	'drink!'
	ryá/ryâ	'eat!'
	kóma	'tie!'
	híínga	'cultivate!'
	cwééra	'spit'
	karáánga	'dry roast!'
b.	múrye	'eat him!'
	tubóne	'find us!'
	tukáraanjire	'dry roast for us!'
c.	yébone	'find yourself!'
	yéteere	'beat yourself!'
	yékaraanjire	'dry roast for yourself!

B.4   Multiple-object Pronouns

It is possible for verbs to take more than one object prefix. Several examples involving multiple-object prefixation are provided below.

(B.12)	a-ka-ga-téek-a	'he cooked them$_5$'
	a-ka-ga-tu-tééc-er-a	'he cooked them$_5$ for us'
	a-ka-ga-ba-tééc-er-a	'he cooked them$_5$ for them'
	a-ka-ga-ba-tééc-er-á- mu	'he cooked them in it for them'

(B.13)	a-ka-jí-tweek-a	'he sent it$_9$'
	a-ka-ji-bá-tweec-er-a	'he sent it$_9$ to them'
	a-ka-ji-ba-kú-tweec-er-ir-a	'he sent it$_9$ to them for you'

(B.14)   a-ka-gá-ha   'he gave it$_6$'

           a-ka-ga-bá-ha   'he gave it$_6$ to them'

           a-ka-ga-ba-kú-he-er-a   'he gave it$_6$ to them for you'

           a-ka-ga-ba-mú-he-er-a   'he gave it$_6$ to them for her'

(B.15)   a-ka-bé-éj-es-a   'he taught them'

           a-ka-bé-éj-es' ookuháándika   'he taught them to write (writing)'

           a-ka-ba-kw-ééj-es-a   'he taught them it$_{15}$'

           a-ka-ba-ku-mw-ééj-es-ez-a   'he taught them it$_{15}$ for her'

(B.16)   a-ka-gá-shaba   'he asked for it$_6$'

           a-ka-ga-bá-shaba   'he asked them for it$_6$'

           a-ka-ga-ba-mú-shab-ir-a   'he asked them for it$_6$ for her'

(B.17)   a-ka-ci-shoma   'he read it$_7$'

           a-ka-ci-bá-shom-er-a   'he read it$_7$ to them'

           a-ka-ji-ba-mú-shom-er-a   'he read it$_7$ to them for her'

B.5   Clititcs

B.5.1   Verbal Enclitics

There are four main verbal enclitics: *-ga*, *-ho*, *-mu*, and *-ya*. The enclitic *-ga* has a tense/aspect meaning while the remainder are locative in function. Finally, there is the enclitic adverb *-je* 'well'.

(B.18) Tense/Aspect Enclitic Forms

    a. tiinkareebá-ga   'I have never seen'

       tiinkareeba-hoga   'I have never seen at all'

    b. tiinkabará-ga   'I have never counted'

       tiinkabará-hoga   'I have never counted at all'

    c. tiinkatééra-ga   'I have never beaten'

       tiinkatééra-hóga   'I have never beaten at all'

    d. tiinkashára-ga   'I have never cut'

       tiinkashára-hoga   'I have never cut at all'

    e. tiinkashara-ga   'I have never gone crazy'

       tiinkashara-hoga   'I have never gone crazy at all'

The use of these clitics seems to be restricted to this tense, for example, the following is not possible.

(B.19) Impossible Enclitic Tenses

    a. tiindábazire   'I didn't count' (remote)

       *tiindábazire-ga   'I didn't count ever' (remote)

B.5.2   Locative Clitics

The three clitics *ho*, *ya*, and *mu* indicate proximate location, distal location, and location within.

(B.20) a. ruga-ho   'get off'

       b. ruga-mu   'get out of'

       c. ruga-ya   'get over here'

There is also the postverbal clitic a *ha*, indicating distal location.

(B.21) Locative clitics

      a. ateeciré-yo   's/he cooked there' (yesterday)

          ateecir' ááha   's/he cooked here'

          ateeciré-mu   's/he cooked in (it)'

          agáteeciré-mu   's/he cooked them$_6$ in it'

      b. abiiká-mu   's/he stores in it'

          abiik' ááha   's/he stores here'

          abiiká-ho   's/he stores there'

Locative clitics can also have a partative meaning "a little, a bit".

