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UMI
KIKAMBA PHONOLOGY AND MORPHOLOGY

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

By

Rosalind Ruth Roberts-Kohno, B.A., M.A.

****

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2000

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This dissertation describes and analyzes the phonology and morphology of the Bantu language Kikamba, spoken in Kenya. Kikamba data contributes to several theoretical issues, namely, empty segments and vowel hiatus, tone features, and the syntax-phonology interface. In order to show the theoretical significance of Kikamba in these areas, an explanation of the morphological and phonological systems is first provided. Kikamba marks agreement through prefixes added to stems in all word classes. I discuss the noun class system and the process of stem formation by which nouns are derived. For verbs, derivational and inflectional morphemes, subject and object prefixes, and paradigms which show the morphological and tonal structure of 20 tenses are presented. I also provide a thorough description of the processes of syllabification and vowel coalescence, which are crucial to understanding tonal behavior and vowel hiatus.

Kikamba is a very convincing case of a language with an empty consonantal root node which is unspecified for features. This ‘empty C’ causes vowels which normally coalesce to remain distinct and syllabify into separate syllables. Moreover, this empty C surfaces as s, l, b, d, and g in specific contexts. While this empty C causes hiatus between vowels word-internally, it deletes at the phrase level, allowing all vowel combinations to coalesce.
Kikamba is a four-tone language in which the Super-High and Super-Low tone pattern together, thereby providing evidence that they share the tone feature [+extreme]. Moreover, this feature is sensitive to syntactic structure. Specifically, this feature must surface at the right edge of a maximal projection (X-Max). In lexical tones, [+extreme] deletes when it is not at the right edge of X-Max, which affects both Super-High and Super-Low tones. In grammatical tones, only the Super-Low tone deletes, and Super-High remains, even if not at the right edge of X-Max. The phrasal Super-Low tone assigned to assertive verbs shifts to a following complement in order to arrive at the right edge of X-Max. Finally, it is shown that morphological agreement influences phrasing, and thus the behavior of the feature [+extreme], and that CP clauses are impermeable to the shift of phrasal Super-Low tone.
Dedicated to my father, my mother, and my grandmother,

Forrest Montgomery Roberts, Mary Patience Roberts, and Rosalind Roberts
ACKNOWLEDGMENTS

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<td>O-F</td>
<td>object focus, referring to the object focus form of the verb tense</td>
</tr>
<tr>
<td>OP</td>
<td>object prefix</td>
</tr>
<tr>
<td>PAL</td>
<td>Palatalization</td>
</tr>
<tr>
<td>perf</td>
<td>perfective</td>
</tr>
<tr>
<td>pl</td>
<td>plural</td>
</tr>
<tr>
<td>pres</td>
<td>present</td>
</tr>
<tr>
<td>prog</td>
<td>progressive</td>
</tr>
<tr>
<td>R/C</td>
<td>relative clause</td>
</tr>
<tr>
<td>rem</td>
<td>remote</td>
</tr>
<tr>
<td>root, rt</td>
<td>root node (in diagrams)</td>
</tr>
<tr>
<td>RTN</td>
<td>Rising tone neutralization</td>
</tr>
<tr>
<td>s/o</td>
<td>someone</td>
</tr>
<tr>
<td>sg</td>
<td>singular</td>
</tr>
<tr>
<td>SH</td>
<td>Super-High tone</td>
</tr>
<tr>
<td>SL</td>
<td>Super-Low tone</td>
</tr>
<tr>
<td>SP</td>
<td>subject prefix</td>
</tr>
<tr>
<td>sp1 through sp5</td>
<td>abbreviations for the set of subject prefixes found in Kikamba</td>
</tr>
<tr>
<td>SS</td>
<td>Sequential shortening</td>
</tr>
<tr>
<td>stat</td>
<td>stative</td>
</tr>
<tr>
<td>subjunc</td>
<td>subjunctive</td>
</tr>
<tr>
<td>tonal</td>
<td>tonal node (in diagrams)</td>
</tr>
<tr>
<td>UR</td>
<td>underlying representation</td>
</tr>
<tr>
<td>V</td>
<td>vowel</td>
</tr>
<tr>
<td>V2H</td>
<td>the grammatical H tone assigned to the second mora of stems</td>
</tr>
<tr>
<td>VC</td>
<td>vowel coalescence</td>
</tr>
<tr>
<td>VH</td>
<td>Vowel harmony</td>
</tr>
<tr>
<td>voc</td>
<td>vocalic node</td>
</tr>
<tr>
<td>Vpl</td>
<td>Vowel place node</td>
</tr>
<tr>
<td>X-Max</td>
<td>maximal projection, usually the right edge of a phrasal category</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

1.1 Overview

The aim of this dissertation is to describe and analyze the phonology and morphology of Kikamba, focusing on issues of tone and syllable structure. In order to understand syllable structure and tone, an understanding of the morphology and the segmental phonology is crucial. Specifically, the phenomenon of vowel hiatus versus coalescence, as it is explained by the presence of an empty root node, plays an important role in understanding Kikamba phonology. This dissertation undertakes a systematic description of the morphological and phonological structure of Kikamba, as well as an analysis of syllable structure and tone.

1.2 Methodology

The data in this dissertation was gathered from Beatrice Mulala, a speaker of the Machakos dialect of Kikamba, over the period from 1993-1999. Some of the data was recorded and digitized for later analysis. However, the majority of the generalizations made in this thesis are based on transcriptions made at the time of elicitation. Some of the data I elicited alone, and some was elicited working together with my advisor and colleague, David Odden. The generalizations made here are those that are based on
eliciting forms several times over long periods of time, so that I know them to accurately describe the dialect spoken by Ms. Mulala.

1.3 Transcription system

In this dissertation, I use a transcription system that will make differences in phonemes readily apparent, which at the same time facilitates reading the data. The transcription conventions used in this dissertation can be found in Table 1.1. Column 1 represents the phonemes and allophones of Kikamba, and where relevant, the environment where the allophones are found (see Chapter 3 for a discussion of these segments in detail). Column 2 represents how these segments are transcribed in this dissertation. Column 3 provides an example of this transcription. Finally, since previous works on Kikamba represent data using the official orthography, Column 4 shows the orthography that corresponds to the transcriptions used in this dissertation.

In addition, syllabification and tone are also noted in the transcriptions. A dot (.) between vowels indicates a syllabification break in the surface form. In underlying forms, a ‘C’ is used to represent an empty consonantal root node unspecified for features. The empty C is a segment in Kikamba and can occur in any position that other consonants can occur in. See Chapter 4 for a complete discussion of the empty C.

Tones in Kikamba are transcribed with the following tonal marks: a Super-High tone is indicated with a double acute accent (¨), a High tone is indicated with an acute accent (´), a Super-Low tone is indicated with a grave accent ( `), and a Falling tone is indicated with a circumflex ( ^= ). All other vowels have a Low tone, which is unmarked in the transcriptions. One last symbol that needs to be explained is ‘!’ , which marks absolute downstep. Whenever the feature [+extreme] is phrase-medial, absolute downstep is triggered on the following syllable. This is discussed in §3.4.3.
Table 1.1: Table of transcriptions and orthographic correspondences

<table>
<thead>
<tr>
<th>Segment</th>
<th>Transcription</th>
<th>Example</th>
<th>Traditional orthography</th>
</tr>
</thead>
<tbody>
<tr>
<td>β: b, post-nasal</td>
<td>b</td>
<td>kōómmbā ‘to mold’</td>
<td>b</td>
</tr>
<tr>
<td>β, elsewhere</td>
<td>b</td>
<td>kōńólokà ‘to fall’</td>
<td>v</td>
</tr>
<tr>
<td>t: d, post-nasal</td>
<td>d</td>
<td>koonḍálâ ‘to count me’</td>
<td>d</td>
</tr>
<tr>
<td>t, elsewhere</td>
<td>t</td>
<td>kotâlâ ‘to count’</td>
<td>t</td>
</tr>
<tr>
<td>k: g, post-nasal</td>
<td>g</td>
<td>koongonà ‘to hit me’</td>
<td>g</td>
</tr>
<tr>
<td>k, elsewhere</td>
<td>k</td>
<td>kokonà ‘to hit’</td>
<td>k</td>
</tr>
<tr>
<td>ô</td>
<td>th</td>
<td>kothîmā ‘to measure’</td>
<td>th</td>
</tr>
<tr>
<td>s: z, post-nasal</td>
<td>z</td>
<td>koonzúkumà ‘to push me’</td>
<td>z</td>
</tr>
<tr>
<td>s, elsewhere</td>
<td>s</td>
<td>kosoñkumà ‘to push’</td>
<td>s</td>
</tr>
<tr>
<td>č: j, post-nasal</td>
<td>j</td>
<td>kokonaanjâ ‘to cause to hit a little’</td>
<td>gy</td>
</tr>
<tr>
<td>č, elsewhere</td>
<td>ch</td>
<td>chá ‘tea’ (cl.7)</td>
<td>ky</td>
</tr>
<tr>
<td>l: d, post-nasal</td>
<td>d</td>
<td>koonđechà ‘to let me go’</td>
<td>d</td>
</tr>
<tr>
<td>l, elsewhere</td>
<td>l</td>
<td>kolikâ ‘to enter’</td>
<td>l</td>
</tr>
<tr>
<td>m</td>
<td>m</td>
<td>komañntâ ‘to search’</td>
<td>m</td>
</tr>
<tr>
<td>n</td>
<td>n</td>
<td>moññambô ‘lion’ (cl.3)</td>
<td>ny</td>
</tr>
<tr>
<td>n + y</td>
<td>ny</td>
<td>kokonyâ ‘to show’</td>
<td>see Tab. 1.2</td>
</tr>
<tr>
<td>ñ</td>
<td>ng’</td>
<td>kongolotâ ‘to snore’</td>
<td>ng’</td>
</tr>
<tr>
<td>y: y, post-vocalic</td>
<td>y</td>
<td>koyà ‘to eat’</td>
<td>y</td>
</tr>
<tr>
<td>y, post-consontal</td>
<td>y</td>
<td>syeënđô ‘things’ (cl.8)</td>
<td>y</td>
</tr>
<tr>
<td>w</td>
<td>w</td>
<td>kweëndà ‘to like’</td>
<td>w</td>
</tr>
<tr>
<td>u</td>
<td>w</td>
<td>kokwâ ‘to die’</td>
<td>see Tab. 1.2</td>
</tr>
<tr>
<td>i</td>
<td>i</td>
<td>kwîñà ‘to sing’</td>
<td>i</td>
</tr>
<tr>
<td>e</td>
<td>e</td>
<td>ko-emà ‘to cultivate’</td>
<td>see Tab. 1.2</td>
</tr>
<tr>
<td>ë</td>
<td>ë</td>
<td>ko-eëndà ‘to go’</td>
<td>e</td>
</tr>
<tr>
<td>a</td>
<td>a</td>
<td>kwañkà ‘to build’</td>
<td>a</td>
</tr>
<tr>
<td>o</td>
<td>o</td>
<td>ko-ɔtâ ‘to dream’</td>
<td>o</td>
</tr>
<tr>
<td>u</td>
<td>u</td>
<td>ko-umà ‘to curse’</td>
<td>u</td>
</tr>
</tbody>
</table>

In addition to these correspondences, it is important to point out that not all previous works on Kikamba use exactly the same transcriptions. In Table 1.2, I show the segments whose transcriptions vary in the major works to date on Kikamba.
Table 1.2: Variations in transcription systems

<table>
<thead>
<tr>
<th>Segment</th>
<th>AIM Dictionary</th>
<th>Farnsworth</th>
<th>Whiteley and Muli</th>
<th>Mbiti</th>
</tr>
</thead>
<tbody>
<tr>
<td>n+y</td>
<td>ni</td>
<td>n’y</td>
<td>ni</td>
<td>n’y</td>
</tr>
<tr>
<td>u</td>
<td>w</td>
<td>w’</td>
<td>w and w</td>
<td>w’</td>
</tr>
<tr>
<td>e</td>
<td>ï</td>
<td>ï</td>
<td>ï</td>
<td>ï</td>
</tr>
<tr>
<td>o</td>
<td>ù</td>
<td>ù</td>
<td>ù</td>
<td>ù</td>
</tr>
</tbody>
</table>

The sequence n + y requires no special transcription, it is simply the concatenation of two segments. However, the combination has traditionally been thought of as inducing either a special type of n, as indicated in the Farnsworth and Mbiti transcriptions, or affecting the pronunciation of the following vocoid i. Whiteley and Muli specifically state that the causative suffix is y, except when following n (1962:85).

As for u, the AIM dictionary does not distinguish this segment from a plain w. On the other hand, Whiteley and Muli claim that there are two w’s which are distinct from a plain w. My fieldwork has revealed that there are two labial glides, one a traditional w, and the other a labio-palatal glide q. This analysis is consistent with data in Farnsworth and Mbiti, who also distinguish only a plain w and a labio-palatal glide q, written as w’.

1.4 Organization

This thesis is organized as follows. Chapter 2 describes the morphological structure of Kikamba. This includes a description of the noun class system, agreement markers, stem formation, the morphological structure of the verb including the derivational and inflectional suffixes and the subject, object, and negative prefixes, and detailed paradigms of 20 tenses. Chapter 3 describes the phonological system. Included in this chapter are segmental rules, syllable fusion, and vowel coalescence. Both phrase-level and word-internal vowel coalescence are discussed. Chapter 4 takes an in-depth look at the empty C phenomenon. Kikamba provides the most extensive case to date of the empty C. I also discuss other languages which have been posited to have an empty C.
Finally, I provide a brief derivational account of the empty C phenomenon. Chapter 5 describes the tonal system. The topics discussed are the tone patterns in the nominal and verbal systems, the tone features needed to account for the system, the tone rules required to explain the tonal interactions, and the syntax-phonology interface. Chapter 6 concludes this thesis with areas for further research.

1.5 Previous works on Kikamba

Guthrie (1971) is an important cross-linguistic study of Bantu languages which is a critical work to consult for anyone studying either the historical development of a Bantu language, or the synchronic grammar of a Bantu language.

There are two grammars on Kikamba, Farnsworth (1952, 1957) and Whiteley and Muli (1962), both of which have as their goal to provide an overview of the language for the purpose of language instruction. These grammars briefly introduce and give a cursory explanation of all major areas of the grammar. They are not intended to be grammatical reference materials, and thus, do not go into much depth regarding the phonology or the morphology of the language. Both of these grammars are based on the Machakos dialect of Kikamba.

There are three important differences between these studies and the current study. First, the current study provides an in-depth look at areas of the morphological and phonological systems which contribute to an understanding of syllabification and tonal phenomena, whereas Farnsworth and Whiteley and Muli are more superficial descriptions of the grammar.

Second, the current study includes tonal transcriptions for all data, as well as a thorough description of tone features and tonal interactions. Farnsworth recognizes that tone distinguishes some lexical items, but still claims that Kikamba is not a tonal language, and does not transcribe tone in the body of the grammar at all. Whiteley and
Muli mention in their introduction that tone plays a role in Kikamba, but likewise tone is not transcribed in the data at all.

Third, Farnsworth does not transcribe vowel length distinctions, although it is mentioned that the historical loss of consonants has given rise to long sequences of vowels. Whiteley and Muli accurately recognize that, on the surface, there are several vowel lengths, and transcribe them accordingly. What is missing is an explanation based on the interaction of vowel length and syllabification, which is provided in this study. Chapter 3 of the current study goes into detail on the issue of vowel length.

In addition to these works, there are two Kikamba dictionaries available. The first was published by the Africa Inland Mission in 1939. This dictionary lists words based on their stem-initial segment. I have had the opportunity to record and check this dictionary with my informant, and although some of the vocabulary is either outdated, or not in her dialect, this is a very valuable tool for anyone studying Kikamba in any capacity. However, a systematic study of this work is beyond the scope of this thesis and is not found here. The second dictionary is a shorter list of English-Kikamba vocabulary which has proved very helpful in elicitation sessions (Mbiti 1959). However, both dictionaries fall short in that tone is not transcribed at all, and only bisyllabic short vowel sequences are transcribed as distinct from other long vowels, which does not accurately describe the facts of Kikamba.

There are a few theoretical works on Kikamba as well. Hinnebusch (1974) and Maundu (1985) discuss the historical loss of consonants and what it means for the synchronic grammar of Kikamba. What these two works have in common is the attempt to explain the resurfacing of $l$ in class 12/13 nouns in the Machakos dialect and the resurfacing of $b$ as part of the IsOP $N$ which is found in pre-verb-stem position. Both works make reference to the fact that Kikamba went through a historical process by which the phonemes $b$, $d$, and $g$ were lost between vowels. Note that intervocally these sounds were $\beta$, $l$, and $\gamma$, respectively, as evidenced in other dialects such as the Kitui
dialects of Kikamba which have resisted this loss of consonants. Hinnebusch (1974) gives a nice explanation of these facts.

Maundu attempts to explain these facts by claiming that the choice of b and l in specified environments is the result of “analogical extension to forms which had other forms historically” (1985:223). He also claims mb has become a plural marker for class 9/10 adjectives, and my data or any other data I have seen in no way support this claim. In addition, Maundu gives very little data and he does not state exactly why he disagrees with the Hinnebusch (1974) analysis. While both these analyses try to explain the historical facts, neither elaborates on the theoretical construct necessary to explain the Kikamba facts synchronically, namely the presence of an empty root node in specific environments as part of the underlying lexical representations. The empty root node is the topic of Chapter 4.

Ndubu and Whiteley (1962) discuss the particle né and its relation to one-word tenses in Kikamba. Based on my fieldwork, they correctly identify several things about this particle. First, né is a focally-neutral particle that represents the unemphatic usage of a verb. Second, the lack of né puts the focus on what follows. Thus, né tenses correspond to object-focus forms where né is not present. né is also the form of the copula in that it occurs with nouns or other words to mean ‘It is X.’ In addition, this work is valuable in providing Kikamba data in sentence form.

Ford (1976) presents a cross-linguistic description of tonal phenomena in Kikamba and other Bantu languages in Kenya. This is the first work to accurately describe the patterning of the four tones in Kikamba and Ford correctly recognizes that a tone feature such as [+extreme] is needed to handle Kikamba tonal phenomena. Ford also has a manuscript on the tone system of Kikamba, elaborating on his findings (1976).

Finally, there are three morpho-syntactic articles on Kikamba: Anschutz (1990), Brown (1990) and Kioko (1995). These articles address Kikamba verbal extensions and which syntactic theory can best handle their behavior. As a syntactic analysis is beyond the scope of this thesis, these works will not be discussed here.
1.6 Contributions of this dissertation

This study builds on previous works by providing an overview of crucial phonological, tonological and morphological properties of Kikamba cast in a current theoretical framework. Important contributions of this work include detailed descriptions and paradigms of the nominal and verbal systems, including noun classes, nominal stems, agreement prefixes, the morphological structure of verbs, verbal extensions, and the tense/aspect system. Moreover, tone and vowel length are accurately and thoroughly described.

The theoretical contributions of this work include a description of the connection between syllable fusion and vowel coalescence and its manifestations. It also provides an account of the most extensive case to date in support of the empty C phenomenon. I believe such data could potentially contribute to the discussion of non-derivational theories of phonology but such an analysis is beyond the scope of this dissertation. I also provide a detailed description of the tonal interactions which lead to the postulation of the tone feature [+extreme]. In addition, the behavior of SL tones provides more evidence for current theories exploring the interface of phonology with syntax.