(B.22) Locatives with a partitive meaning

      a. añwiiré-ho   's/he drank a bit'

          niñiizha kuryá-ho   'I will eat a little'

          bateeké-ho   'they should cook a little'

B.5.3 Clitics and Tone

Some of the clitics seem to have a high tone associated with them. We can see the effects of this high tone on the preceding verb. First, in phrase final position, the clitic high retracts to the penultimate syllable in the utterance, as illustrated below.

(B.23)   Clitic High Retraction

    a. a-ka-reeb-a   's/he saw' (remote past)

       3s-REM.PAST-√see-FV

       akareebá-mu   s/he saw a little bit/in it'

    b. akagweezhejera   's/he slept'

       akabweezhejerá-mu   's/he slept a little bit'

    c. akañwa   's/he drank'

       akañwáá-mu   's/he drank a little bit'

Retraction does not occur when another element follows the verb-clitic complex.

(B.24) Nonretraction

    a. a-ka-s-a   's/he ground' (remote past)

       3S-REM.PAST-√grind-FV

       akasá-mu   's/he ground a little bit'

       akasa-mú-je   's/he ground a little bit well'

    The high tone of the clitics does interact with high tones on the verb. Specifically, the OCP seems to prohibit adjacent tones and the first tone is deleted. Thus, we find the neutralization of the tonally distinct verbs below.

(B.25) Tonal Neutralization

    a. okushara   'to cut up'

       akashára   's/he cut up' (remote past)

       akashará-mu   's/he cut up a little bit'

    b. okushára   'to go crazy'

       akashára   's/he went crazy'

       akashará-mu   's/he went crazy a little bit'

This same OCP-motivated deletion of a high tone on the verb is found whenever the high tone of the clitic and the high tone of the verb are adjacent.

(B.26) High Tone Deletion

      a. a-ñwé-íre   's/he drank' (yesterday)

           3s-√drink-PERF

           añweiré-mu   's/he drank a little'

      b. aséire   's/he ground'

           aseiré-mu   's/he ground a little bit'

      c. akacúunda   's/he churned' (remote past)

           akacuundá-mu   's/he churned a bit'

However, if the high tones are separated by one or more tone bearing units, then there is no deletion, as shown in (B.27).

(B.27) OCP Failure

    a. akakáraanga   's/he dry roasted' (remote past)

          akakáraangá-mu   's/he dry roasted a little bit'

          akakáraanga-mú-je   's/he dry roasted a little bit well'

    b. e-ka-bóígor-a   'it$_9$ snarled'

        CL9-REM.PAST-√snarl-FV

          ekabóígorá-mu   'it$_9$ snarled a little bit'

    c. ekamócera   'it$_9$ barked a little bit at'

          ekamócera-mú buremu   'it$_9$ barked a little bit at Buremu'

    d. aseiré-mu   's/he ground a little bit'

          aséíre-mú-je   's/he ground a little bit well'

    e. añwéíre   's/he drank' (yesterday)

          añweiré-je   's/he drank well'

          añweiré-mu   's/he drank a little bit'

          añwéíre-mú-je   's/he drank a little bit well'

Below, in (B.28), we see some interesting effects caused by the addition of multiple high-toned clitics to the verb. In particular, note the patterns of deletion involving the high tone of the verb.

(B.28) a. okumwa   'to shave'
            amwiiré-je   's/he shaved well'
            amwiiré-ho   's/he shaved a little'
            amwííre-hó-je   's/he shaved a little well'

        b. okubara   'to count'
            abaziré-je   's/he counted well'
            abaziré-ho   's/he counted a little'
            abazíre-hó-je   's/he counted a little well'

        c. okucaca   'to mince'
            acaciré-je   's/he minced well'
            acaciré-ho   's/he minced a little'
            acacíre-hó-je   's/he minced a little well'

        d. okugaanira   'to converse'
            agáániire   's/he conversed'
            agáániiré-je   's/he conversed well'
            agáániiré-ho   's/he conversed a little'
            agáániire-hó-je   's/he conversed a little well'

        e. okuramusya   'to greet'
            aramúcizé-je   's/he greeted well'
            aramúcizé-ho   's/he greeted a little'
            aramúcize-hó-je   's/he greeted a little well'

        f. okúrya   'to eat'
            ariiré-je   's/he ate well' (yesterday)
            ariiré-ho   's/he ate a little'
            ariiré-hó-je   's/he ate a little well'

        g. okutéeka   'to cook'
            ateeciré-je   's/he cooked well'
            ateeciré-ho   's/he cooked a little'
            ateeciré-hó-je   's/he cooked a little well'

369

h. okukáraanga   'to dry roast'

    akaraanjiré-je   's/he dry roasted well'

    akaraanjiré-ho   's/he dry roasted a little'

    akaraanjiré-hó-je   's/he dry roasted a little well'

B.5.4 Some more clitic data—vowel length

Clitics also provide interesting data into the domain of compensatory lengthening. Normally a vowel after a consonant–glide sequence is long. However, vowels are always short at the edges of words (both initially and finally). In the case of the clitics, vowel lengthening does not occur.

(B.29) Lengthening Failure before clitics

a. oku-reeb-w-á je   'to be seen well'

    INF-√see-PASS-FV well

    okuryá je   'to eat well'

    okumwá je   'to shave well'

    okuñwá je   'to drink well'

b. okumwá ho   'to shave a little bit'

    okuñwá ho   'to drink a little bit'

    okureebwá ho   'to be seen a little bit'

    okutéékwá ho   'to be cooked a little'

B.6 Imbrication

Imbrication is an interesting morphological process found in many Bantu languages. In Runyankore, it essentially involves the overlapping of the perfective in suffix *-ire* with the end of the verb stem. Imbrication only occurs after stems larger than CVC and when the final C of the derivational stem is *r*, *n*, *s* or *z* (which derives from *r+y*).

(B.30) Imbrication in Runyankore verbs

√bóígor-	-boigoire	'bark'
√boor-	-boire	'look down on'
√fútan-	-futaine	'chew'
√gáángaar-	-gaangaire	'stiffen'
√myoor-	-myoire	'twist'
√gabur-	-gabwiire	'serve, feed'

(B.31) /r/-final roots

√bóígor	-boigoire	'bark'
√boor	-boire	'look down on'
√enjer	-enjiire	'take cattle to drink'
√eser	-eseire	'water livestock'
√ésongor	-esongoire	'sing'
√gáángaar	-gaangaire	'stiffen'
√gwezejer	-gwezejeire	'sleep'
√hweer	-hweire	'help, assist'
√myoor	-myoire	'twist'
√gabur	-gabwiire	'serve, feed'
√habur	-habwiire	'advise, guide'
√ibur	-ibwiire	'take out of water (tr.)'
√kuur	-kwiire	'pull out'
√gaaniir	-gaaniire	'converse'

(B.32)   /n/-final roots

√nyoogan	-nyoogaine	'jostle'
√fútan	-futaine	'chew'
√bar-an	-baraine	'count for'

(B.33) /s/-final roots (generally involve the causative suffix *-is-*)

√naab-is	-nabiise	'washed'
√é-haakan-is	-ehaakaniise	'deny self, question self'
√boor-es	-booreise	'cause to despise'
√cac-is	-caciise	'cause to mince'
√sar-is	-sariise	'cut with'
√kom-es	-komeise	'tied with'

(B.34) /z/-final roots

√sobez	sobeize	'wrong s.o.'
√tóóreza	tooreize	'copy, imitate'

BIBLIOGRAPHY

Akinlabi, Akinbiyi. 1996. Featural Affixation. *Journal of Linguistics* 32:239–289.

Bernsten, Jan. 1996. Runyakitara: Uganda's 'New' Language. Ms. Michigan State University.

Bickmore, Lee. 1989. *Kinyambo Prosody*. Ph.D. Dissertation. University of California, Los Angeles.

Bickmore, Lee. 1996a. Ekegusii Verbal Tonology: Derivational and Constraint-based Approaches Compared. Ms. SUNY Albany.

Bickmore, Lee. 1996b. Bantu Tone Spreading and Displacement as Alignment and Minimal Misalignment. Ms. SUNY Albany. ROA 161-1196.[1]

Byarushengo, Ernest Rugwa, Larry M. Hyman and Sarah Tenenbaum. 1976. Tone, Accent, and Assertion in Haya. In Larry M. Hyman, ed., *Studies in Bantu Tonology. Southern California Occasional Papers in Linguistics, No 3*. Los Angeles: USC Department of Linguistics.

Carstens, Vicki. 1993. On Nominal Morphology and DP Structure. In Sam A. Mchombo, ed., *Theoretical Aspects of Bantu Grammar*, 151–180. Palo Alto, CA: Center for the Study of Language and Information.