Thus, this study contributes in an important way to our knowledge of Kikamba and thus, to our knowledge of Bantu languages specifically, as well as human language in general.
CHAPTER 2

MORPHOLOGY

2.1 Introduction

In this chapter, the basic morphology of Kikamba is presented. While some aspects of Kikamba morphology are relatively straightforward and follow patterns typical of Bantu languages, the system is made more complex by the presence of the empty C, and vowel coalescence. Where applicable, I will point out how the underlying form and surface forms are connected, keeping in mind that Chapter 4 and Chapter 3 cover the empty C and vowel coalescence, respectively. In §2.2, I describe the nominal morphology patterns, and in §2.3, I describe the verbal morphology patterns.

2.2 Nominal morphology

The Kikamba noun class system is typical of Bantu noun class systems. Nouns are lexically assigned to classes, which are indicated by class prefixes attached to noun stems. Modifiers follow the noun and agree with the noun they modify by taking an agreement prefix which attaches to the modifier stem. The set of modifiers includes adjectives, demonstratives, and quantifiers. The agreement system is very productive because nouns and adjectives can also be formed from verbs with the addition of prefixes, suffixes, and specific tone patterns. This rich nominal morphology demonstrates a wide variety of tonal and segmental phenomena which are discussed in detail in later chapters.
2.2.1 Noun class system

The noun class system found in Bantu languages typically involves pairs of classes which encode the singular and plural for a given noun. All noun class prefixes are toneless, and thus receive a L tone by default on the surface. Kikamba noun class prefixes are found in Table 2.1, along with an example of a noun from each class. Immediately following, I provide specific details for each noun class.

Table 2.1: Noun class prefixes

<table>
<thead>
<tr>
<th>Class</th>
<th>Noun Prefix</th>
<th>Noun Stem</th>
<th>Noun</th>
<th>Noun Stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mo-</td>
<td>-tabutá</td>
<td>motabutá</td>
<td>'interpreter'</td>
</tr>
<tr>
<td>2</td>
<td>a-</td>
<td>atabutá</td>
<td>'interpreters'</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>mo-</td>
<td>-té</td>
<td>moté</td>
<td>'tree'</td>
</tr>
<tr>
<td>4</td>
<td>me-</td>
<td>meté</td>
<td>'trees'</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>e- ~ ye-</td>
<td>-baatá</td>
<td>ebaatá</td>
<td>'duck'</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>mabaatá</td>
<td>'ducks'</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ke-</td>
<td>-kaabo</td>
<td>kekaabo</td>
<td>'basket'</td>
</tr>
<tr>
<td>8</td>
<td>Ci-1</td>
<td>ikaabo</td>
<td>'baskets'</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>N- ~ 0</td>
<td>-kité</td>
<td>ngité</td>
<td>'dog'</td>
</tr>
<tr>
<td>10</td>
<td>N- ~ 0</td>
<td>ngité</td>
<td>'dogs'</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Co-</td>
<td>-byó</td>
<td>obyó</td>
<td>'knife'</td>
</tr>
<tr>
<td>(10)</td>
<td>N- ~ 0</td>
<td>mbyó</td>
<td>'knives'</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>ka-</td>
<td>-kò</td>
<td>kakò</td>
<td>'leopard-dim'</td>
</tr>
<tr>
<td>13</td>
<td>to-</td>
<td>tokò</td>
<td>'leopards-dim'</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>o- ~ 0²</td>
<td>-túkò</td>
<td>otúkò</td>
<td>'night'</td>
</tr>
<tr>
<td>(6)</td>
<td>ma-</td>
<td>ma.otúkò</td>
<td>'nights'</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>ko-</td>
<td>tó</td>
<td>kotó</td>
<td>'ear'</td>
</tr>
<tr>
<td>(6)</td>
<td>ma-</td>
<td>mató</td>
<td>'ears'</td>
<td></td>
</tr>
</tbody>
</table>

1 Evidence that this prefix and the class 11 prefix Co have an empty C will be presented in Chapter 4.

2 In this class, some nouns take the prefix o- and others do not. If the prefix o- is present in the singular form of the noun, then it is also present in the plural form, along with the plural prefix ma-. See §2.2.1.1 for further details.
2.2.1.1 Basic noun classes

Class 1/2 is the class representing human beings. The class 1 prefix is *mo* and represents the singular. The class 2 prefix is *a*, and represents the plural. For this class, as for all classes, when a noun begins with a vowel, there is coalescence between the prefix and the stem. This sometimes results in Glide formation, and sometimes in Mid vowel fusion. A complete discussion of coalescence phenomena can be found in Chapter 3. Examples of nouns in class 1/2 are found in (2.1).

(2.1) Class 1-Singular
- a. motumé.a
- b. mwáánáké
- c. motábányá
- d. moñáãnhá
- e. mosiili

Class 2-Plural
- atumé.a
- áánáké
- atábányá
- anáãnhá
- asiilli

Examples of nouns in class 1/2 are found in (2.1).

Class 3 is the singular noun class represented by the prefix *mo* and class 4 is the plural noun class represented by the prefix *me*. Noun classes 3/4, 5/6, and 7/8 generally represent inanimate objects with a few exceptions, such as (2.2d) *moñáãmbó* ‘lion.’ While historically there may be more to the distinction between inanimate objects in these classes, synchronically they are simply grammatical class distinctions. Examples of class 3/4 are seen in (2.2). The vowel coalescence in (2.2c) is discussed in Chapter 3.

(2.2) Class 3-Singular
- a. moté
- b. mokáte
- c. mwáaká
- d. moñáámbó

Class 4-Plural
- meté
- mekáté
- myáká
- menáámbó

Examples of inanimate objects represented in class 3/4 are seen in (2.2). The vowel coalescence in (2.2c) is discussed in Chapter 3.

Class 7/8 is represented by the prefixes *ke* in the singular and *Ci* in the plural. Examples of inanimate objects represented in class 7/8 are seen in (2.3).
In (2.4), there are examples of a few notable exceptions in class 7/8 of nouns referring to humans. These words are similar to other nouns referring to human beings that are found in classes other than 1/2 in that they tend to refer to people with lesser social status. A few animals fall into this class as well, as seen in (2.4e-g).

Class 9/10 also contains some inanimate objects, but is generally the class to which animals and insects belong. The class prefix is the same for both singular and plural: a moraic nasal represented as $N$ underlyingly. Evidence will be presented in Chapters 3 and 4 that this prefix loses its mora and becomes part of the onset of the first syllable of the noun stem. The nasal spreads voicing, resulting in a voiced nasal-consonant cluster in initial position in most nouns. The place of articulation of the onset consonant of the stem spreads to the nasal prefix as well. Examples are seen in (2.5).
The singular noun classes 11, 14, and 15 have far fewer lexical items than classes 1/2, 3/4, 7/8, and 9/10, and they form their plurals with plural prefixes from other noun classes. Nouns beginning with the prefix Co are categorized in either class 11 or class 14, depending on whether the plural is formed in class 10 or class 6, respectively. The plural for class 11 is class 10 and is formed by adding a moraic nasal prefix, just as the plurals of class 9 nouns do. Examples are seen in (2.6).

(2.6) Class 11-Singular
   a. osekí
   b. obyo
   c. o.émé

   Class 10-Plural
   nzekí
   mbyo
   némé

   ‘blade(s) of grass’
   ‘knife/knives’
   ‘tongue(s)’

Some nouns in class 14 do not take a prefix o but simply have a bare stem as the singular form. Nouns in this class form their plurals in class 6 by adding the prefix ma, just as class 5 nouns do, as will be seen in (2.9). In the plural, ma is added to the entire word regardless of whether an o is present or not. Examples are seen in (2.7).

(2.7) Class 14-Singular
   a. sooba
   b. we.a
   c. otuko

   Class 6-Plural
   masooba
   mawe.a
   ma.otuko

   ‘bottle(s)’
   ‘work(s)’
   ‘night(s)’

Class 15 singular nouns take the prefix ko and the plural is formed in class 6 with the prefix ma. There are very few nouns in this class, and they are all body parts.

---

3 This noun stem begins with an empty C. Normally, nouns beginning with empty C surface with the excrecent consonant d after the nasal prefix and so one would expect the word ‘tongues’ to be pronounced as ndémé. However, due to application of a rule called Ganda Law, the obstruent d is deleted (or, alternatively, is prevented from being inserted) just in case the following syllable begins with a nasal, as is the case here. So the surface form is némé. See Chapter 4 for details.

13
Examples are seen in (2.8a-c). This prefix is also used for the infinitive of the verb, as seen in (2.8d-f).

(2.8) Class 15-Singular    Class 6-Plural
a. koto                   matō                   ‘ear(s)’
b. ko.o.ò                 ma.o.ò                  ‘leg(s), foot/feet’
c. kw55k5                 m55k5                  ‘arm(s)’
d. kokonà                 ‘to hit’
e. kotālā                 ‘to count’
f. kobálokà               ‘to fall’

2.2.1.2 The augmentative and diminutive

Class 5/6 is a lexical noun class and is also the augmentative class. The prefixes are e for the singular, and ma for the plural. Most words in this class are inanimate objects, as demonstrated in (2.9a-d). There are also some animate beings in this class as well, as seen in (2.9e-g), and (2.9g) has a derogatory sense.

(2.9) Class 5-Singular    Class 6-Plural
a. ebf.à                 mabí.à                  ‘stone(s)’
b. ekūnō                  makūnō                  ‘mushroom(s)’
c. etúúndá               matúúndá                ‘fruit(s)’
d. etù                   matù                    ‘cloud(s)’
e. ekoooyó               makooyó                  ‘fish’
f. ebaatá                mabaatá                  ‘duck(s)’
g. eweëtò                maweëtò                  ‘new wife/wives’

As the class to which productively derived augmentative nouns are assigned, nouns that normally fall into other noun classes can acquire an augmentative meaning, i.e. ‘big X,’ with the addition of the class 5 or class 6 prefix. Examples are seen in (2.10).
(2.10) Augmentative

Class 5-Singular
a. emoté (cl.3)
b. ekaabó (cl.7)
c. ekité (cl.9)
d. esoobá (cl.14)
e. ekotó (cl.15)
f. yeèndô (cl.7)^

Class 6-Plural
mamoté (cl.4)
makaabó (cl.8)
makité (cl.10)
masoobá (cl.6)
makotó (cl.6)
mèndô (cl.8)

‘big tree(s)’
‘huge basket(s)’
‘big dog(s)’
‘big bottle(s)’
‘big ear(s)’
‘big thing(s)’

When nouns referring to people from class 1/2 are put into class 5/6, they take on a derogatory meaning. Some examples are seen in (2.11).

(2.11) Augmentative

Class 5-Singular
a. emotábányá
b. emotwí

c. emoòndô

Class 6-Plural
mamotábányá
mamotwí
mamoòndô

‘translator(s)-der’
‘fruit picker(s)-der’
‘person/people-der’

An important thing to note about class 5/6 is that when classes 1/2, 3/4, 11/10, and 15/6, are assigned to class 5/6, the class 5/6 prefix is prefixed to the form of the noun which already has a noun class prefix. In other words, these nouns retain their own noun class prefix, and the augmentative prefix becomes a pre-prefix. Examples are seen in (2.12). Moreover, note that in the plurals of these nouns, i.e. classes 2, 4, 10, and 6, the original noun class prefix used in the augmentative form may be singular.

^ This noun begins with y- due to coalescence with the initial vowel of the noun stem. See Chapter 3 for details on vowel coalescence.
Basic noun class

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 11</th>
<th>Class 10</th>
<th>Class 15</th>
<th>Class 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>motâbânya</td>
<td>atâbânya</td>
<td>moté</td>
<td>meté</td>
<td>o.émé</td>
<td>némé</td>
<td>koto</td>
<td>mató</td>
</tr>
<tr>
<td>emotâbânya</td>
<td>mamotâbânya</td>
<td>emoté</td>
<td>mamoté</td>
<td>e.olémé</td>
<td>ma.olémé</td>
<td>ekoto</td>
<td>makoto</td>
</tr>
</tbody>
</table>

Augmentative

| emotâbânvâ | mamotâbânvâ | emoté | mamoté | e.olémé | ma.olémé | ekoto | makoto |

Translator-der: 'translator-der'  
Translators-der: 'translators-der'  
Big tree: 'big tree'  
Big trees: 'big trees'  
Big tongue: 'big tongue'  
Big tongues: 'big tongues'  
Big ear: 'big ear'  
Big ears: 'big ears'  

Class 12/13 functions as the diminutive class. Class 12 is the singular, and is indicated by the prefix ka, and class 13 is the plural which is indicated by the prefix to. Examples are seen in (2.13).

Diminutive

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 11</th>
<th>Class 10</th>
<th>Class 15</th>
<th>Class 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>moondó</td>
<td>andó</td>
<td>moté</td>
<td>meté</td>
<td>mokâté</td>
<td>mekâté</td>
<td>ebaatá</td>
<td>mabaatá</td>
</tr>
<tr>
<td>kamoondó</td>
<td>tomoondó (*twaändó)</td>
<td>kamoté</td>
<td>tometé</td>
<td>kamokâté</td>
<td>tomekâté</td>
<td>kabaatá</td>
<td>tobaatá</td>
</tr>
<tr>
<td>little person</td>
<td>little people</td>
<td>little tree</td>
<td>little trees</td>
<td>little bread</td>
<td>little breads</td>
<td>little duck</td>
<td>little ducks</td>
</tr>
</tbody>
</table>

There are certain classes that retain their singular noun class prefix when the diminutive prefix is added. These are classes 1/2, 3/4, 11/10, and 15/6. In the examples in (2.13), notice that nouns in class 2, 10, and 6 retain the prefix from the corresponding singular.
class, but in (2.12d,f), nouns in class 4 do not. Such data show that, just as with the augmentative use of class 5/6, the basic class prefix used with the diminutive may be either singular or plural. While in general either the singular or plural prefix may be used with the diminutive, notice that in (2.13b), class 2 does not allow the original plural prefix to be used with the diminutive.

In addition to these prefixes, both the augmentative and the diminutive are marked by a floating lateral specification. Evidence for this is related to empty C phenomena: whenever a noun containing an empty C is put into the augmentative or diminutive class, the empty C surfaces as Ɂ. This discussion can be found in Chapter 4.

2.2.1.3 Definite nouns

The definite form of Kikamba nouns is indicated by the presence of a SH tone on the prefix. If the noun class prefix does not coalesce with the noun stem, then the prefix acquires a SH tone. The definite prefix must also be a long vowel, so the short vowel in noun class prefixes lengthens in the definite. Examples are seen in (2.14).

(2.14) UR

<table>
<thead>
<tr>
<th>Indefinite</th>
<th>Definite</th>
<th>Meaning</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /a-ndo/</td>
<td>andó</td>
<td>aándó 'the people'</td>
<td>2</td>
</tr>
<tr>
<td>b. /mo-theñá/</td>
<td>motheñá</td>
<td>móøtheñá 'the day'</td>
<td>3</td>
</tr>
<tr>
<td>c. /me-theñá/</td>
<td>methñá</td>
<td>mëëtheñá 'the days'</td>
<td>4</td>
</tr>
<tr>
<td>d. /e-kooyó/</td>
<td>ekooyó</td>
<td>éékooyó 'the fish'</td>
<td>5</td>
</tr>
<tr>
<td>e. /e-leēngé/</td>
<td>eleēngé</td>
<td>éëleēngé 'the pumpkin'</td>
<td>5</td>
</tr>
<tr>
<td>f. /ma-leēngé/</td>
<td>maleēngé</td>
<td>mëëleēngé 'the pumpkins'</td>
<td>6</td>
</tr>
<tr>
<td>g. /e-koombé/</td>
<td>ekoombé</td>
<td>éékoombé 'granary'</td>
<td>5</td>
</tr>
<tr>
<td>h. /ma-koombé/</td>
<td>makoombé</td>
<td>mëëkoombé 'granary'</td>
<td>6</td>
</tr>
<tr>
<td>i. /ke-theká/</td>
<td>kethká</td>
<td>këëthká 'the forest'</td>
<td>7</td>
</tr>
<tr>
<td>j. /ke-kó/</td>
<td>kekó</td>
<td>këëkó 'the dirt'</td>
<td>7</td>
</tr>
<tr>
<td>k. /i-wá/</td>
<td>iwá</td>
<td>Ɂiwichá 'the sugar cane'</td>
<td>8</td>
</tr>
<tr>
<td>l. /i-theká/</td>
<td>ithká</td>
<td>Ɂiithká 'the forests'</td>
<td>8</td>
</tr>
</tbody>
</table>
If the noun class prefix vowel coalesces with the stem vowel, a long vowel is prefixed to the noun to bear the SH tone, as seen in (2.15). This prefix is the same prefix used for the demonstratives corresponding to the noun class. In addition, in classes where there is no prefix vowel for some lexical items, such as 9, 10, and 14, the definite is always formed by adding a long prefix vowel to bear the SH tone.

\[(2.15)\]

<table>
<thead>
<tr>
<th>UR</th>
<th>Indefinite</th>
<th>Definite</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /mo-ëndwá/</td>
<td>mwësëndwá</td>
<td>óómweëndwá</td>
</tr>
<tr>
<td>b. /mo-ëndì/</td>
<td>mwësëndì</td>
<td>óómweëndì</td>
</tr>
<tr>
<td>c. /mo-ëndò/</td>
<td>moëndò</td>
<td>óómoloëndò</td>
</tr>
<tr>
<td>d. /mo-ëño/</td>
<td>mëño</td>
<td>óómëño</td>
</tr>
<tr>
<td>e. /ke-ëkë/</td>
<td>keëkë</td>
<td>íkeëkë</td>
</tr>
<tr>
<td>f. /0-ëski/</td>
<td>ëski</td>
<td>íëski</td>
</tr>
<tr>
<td>g. /0-ngëëmbë/</td>
<td>ngëëmbë</td>
<td>íngëëmbë</td>
</tr>
<tr>
<td>h. /0-ngëëmbë/</td>
<td>ngëëmbë</td>
<td>íngëëmbë</td>
</tr>
<tr>
<td>i. /o-ësaë/</td>
<td>waasëa</td>
<td>óówaasëa</td>
</tr>
<tr>
<td>j. /o-emë/</td>
<td>weëmë</td>
<td>óóweëmë</td>
</tr>
<tr>
<td>k. /0-këë/</td>
<td>këë</td>
<td>óókaëë</td>
</tr>
<tr>
<td>l. /o-ëndò/</td>
<td>ondò</td>
<td>óóondò</td>
</tr>
<tr>
<td>m. /kë-ënà/</td>
<td>këënà</td>
<td>ákëënà</td>
</tr>
<tr>
<td>n. /to-ënà/</td>
<td>twëënà</td>
<td>óótwëënà</td>
</tr>
<tr>
<td>o. /ko-ëkë/</td>
<td>kwëëkë</td>
<td>óókwëëkë</td>
</tr>
<tr>
<td>p. /ma-ëkë/</td>
<td>mëëkë</td>
<td>ámëëkë</td>
</tr>
</tbody>
</table>

However, there are some cases where the long vowel of the definite form surfaces as short. This happens just in case the long vowel is followed by an onsetless syllable. In this case the long vowel of the definite shortens by a rule of Sequential shortening. See Chapter 4 for details.
2.2.1.4 Modifier agreement patterns

As is typical of Bantu languages, an adjective or other nominal modifier takes a prefix which agrees with the noun it modifies. In Kikamba, the agreement prefix for a given noun class takes different shapes depending on the type of modifier it is prefixed to. There are three patterns of modifier agreement, as shown in the tables below. All tables show the prefixes, examples of modifier stems which they can be added to, and the surface form of the noun + modifier pairs.