Cassimjee, Farida & Charles W. Kisseberth. 1998. Optimal Domains Theory and Bantu Tonology: A Case Study from Isixhosa and Shingazidja. In Larry M. Hyman and Charles W. Kisseberth, eds., *Theoretical Aspects of Bantu Tone*. Stanford, CA: CSLI.

Clements, G. N. & E. V. Hume. 1995. The Internal Organization of Speech Sounds. In John Goldsmith, ed., *The Handbook of Phonological Theory*. Cambridge, Massachusetts: Basil Blackwell.

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[1] Scholarly works followed by an entry of the form "ROA ###-####" can be found on the Rutgers Optimality Archive (ROA) at "`http://ruccs.rutgers.edu./roa.html`".

Cole, Desmond T. 1967. *Some Features of Ganda Linguistic Structure*. Johannesburg: Witwatersrand University Press.

Cook, Vivian & Mark Newson. 1996. *Chomsky's Universal Grammar* (Second Edition). Cambridge, MA and Oxford, UK: Blackwell Publishers.

Crowhurst, Megan & Mark Hewitt. 1997. Boolean Operations and Constraint Interactions in Optimality Theory. Ms. University of North Carolina at Chapel Hill and Brnadeis University. ROA 229-11973.

Daly, John. 1993. Representation of Tone in Peñoles Mixtec. Ms. Dallas: Summer Institute of Linguistics.

Downing, Laura. 1994a. An Optimality Approach to Verbal Reduplication in Three Bantu Languages. Ms. University of Illinois. (Draft of paper presented in Utrecht, June 1994).

Downing, Laura. 1994b. SiSwati Verbal Reduplication and the Theory of Generalized Alignment. *Proceedings of the North East Linguistic Society* (NELS 24). Volume 1. Mercè Gonzàlez, ed. Amherst: University of Massachusetts.

Downing, Laura, 1996. *The Tonal Phonology of Jita*. Lincom Studies in African Linguistics 05. München, Newcastle: Lincom Europa.

Goldsmith, John. 1987. Stem Tone Patterns of the Lacustrine Bantu Languages. In David Odden, ed.,*Current Approaches to African Linguistics, Volume 4*. Dordrecht, Providence, RI: Foris.

Goldsmith, John. 1990. *Autosegmental & Metrical Phonology*. Cambridge, MA: Basil Blackwell.

Guthrie, Malcolm. 1967. *The Classification of the Bantu Languages*. London: Dawsons of Pall Mall.

Finley, Moses I. (ed.) 1959. *The Portable Greek Historians*. New York: Viking Press.

Herman, Rebecca. 1996a. Final Lowering in Kipare. *Phonology* 13:171–196.

Herman, Rebecca. 1996b. Prosodic Structure of SiSwati. In David Doty, Rebecca Herman, Elizabeth Hume and Panayiotis A. Pappas, eds., *Papers in Phonology. Working Papers in Linguistics 48*. Columbus: The Ohio State University Department of Linguistics

Horrocks, Geoffrey. 1987. *Generative Grammar*. New York: Longman, Inc.

Hubbard, Kathleen A. 1992. NP-VP Asymmetries in Rynyambo Prosodic Domains. Ms. University of California, Berkeley.

Hume, Elizabeth. 1997. Vowel Preservation in Leti. *Oceanic Linguistics*. 36.1:65–101.

Hume, Elizabeth. 1994 [1992]. *Front Vowels Coronal Consonants and their Interaction in Nonlinear Phonology*. New York: Garland.

Hyman, Larry M. 1995. Miminality and the Prosodic Morphology of Cibemba Imbrication. *Journal of African Languages and Linguistics*. **16**:3–39.

Hyman, Larry M. 1993. In Goldsmith *The Last Phonological Rule*.

Hyman, Larry M. 1992. Moraic Mismatches in Bantu. *Phonology* 9:255–265.

Hyman, Larry & Charles W. Kisseberth. 1998. *Theoretical Aspects of Bantu Tone*. Stanford, CA: CSLI.

Hyman, Larry M. & Ernest Rugwa Byarushengo. 1984. A Model of Haya Tonology. In G. N. Clements & J. Goldsmith, eds., *Autosegmental Studies in Bantu Tone*. Dordrecht, Holland: Foris Publications.

Hyman, Larry M. & Francis X. Katamba. 1990. The Augment in Luganda Tonology. *Jounal of African Languages and Linguistics* 12:1–45.

Itô, Junko and Armin Mester. 1998. Markedness and Word Structure: OCP Effects in Japanese. Ms. University of California, Santa Cruz. ROA 255-04982.

Itô, Junko, Yoshihisa Kitagawa and Armin Mester. 1996. Prosodic Faithfulness and Correspondence: Evidence from a Japanese Argot. *Journal of East Asian Linguistics: 5*. Dordrecht: Kluwer Academic Publishers.

Jackendoff, Ray S. 1977. *X′-Syntax: a Study of Phrase Structure*. Cambridge, MA: MIT Press.

Johnson, Lawrence. 1976. Devoicing, Tone, and Stress in Runyankore. In Larry M. Hyman, ed., *Studies in Bantu Tonology*. *Southern California Occasional Papers in Linguistics, No 3*. Los Angeles: USC Department of Linguistics.

Ladefoged, Peter, Ruth Glick & Clive Criper. 1972. *Language in Uganda*. New York: Oxford Univesity Press.

Leben, William. 1973. *Suprasegmental Phonology*. Ph.D. dissertation, MIT. Ditributed by Indiana University Linguistics Club.

Marantz, Alec. 1982. Re Reduplication. *Linguistic Inquiry*. 13:435–480.

Meinhof, Carl & N. J. van Warmelo. 1932. *Introduction to the Phonology of the Bantu Languages*. Berlin: Dietrich Reimer/Ernst Vohsen.

McCarthy, John. 1986. OCP Effects: Gemination and Antigemination. *Linguistic Inquiry* 17:207–63.

McCarthy, John. 1994. Remarks on Phonological Opacity in Optimality Theory. In Jacqueline Lecarme, Jean Lowenstamm, & Ur Shlonsky, eds., *Proceedings of the Second Colloquium on Afro-Asiatic Linguistics*. (Sophia Antipolis, June 1994).

McCarthy, John and Alan Prince. 1993a. Prosodic Morphology I: Constraint Interaction and Satisfaction. Ms. The University of Massachusetts, Amherts, Rutgers University.

McCarthy, John and Alan Prince. 1993b. Generalized Alignment. In Geert Booij & Jaap van Marle, eds., *Yearbook of Morphology 1993*. Dordrecht: Kluwer Academic Publishers. Pp. 79–153.

McCarthy, John and Alan Prince. 1995. Faithfulness and Reduplicative Identity. In J. Beckman, L. Walsh Dickey & Suzanne Urbanczyk, eds., *Papers in Optimality Theory*. University of Massachusetts, Amherst: GLSA.

Morris, H. F. & Kirwan, B. E. R. 1957 (1972). A Runyankore Grammar. Kampala: East African Literature Bureau.

Mutaka, Ngessimo & Larry M. Hyman. 1990. Syllables and Morpheme Integrity in Kinande Reduplication. *Phonology* 7:73–119.

Myers, Scott. 1997. OCP Effects in Optimality Theory. Ms. Department of Linguistics, The University of Texas at Austin.

Myers, Scott. 1987. Tone and the Structure of Words in Shona. Ph.D. Dissertation, University of Massachusetts, Amherst

Napoli, Donna Jo, and Marina Nespor. 1979. The Syntax of Word-Initial Consonant Gemination in Italian. *Language* 55:812–841.

Nespor, Marina and Irene Vogel. 1986. Prosodic Phonology. Dordrecht: Foris Publications.

Odden, David. 1998a. Principles of Tone Assignment in Tanzanian Yao. In Larry M. Hyman and Charles W. Kisseberth, eds., *Theoretical Aspects of Bantu Tone*. Stanford, CA: CSLI.

Odden, David. 1998b. Sympathy, Two-level Constraints, Disjunction and Opacity in Tachoni. Ms. The Ohio State University. Handout of a talk presented at GLOW 1998.

Odden, David. 1998c. Tone and Syntax in Zinza. Ms. The Ohio State University, Department of Linguistics.

Odden, David. 1996a. Patterns of Reduplication in Kikerewe. In David Doty, Rebecca Herman, Elizabeth Hume and Panayiotis A. Pappas, eds., *Papers in Phonology. Working Papers in Linguistics 48*. Columbus: The Ohio State University Department of Linguistics

Odden, David. 1996b. *The Phonology and Morphology of Kimatuumbi*. New York : Oxford University Press.