The first pattern is found in adjectives, including both lexical and deverbal adjectives, and in the modifiers ‘many’ and ‘few.’ This pattern is shown in Table 2.2 with the nominal adjective túuné ‘red.’ In this pattern, the adjective prefix is identical to the noun class prefix in Table 2.1, except that class 8 (i) chooses class 10 (N) agreement and that class 11 and 14 (o ~ 0) choose class 3 (mo) agreement.
Table 2.2 Pattern #1: Adjective stem ṭûûnê ‘red’

<table>
<thead>
<tr>
<th>Class</th>
<th>Adjective Prefix</th>
<th>Noun + Adjective</th>
<th>( \text{Noun} + \text{Adjective} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mo-</td>
<td>moondo motûûnê</td>
<td>'red person'</td>
</tr>
<tr>
<td>2</td>
<td>a-</td>
<td>ando atûûnê</td>
<td>'red people'</td>
</tr>
<tr>
<td>3</td>
<td>mo-</td>
<td>motê motûûnê</td>
<td>'red tree'</td>
</tr>
<tr>
<td>4</td>
<td>me-</td>
<td>metë metûûnê</td>
<td>'red trees'</td>
</tr>
<tr>
<td>5</td>
<td>e-</td>
<td>ebaatâ etûûnê</td>
<td>'red duck'</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>mabaatâ matûûnê</td>
<td>'red ducks'</td>
</tr>
<tr>
<td>7</td>
<td>ke-</td>
<td>keng’e.i ketûûnê</td>
<td>'red thief'</td>
</tr>
<tr>
<td>8</td>
<td>N-</td>
<td>ing’e.i ndûûnê</td>
<td>'red thieves'</td>
</tr>
<tr>
<td>9</td>
<td>N-</td>
<td>ngîte ndûûnê</td>
<td>'red dog'</td>
</tr>
<tr>
<td>10</td>
<td>N-</td>
<td>ngîte ndûûnê</td>
<td>'red dogs'</td>
</tr>
<tr>
<td>11</td>
<td>mo-</td>
<td>obyo motûûnê</td>
<td>'red knife'</td>
</tr>
<tr>
<td>(10)</td>
<td>N-</td>
<td>mbyo ndûûnê</td>
<td>'red knives'</td>
</tr>
<tr>
<td>12</td>
<td>ka-</td>
<td>kako katûûnê</td>
<td>'red leopard-dim'</td>
</tr>
<tr>
<td>13</td>
<td>to-</td>
<td>toko totûûnê</td>
<td>'red leopards-dim'</td>
</tr>
<tr>
<td>14</td>
<td>mo-</td>
<td>bîsa motûûnê</td>
<td>'red picture'</td>
</tr>
<tr>
<td>(6)</td>
<td>ma-</td>
<td>mabîsa matûûnê</td>
<td>'red pictures'</td>
</tr>
<tr>
<td>15</td>
<td>ko-</td>
<td>kotó kotûûnê</td>
<td>'red ear'</td>
</tr>
<tr>
<td>(6)</td>
<td>ma-</td>
<td>mató matûûnê</td>
<td>'red ears'</td>
</tr>
</tbody>
</table>

The adjectives in Table 2.3 and Table 2.4 are only possible with plural nouns, so only the plural noun classes are represented. Table 2.3 shows the adjective 'many.'

Table 2.3 Pattern #1: Adjective stem ingê ‘many’

<table>
<thead>
<tr>
<th>Class</th>
<th>Adjective Prefix</th>
<th>Noun + 'many'</th>
<th>( \text{Noun} + \text{Adjective} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>a-</td>
<td>ando a.i.ingê</td>
<td>'many people'</td>
</tr>
<tr>
<td>4</td>
<td>me-</td>
<td>me.oonda nî.ingê</td>
<td>'many gardens'</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>matu mat.i.ingê</td>
<td>'many clouds'</td>
</tr>
<tr>
<td>8</td>
<td>N-</td>
<td>ibeti nî.ingê</td>
<td>'many wives'</td>
</tr>
<tr>
<td>10</td>
<td>N-</td>
<td>ng’ombe nî.ingê</td>
<td>'many cows'</td>
</tr>
<tr>
<td>13</td>
<td>to-</td>
<td>tomoondo twi.ingê</td>
<td>'many people-dim'</td>
</tr>
</tbody>
</table>

Table 2.4 shows the adjective 'few.'
Table 2.4 Pattern #1: Adjective stem *niini* ‘few’

<table>
<thead>
<tr>
<th>Class</th>
<th>Adjective Prefix</th>
<th>Noun + ‘few’</th>
<th>Noun + ‘few’</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>a-</td>
<td>ando aníini</td>
<td>‘few people’</td>
</tr>
<tr>
<td>4</td>
<td>me-</td>
<td>me.oonda meníini</td>
<td>‘few gardens’</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>matu maníini</td>
<td>‘few clouds’</td>
</tr>
<tr>
<td>8</td>
<td>N-</td>
<td>ibeti níini</td>
<td>‘few wives’</td>
</tr>
<tr>
<td>10</td>
<td>N-</td>
<td>ng’ombe níini</td>
<td>‘few cows’</td>
</tr>
<tr>
<td>13</td>
<td>to-</td>
<td>tomoondo toníini</td>
<td>‘few people-dim’</td>
</tr>
</tbody>
</table>

The second set of agreement prefixes is found in possessive pronouns, possessive phrases, locative phrases, and wh-modifiers. Table 2.5 shows class prefixes for the possessive pronoun *akwa* ‘my.’ The class 1, 4, and 9 prefixes have a L tone, whereas the other classes are marked by a H tone.

Table 2.5 Pattern #2: Possessive pronoun stem *akwa* ‘my’

<table>
<thead>
<tr>
<th>Class</th>
<th>Prefix</th>
<th>Noun + Possessive Pronoun</th>
<th>Noun + Possessive Pronoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>o-</td>
<td>moondo waakwa</td>
<td>‘my person’</td>
</tr>
<tr>
<td>2</td>
<td>má-</td>
<td>ando máakwa</td>
<td>‘my people’</td>
</tr>
<tr>
<td>3</td>
<td>ó-</td>
<td>mo.oonda wáakwa</td>
<td>‘my garden’</td>
</tr>
<tr>
<td>4</td>
<td>e-</td>
<td>me.oonda yaakwa</td>
<td>‘my gardens’</td>
</tr>
<tr>
<td>5</td>
<td>é-</td>
<td>etu yáakwa</td>
<td>‘my cloud’</td>
</tr>
<tr>
<td>6</td>
<td>má-</td>
<td>matu máakwa</td>
<td>‘my clouds’</td>
</tr>
<tr>
<td>7</td>
<td>ké-</td>
<td>keendo chaakwa</td>
<td>‘my thing’</td>
</tr>
<tr>
<td>8</td>
<td>Cí</td>
<td>ibeti syáakwa</td>
<td>‘my wives’</td>
</tr>
<tr>
<td>9</td>
<td>e-</td>
<td>ngíte yaakwá</td>
<td>‘my dog’</td>
</tr>
<tr>
<td>10</td>
<td>Cí-</td>
<td>ng’ombe syáakwa</td>
<td>‘my cows’</td>
</tr>
<tr>
<td>11</td>
<td>ó-</td>
<td>wááthi wáakwa</td>
<td>‘my song’</td>
</tr>
<tr>
<td>12</td>
<td>ká-</td>
<td>kabaló.a kákwa</td>
<td>‘my letter-dim’</td>
</tr>
<tr>
<td>13</td>
<td>tó-</td>
<td>twáána twákwa</td>
<td>‘my children-dim’</td>
</tr>
<tr>
<td>14</td>
<td>ó-</td>
<td>ondo wákwa</td>
<td>‘my idea’</td>
</tr>
<tr>
<td>15</td>
<td>kó-</td>
<td>kotó kwaakwa</td>
<td>‘my ear’</td>
</tr>
</tbody>
</table>
Possessive phrases and WH-modifiers also utilize the same set of prefixes. In Table 2.6, we find the class 2 prefix *ma* of this pattern with a variety of stems to illustrate this point.

Table 2.6 Pattern #2: Other stems

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Stem</th>
<th>Noun Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>-má-</td>
<td>-a</td>
<td><em>ando má motábányá</em></td>
</tr>
<tr>
<td>má-</td>
<td>-ébá</td>
<td><em>ando mëébá</em></td>
</tr>
<tr>
<td>má-</td>
<td>-ilyááta</td>
<td><em>ando má.ilyááta</em></td>
</tr>
<tr>
<td>má-</td>
<td>-eCána</td>
<td><em>ando më.ána</em></td>
</tr>
</tbody>
</table>

Locative ‘N of N’ constructions require the same preposition as the possessive phrase seen in Table 2.6: *ando má motábányá*, with the choice of prefix for a lexically determined by the first noun. There are three possible prepositions which can occur in this structure: *na, ya,* and *wa,* with *wa* being the more common form. Examples (2.17a,b) represent nouns that take *na-* , although there are no noun classes which take *ne* as an agreement prefix. Locative nouns in (2.17c,d) are class 9, as indicated by the nasal prefix, and take the prefix *e,* resulting in *ya.* All other locative nouns in (2.17e-k), take *o* as a prefix resulting in *wa,* although the preceding locative noun is clearly not in class 3. Since *wa* is diachronically derived from *pa,* it is likely that the choice of *wa* is the residue from agreement with a locative noun, rather than agreement with the noun class of the noun.
The third agreement pattern is the demonstrative pattern. This pattern is found in demonstratives, numerals, in the modifiers ‘all/the whole’ and ‘another,’ and as the prefix for the relative clause marker ḡ. Table 2.7 shows examples with the demonstrative ‘this/these’ and Table 2.8 shows examples with the demonstrative ‘that/those.’ Notice that the stems change for each noun class.
### Table 2.7 Pattern #3: Demonstrative stem CV 'this/these'

<table>
<thead>
<tr>
<th>Class</th>
<th>Prefix</th>
<th>Stem</th>
<th>Noun Phrase</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ó-</td>
<td>-Có</td>
<td>moondô + ó.ô → moondó.ô</td>
<td>'this person'</td>
</tr>
<tr>
<td>2</td>
<td>á-</td>
<td>-Cá</td>
<td>andô + á.á → ando á.á</td>
<td>'these people'</td>
</tr>
<tr>
<td>3</td>
<td>ó-</td>
<td>-Có</td>
<td>mokáté + ó.ô → mokatô.ô</td>
<td>'this bread'</td>
</tr>
<tr>
<td>4</td>
<td>é-</td>
<td>-nô</td>
<td>me.oondà + énô → me.oondéénô</td>
<td>'these gardens'</td>
</tr>
<tr>
<td>5</td>
<td>yé-</td>
<td>-Cé</td>
<td>ebaatá + yé.é → ebaatá yé.é</td>
<td>'this duck'</td>
</tr>
<tr>
<td>6</td>
<td>á-</td>
<td>-Cá</td>
<td>makunô + á.á → makuno á.á</td>
<td>'these mushrooms'</td>
</tr>
<tr>
<td>7</td>
<td>kê-</td>
<td>-Cé</td>
<td>cha.i + ké.é → chá.i ké.é</td>
<td>'this tea'</td>
</tr>
<tr>
<td>8</td>
<td>Í-</td>
<td>-Cí</td>
<td>syeéndô + í.í → syendo í.í</td>
<td>'these things'</td>
</tr>
<tr>
<td>9</td>
<td>é-</td>
<td>nô~nô</td>
<td>ngókó + énô → ngókó énô ~ nô</td>
<td>'this chicken'</td>
</tr>
<tr>
<td>10</td>
<td>í-</td>
<td>-Cí</td>
<td>ng’ombì + í.í → ng’ombe í.í</td>
<td>'these cows'</td>
</tr>
<tr>
<td>11</td>
<td>ó-</td>
<td>-Có</td>
<td>olí.í + ó.ô → olí.í ó.ô</td>
<td>'this thread'</td>
</tr>
<tr>
<td>12</td>
<td>kâ-</td>
<td>-Cá</td>
<td>kamoondô + ká.á → kamoondo kâ.á</td>
<td>'this person-dim'</td>
</tr>
<tr>
<td>13</td>
<td>tô-</td>
<td>-Có</td>
<td>tong’elí +tô.ô → tong’elí tô.ô</td>
<td>'these thieves-dim'</td>
</tr>
<tr>
<td>14</td>
<td>ó-</td>
<td>-Có</td>
<td>ondô + ó.ô → ondo ó.ô</td>
<td>'this idea'</td>
</tr>
<tr>
<td>15</td>
<td>kô-</td>
<td>-Có</td>
<td>kúšókô + kô.ô → kúšóko kô.ô</td>
<td>'this arm'</td>
</tr>
</tbody>
</table>

### Table 2.8 Pattern #3: Demonstrative stem Vyâ ‘that/those’

<table>
<thead>
<tr>
<th>Class</th>
<th>Prefix</th>
<th>Noun Phrase</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ó-</td>
<td>moondóyâ</td>
<td>'that person'</td>
</tr>
<tr>
<td>2</td>
<td>á-</td>
<td>andwaayâ</td>
<td>'those people'</td>
</tr>
<tr>
<td>3</td>
<td>ó-</td>
<td>mo.oondóyâ</td>
<td>'that garden'</td>
</tr>
<tr>
<td>4</td>
<td>é-</td>
<td>me.oondéeyâ</td>
<td>'those gardens'</td>
</tr>
<tr>
<td>5</td>
<td>yé-</td>
<td>etu yéeyâ</td>
<td>'that cloud'</td>
</tr>
<tr>
<td>6</td>
<td>á-</td>
<td>máuyayâ</td>
<td>'those clouds'</td>
</tr>
<tr>
<td>7</td>
<td>kê-</td>
<td>keendo kéeyâ</td>
<td>'that thing'</td>
</tr>
<tr>
<td>8</td>
<td>í-</td>
<td>ibetíiyâ</td>
<td>'those wives'</td>
</tr>
<tr>
<td>9</td>
<td>é-</td>
<td>ng’ombéeyâ</td>
<td>'that cow'</td>
</tr>
<tr>
<td>10</td>
<td>í-</td>
<td>ng’ombe íiyâ</td>
<td>'those cows'</td>
</tr>
<tr>
<td>11</td>
<td>ó-</td>
<td>olí.i óoyâ</td>
<td>'that thread'</td>
</tr>
<tr>
<td>12</td>
<td>kâ-</td>
<td>kaána káayâ</td>
<td>'that child-dim'</td>
</tr>
<tr>
<td>13</td>
<td>tô-</td>
<td>twáána tóoyâ</td>
<td>'those children-dim'</td>
</tr>
<tr>
<td>14</td>
<td>ó-</td>
<td>ondóoyâ</td>
<td>'that idea'</td>
</tr>
<tr>
<td>15</td>
<td>kô-</td>
<td>kúšóko kóoyâ</td>
<td>'that arm'</td>
</tr>
</tbody>
</table>
Table 2.9 shows the modifier which means ‘all X’ or ‘the whole X.’

Table 2.9 Pattern #3: Modifier stem onthē ‘all/the whole X’

<table>
<thead>
<tr>
<th>Class</th>
<th>Prefix</th>
<th>Noun Phrase</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ó-</td>
<td>moõndo wɔonṯe</td>
<td>‘the whole person’</td>
</tr>
<tr>
<td>2</td>
<td>á-</td>
<td>andò ŋoonthē</td>
<td>‘all people’</td>
</tr>
<tr>
<td>3</td>
<td>ó-</td>
<td>mo.oõnda wɔonṯe</td>
<td>‘the whole garden’</td>
</tr>
<tr>
<td>4</td>
<td>é-</td>
<td>me.oõnda yɔonṯe</td>
<td>‘all gardens’</td>
</tr>
<tr>
<td>5</td>
<td>é-</td>
<td>efá yɔonṯe</td>
<td>‘all milk’</td>
</tr>
<tr>
<td>6</td>
<td>á-</td>
<td>mañõ ŋoonthē</td>
<td>‘all clouds’</td>
</tr>
<tr>
<td>7</td>
<td>ké-</td>
<td>chá.í chɔonṯe</td>
<td>‘all tea’</td>
</tr>
<tr>
<td>8</td>
<td>Cí-</td>
<td>syeɛndò syɔonṯe</td>
<td>‘all things’</td>
</tr>
<tr>
<td>9</td>
<td>é-</td>
<td>ngõkó yɔonṯe</td>
<td>‘the whole chicken’</td>
</tr>
<tr>
<td>10</td>
<td>Cí-</td>
<td>ngõkó syɔonṯe</td>
<td>‘all chickens’</td>
</tr>
<tr>
<td>11</td>
<td>ó-</td>
<td>ol.í wɔonṯe</td>
<td>‘the whole thread’</td>
</tr>
<tr>
<td>12</td>
<td>ká-</td>
<td>kalengẽ kɔonṯe</td>
<td>‘the whole pumpkin-dim’</td>
</tr>
<tr>
<td>13</td>
<td>tó-</td>
<td>twãañá twɔonṯe</td>
<td>‘all children-dim’</td>
</tr>
<tr>
<td>14</td>
<td>ó-</td>
<td>ondõ wɔonṯe</td>
<td>‘the whole idea’</td>
</tr>
<tr>
<td>15</td>
<td>kó-</td>
<td>kwɔɔskĩ kwɔonṯe</td>
<td>‘the whole arm’</td>
</tr>
</tbody>
</table>

Numerals also follow the same pattern. Table 2.10 shows the citation form of numbers 1 through 5 when referring to nouns in different classes. Only these numerals are represented because these are the only ones which agree with a preceding noun by taking an agreement prefix. I also provide the citation form of the number used when counting.

---

5 There was an interesting fact found that the w showed up as the labio-palatal glide in classes 3, 11, and 14, but always as a regular w in class 1 nouns. I have no explanation for why this may be the case. I simply point out that this is the data I elicited.
Table 2.10 Pattern #3: Numerals

<table>
<thead>
<tr>
<th>Stem: Citation</th>
<th>Class</th>
<th>Prefix</th>
<th>'1~ some'</th>
<th>'2'</th>
<th>'3'</th>
<th>'4'</th>
<th>'5'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-mwé</td>
<td>emwé</td>
<td>-élé</td>
<td>itató</td>
<td>-nà</td>
<td>-tânà</td>
</tr>
<tr>
<td>1</td>
<td>o-6</td>
<td>omwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>á-</td>
<td>amwé</td>
<td>éélé</td>
<td>atató</td>
<td>aná</td>
<td>àtânà</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ó-</td>
<td>òmwe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>e-</td>
<td>emwé</td>
<td>éélé</td>
<td>etató</td>
<td>ena</td>
<td>etàänò</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>yé-</td>
<td>yémwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>á-</td>
<td>ámwe</td>
<td>éélé</td>
<td>ãná</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ké-</td>
<td>kémwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>í-</td>
<td>ímwé</td>
<td>yéélé</td>
<td>ítató</td>
<td>íná</td>
<td>ítàänò</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>e-</td>
<td>emwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>í-</td>
<td>ímwé</td>
<td>yéélé</td>
<td>ítató</td>
<td>íná</td>
<td>ítàänò</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>ó-</td>
<td>òmwe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>ká-</td>
<td>kámwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>tó-</td>
<td>tomwé</td>
<td>twéélé</td>
<td>tótató</td>
<td>tóná</td>
<td>tôtàänò</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>ó-</td>
<td>òmwe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>kó-</td>
<td>kómwé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other numbers do not take an agreement prefix, and thus, have the same form when following any noun. Forms for numbers 6 though 10 are seen in (2.18).

(2.18) a. thàantható | '6'
b. mo.ónzá | '7'
c. náàná | '8'
d. ke.endá | '9'
e. ekómí | '10'

---

6 When numerals 1-5 modify a noun in classes 1, 4, and 9, the prefix surfaces with a L tone.
2.2.2 Stem formation

There are several productive patterns by which nominal stems are formed in Kikamba. Here I discuss derived nouns, derived adjectives, and possessive modifiers. In addition to lexical nouns, many nominals are productively derived from verbs in Kikamba. For example, nouns and adjectives are derivable from verb roots. Deverbal nouns referring to humans take the class 1-2 prefixes *mo* and *a*, and the final vowel *i* or *a*. The generalization is that these derived nouns end in *i* and have a final SL tone, unless there is a glide in the stem. If the glide is in the onset of the first stem syllable, the derived noun still takes *i* and a SL tone, as in (2.19g). However, just in case the glide is not in the first stem syllable of the derived noun stem, but is later in the stem, the final vowel is *a* and the noun takes a V2H tone (see Chapter 5 for details on tone). Examples are seen in (2.19).

(2.19) Verb

<table>
<thead>
<tr>
<th>(a) koné:enà</th>
<th>'to speak'</th>
<th>(b) kobálókà</th>
<th>'to fall'</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) ko.emà</td>
<td>'to dig'</td>
<td>(d) ko.ëndà</td>
<td>'to go'</td>
</tr>
<tr>
<td>(e) ko.5òtò</td>
<td>'to dream'</td>
<td>(f) ko.ú.á</td>
<td>'to cook'</td>
</tr>
<tr>
<td>(g) kotwá</td>
<td>'to pick fruit'</td>
<td>(h) kwaalanyà</td>
<td>'to plan'</td>
</tr>
<tr>
<td>(i) ko.aandekà</td>
<td>'to write'</td>
<td>(j) ko.alyoîlà</td>
<td>'to translate'</td>
</tr>
<tr>
<td>(k) kosomà</td>
<td>'to learn'</td>
<td>(l) kobâlochà</td>
<td>'to make fall'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 1-Singular</th>
</tr>
</thead>
<tbody>
<tr>
<td>moné:éni</td>
</tr>
<tr>
<td>mobálókì</td>
</tr>
<tr>
<td>mo.emì</td>
</tr>
<tr>
<td>mo.ëndì</td>
</tr>
<tr>
<td>mo.5òtì</td>
</tr>
<tr>
<td>mo.ú.ì</td>
</tr>
<tr>
<td>motwì</td>
</tr>
<tr>
<td>mwaalánàyà</td>
</tr>
<tr>
<td>mo.áándékwà</td>
</tr>
<tr>
<td>mo.alyóólà</td>
</tr>
<tr>
<td>moso:méthya</td>
</tr>
<tr>
<td>mobálóchà</td>
</tr>
</tbody>
</table>

7 This form is a causative: /mo-bálók-y-a/ → [mobálóchá]. The presence of the glide induces the pattern final -a and V2H for the deverbal noun. The glide does not surface because it palatalizes the preceding *k*.
Deverbal nouns referring to actions are formed by adding the class prefix \( o \) and the final vowel \( o \) or \( i \). There is no way to tell if these should be categorized as class 11 or class 14 since these deverbal nouns do not have plurals. The choice of final vowel appears to be a lexical choice not related, synchronically at least, to phonological structure. All such nominalizations are marked by a final SL tone. See examples in (2.20).

(2.20) Verb

<table>
<thead>
<tr>
<th>Verb</th>
<th>Class 11/14 - (Singular)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kobaàndà</td>
<td>obaàndî</td>
</tr>
<tr>
<td>b. kobiìngà</td>
<td>obìngì</td>
</tr>
<tr>
<td>c. kokona</td>
<td>okoni</td>
</tr>
<tr>
<td>d. kone.enà</td>
<td>oné.enî</td>
</tr>
<tr>
<td>e. koongame.à</td>
<td>o.ongame.i</td>
</tr>
<tr>
<td>f. kwiína</td>
<td>wiíni</td>
</tr>
<tr>
<td>g. kositaàkà</td>
<td>ositaàkò</td>
</tr>
<tr>
<td>h. kwongelà</td>
<td>weongelî</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verb</th>
<th>Class 11/14 - (Singular)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kobaàndà</td>
<td>obaàndî</td>
</tr>
<tr>
<td>b. kobiìngà</td>
<td>obìngì</td>
</tr>
<tr>
<td>c. kokona</td>
<td>okoni</td>
</tr>
<tr>
<td>d. kone.enà</td>
<td>oné.enî</td>
</tr>
<tr>
<td>e. koongame.à</td>
<td>o.ongame.i</td>
</tr>
<tr>
<td>f. kwiína</td>
<td>wiíni</td>
</tr>
<tr>
<td>g. kositaàkà</td>
<td>ositaàkò</td>
</tr>
<tr>
<td>h. kwongelà</td>
<td>weongelî</td>
</tr>
</tbody>
</table>

Adjectives can also be productively derived from verbs. A deverbal adjective takes a prefix which agrees with the noun class of the noun it is modifying. The relationship between a head noun and its deverbal adjective modifier is that the head noun is the object if the verb is transitive, and the subject if the verb is intransitive. Synchronically, verbs are lexically specified as to whether the derived adjective ends in \( u \) or \( e \). In the examples in (2.21), we see that deverbal adjectives also bear a V2H (see Chapter 5 for details on tone). In the adjective column, we see the modifier prefixes corresponding to each noun class. These deverbal adjectives take the same set of prefixes as the nominal adjectives in Table 2.2.
<table>
<thead>
<tr>
<th>Verb</th>
<th>Adjective</th>
<th>Noun + adjective</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kokaàthà /mo-kaath-ɛ/</td>
<td>moondo mokaáthɛ</td>
<td>'a praised person' (cl.1)</td>
</tr>
<tr>
<td>b. kokwà /a-ku-u/</td>
<td>ando akú</td>
<td>'dead people' (cl.2)</td>
</tr>
<tr>
<td>c. kokwaàsà /mo-as-ɛ/</td>
<td>mo.ɔ mwaasɛ</td>
<td>'a carved digging stick' (cl.3)</td>
</tr>
<tr>
<td>d. kokwaàsà /me-as-ɛ/</td>
<td>me.ɔ myaasɛ</td>
<td>'carved digging sticks' (cl.4)</td>
</tr>
<tr>
<td>e. kolóongalà /e-lóongal-u/</td>
<td>e.aangi elóongálú</td>
<td>'a straight arrow' (cl.5)</td>
</tr>
<tr>
<td>f. kotûùbà /ma-tuub-u/</td>
<td>matúmo matúúbú</td>
<td>'blunt spears' (cl.6)</td>
</tr>
<tr>
<td>g. kuumbolà /ke-umbol-ɛ/</td>
<td>kengo.ɛ chuumbólɛ</td>
<td>'a confessed thief' (cl.7)</td>
</tr>
<tr>
<td>h. kolíndà /N-liind-ek-u/</td>
<td>ithíma nííndékúp</td>
<td>'plugged up wells' (cl.8)</td>
</tr>
<tr>
<td>i. ko.áthá /N-áth-ɛ/</td>
<td>mbusya ngáthɛ</td>
<td>'a shot rhino' (cl.9)</td>
</tr>
<tr>
<td>j. kobó.á /N-bóC-ɛ/</td>
<td>ngo.a mbó.ɛ</td>
<td>'washed clothes' (cl.10)</td>
</tr>
<tr>
<td>k. kolíngokà /mo-língok-u/</td>
<td>olíi molííngókú</td>
<td>'an unwound thread' (cl.11)</td>
</tr>
<tr>
<td>l. kolíngokà /N-língok-u/</td>
<td>ndíi nííngókú</td>
<td>'unwound threads' (cl.10)</td>
</tr>
<tr>
<td>m. konó.á /ka-nóC-ɛ/</td>
<td>kabyó kanó.ɛ</td>
<td>'a sharpened knife' (cl.12)</td>
</tr>
<tr>
<td>n. kotûúbà /to-tuub-u/</td>
<td>tobyó totúúbú</td>
<td>'blunt knives' (cl.13)</td>
</tr>
<tr>
<td>o. ko.aandekà /mo-Caandek-ɛ/</td>
<td>balo.a mo.aaândékɛ</td>
<td>'a written letter' (cl.14)</td>
</tr>
<tr>
<td>p. ko.aandekà /ma-Caandek-ɛ/</td>
<td>mabalo.a ma.aaándékɛ</td>
<td>'written letters' (cl.6)</td>
</tr>
<tr>
<td>q. kolómá /ko-lóm-u/</td>
<td>kwóskó kolómú</td>
<td>'a firm grip (arm)' (cl.15)</td>
</tr>
<tr>
<td>r. kobó.á /ma-bóC-ɛ/</td>
<td>mósóko mabó.ɛ</td>
<td>'washed arms' (cl.6)</td>
</tr>
</tbody>
</table>

8 This derived adjective also has the potential suffix -ek. See §2.3 on verbal morphology.

9 In (2.21h,l), the prefix N+ l → nd. Then, d deletes because of Ganda Law. See Chapter 4.
Locatives are also nominals. Locative nouns are formed by adding the suffix í-ne to the end of a noun. As a result, the final vowel of the noun lengthens. Examples are seen in (2.22). When the locative suffix, which is more like a postposition, is added to a noun, a lexical SL tone on the noun will delete. This is because SL tone in Kikamba is restricted to surfacing at the right edge of X-Max. This phenomenon will be explained in greater detail in Chapter 5.

<table>
<thead>
<tr>
<th>Noun</th>
<th>Locative</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /e-CiCo/ e.i.o</td>
<td>‘banana’ e.i.óone</td>
<td>‘in a banana’ (cl.5)</td>
</tr>
<tr>
<td>b. /e-CaNgí/ e.aangí</td>
<td>‘arrow’ e.aangí ne</td>
<td>‘in an arrow’ (cl.5)</td>
</tr>
<tr>
<td>c. /e-leNgé/ eleŋgé</td>
<td>‘pumpkin’ eleŋgééne</td>
<td>‘in a pumpkin’ (cl.5)</td>
</tr>
<tr>
<td>d. /o-sooba/ sooba</td>
<td>‘bottle’ soobáane</td>
<td>‘in a bottle’ (cl.14)</td>
</tr>
<tr>
<td>e. /e-tù/ etù</td>
<td>‘cloud’ etúune</td>
<td>‘in a cloud’ (cl.5)</td>
</tr>
<tr>
<td>f. /o-ôsè/ ôsè</td>
<td>‘river’ ôséene</td>
<td>‘in a river’ (cl.11)</td>
</tr>
<tr>
<td>g. /e-túmò/ etúmɔ</td>
<td>‘spear’ etúmɔone</td>
<td>‘in a spear’ (cl.5)</td>
</tr>
</tbody>
</table>

In the possessives, there is a stem corresponding to each noun class and person which joins with the agreement prefix. I provide an example from class 1: moòndò, as well as class 2: andò, because classes 1, 4, and 9 have different stems from the other classes in the possessive.
Table 2.11: Possessive stems

<table>
<thead>
<tr>
<th>Class 1,4,9 pattern</th>
<th>Prefix + possessive stem</th>
<th>Noun phrase</th>
<th>'my person'</th>
<th>'your-sg person'</th>
<th>'his/her person'</th>
<th>'our person'</th>
<th>'your-pl person'</th>
<th>'their person'</th>
</tr>
</thead>
<tbody>
<tr>
<td>o + akwá</td>
<td>moondo waakwá</td>
<td>'my person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o + akú</td>
<td>moondo waakú</td>
<td>'your-sg person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o + aké</td>
<td>moondo waaké</td>
<td>'his/her person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o + (a)ító</td>
<td>moondo waító ~wiító</td>
<td>'our person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o + e.énû</td>
<td>moondo we.énû</td>
<td>'your-pl person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o + o.ó</td>
<td>moondo wo.o</td>
<td>'their person'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other noun classes</td>
<td>má + akwa</td>
<td>ando máakwa</td>
<td>'my people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má + aku</td>
<td>ando máaku</td>
<td>'your-sg people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má + āké</td>
<td>ando mááké</td>
<td>'his people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má + ító</td>
<td>ando máító</td>
<td>'our people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má + e.énû</td>
<td>ando mé.énû</td>
<td>'your-pl people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má + o.ó</td>
<td>ando mó.ó</td>
<td>'their people'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specifically, class 1, 4, and 9 take a L-toned agreement prefix while the other classes take a H-toned agreement prefix. In addition, the tone pattern on the possessive stem itself is different. In classes 1, 4, and 9 singular possessives, 1sg and 2sg have a final H tone, whereas this H tone is absent in other noun classes. The H tone on the first vowel of the 3sg stem is missing in classes 1, 4, and 9 as well. Finally, the 1pl possessive stem in classes 1, 4, and 9 has an optional a in stem-initial position. Interestingly, when that a is not present, the coalesced vowel unexpectedly surfaces with a level L tone. As explained in Chapter 5, there are generally no tautosyllabic rising tones in Kikamba. Thus, when a L and H toned vowel coalesce, there is a rule of Rising tone neutralization that spreads the H leftward to the L-toned vowel, resulting in a level H tone syllable. However, in the plural possessive, a level L-toned syllable surfaces instead.

2.3 Verbal morphology

The morphological structure of the Kikamba verb is similar to that of most Bantu languages. There is a verb root which carries the lexical meaning of the verb. To the verb root, derivational suffixes, inflectional suffixes, and a final vowel may be added to form
the verb stem. To complete a verb, subject prefixes, tense/aspect prefixes, and object prefixes may be added. This information is summarized in (2.23).

(2.23) Morphological structure of verbs

\[
[word V/F + SP + T/A + OP + [stem VERB + DS + IS + FV s] w]
\]

- \(V/F\) = verb-focus, or focally-neutral, prefix
- \(SP\) = subject prefix
- \(T/A\) = tense/aspect prefix
- \(OP\) = object prefix
- \(VERB\) = verb root
- \(DS\) = derivational suffix(es)
- \(IS\) = inflectional suffix
- \(FV\) = final vowel

The derivational suffixes are always optional, but the tense-specific inflectional suffixes are required. The required final vowel which is added to verbs is \(a\) in most tenses. For example, infinitives end in the final vowel \(a\).\(^{10}\) Fewer tenses end in the final vowel \(e\). These are the assertive form of the perfective tenses, the subjunctive, and the imperative. An optional object prefix may be added directly before the verb root. Tense/aspect prefixes are added before the object prefix, depending on the tense. And a subject prefix is always required with inflected verbs and precedes any tense/aspect prefixes. Finally, assertive verbs require an initial prefix \(né\). I will discuss these various morphemes below.

2.3.1 Derivational morphemes

In this section, I discuss the derivational suffixes which change the meaning of the verb. Derivational suffixes are often referred to as derivational extensions, since they

\(^{10}\) Among the infinitives, there is only one verb with a final \(e\): \(ko.ētē\) ‘to bring.’
extend the meaning of the verb. In general, these suffixes are added directly after the verb root. However, there is an exception: a morpheme-final glide either from a verb root or an extension always surfaces in pre-final vowel position. This circumscription of a glide will be discussed in Chapter 3.

Among the extensions in Kikamba, the reciprocal, applied, passive, causative, and repetitive/plural are highly productive, while other extensions are limited to a small set of verb roots. The set of verbal extensions and their meanings can be seen in (2.24).

(2.24) Derivational extension | Meaning |
---|---|
-an | reciprocal | ‘to X each other (e/o)’
-eC | applied | ‘to X for/on/to/etc.’
-w | passive | ‘to be Xed’
-ethy | causative 1 | ‘to force to X’
-y | causative 2 | ‘to help X’
-aNg | repetitive/plural | ‘to do X a little more’
-oC | reversive | ‘to do the opposite of X’
-ek | potential | ‘to be X-able’ or continue Xing’
reduplication | reduplication | ‘to X repeatedly or continue Xing’

The reciprocal is formed by adding the suffix an to the verb root. Examples in (2.25) show the infinitive and the reciprocal form of the infinitive.

(2.25) Verb | Reciprocal | Meaning |
---|---|---|
a. kosuùngà | kosuunganà | ‘to guard e/o’
b. kotâlá | kotâlanà | ‘to count e/o’
c. ko.ú.á | ko.ú.anà | ‘to cook e/o’
d. kotilà | kotilanà | ‘to cut e/o’
e. koki.ità | koki.itanà | ‘to touch e/o lightly’

The basic form of the applied is eC, with an underlying empty root node. Examples are seen in (2.26a-e). The empty C phenomenon is explained in Chapter 4. The
allomorphs \( e \) (2.26f-j), \( el \) (2.26k-l), and \( el \) (2.26m), are due to rules of Vowel harmony and [lateral]-Harmony, and are explained in detail in Chapter 3.

(2.26) Verb Applied

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kosuìngà</td>
<td>kosuunge.à</td>
</tr>
<tr>
<td>b. kùúmá</td>
<td>kúúrne.à</td>
</tr>
<tr>
<td>c. ko.ú.à</td>
<td>ko.ú.e.à</td>
</tr>
<tr>
<td>d. kwáámbatà</td>
<td>kotwäámbate.à</td>
</tr>
<tr>
<td>e. kothi.à</td>
<td>kothi.e.à</td>
</tr>
<tr>
<td>f. konö.à</td>
<td>konö.e.à</td>
</tr>
<tr>
<td>g. kwöötá</td>
<td>kwööte.à</td>
</tr>
<tr>
<td>h. ko.skà</td>
<td>ko.ske.à</td>
</tr>
<tr>
<td>i. ko.sëndà</td>
<td>ko.sënde.à</td>
</tr>
<tr>
<td>j. kotëmà</td>
<td>kotëme.à</td>
</tr>
<tr>
<td>k. kobulà</td>
<td>kobulelà</td>
</tr>
<tr>
<td>l. kolikà</td>
<td>kolikelà</td>
</tr>
<tr>
<td>m. kothëélà</td>
<td>kothëeélà</td>
</tr>
</tbody>
</table>

The passive morpheme always surfaces as a \( w \). Assuming the \( w \) is underlying, then it is simply added before the final vowel. The examples in (2.27) are representative of the passive.