Odden, David. 1995a. The Status of Onsetless Syllables in Kikerewe. In David Dowty, Rebecca Herman, Elizabeth Hume and Panayiotis A. Pappas, eds. *Varia.Working Papers in Linguistics*: *47*. Columbus: The Ohio State University Department of Linguistics.

Odden, David. 1995b. Tone: African Languages. In John A. Goldsmith, ed. *The Handbook of Phonological Theory*. Cambridge, MA : Blackwell.

Odden, David. 1994. Adjacency Parameters in Phonology. *Language* 70.2:289–330.

Odden, David. 1988. Anti-antigemination and the OCP. *Linguistic Inquiry* 19:451–75.

Odden, David. 1987. Kimatuumbi phrasal phonology. Phonology Yearbook 4: 13–36.

Odden, David. 1986. On the Obligatory Contour Principle. *Language* 62:451–75.

Odden, David. 1990. C-command or edges in Makonde. *Phonology* 7:163-169.

Odden, David. 1997. Tone Sandhi, Pause and Postverbal Syntax in Zinza. Ms. The Ohio State University.

Odden, David. 1981. Problems in Tone Assignment in Shona. Ph.D. Dissertation, University of Illinois at Urbana-Champaign.

Odden, David & Mary Odden. 1985. Ordered reduplication in Kihehe. *Linguistic Inquiry* 16:497–503.

Odden, David & Mary Odden. 1996. Constraints on Reduplication in Kihehe. Ms. The Ohio State University, Department of Linguistics.

377

Pierrehumbert, Janet. 1980. *The Phonology and Phonetics of English Intonation*. Ph.D. Dissertation, MIT.

Pierrehumbert, Janet and Mary E. Beckman. 1988. *Japanese Tone Structure*. Cambridge, MA: The MIT Press.

Poletto. Robert. 1998. Constraints on Tonal Association in Olusamia: An Optimality Theoretic Account. In Larry M. Hyman and Charles W. Kisseberth, eds.,*Theoretical Aspects of Bantu Tone*. Stanford, CA: CSLI. (Paper originally presented at the Annual Converence on African Linguistics (ACAL), March 27, 1994, Rutgers University.)

Poletto, Robert. 1996. Default Lexical Tone Interaction in Runyankore. Paper presented at the Annual Conference on African Linguistics, ACAL 27. University of Florida, Gainsville, Florida.

Prince, Alan & Paul Smolensky. 1993. *Optimality Theory: Constraint Interaction in Generative Grammar.* Ms. Rutgers University, New Brunswick, and University of Colorado, Boulder, RuCCS-TR-2 [To appear, Cambridge, MA: MIT Press].

Rosenthall, Samuel. 1994. *Vowel/Glide Alternation in a Theory of Constraint Interaction*. Ph.D. Dissertation. Amherst: University of Massachusetts.

Selkirk, Elisabeth. 1986. On Derived Domains in Sentence Phonology. *Phonology Yearbook* 3: 371–405.

Smolensky, Paul. 1995. On the Internal Structure of the Constraint Component *Con* of UG. Handout of a talk at UCLA. ROA-86-0000.

Stevick, Earl W. 1969. Tone in Bantu. *International Journal of American Linguistics*. 35.4:330–341.

Taylor, Charles. 1959. *A Simplified Runyankore-Rukiga-English and English-Runyankore-Rukiga Dictionary*. Kampala: The Eagle Press, East African Literature Bureau.

Taylor, Charles. 1972. Some Functions of the Initial Vowel in Nkore-Kiga. *Linguistics* 79:73–82.

Taylor, Charles. 1977. Presuppositional Clauses in Nkore-Kiga (Uganda). In Paul F. A. Kotey and Haig Der-Houssikian, eds. *Lanugage and Linguistic Problems in Africa. Proceedings of the VII Conference on African Linguistics*. Columbus, SC: Hornbeam Press.

Taylor, Charles. 1985. *Nkore-Kiga (Croon Helm Descriptive Grammars).* London: Croon-Helm.

Whitney, William D. 1889. *Sanskrit Grammar*. Cambridge, MA: Harvard University Press.

Wilbur, Ronnie B. 1973a. *The Phonology of Reduplication*. Distributed by the Indiana University Linguistics Club, Bloomington, Indiana.

Wilbur, Ronnie B. 1973b. Reduplication and Rule Ordering. In Claudia Corum, T. Cecric Smith-Stark & Ann Weiser, eds., *Papers from the Ninth Regional Meeting of the Chicago Linguistics Society*. Chicago: University of Chicago.