(2.27) Infinitive Passive

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kokonà</td>
<td>kokonwà</td>
</tr>
<tr>
<td>b. kotilà</td>
<td>kotilwà</td>
</tr>
<tr>
<td>c. kosáno.à</td>
<td>kosánowà</td>
</tr>
<tr>
<td>d. kobîngà</td>
<td>kobîngwà</td>
</tr>
<tr>
<td>e. kolëèsà</td>
<td>kolëëswà</td>
</tr>
</tbody>
</table>

Kikamba has two causative morphemes. The first of these morphemes, Causative 1, has the rough semantic correlate ‘to force to X’ or ‘to make X,’ and surfaces as \( ethy \).\(^{11}\) Causative 2 has the form \( y \) and means roughly ‘to help X.’ The causative morphemes are

\(^{11}\) The \( ethy \) form was the form most often offered by my informant when eliciting the causative.
added to the right of the verb root before the final vowel, just as other extensions are, as seen in (2.28). The vowel harmony variant ethy is seen in (2.28g-k).\textsuperscript{12}

(2.28) Verb Causative 1
\begin{itemize}
  \item a. kotálä kotálethyà ‘to make count’
  \item b. kosuùngà kosuungethyà ‘to make guard’
  \item c. ko.i.à ko.i.ethyà ‘to force to put’
  \item d. koalyoolà ko.alyooletheyà ‘to make change’
  \item e. ko.aandekà ko.aandekethyà ‘to make write’
  \item f. kosánó.à kosánó.ethyà ‘to make comb’
  \item g. ko.ekà ko.eketheyà ‘to make stop’
  \item h. kokëethyà kokëethethyà ‘to make greet’
  \item i. kwósbà kwósbethyà ‘to make tie’
  \item j. kokólokà kokóloketheyà ‘to make stir’
  \item k. kwósnà kwósnetheyà ‘to make see’
\end{itemize}

(2.29) Verb Repetitive/Plural
\begin{itemize}
  \item a. kotháano.à kotháano.kaàngà ‘to jump a little more’
  \item b. kosoambahà kosoambahàangà ‘to run a little more’
  \item c. kobálokà kobálokàangà ‘to fall more’
  \item d. kweènzà kweedzaàngà ‘to dig repeatedly’
  \item e. kwósnà kwósnàangà ‘to continue seeing’
\end{itemize}

Another productive suffix is ang, which has a repetitive or plural meaning. This suffix has slight variations in meaning, depending on the verb root.

In Bantu languages such as Kikuyu (Downing 1992), there is a productive pattern of reduplication which has the meaning ‘to do something repeatedly,’ which is related to the meaning of the Kikamba extension ang. In Kikamba, however, the process of

\textsuperscript{12} See Chapter 3 for an explanation of Vowel harmony.
reduplication is very restricted. When reduplication is allowed, as shown in (2.30), it occurs primarily in monosyllabic verb roots, and the entire syllable is reduplicated along with the final vowel. Exceptions are found in vowel-initial verb roots where the vowel coalesces with a preceding prefix. In such cases the initial vowel of the verb root is not part of the prosodic stem, the entity which is subject to reduplication. Evidence for the initial syllable falling outside the prosodic stem is that, just in case the verb root has another syllable available, such as a verbal extension, that syllable is copied instead of the initial vowel of the verb root, as seen in (2.30d). An interpretation of such data could be that only a bisyllabic copy of the verb stem is duplicated, usually the verb root + final vowel, unless coalescence with the prefix leaves the verb root sub-minimal, as in (2.30d). In this case, the derivational extension + the final vowel is copied. Since reduplication is rare in the data I collected, this could not be investigated further. However, other minimal word effects were found and are explained in Chapter 6.

(2.30) UR

<table>
<thead>
<tr>
<th>Verb</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /seNba/</td>
<td>kosëëmbà kosëëmbaseëmbà 'to run up and down'</td>
</tr>
<tr>
<td>b. /buly/</td>
<td>kobulyà kobulabulyà 'to scratch the ground'</td>
</tr>
<tr>
<td>c. /kit/</td>
<td>koongite.à koongitakite.à 'to thatch for me repeatedly'</td>
</tr>
<tr>
<td>d. /ín/</td>
<td>kwííne.à kwííneane.à 'to dance for repeatedly'</td>
</tr>
</tbody>
</table>

The last verbal extension is not as fully productive as those discussed above. This is the reverse: oC. Examples are seen in (2.31). Notice that evidence for the presence of the empty C is seen in (2.31), where oC surfaces as ol due to the spread of the feature [lateral]. See Chapter 4 for details.
(2.31) Verb
   a. ko.ïndà ko.iindo.à 'to cover'/ 'to uncover'
   b. kobîngà kobîngo.à 'to shut'/ 'to open'
   c. kokîtà kokîto.à 'to thatch'/ 'to unthatch'
   d. kokôonzà kokoonzo.à 'to fold'/ 'to unfold'
   e. kôîmbá kôîmbo.à 'to mold'/ 'to unmold'
   f. kolîngà kolîngolà 'to wind'/ 'to unwind'
   g. komîlà komîlo.à13 'to twist'/ 'to untwist'

The last extension is the potential and is represented by the suffix ek. Thusfar, I have only found this suffix associated with the negative potential verb tense, so it will be discussed in §2.3.2, the section on inflectional morphology.

2.3.2 Verbal agreement patterns: Subject and object prefixes

In this section, the agreement prefixes for verbs are outlined. These prefixes are different from those seen in nominal modifiers. In Table 2.12, the forms for object prefixes representing each noun class are shown, along with examples. The object prefix is realized directly before the verb stem, and after any tense/aspect prefixes which may be present. Classes 1, 4, and 9 bear a L-tone and the other object prefixes bear a H tone.

13 This verb is an exception to [lateral]-Harmony.
Table 2.12: Object prefixes

<table>
<thead>
<tr>
<th>Class</th>
<th>Object Prefix (OP)</th>
<th>Infinitive with OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>N</td>
<td>koondálá</td>
</tr>
<tr>
<td>1-2</td>
<td>(k)ō</td>
<td>ko.otálá</td>
</tr>
<tr>
<td>1-3</td>
<td>mo</td>
<td>komotálá</td>
</tr>
<tr>
<td>2-1</td>
<td>tó</td>
<td>kotótálá</td>
</tr>
<tr>
<td>2-2</td>
<td>mó</td>
<td>komótálá</td>
</tr>
<tr>
<td>2-3</td>
<td>má</td>
<td>komátálá</td>
</tr>
<tr>
<td>3</td>
<td>Có</td>
<td>ko.ótálá</td>
</tr>
<tr>
<td>4</td>
<td>me</td>
<td>kometálá</td>
</tr>
<tr>
<td>5</td>
<td>Cé</td>
<td>ko.etálá</td>
</tr>
<tr>
<td>6</td>
<td>má</td>
<td>komátálá</td>
</tr>
<tr>
<td>7</td>
<td>ké</td>
<td>kokétálá</td>
</tr>
<tr>
<td>8</td>
<td>Cí</td>
<td>ko.itálá</td>
</tr>
<tr>
<td>9</td>
<td>me</td>
<td>kometálá</td>
</tr>
<tr>
<td>10</td>
<td>Cí</td>
<td>ko.itálá</td>
</tr>
<tr>
<td>11</td>
<td>Có</td>
<td>ko.ótálá</td>
</tr>
<tr>
<td>12</td>
<td>ká</td>
<td>kokátálá</td>
</tr>
<tr>
<td>13</td>
<td>tó</td>
<td>kotótálá</td>
</tr>
<tr>
<td>14</td>
<td>Có</td>
<td>ko.ótálá</td>
</tr>
<tr>
<td>15</td>
<td>kó</td>
<td>kokótálá</td>
</tr>
</tbody>
</table>

The pattern for subject prefixes is a little more complicated. There are five different forms for subject prefixes, and they are explained below with examples. In Table 2.13 are the first set of subject prefixes. These are the basic subject prefixes, and the most common pattern. I will refer to these as SP1. This set of prefixes is used in main clause, affirmative tenses, whenever there is a preceding prefix né. Examples from the remote perfective tense are given in Table 2.13.

---

14 The k in this prefix does not surface if the following syllable has an onset. See Chapter 4 on the empty C for details.

15 Certain object prefixes begin with an empty C. Evidence for this empty C is that coalescence with a preceding vowel is blocked. See Chapter 4 for details.
Table 2.13 Subject Prefix pattern #1: SPI

<table>
<thead>
<tr>
<th>Class</th>
<th>SP1</th>
<th>Remote perfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1 'I'</td>
<td>né</td>
<td>/né-né-a-bâlok-iC-e/ nénâabâlôkîlê 'I fell'</td>
</tr>
<tr>
<td>1-2 'you-sg'</td>
<td>ó</td>
<td>/né-ó-a-bâlok-iC-e/ néwâabâlôkîlê 'you-sg fell'</td>
</tr>
<tr>
<td>1-3 'he/she'</td>
<td>o</td>
<td>/né-o-a-bâlok-iC-e/ néwâabâlôkîlê 'he fell'</td>
</tr>
<tr>
<td>2-1 'we'</td>
<td>tó</td>
<td>/né-tó-a-bâlok-iC-i/ nêtwâabâlôkîlê 'we fell'</td>
</tr>
<tr>
<td>2-2 'you-pl'</td>
<td>mó</td>
<td>/né-mó-a-bâlok-iC-e/ nêmwâabâlôkîlê 'you-pl fell'</td>
</tr>
<tr>
<td>2-3 'they'</td>
<td>má</td>
<td>/né-má-a-bâlok-iC-e/ nêmâabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>3</td>
<td>ó</td>
<td>/né-ó-a-bâlok-iC-e/ nêwâabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>4</td>
<td>e</td>
<td>/né-e-a-bâlok-iC-e/ nêyaabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>5</td>
<td>é</td>
<td>/né-é-a-bâlok-iC-e/ nêyaabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>6</td>
<td>má</td>
<td>/né-má-a-bâlok-iC-e/ nêmâabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>7</td>
<td>ké</td>
<td>/né-ké-a-bâlok-iC-e/ nêchâabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>8</td>
<td>Cí</td>
<td>/né-Cí-a-bâlok-iC-e/ nêsyâabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>9</td>
<td>e</td>
<td>/né-e-a-bâlok-iC-e/ nêyaabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>10</td>
<td>Cí</td>
<td>/né-Cí-a-bâlok-iC-e/ nêsyâabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>11</td>
<td>ó</td>
<td>/né-ó-a-bâlok-iC-e/ nêwâabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>12</td>
<td>ká</td>
<td>/né-ká-a-bâlok-iC-e/ nêkâabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>13</td>
<td>tó</td>
<td>/né-tó-a-bâlok-iC-e/ nêtwâabâlôkîlê 'they fell'</td>
</tr>
<tr>
<td>14</td>
<td>ó</td>
<td>/né-ó-a-bâlok-iC-e/ nêwâabâlôkîlê 'it fell'</td>
</tr>
<tr>
<td>15</td>
<td>kó</td>
<td>/né-kó-a-bâlok-iC-e/ nêkâwâabâlôkîlê 'it fell'</td>
</tr>
</tbody>
</table>

The SP2 subject prefixes are identical to SP1 except for the class 1, 3s form. SP1 is o and SP2 is a. The only assertive tense which uses SP2 is the tense whose subject prefix is not preceded by the focally-neutral particle né, i.e. the future. Other affirmative, non-assertive tenses also take SP2. Examples are seen in (2.32). The only exception to the generalization that SP2 occurs word-initially is the form of the subjunctive in (2.32f), where a prefix precedes the subject prefix.

16 In this example, the subject prefix né + a results in náa instead of the expected nyáa. This is due to a rule of e-deletion in the 1sSP né. Just in case né is followed by a vowel, e obligatorily deletes, and the mora compensatorily lengthens the following vowel. The vowel e of the 1sSP also optionally deletes before an obstruent, but is prohibited from deleting before a sonorant consonant or an empty C. Since such data is related to the empty C, more discussion and examples of e-deletion can be found in Chapter 4.

39
(2.32) Subject Prefix pattern #2: SP2
Class 1, 3sSP a in non-assertive tenses

a. /a-káa-tál-a/  akáatála 'he will count' (fut)
b. /a-ka-tál-a/  ákatálá 'if he counts' (cond)
c. /á-a-tál-a/  áatálá 'when he was counting' (fut cond)
d. /na áa-tál-a/  na áaatálá 'and then he counted' (consec)
e. /a-tál-e/  áatale 'let him count' (subjunc)
f. /nó-áta-l-e/  nóáatale 'that he may count' (subjunc)

SP2 is also the subject prefix chosen for all object-focus forms, as seen in (2.33). A ‘+’ follows object-focus forms to indicate that some object, which is focussed, must follow the verb.

(2.33) Subject Prefix pattern #2: SP2
Class 1, 3sSP a in object-focus tenses

a. /a-e-tál-a/  ētálá + 'he is counting +' (pres)
b. /á-a-tál-a/  áátála + 'he just counted +' (immpst)
c. /a-e-tál-aC-a/  ētálá.á + 'he has been counting +' (prog)
d. /á-a-tál-aC-a/  áatálá.á + 'he used to count +' (rem prog)
e. /á-tál-iC-e/  átálíle + 'he counted this morning' (hod perf)
f. /á-náa-tál-iC-e/  ánääátálíle + 'he counted yesterday' (hest perf)
g. /á-a-tál-iC-e/  áatálíle + 'he counted long ago' (rem perf)
h. /á-tál-eet-e/  átáléete + 'he has been counting' (hod stat)
i. /á-náa-tál-eet-e/  ánääátáléete + 'he was counting' (hest stat)
j. /á-a-tál-eet-e/  áatáléete + 'he had counted' (remote stative)

The subject prefixes categorized as SP3 are also identical to SP1 with notable exceptions seen in Table 2.14. The SP3 forms are found only in the main clause affirmative forms of the present and progressive tenses. This is correlated with the fact that these are also the only two tenses which have the tense/aspect prefix ko following the subject prefix. The examples below only show those subject prefixes which are different from the SP1 pattern.
Table 2.14 Subject Prefix pattern #3: SP3

<table>
<thead>
<tr>
<th>Class</th>
<th>Subject</th>
<th>Present tense M/C Affirmative</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 ‘he/she’</td>
<td>oné ~ onó</td>
<td>/né-oné-ko-tál-a/</td>
<td>‘he is counting’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/né-onó-ko-tál-a/</td>
<td>noónó.otálá</td>
</tr>
<tr>
<td>2-3 ‘they’</td>
<td>mée</td>
<td>/né-mée-ko-tál-a/</td>
<td>némé.otálá</td>
</tr>
<tr>
<td>4</td>
<td>ye-ené</td>
<td>/né-ené-ko-bálók-a/</td>
<td>néné.obálóká</td>
</tr>
<tr>
<td>5</td>
<td>ye-ené</td>
<td>/né-ené-ko-bálók-a/</td>
<td>néené.obálóká</td>
</tr>
<tr>
<td>6</td>
<td>mée</td>
<td>/né-mée-ko-bálók-a/</td>
<td>némé.obálóká</td>
</tr>
<tr>
<td>8</td>
<td>(C)i</td>
<td>/né-i-ko-bálók-a/</td>
<td>ní.obálóká</td>
</tr>
<tr>
<td>9</td>
<td>ye-ené</td>
<td>/né-ené-ko-bálók-a/</td>
<td>néené.obálóká</td>
</tr>
<tr>
<td>10</td>
<td>(C)i</td>
<td>/né-i-ko-bálók-a/</td>
<td>ní.obálóká</td>
</tr>
<tr>
<td>12</td>
<td>kée</td>
<td>/né-kée-ko-bálók-a/</td>
<td>néké.obálóká</td>
</tr>
</tbody>
</table>

This pattern requires some explanation. First consider class 8 and class 10. There is evidence for this subject prefix having an empty C in other affirmative tenses because the empty C surfaces as s, as seen in Table 2.13: nésyáabálólé ‘they fell’ (see Chapter 4 for details). However, in the progressive and present tenses, there is coalescence with the preceding né; thus the empty C has the option of deleting in the present and progressive tenses. Classes 1-3, 4, 5, and 9 all have ne following an initial vowel: one and ene. In addition, class 2-3, 6 and 12 prefixes which end in a in SP1 end in ee in the present and progressive: mée and kée, and there is evidence that they are long. I will return to these generalizations shortly.

SP4 are the main clause negative subject prefixes corresponding to SP1 and SP2. These prefixes are the same as SP2, except for a subset of them which combine with the negative marker into a single negative subject prefix morpheme. The prefixes which allow this option are prefixes consisting of a single vowel with no onset: e, o, and a.

17 The k of the tense/aspect prefix ko does not surface in these forms due to a rule of Prefix k-deletion which deletes k in this prefix when the following syllable has an onset.

18 The subject prefix surfaces as short due to a rule of Sequential shortening (see Chapter 4). In forms where Sequential shortening is not applicable, the vowel of the subject prefix is long (c.f. néméeko.ebà ‘they have been paying’ (prog).
Thus, these three prefixes followed by a negative marker alternate with *nde*, *ndo*, and *nda*, respectively. For the 1sSP form, however, the contracted forms *nde* and *ndi* are the only two options; there is no option available with *ne* + negative marker. Examples are seen in Table 2.15.

Table 2.15 Subject Prefix pattern #4: SP4

<table>
<thead>
<tr>
<th>Class</th>
<th>SP4</th>
<th>Hesternal perfective M/C Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1 ‘I’</td>
<td>nde~ndi</td>
<td>/ndé-néé-bálok-a/ ndéneébálokà ‘I didn’t fall’</td>
</tr>
<tr>
<td>1-2 ‘you-sg’</td>
<td>~ndo</td>
<td>/ndo-néé-bálok-a/ ndóneébálokà ‘you-sg didn’t fall’</td>
</tr>
<tr>
<td>1-3 ‘he/she’</td>
<td>~nda</td>
<td>/ndá-néé-bálok-a/ ndánneébálokà ‘he didn’t fall’</td>
</tr>
<tr>
<td>3</td>
<td>~ndo</td>
<td>/ndo-néé-bálok-a/ ndóneébálokà ‘it didn’t fall’</td>
</tr>
<tr>
<td>4</td>
<td>~nde</td>
<td>/ndé-néé-bálok-a/ ndéneébálokà ‘they didn’t fall’</td>
</tr>
<tr>
<td>5</td>
<td>~nde</td>
<td>/ndé-néé-bálok-a/ ndéneébálokà ‘it didn’t fall’</td>
</tr>
<tr>
<td>9</td>
<td>~nde</td>
<td>/ndé-néé-bálok-a/ ndéneébálokà ‘it didn’t fall’</td>
</tr>
<tr>
<td>11</td>
<td>~ndo</td>
<td>/ndo-néé-bálok-a/ ndóneébálokà ‘it didn’t fall’</td>
</tr>
<tr>
<td>14</td>
<td>~ndo</td>
<td>/ndo-néé-bálok-a/ ndóneébálokà ‘it didn’t fall’</td>
</tr>
</tbody>
</table>

SP5 negative markers are found in the negative main clause forms of the present and progressive tenses. These are the two tenses which take SP3 in affirmative main clauses. The difference between SP4 and SP5 is in the singular, class 1 subject prefixes. All the subject prefixes surface with a long vowel, and the 3s form of the class 1 prefix is *ndes*. The 3s form is important because just like in the SP3 pattern, a subject prefix which usually surfaces with *a* surfaces instead with *ee*. The generalization is that a subject prefix ending in *a* may not surface before the tense/aspect prefix *ko*. Instead, subject prefixes ending in *a* surface with *e* before *ko*. Examples are seen in Table 2.16.
Table 2.16 Subject Prefix pattern #5: SP5

<table>
<thead>
<tr>
<th>Class</th>
<th>SP5</th>
<th>Present tense M/C Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1 'I'</td>
<td>ndee~ndii</td>
<td>ndééko.ebà 19 'I am not paying'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ndé.otála 'I am not counting'</td>
</tr>
<tr>
<td>1-2 'you-sg'</td>
<td>ndoo</td>
<td>ndóóko.ebà 'you-sg are not paying'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ndó.otála 'you-sg are not counting'</td>
</tr>
<tr>
<td>1-3 'he/she'</td>
<td>ndec</td>
<td>ndééko.ebà 'he is not paying'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ndé.otála 'he is not counting'</td>
</tr>
<tr>
<td>2-3 'they'</td>
<td>ma</td>
<td>máté.otála 'they are not counting'</td>
</tr>
<tr>
<td>6</td>
<td>ma</td>
<td>máté.obálókà 'they are not falling' (cl.6)</td>
</tr>
<tr>
<td>12</td>
<td>ka</td>
<td>katé.obálókà 'it is not falling' (cl.12)</td>
</tr>
</tbody>
</table>

I have included the prefixes *ma* (cl.2-3), *ma* (cl.6), and *ka* (cl.12) in Table 2.16 because these are forms which surface with *e* in the affirmative forms, but do not surface with *e* in the negative forms. This is because the conditioning environment for *a* to surface as *e* is the property of directly preceding the tense/aspect prefix *ko*. Since *ma* and *ka* have an onset, they do not have the option of fusing with a negative marker and surfaceing directly before the prefix *ko*. Thus, they precede the negative marker and surface with *a* in the negative, main clause forms of the present and progressive tenses.

Relative clauses choose SP1 as the subject prefix, as seen in the habitual examples in (2.34a-c). The only exception to this is the affirmative relative clause forms of the present tense and the progressive tense. In this context, the subject once again stands before the tense/aspect prefix *ko* and thus takes SP3. Examples are seen in (2.34d,e).

---

19 There is a rule of Prefix *k*-deletion that deletes the *k* in *ko* if the following syllable has an onset. As a result of the application of this rule to forms like *ndé.otála*, the subject prefix precedes an onsetless syllable and subsequently shortens by a rule of Sequential shortening (see Chapter 4 for details). It is in forms such as *ndééko.ebà* where the *k* does not delete that provide evidence for these subject prefixes having a long vowel.

43
(2.34) Habitual tense R/C Affirmative and Negative

a. /moondo ola ne-tal-aC-a/ moondoolá nētaláá ‘man who I always count’
b. /moondo ola o-tal-aC-a/ moondooláotalá.a ‘man who always counts’
c. /moondo ola o-ta-tal-aC-a/ moondooláotataláá ‘man who he doesn’t always count’

Present tense R/C Affirmative

d. /moondo ola one-ko-tal-a/ moondooláonekalá ‘man who is counting’
e. /moondo ola me-k0-tal-a/ moondoolámekalá ‘man who they are counting’

Table 2.17 summarizes the subject prefix information.

Table 2.17: Summary of Subject Prefixes

<table>
<thead>
<tr>
<th>Class</th>
<th>Affirmative Subject Prefixes</th>
<th>Negative Subject Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SP1</td>
<td>SP2</td>
</tr>
<tr>
<td>1-1 ‘I’</td>
<td>né</td>
<td>ne</td>
</tr>
<tr>
<td>1-2 ‘you-sg’</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>1-3 ‘he/she’</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>2-1 ‘we’</td>
<td>to</td>
<td>to</td>
</tr>
<tr>
<td>2-2 ‘you-pl’</td>
<td>mó</td>
<td>mo</td>
</tr>
<tr>
<td>2-3 ‘they’</td>
<td>má</td>
<td>ma</td>
</tr>
<tr>
<td>3</td>
<td>ó</td>
<td>o</td>
</tr>
<tr>
<td>4</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>5</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>6</td>
<td>má</td>
<td>ma</td>
</tr>
<tr>
<td>7</td>
<td>ké</td>
<td>ke</td>
</tr>
<tr>
<td>8</td>
<td>Cí</td>
<td>i</td>
</tr>
<tr>
<td>9</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>10</td>
<td>Cí</td>
<td>i</td>
</tr>
<tr>
<td>11</td>
<td>ó</td>
<td>o</td>
</tr>
<tr>
<td>12</td>
<td>ká</td>
<td>ka</td>
</tr>
<tr>
<td>13</td>
<td>tó</td>
<td>to</td>
</tr>
<tr>
<td>14</td>
<td>ó</td>
<td>o</td>
</tr>
<tr>
<td>15</td>
<td>kó</td>
<td>ko</td>
</tr>
</tbody>
</table>
2.3.3 Inflectional morphemes

In this section, I introduce the basic tense/aspect markers found in Kikamba. There are many inflectional prefixes in Kikamba. First, I discuss how negation is marked. Second, I discuss the verb-focus particle *ne*. Finally, I discuss the other tense/aspect markers, including *kaa, ko,* and *a,* and *aC.*

There are five surface forms of the negative prefix, in addition to the fact that sometimes the subject prefix alone indicates a negative verb form, as discussed in §2.3.2. The overt negative markers are *ta, tss, tee, yee,* and *Ci.* However, it is not always clear which marker is found where, due to the obscuring effect of vowel coalescence (see Chapter 3). The distribution of these morphemes is at least in part determined by the morphological structure of the verb. The markers found in main clause negative phrases are *tee–yee* and *Ci.* Whether *tee* or *i* is found in a given verb form is determined by whether the following syllable has an onset or not, and whether that onset is a real consonant or an empty C. While this may initially seem a strange condition, we will see in Chapters 3 and 4 that the presence of a syllable onset and whether that onset is specified for features drives much of the phonological variation in Kikamba.

The basic distribution of *tee* and *i* is as follows. When a following syllable begins with a vowel, the negative marker is *tee* (or *yee*). However, when the following syllable begins with a consonant, the negative marker must be *i.* When the negative marker comes before an empty *C,* all three negative markers are possible. In order to observe this pattern, a tense is needed where the negative prefix immediately precedes the verb stem. Examples with the hodiernal stative tense are seen in (2.35).
Hodiernal stative tense

Consonant-initial stem: /-tal/

to.itâlêetê

Vowel-initial stem: /-ék/
totéékêetê
toyéékêetê

Empty C-initial stem: /-Com/
to.i.ômêêctÊ
totê.ômêêetê
toyê.ômêêetê

'count'

'we haven’t been counting'

'do'

'we haven’t done'

'we haven’t done'

'bite'

'we haven’t bitten/been biting'

'we haven’t bitten/been biting'

However, in the present and progressive tenses, where the negative marker is immediately followed by the tense/aspect prefix ko, there is a different pattern. In these tenses, all three negative markers, tee, yee, and i, are possible, as seen in (2.36).20

Progressive tense

Consonant-initial stem: /-tal/

ma.ô.tâlêa.à 'they have not been counting'

matê.ô.tâlêa.à 'they have not been counting'

mayê.ô.tâlêa.à 'they have not been counting'

Vowel-initial stem: /-âk/

ma.î.kwââka.à 'they have not been building'

matêékwââka.à 'they have not been building'

mayêékwââka.à 'they have not been building'

Empty C-initial stem: /-Com/

ma.îko.ôma.à 'they have not been biting'

matêéko.ôma.à 'they have not been biting'

mayêéko.ôma.à 'they have not been biting'

In the relative clause forms, we find the tee and ta alternates of the negative. The basic negative relative clause marker is ta. Ta is the only option allowed in most relative clause forms. Examples of the habitual are seen in (2.37).

20 Although this negative marker is long, it surfaces as short in the examples in (2.36) due to the rule of Sequential shortening (See Chapter 4).
(2.37) Habitual tense R/C Negative
   a. moondo ólá totatala.a  ‘man who we never count’
   b. moondo ólá motatala.a  ‘man who you-pl never count’
   c. moondo ólá matatala.a  ‘man who they never count’

If a tense/aspect marker intervenes which has an onset, i may alternate with ta. Examples are seen in (2.38).

(2.38) R/C Negative tenses

Hodiernal Perfective
   a. moondo ólá tôtanaatâlâ
      moondo ólá tô.inaatâlâ  ‘man who we didn’t count this morning’
   b. moondo ólá môtanaatâlâ
      moondo ólá mó.inaatâlâ  ‘man who you-pl didn’t count this morning’
   c. moondo ólá mátanaatâlâ
      moondo ólá mâ.inaatâlâ  ‘man who they didn’t count this morning’

Hesternal Perfective
   d. moondo ólá tô.inéétâlâ
      moondo ólá tôtanéétâlâ  ‘man who we didn’t count yesterday’
   e. moondo ólá môtanéétâlâ
      moondo ólá mó.inéétâlâ  ‘man who you-pl didn’t count yesterday’
   f. moondo ólá mâ.inéétâlâ
      moondo ólá mâtanéétâlâ  ‘man who they didn’t count yesterday’

Future
   g. moondo ólá tôtakaatalâ
      moondo ólá tôibaatalâ  ‘man who we will not count’
   h. moondo ólá môtakaatalâ
      moondo ólá móbiakaatalâ  ‘man who you-pl will not count’
   i. moondo ólá mátakaatalâ
      moondo ólá mâbiakaatalâ  ‘man who they will not count’

However, it is important to note that the alternate i is questionable in forms where the subject prefix has no onset, and thus, vowel coalescence becomes more difficult to untangle. An example is a 3s form: ?moondo ólá ôinaatâlâ  ‘man who didn’t count this morning.’

47
If the tense/aspect marker following the negative marker is an onsetless syllable, then \textit{ta} is the only possibility. Examples of this are the remote tenses, seen in (2.39), which have an \textit{a} following the negative marker.

(2.39) R/C Negative tenses

Remote past progressive

\begin{align*}
a. /né-ta-a-tâl-aC-a/ & \quad \text{ndâatâlā.ā} \quad \text{‘man who I didn’t used to count’} \\
b. /ô-ta-a-tâl-aC-a/ & \quad \text{ôtâatâlā.ā} \quad \text{‘man who you-sg didn’t used to count’} \\
c. /o-ta-a-tâl-aC-a/ & \quad \text{otâatâlā.ā} \quad \text{‘man who he didn’t used to count’} \\
d. /tō-ta-a-tâl-aC-a/ & \quad \text{tótâatâlā.ā} \quad \text{‘man who we didn’t used to count’} \\
e. /mó-ta-a-tâl-aC-a/ & \quad \text{mótâatâlā.ā} \quad \text{‘man who you-pl didn’t used to count’} \\
f. /mâ-ta-a-tâl-aC-a/ & \quad \text{mâtâatâlā.ā} \quad \text{‘man who they didn’t used to count’} \\
g. /né-tâ-a-tâl-a/ & \quad \text{ndâatâlā} \quad \text{‘man who I didn’t count long ago’} \\
h. /ô-ta-a-tâl-a/ & \quad \text{ôtâatâlā} \quad \text{‘man who you-sg didn’t count long ago’} \\
i. /o-ta-a-tâl-a/ & \quad \text{otâatâlā} \quad \text{‘man who didn’t count long ago’} \\
j. /tō-ta-a-tâl-a/ & \quad \text{tótâatâlā} \quad \text{‘man who we didn’t count long ago’} \\
k. /mó-ta-a-tâl-a/ & \quad \text{mótâatâlā} \quad \text{‘man who you-pl didn’t count long ago’} \\
l. /mâ-ta-a-tâl-a/ & \quad \text{mâtâatâlā} \quad \text{‘man who they didn’t count long ago’} \\
m. /né-tâ-a-tâl-eet-e/ & \quad \text{ndâatâléétē} \quad \text{‘man who I had not counted long ago’} \\
n. /ô-ta-a-tâl-eet-e/ & \quad \text{ôtâatâléétē} \quad \text{‘man who you-sg hadn’t counted long ago’} \\
o. /o-ta-a-tâl-eet-e/ & \quad \text{otâatâléétē} \quad \text{‘man who had not counted long ago’} \\
p. /tō-ta-a-tâl-eet-e/ & \quad \text{tótâatâléétē} \quad \text{‘man who we had not counted long ago’} \\
q. /mó-ta-a-tâl-eet-e/ & \quad \text{mótâatâléétē} \quad \text{‘man who you-pl hadn’t counted long ago’} \\
r. /mâ-ta-a-tâl-eet-e/ & \quad \text{mâtâatâléétē} \quad \text{‘man who they had not counted long ago’}
\end{align*}

There are two tenses which take \textit{tee} as the negative marker instead of \textit{ta}. And these two cases should be familiar to us by now: the present and progressive tenses. These are the two tenses which have the tense/aspect marker \textit{ko}. Recall that whenever a subject prefix with \textit{a} precedes \textit{ko}, the prefix surfaces with \textit{e}. The same thing happens with the negative marker. Since the relative clause negative marker is \textit{ta}, it is replaced by \textit{tee} before the tense/aspect marker \textit{ko}. In the examples in (2.40), we first see examples where Prefix k-deletion has not taken place. Before a consonant, the prefix \textit{tee} surfaces as long.
If Prefix k-deletion has taken place, then Sequential shortening takes place, and *te* surfaces with a short vowel: *te*.

(2.40) Present tense R/C Negative

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Neutral</th>
<th>Object-focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /má-tée-ko-ák-a/</td>
<td>máțéskwááká</td>
<td>‘man who they are not building’</td>
</tr>
<tr>
<td>b. /má-tée-ko-Ceb-a/</td>
<td>máțékoeb</td>
<td>‘man who they are not paying’</td>
</tr>
<tr>
<td>c. /má-tée-ko-tál-a/</td>
<td>máțéotálá</td>
<td>‘man who they are not counting’</td>
</tr>
<tr>
<td>d. /tó-tée-ko-tál-a/</td>
<td>tóteotálá</td>
<td>‘man who we are not counting’</td>
</tr>
<tr>
<td>e. /tó-tée-ko-kon-a/</td>
<td>tóteokonà</td>
<td>‘man who we are not hitting’</td>
</tr>
</tbody>
</table>

The verb-focus marker, or focally-neutral marker, is an initial prefix *ne* that is found in all main clause, affirmative verb tenses except the future. Most tenses below also have an object-focus form; in such cases, the *ne* is not present. Examples are seen in (2.41).

(2.41) Tense

<table>
<thead>
<tr>
<th>Tense</th>
<th>Neutral</th>
<th>Object-focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>nétô.otálá</td>
<td>tweetálá</td>
</tr>
<tr>
<td>Immediate past</td>
<td>nétwátálá</td>
<td>twáatálá</td>
</tr>
<tr>
<td>Progressive</td>
<td>nétô.otálalà</td>
<td>tweetálalà</td>
</tr>
<tr>
<td>Hesternal prog</td>
<td>nétónátálalà</td>
<td>tonátálalà</td>
</tr>
<tr>
<td>Remote prog</td>
<td>nétwátálalà.à</td>
<td>twaatál.à</td>
</tr>
<tr>
<td>Hodiernal perf</td>
<td>nétótálilè</td>
<td>totálilè</td>
</tr>
<tr>
<td>Hesternal perf</td>
<td>nétónátálilè</td>
<td>tonátálilè</td>
</tr>
<tr>
<td>Remote perf</td>
<td>nétwátálilè</td>
<td>twaatálilè</td>
</tr>
<tr>
<td>Hodiernal stative</td>
<td>nétótálète</td>
<td>totálète</td>
</tr>
<tr>
<td>Hesternal stative</td>
<td>nétónátálèteè</td>
<td>tonátálèteè</td>
</tr>
<tr>
<td>Remote stative</td>
<td>nétwátálèteè</td>
<td>twaatálèteè</td>
</tr>
<tr>
<td>Habitual</td>
<td>nétótálalà.à</td>
<td>totalalà.à</td>
</tr>
<tr>
<td>Future</td>
<td>tokáatálà</td>
<td>N/A</td>
</tr>
</tbody>
</table>

All other tense/aspect markers are placed after the subject prefix and before the object prefix if present, otherwise before the verb stem. The tense/aspect prefix *a* marks the immediate past and the remote forms of tenses, as seen in (2.42).
The tense/aspect marker *naa* marks the hesternal forms of the progressive, perfective, and stative verb tenses. It may consist of two morphemes, *ne* + *a*, but there are no alternations which justify dividing up the morphemes in this way. Examples are in (2.43).

<table>
<thead>
<tr>
<th>Hesternal progressive</th>
<th>nětōnáatálaâ</th>
<th>'we were counting'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hesternal perfective</td>
<td>nětōnáatáliâe</td>
<td>'we counted'</td>
</tr>
<tr>
<td>Hesternal stative</td>
<td>nětōnáatáleëë</td>
<td>'we were counting'</td>
</tr>
</tbody>
</table>

The tense/aspect prefix *ko* marks the infinitive and the present and progressive tenses. Examples are seen in (2.44) with *ko* underlined. Notice that under the condition that the following syllable has an onset, the *k* of *ko* deletes. And for V-initial stems, vowel coalescence takes place and *ko* surfaces as *kw*. A full discussion of this empty C-related phenomenon is found in Chapter 4 and a discussion of vowel coalescence can be found in Chapter 3.

<table>
<thead>
<tr>
<th>Stem type</th>
<th>Present</th>
<th>Progressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-initial /-tâl/</td>
<td>nětó.otâla</td>
<td>nětó.otâlaâ</td>
</tr>
<tr>
<td></td>
<td>'we are counting'</td>
<td>'we’ve been counting'</td>
</tr>
<tr>
<td>V-initial /-âk/</td>
<td>nětókwââka</td>
<td>nětókwââkaâ</td>
</tr>
<tr>
<td></td>
<td>'we are building'</td>
<td>'we’ve been building'</td>
</tr>
<tr>
<td>Empty C-initial /-Ceb/</td>
<td>nětóko.eba</td>
<td>nětóko.ebaâ</td>
</tr>
<tr>
<td></td>
<td>'we are paying'</td>
<td>'we’ve been paying'</td>
</tr>
</tbody>
</table>

The tense/aspect marker *e* is found in the object focus forms of the present tense and the progressive tense, and marks the progressive. I suspect that this *e* was also diachronically present in the 3s and 3p affirmative forms. The evidence for this is that in
the 3s, the two progressive tenses are the only two which take the subject prefix one, which ends in e. These are also the only two tenses in which the 3p subject prefix is mee, which is otherwise ma. It is a robust fact of the language that a coalesces with e to produce ee (See Chapter 3 for details of Mid vowel fusion). Moreover, whereas the subject prefix ma has a short vowel, there is evidence that mee has a long vowel, which is evidence that vowel fusion has taken place. It seems that the requirement of these tenses that there be an e preceding ko has historically shifted to the requirement that prefixes ending in a surface with e in the present and progressive tenses. Examples are seen in (2.45), which show the e in the object-focus forms, synchronically valid evidence of e being a progressive marker. Furthermore, the subject prefixes mee and kee, and the negative marker tee do not trigger Vowel harmony. Since only underlying e and o trigger Vowel harmony, this is evidence that the e in these prefixes is derived. Thus, these prefixes do provide evidence for a synchronic progressive marker e in the Present and Progressive tenses (see Chapter 3 for examples).

(2.45) Present tense M/C Object-Focus
   a. tweetala maiò ‘we are counting bananas’
   Progressive tense M/C Object-Focus
   b. tweetala.â maiò ‘we have been (and still) counting bananas’

The future is marked by the tense/aspect prefix kaa. Examples are seen in (2.46).

(2.46) Future tense M/C Affirmative
   a. tokatâlâ ‘we will count’
   b. tokâakonânâ ‘we will hit each other’
   c. makâakitâ ‘they will thatch’

There is also a tense/aspect suffix which marks the progressive tenses and the habitual. This suffix is aC. Examples are seen in (2.47).
(2.47) Progressive tense M/C Affirmative
a. nétó.otálà.â ‘we have been counting’
  b. némó.otálà.â ‘you-pl have been counting’
  c. némé.otálà.â ‘they have been counting’

Hesternal progressive
d. nétónátálà.â ‘we were counting’
e. némónátálà.â ‘you-pl were counting’
f. némánátálà.â ‘they were counting’

Remote progressive
g. nétwátálà.â ‘we used to count’
h. némwátálà.â ‘you-pl used to count’
i. némátálà.â ‘they used to count’

Habitual
j. nétótálà.â ‘we always count’
k. némótálà.â ‘you-pl always count’
l. némátálà.â ‘they always count’

2.3.4 Verb tenses in detail

Kikamba has a rich variety of verb tenses, as seen in the examples above. In addition to the segmental morphemes mentioned above, tone also plays an important role in these tenses, and will be the focus of Chapter 5. I now provide the basic paradigm for the various tenses. For all the examples, I will use the verb root tál ‘count.’ For each tense, I provide a chart showing, where applicable: (1) the main clause affirmative form (MC/Aff), (2) the main clause affirmative object-focus form (MC/O-F), (3) the main clause negative form (MC/Neg), (4) the relative clause affirmative form (RC/Aff), and (5) the relative clause negative form (RC/Neg). This is indicated in the first row of each chart.

The second row provides the morphological structure of the tense. ‘sp#’ refers to the subject prefix series from Table 2.17, ‘neg’ indicates the negative marker, ‘vb’ indicates the verb root, and the rest are the tense/aspect morphemes and the final vowel found in that tense. The third row indicates the tone of the first, second, and third person singular subject prefixes and the fourth row indicates the tone of the first, second and
third person plural subject prefixes. For example, Sg: 1,2,3-H indicates that the 1sSP, 2sSP, and 3sSP are H-toned, and Sg: 1,2,-H,3-L indicates that the 1sSP and 2sSP are H-toned and the 3sSP is L-toned. The fifth row provides examples using the verb stem tál ‘count’ in the following order: first person singular, second person singular, third person singular, first person plural, second person plural, and third person plural, where applicable. Examples followed by a ‘+’ indicate that an overt direct object which is focussed is required.

The present tense means ‘someone is X-ing,’ ‘someone is about to X,’ or ‘someone is going to X.’ The negative was glossed as having the meaning ‘someone is not X-ing now.’ This tense is marked by the prefix ko, as seen in Table 2.18. However, the only trace we see of the k in ko is in the first person, affirmative forms, where ne + ko surfaces a ngo. This is because k deletes post-vocally due to rule of Prefix k-deletion, which is formalized in Chapter 4.

Table 2.18: Present

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) RC/Aff</th>
<th>(5) RC/Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>nè-sp3-ko- vb-a</td>
<td>sp2-e- vb-á</td>
<td>sp5-neg-ko- vb-a</td>
<td>sp3-ko- vb-a</td>
<td>sp1-neg-ko- vb-a</td>
</tr>
<tr>
<td>Sg: 1,2,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-SH</td>
<td>1,2,3-H</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>néeéngotálã</td>
<td>nectálã+</td>
<td>ndé.otálã</td>
<td>ngotálã</td>
<td>ndé.otálã</td>
</tr>
<tr>
<td>nó.otálã</td>
<td>weetálã+</td>
<td>ndó.otálã</td>
<td>o.otálã</td>
<td>óté.otálã</td>
</tr>
<tr>
<td>nóoneotálã</td>
<td>eetálã+</td>
<td>ndé.otálã</td>
<td>oné.otálã</td>
<td>ote.otálã</td>
</tr>
<tr>
<td>nétó.otálã</td>
<td>tweetálã+</td>
<td>toté.otálã</td>
<td>to.otálã</td>
<td>tóte.otálã</td>
</tr>
<tr>
<td>némó.otálã</td>
<td>mwetálã+</td>
<td>moté.otálã</td>
<td>mo.otálã</td>
<td>moté.otálã</td>
</tr>
<tr>
<td>némé.otálã</td>
<td>meetálã+</td>
<td>maté.otálã</td>
<td>me.otálã</td>
<td>máté.otálã</td>
</tr>
</tbody>
</table>

The immediate past means ‘someone just X-ed.’ This is the only non-remote tense containing the a prefix. Table 2.19 displays the affirmative form of this tense. The main clause negative and the subordinate clause negative forms of this tense are the same as the hodiernal perfective tense, and not are listed here, but see Table 2.25 for these forms. The
immediate past is one of the tenses where the 3s form of the verb has a different stem tone pattern than the other forms. In the affirmative forms, there is no final H tone (see Chapter 5 for details). In addition, the tense/aspect marker a is H-toned in the affirmative, 3s forms, whereas it is L-toned for the other forms.

Table 2.19: Immediate past

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(4) R/C Aff</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-spl-a-vb-a</td>
<td>sp2-á-vb-a+</td>
<td>spl-a-vb-a</td>
</tr>
<tr>
<td>Sg: 1,2,3-H</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>néwâatâlâ</td>
<td>wâatâlâ+</td>
<td>wâatâlá</td>
</tr>
<tr>
<td>néwâatâlâ</td>
<td>wâatâlâ+</td>
<td>wâatâlá</td>
</tr>
<tr>
<td>néwâatâlâ</td>
<td>wâatâlâ+</td>
<td>wâatâlá</td>
</tr>
<tr>
<td>nétwâatâlâ</td>
<td>wâatâlâ+</td>
<td>wâatâlá</td>
</tr>
<tr>
<td>némwâatâlâ</td>
<td>mâtâlâ+</td>
<td>mâtâlá</td>
</tr>
<tr>
<td>némâatâlâ</td>
<td>mâtâlâ+</td>
<td>mâtâlá</td>
</tr>
</tbody>
</table>

The future tense means ‘someone will X.’ It is different from the other main clause affirmative tenses in that it does not have the initial verb focus particle né. Thus, there is no object-focus form. The future tense is marked by the prefix kâa. In this tense, the 3s relative clause form is marked by the absence of the final H tone that marks the other forms.
The progressive tense means ‘someone has been X-ing,’ and implies that the action is still taking place. All the progressive tenses are marked by the suffix $aC$. Like the present tense, this tense is marked by the tense/aspect prefix $ko$. In fact, the progressive is identical to the present tense, except for the addition of the $aC$ suffix.

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>sp2-káa-vb-á</td>
<td>sp4-neg-káa-vb-a+</td>
<td>sp1-káa-vb-á</td>
<td>sp1-neg-káa-vb-á</td>
</tr>
<tr>
<td>Sg: 1,2,3-L</td>
<td>1,2,3-SH</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-L</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>ngáatalâ</td>
<td>ndékataalâ</td>
<td>ngaatalâ</td>
<td>ndékataalâ</td>
</tr>
<tr>
<td>okáatalâ</td>
<td>ndékataalâ</td>
<td>okataalâ</td>
<td>okataalâ</td>
</tr>
<tr>
<td>akáatalâ</td>
<td>ndékataalâ</td>
<td>okataalâ</td>
<td>okataalâ</td>
</tr>
<tr>
<td>tokáatalâ</td>
<td>tokataalâ</td>
<td>tokataalâ</td>
<td>tokataalâ</td>
</tr>
<tr>
<td>mokáatalâ</td>
<td>mokataalâ</td>
<td>mokataalâ</td>
<td>mokataalâ</td>
</tr>
<tr>
<td>makáatalâ</td>
<td>makataalâ</td>
<td>makataalâ</td>
<td>makataalâ</td>
</tr>
</tbody>
</table>

Table 2.21: Progressive

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp3-kó-vb-aC-a</td>
<td>sp2-e-vb-aC-a+</td>
<td>sp5-neg-kó-vb-aC-a</td>
<td>sp3-kó-vb-aC-a</td>
<td>sp1-neg-kó-vb-aC-a</td>
</tr>
<tr>
<td>Sg: 1,2,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-SH</td>
<td>1,2-L,3-H</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>néénogotâla.â</td>
<td>néetâla.â+</td>
<td>ndé.otâla.â</td>
<td>ngotâla.â</td>
<td>ndé.otâla.â</td>
</tr>
<tr>
<td>nó.otâla.â</td>
<td>weetâla.â+</td>
<td>ndó.otâla.â</td>
<td>o.otâla.â</td>
<td>ót.otâla.â</td>
</tr>
<tr>
<td>nóoné.otâla.â</td>
<td>xeetâla.â+</td>
<td>ndé.otâla.â</td>
<td>oné.otâla.â</td>
<td>oté.otâla.â</td>
</tr>
<tr>
<td>nétó.otâla.â</td>
<td>tweetâla.â+</td>
<td>tó.otâla.â</td>
<td>tó.otâla.â</td>
<td>tót.otâla.a</td>
</tr>
<tr>
<td>némó.otâla.â</td>
<td>mweetâla.â+</td>
<td>mó.otâla.â</td>
<td>mó.to.otâla.â</td>
<td>móto.otâla.a</td>
</tr>
<tr>
<td>némé.otâla.â</td>
<td>meetâla.â+</td>
<td>maté.otâla.â</td>
<td>mé.otâla.â</td>
<td>maté.otâla.a</td>
</tr>
</tbody>
</table>

---

21 This tense is called Present perfect progressive in Roberts-Kohno (1996, 1999).
The next tense, the hesternal progressive, means ‘someone was X-ing (yesterday).’ This tense, like the hesternal perfective and hesternal stative is marked by the prefix *naa*.

Table 2.22: Hesternal progressive

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ne-sp1-naa-</td>
<td>sp2-naa-</td>
<td>sp4-neg-naa-</td>
<td>sp1-naa-</td>
<td>sp1-neg-naa-</td>
</tr>
<tr>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L, 3-H</td>
<td>1,2,3-H</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L, 3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
</tbody>
</table>

There is also a progressive tense referring to the remote past. The meaning of this tense is ‘someone used to X.’ This tense is marked by the tense/aspect prefix *a* and suffix *aC*.

Table 2.23: Remote progressive

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/ O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp1-a-</td>
<td>sp2-a-</td>
<td>sp4-neg-a-</td>
<td>sp1-a-</td>
<td>sp1-neg-a-</td>
</tr>
<tr>
<td>vb-aC-a</td>
<td>vb-aC-a+</td>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
<td>vb-aC-a</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L, 3-H</td>
<td>1,2,3-SH</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L, 3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
</tbody>
</table>

56
The habitual tense also has the aC suffix that marks the progressive tenses. This tense means ‘someone always X-es.’ In this tense, the 3s affirmative forms are marked by the absence of a final H tone, which is present elsewhere.

Table 2.24: Habitual

<table>
<thead>
<tr>
<th></th>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC/Aff</td>
<td>né-sp1-vb-aC-á</td>
<td>sp2-vb-aC-a+</td>
<td>sp4-neg-vb-aC-á</td>
<td>sp1-vb-aC-a</td>
<td>sp1-neg-vb-aC-a</td>
</tr>
<tr>
<td>Sg:</td>
<td>1,2-H,3-L</td>
<td>1,2-L, 3-H</td>
<td>1,2,3-H</td>
<td>1,2-H,3-L</td>
<td>1,2,3-L</td>
</tr>
<tr>
<td>PI:</td>
<td>1,2,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nééndala.â</td>
<td>ndétalâ.â</td>
<td>nêtala.â</td>
<td>ndatálâ.â</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nótala.â</td>
<td>ndótalâ.â</td>
<td>oílala.á</td>
<td>ootálâ.á</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nótala.â</td>
<td>ndótalâ.â</td>
<td>oílala.á</td>
<td>ootálâ.á</td>
<td></td>
</tr>
<tr>
<td></td>
<td>némótala.â</td>
<td>motálâ.á</td>
<td>móítalâ.á</td>
<td>mototálâ.á</td>
<td></td>
</tr>
<tr>
<td></td>
<td>némátala.â</td>
<td>mátala.á</td>
<td>matálâ.á</td>
<td>matotálâ.á</td>
<td></td>
</tr>
</tbody>
</table>

The perfective tenses indicate that an action is complete, and all perfective tenses are marked by the suffix iCe, which consists of the underlying suffix iC and final vowel e. In the perfective examples in Table 2.25, Table 2.26, and Table 2.27, the perfective suffix iCe surfaces as ile due to the spread of [lateral] from the l in the verb root. The Hodiernal perfective is the “today past” tense, which refers to an action that has been completed some time today: ‘someone X-ed this morning.’ In this tense, the 3s forms do not have a final H tone. However, this does not explain the complex tone patterns found, see Chapter 5 for an explanation of these tone patterns.

---

22 See Chapter 4 for details on the empty C phenomenon.

23 See Chapter 4 for details on [lateral]-Harmony.
The Hesternal perfective, or recent past, refers to an action which happened in the near past, such as yesterday or last month, for example: 'someone X-ed yesterday.' This is like the other hesternal tenses in that it is marked by the prefix *naa.*

Table 2.26: Hesternal perfective²⁵

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp1-náa-vb-iC-ε</td>
<td>sp2-náa-vb-iC-ε+</td>
<td>sp4-nég-néé-vb-a (néé ~náá)</td>
<td>sp1-náa-vb-iC-ε</td>
<td>sp1-nég-náa-vb-a</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L,3-H</td>
<td>1,2,3-SH</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
</tbody>
</table>

²⁴ This tense is called the Today past in Roberts-Kohno (1996, 1999).

²⁵ This tense is called the Recent past in Roberts-Kohno (1996, 1999).
The remote perfective is the distant past tense and means 'someone X-ed months ago/ a long time ago.' Like other remote tenses, it is marked by the prefix a.

Table 2.27: Remote perfective

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp1-a-</td>
<td>sp2-a</td>
<td>sp4-neg-a-</td>
<td>sp1-a-</td>
<td>sp1-neg-a-</td>
</tr>
<tr>
<td>vb-iC-ε</td>
<td>vb-iC-ε</td>
<td>vb-a</td>
<td>vb-iC-ε</td>
<td>vb-a</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L,3-H</td>
<td>1,2-SH,3-L</td>
<td>1,2,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
</tr>
</tbody>
</table>

The next set of tenses are the stative forms, which indicate that an action is or was in the state of being completed. It is also sometimes interpreted as an adjectival form of the verb. Statives are marked by the suffix eet and the final vowel e. The hodiernal stative means 'someone has been X-ing and is still X-ing.' Just as in the hodiernal perfective, there is no prefix corresponding to the hodiernal which occurs before the verb stem. Analogous to the 3s affirmative forms of the hodiernal perfective, the 3s forms do not bear a final H tone.

---

26 This tense is called the Remote past in Roberts-Kohno (1996, 1999).
Table 2.28: Hodiernal stative

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/CAff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp1-vb-éet-é</td>
<td>sp2-vb-éet-é</td>
<td>sp4-neg-vb-éet-é</td>
<td>sp1-vb-éet-é</td>
<td>sp1-neg-vb-éet-é</td>
</tr>
<tr>
<td>1,2-H,3-L</td>
<td>1,2-L,3-H</td>
<td>1,2,3-H</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>1,2,3-H</td>
<td>1,2-L,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>néntáléetè</td>
<td>ndáléetè +</td>
<td>ndétáléetè</td>
<td>nétáléetè</td>
<td>ndatáléetè</td>
</tr>
<tr>
<td>nóótáléetè</td>
<td>otáléetè +</td>
<td>ndótáléetè</td>
<td>ntótáléetè</td>
<td>otótáléetè</td>
</tr>
<tr>
<td>nóótáléetè</td>
<td>átáléetè +</td>
<td>ndáltáléetè</td>
<td>ótáléetè</td>
<td>ótótáléetè</td>
</tr>
<tr>
<td>nótótáléetè</td>
<td>totáléetè +</td>
<td>ndótótáléetè</td>
<td>tótáléetè</td>
<td>tótótáléetè</td>
</tr>
<tr>
<td>némótáléetè</td>
<td>motáléetè +</td>
<td>moítáléetè</td>
<td>mótáléetè</td>
<td>mótótáléetè</td>
</tr>
<tr>
<td>némátáléetè</td>
<td>mátáléetè +</td>
<td>maítáléetè</td>
<td>mátáléetè</td>
<td>mátótáléetè</td>
</tr>
</tbody>
</table>

The hesternal stative means 'someone was X-ing' in the recent past. Once again, hesternal forms are marked by the prefix naa.

Table 2.29: Hesternal stative

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/CAff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-sp1-náa-vb-éet-é</td>
<td>sp2-náa-vb-éet-é</td>
<td>sp4-neg-náa-vb-éet-é</td>
<td>sp1-náa-vb-éet-é</td>
<td>sp1-neg-náa-vb-éet-é</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L,3-H</td>
<td>1,2,3-H</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>nénénáatáléetè</td>
<td>nénáatáléetè +</td>
<td>ndénáatáléetè</td>
<td>nénáatáléetè</td>
<td>ndánáatáléetè</td>
</tr>
<tr>
<td>nóónáatáléetè</td>
<td>nóonáatáléetè +</td>
<td>ndónáatáléetè</td>
<td>nóonáatáléetè</td>
<td>ótánáatáléetè</td>
</tr>
<tr>
<td>nóóonáatáléetè</td>
<td>nóóonáatáléetè +</td>
<td>ndónóonáatáléetè</td>
<td>nóóonáatáléetè</td>
<td>ótóonáatáléetè</td>
</tr>
<tr>
<td>nénóonáatáléetè</td>
<td>nénóonáatáléetè +</td>
<td>ndénóonáatáléetè</td>
<td>nénóonáatáléetè</td>
<td>nótnóonáatáléetè</td>
</tr>
<tr>
<td>nénénóonáatáléetè</td>
<td>nénénóonáatáléetè +</td>
<td>ndénénóonáatáléetè</td>
<td>nénénóonáatáléetè</td>
<td>nótnóonáatáléetè</td>
</tr>
</tbody>
</table>
| The final stative tense is the remote stative and means 'someone had X-ed long ago.' This tense is marked by the remote prefix a just like the remote perfective tense. 

27 This tense is called the Past perfect continuous in Roberts-Kohno (1996, 1999).
Table 2.30: Remote stative\textsuperscript{28}

<table>
<thead>
<tr>
<th>(1) MC/Aff</th>
<th>(2) MC/O-F</th>
<th>(3) MC/Neg</th>
<th>(4) R/C Aff</th>
<th>(5) R/C Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>né-spl-a-vb-éét-ê</td>
<td>sp2-a-vb-éet-ê</td>
<td>sp4-neg-a-vb-éet-ê</td>
<td>sp1-a-vb-éet-ê</td>
<td>sp1-neg-a-vb-éet-ê</td>
</tr>
<tr>
<td>Sg: 1,2-H,3-L</td>
<td>1,2-L,3-H</td>
<td>1,2,3-SH</td>
<td>1,2-H,3-L</td>
<td>1,2-H,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
<td>1,2-L,3-H</td>
<td>1,2,3-L</td>
<td>1,2,3-H</td>
<td>1,2,3-H</td>
</tr>
<tr>
<td>nénaatalééte</td>
<td>naatalééte +</td>
<td>ndaatalééte</td>
<td>náatáleéte</td>
<td>ndáatalééte</td>
</tr>
<tr>
<td>néwáatalééte</td>
<td>waatalééte +</td>
<td>ndwáatalééte</td>
<td>wáatalééte</td>
<td>ótáatalééte</td>
</tr>
<tr>
<td>néwáatalééte</td>
<td>áatalééte +</td>
<td>ndtáatalééte</td>
<td>táatalééte</td>
<td>ótáatalééte</td>
</tr>
<tr>
<td>nétwáatalééte</td>
<td>twaalééte +</td>
<td>ndtwaalééte</td>
<td>twaalééte</td>
<td>twtáatalééte</td>
</tr>
<tr>
<td>némwáatalééte</td>
<td>mwaatalééte +</td>
<td>mwáatalééte</td>
<td>móaatalééte</td>
<td>mútáatalééte</td>
</tr>
<tr>
<td>némáatalééte</td>
<td>máatalééte +</td>
<td>matáatalééte</td>
<td>máatalééte</td>
<td>mátáatalééte</td>
</tr>
</tbody>
</table>

The imperative form of the verb is formed from the stem alone. The final vowel of the singular imperative is \(a\). The plural imperative takes a final \(ai\). The negative forms have the same morphological structure as the negative of the subjunctive (see Table 2.32 below). Examples of the imperative are seen in Table 2.31.

Table 2.31: Imperative

<table>
<thead>
<tr>
<th>‘You-sg, X!’</th>
<th>‘You-pl, X!’</th>
<th>‘You-sg, don’t X!’</th>
<th>‘You-pl, don’t X!’</th>
</tr>
</thead>
<tbody>
<tr>
<td>vb-a</td>
<td>vb-a-i</td>
<td>sp4-kaa-vb-ê</td>
<td>sp4-neg-kaa-vb-ê</td>
</tr>
<tr>
<td>tâla</td>
<td>tâláï</td>
<td>ndokaatalê</td>
<td>moikaatalê</td>
</tr>
</tbody>
</table>

There are two forms of the subjunctive in Kikamba. The subjunctive is marked by the presence of the final vowel \(e\), just like the perfective tenses. For the meaning ‘let someone X,’ there is only the subject prefix, the verb root, and the final vowel. For the meaning ‘that someone may X,’ the prefix \(nño\), which is in free variation with \(nôo\), is required. While the affirmative forms of the subjunctive have a toneless verb stem, this changes when an object prefix is present, as with the object prefix \(mo\) ‘him’ in

\textsuperscript{28} This tense is called the Remote past perfect in Roberts-Kohno (1996, 1999).
"nótómótólélé ‘we may count for him.’ The presence of the object prefix triggers the tone pattern of the lexical tone on the verb and V2H tone insertion. See Chapter 5 for more details on tone patterns in Kikamba tenses.

Table 2.32: Subjunctive

<table>
<thead>
<tr>
<th>‘Let someone X’</th>
<th>‘(That) someone (may) X’</th>
<th>‘Let someone not X’</th>
</tr>
</thead>
<tbody>
<tr>
<td>sp2-vb-ε</td>
<td>nóo-sp2-vb-ε</td>
<td>sp4-neg-kaa-vb-ε</td>
</tr>
<tr>
<td>~ nóo-sp2-vb-ε</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sg: 1,2,3-SH</td>
<td>1,2,3-SH</td>
<td>1,2,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-SH</td>
<td>1,2,3-SH</td>
<td>1,2,3-L</td>
</tr>
<tr>
<td>nótale</td>
<td>nónétale</td>
<td>ndekaatálé</td>
</tr>
<tr>
<td>òtale</td>
<td>nóóttale</td>
<td>ndokaatálé</td>
</tr>
<tr>
<td>átale</td>
<td>nóótale</td>
<td>ndakaatálé</td>
</tr>
<tr>
<td>tótale</td>
<td>nótótale</td>
<td>toikaatálé</td>
</tr>
<tr>
<td>mótale</td>
<td>nóomótale</td>
<td>moikaatálé</td>
</tr>
<tr>
<td>mótale</td>
<td>nóomótale</td>
<td>maikaatálé</td>
</tr>
</tbody>
</table>

The conditional tense is represented in Table 2.33. This tense means ‘if someone X-es’; it represents the hypothetical. The conditional has the tense/aspect marker ka.

Table 2.33: Conditional

<table>
<thead>
<tr>
<th>sp2-ka-vb-a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sg: 1,2,3-H</td>
</tr>
<tr>
<td>Pl: 1,2,3-H</td>
</tr>
<tr>
<td>ngatálá</td>
</tr>
<tr>
<td>ókatálá</td>
</tr>
<tr>
<td>ákatálá</td>
</tr>
<tr>
<td>tòkatálá</td>
</tr>
<tr>
<td>mókatálá</td>
</tr>
<tr>
<td>mákatálá</td>
</tr>
</tbody>
</table>

29 When an object prefix is present, the stem tone pattern is base + V2H tone.
The following tense was elicited with two separate glosses. The first meaning is a conditional tense which implies future. It was elicited when asking for the form 'when someone was X-ing.' The second meaning of this tense is 'after someone X-ed.' With this meaning, it refers to an action after which something else happens. This tense has the tense/aspect prefix \(a\) and is the only tense which ends in a SH in isolation.

Table 2.34: Future conditional and Subsequent

<table>
<thead>
<tr>
<th>sp2-a-vb-á</th>
<th>Sg: 1,2,3-H</th>
<th>Pl: 1,2,3-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>náatálá</td>
<td>wáatálá</td>
<td>áatálá</td>
</tr>
<tr>
<td>twáatálá</td>
<td>mwáatálá</td>
<td>máatálá</td>
</tr>
</tbody>
</table>

The consecutive has the meaning '...and then someone X-ed.' This form of the verb is preceded by the preposition \(na\). It also has the \(a\) tense/aspect marker.

Table 2.35: Consecutive

<table>
<thead>
<tr>
<th>MC/Aff</th>
<th>MC/Aff</th>
<th>Sg: 1,2,3-H</th>
<th>Pl: 1,2,3-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(na)-sp2-a-vb-a</td>
<td>na náatálá</td>
<td>na wáatálá</td>
<td>na áatálá</td>
</tr>
<tr>
<td></td>
<td>na twáatálá</td>
<td>na mwáatálá</td>
<td>na máatálá</td>
</tr>
</tbody>
</table>
The last two tenses listed are morphologically negative tenses because they are marked by negative prefixes. The ‘Simultaneous’ tense indicates an action that takes place at the same time as another action and is glossed as ‘while someone was X-ing.’

Table 2.36: Simultaneous

<table>
<thead>
<tr>
<th>MC/Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>sp4-neg-vb-a</td>
</tr>
<tr>
<td>Sg: 1-H,2,3-L</td>
</tr>
<tr>
<td>Pl: 1,2,3-L</td>
</tr>
<tr>
<td>ndétálá</td>
</tr>
<tr>
<td>oítálá</td>
</tr>
<tr>
<td>aítálá</td>
</tr>
<tr>
<td>toítálá</td>
</tr>
<tr>
<td>moítálá</td>
</tr>
<tr>
<td>maiítálá</td>
</tr>
</tbody>
</table>

The negative potential tense is marked by the suffix *ek*, and means that the subject is not able to do something: ‘someone cannot X.’

Table 2.37: Negative potential

<table>
<thead>
<tr>
<th>MC/Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>sp4-neg-vb-eky-a</td>
</tr>
<tr>
<td>Sg: 1,2,3-H</td>
</tr>
<tr>
<td>Pl: 1,2,3-L</td>
</tr>
<tr>
<td>ndétáléchâ</td>
</tr>
<tr>
<td>ndôítáléchâ</td>
</tr>
<tr>
<td>ndátáléchâ</td>
</tr>
<tr>
<td>toiítáléchâ</td>
</tr>
<tr>
<td>moítáléchâ</td>
</tr>
<tr>
<td>maiítáléchâ</td>
</tr>
</tbody>
</table>
2.4 Conclusion

This chapter has laid out the basic morphological structure of Kikamba. Details of the phonological processes involved can be found in Chapters 3, 4, and 5.
3.1 Introduction

Kikamba has CV syllable structure and much of the Kikamba segmental phenomena are a result of syllable fusion and vowel coalescence to conform to this structure. When morphemes come together resulting in an unacceptable surface sequence, vowels coalesce or segments delink in order to produce acceptable syllables in Kikamba. In this chapter, I discuss the resolution of surface sequences which do not conform to allowable syllable structure in Kikamba. In §3.2, I provide an overview of Kikamba segments. In §3.3, I discuss the general phonological rules. In §3.4, I focus on syllabification and vowel coalescence. I first focus on the simplest cases of vowel coalescence: two short vowels fusing into a single syllable, which results whenever vowels are adjacent at the root node. Since the historical loss of consonants has left many morphemes which consist of only vowels, it is frequently the case that long vowels and short vowels come together, or several short vowels come together through morpheme concatenation. The resolution of such cases demonstrate that syllable fusion and vowel coalescence are separate processes.
3.2 Kikamba segmental inventory

In this section, I review the segmental inventory of Kikamba.

3.2.1 Consonants

The inventory of Kikamba consonants is found in Table 3.1. The consonants in parentheses are not found underlyingly, but are derived. Where the transcription differs from the phonetic symbol describing the sound, the transcription used is indicated in brackets. Thus, \( \breve{c} \) is transcribed as \(<\text{ch}>\).

Table 3.1: Kikamba consonants

<table>
<thead>
<tr>
<th>Consonants</th>
<th>Bilabial</th>
<th>Interdental</th>
<th>Alveopalatal</th>
<th>Velar</th>
<th>Labiovelar</th>
<th>Labiopalatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>(( b ))</td>
<td>t</td>
<td>k</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(( d ))</td>
<td>(g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td>( \beta &lt;b&gt; )</td>
<td>( \delta &lt;\text{th}&gt; )</td>
<td>s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(( z ))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>(( \check{c} ))</td>
<td>&lt;ch&gt;</td>
<td>(( J )) &lt;j&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>( n &lt;\tilde{n}&gt; )</td>
<td>n</td>
<td>( \eta &lt;\text{ng}'&gt; )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td>y</td>
<td></td>
<td>w</td>
<td>( q &lt;\tilde{w}&gt; )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The basic system consists of two voiceless stops: \( t \) and \( k \), three fricatives: \( \beta \), \( \delta \), and \( s \) with \( \beta \) and \( \delta \) voiced and \( s \) voiceless, one liquid: \( l \), and fours nasals: \( m \), \( n \), \( n \) and \( \eta \). There are three glides: \( y \), \( w \), and \( q \).

Some of these sounds require further explanation. First, \( \check{c} \) is derived from the sequence \( k + y \); the \( y \) palatalizes the \( k \). There is also the typical Bantu phonological pattern of voiceless obstruents becoming voiced post-nasally. Thus, \( t \), \( k \), \( s \) and \( \check{c} \) become \( d \), \( g \), \( z \) and \( J \), respectively, post-nasally. In addition, \(<b>\) represents a voiced labial
fricative $\beta$ which becomes a voiced labial stop $b$ post-nasally. And $l$ has the allophone $d$ post-nasally. There is also an underlying moraic nasal phoneme represented as $N$, which is unspecified for place of articulation. On the surface, this phoneme desyllabifies and the mora associates to a preceding vowel. When this happens, the nasal becomes part of the following onset, taking on the place of articulation of the following consonant.

The palatal glide $y$ is articulated very far to the front of the mouth, so that it is interdental, but post-consonantally, it is a regular palatal glide. There are also two labial glides. There is a labio-velar glide $w$ and a labio-palatal glide $q$. The second of these two is recognized by speakers of Kikamba as primarily a labial, since in the traditional orthography, $q$ is transcribed as a type of $w$: $<\ddot{w}>$ or $<w^*>$. Both labial glides are underlying and derived. Word-internally, it is clear that $o \rightarrow w$ when it coalesces with a following vowel, and $u \rightarrow \ddot{w}$ when it coalesces with a following vowel. The $\ddot{w}$ is an interesting segment because it is rarer than $w$, and it initially looks like its appearance is always predictable. The monosyllabic verb roots discussed in Chapter 6 provide evidence that $\ddot{w}$ derives from $u$. There is also another derived environment for $w$ as well: $y$ and $w$ fuse to form the onset of a syllable. However, there are also a limited number of words which have the $\ddot{w}$ as the only glide with no evidence of underlying $u$. Thus, $\ddot{w}$ must also necessarily be analyzed as underlying.

3.2.2 Vowels

I now turn to a discussion of the vowels. Kikamba has a seven-vowel system, as seen in Table 3.2.

---

1 See Chapter 1 for a complete table of traditional orthographic correspondences.
Table 3.2: Kikamba vowels

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Mid</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>u</td>
<td></td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td>o</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>i</td>
<td>a</td>
<td>e</td>
</tr>
</tbody>
</table>

In Kikamba’s seven-vowel system, three heights are distinguished. Thus, $i$ and $u$ are high vowels, $e$ and $o$ are mid vowels, and $e$, $a$, and $a$ are low vowels. This is represented in the Parkinson (1996) Incremental Constriction Model of vowel height as in Table 3.3, with additions of the height feature [closed].

Table 3.3: Representation of Kikamba vowels

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>u</th>
<th>e</th>
<th>o</th>
<th>e</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>coronal</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>labial</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>closed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>closed</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the examples in Table 3.4, infinitives are provided to show that all the segments except those that may only appear after a nasal in Kikamba can occur in initial position in a verb root. The infinitive prefix is $ko$. Thus, the verb roots which begin with a vowel coalesce with the prefix, resulting in various surface forms, such as $ko + i \rightarrow kwii$. This will be explained in detail later in this chapter.
Table 3.4 Infinitive verb stems

<table>
<thead>
<tr>
<th>Segments</th>
<th>Infinitive UR</th>
<th>Surface form</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>/ko-ìn-à/</td>
<td>kwiñá 'to sing'</td>
</tr>
<tr>
<td>e</td>
<td>/ko-ék-à/</td>
<td>kwééká 'to do'</td>
</tr>
<tr>
<td>ε</td>
<td>/ko-éNz-à/</td>
<td>kwéenzá 'to dig'</td>
</tr>
<tr>
<td>a</td>
<td>/ko-åk-à/</td>
<td>kwáaká 'to build'</td>
</tr>
<tr>
<td>ɔ</td>
<td>/ko-3n-à/</td>
<td>kwôoná 'to see'</td>
</tr>
<tr>
<td>ɔ</td>
<td>/ko-öm-à/</td>
<td>kôómá 'to be dry'</td>
</tr>
<tr>
<td>u</td>
<td>/ko-ûm-à/</td>
<td>kûûmá 'to come out'</td>
</tr>
<tr>
<td>t</td>
<td>/ko-tál-à/</td>
<td>kotálá 'to count'</td>
</tr>
<tr>
<td>k</td>
<td>/ko-kon-à/</td>
<td>kokonà 'to hit'</td>
</tr>
<tr>
<td>b</td>
<td>/ko-bâlok-à/</td>
<td>kobâlokà 'to fall'</td>
</tr>
<tr>
<td>th</td>
<td>/ko-thím-à/</td>
<td>kothímá 'to measure'</td>
</tr>
<tr>
<td>s</td>
<td>/ko-sânoC-à/</td>
<td>kosâno.à 'to comb'</td>
</tr>
<tr>
<td>l</td>
<td>/ko-lik-à/</td>
<td>koliká 'to enter'</td>
</tr>
<tr>
<td>m</td>
<td>/ko-maNth-à/</td>
<td>komaânthà 'to search'</td>
</tr>
<tr>
<td>n</td>
<td>/ko-nëNg-à/</td>
<td>konëngà 'to give'</td>
</tr>
<tr>
<td>ng’</td>
<td>/ko-ng’ołt-à/</td>
<td>kong’ołtá 'to snore'</td>
</tr>
<tr>
<td>w</td>
<td>/ko-wëct-à/</td>
<td>kowëctá 'to mention'</td>
</tr>
<tr>
<td>y³</td>
<td>/ko-Cé-à/</td>
<td>koyá 'to eat'</td>
</tr>
<tr>
<td>C⁴</td>
<td>/ko-Camok-à/</td>
<td>ko.amoká 'to wake up'</td>
</tr>
</tbody>
</table>

3.3 General phonological rules

There are several segmental phonological rules that play a regular role in Kikamba phonology, and which are important for understanding the surface forms. These

---

² w was not found in verb stem-initial position.

³ Verb roots which begin with w or y are potentially ambiguous because there could be an empty C before the w or y and the resulting surface form would still begin with w or y.

⁴ The empty C is the topic of Chapter 4.
are Palatalization, Desyllabification of moraic nasals, Delateralization, Phonological circumscription of glides and Onset glide fusion, and Vowel harmony.

3.3.1 Palatalization

The affricates ch and j are derived by palatalization. Palatalization only occurs in the presence of a following y: it is the realization of a k+y and a g+y sequence, respectively. Thus, there are two contexts where we find palatalization. The first is when the y causative is added to a k-final or g-final verb root. The second is when vowel coalescence results in Glide formation and the glide y is adjacent to a k. Examples will be given for both these contexts.

The causative examples are first considered. One form of the causative morpheme is a y which is added between a verb root and a final vowel. Examples of the causative morpheme are seen in (3.1).

(3.1) Verb Causative form
    a. kotálá ‘to count’ /ko-tál-y-à/ kotályá ‘to cause to count’
    b. kokonà ‘to hit’ /ko-kon-y-à/ kokonyà ‘to cause to hit’
    c. kotuûtìà ‘to sweep’ /ko-tuut-y-à/ kotuùtyà ‘to cause to sweep’

Examples in (3.2a-f) show that when the causative y is added to a verb which has a root-final k, the ky sequence palatalizes to ch.⁵ The infinitives show that the verb root ends in a k in the absence of the causative.

⁵ Although a likely interpretation of the causative is that it is underlyingly a vowel which undergoes glide formation, there are no surface alternations to indicate that it is underlyingly a vowel. In addition, if the morpheme starts out as a vowel, the behavior of two glides in pre-final vowel position cannot be explained. See Chapter 2 and §3.3.4.2.
(3.2) Verb Causative form

<table>
<thead>
<tr>
<th>Verb</th>
<th>Causative form</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kobálokà</td>
<td>'to fall' /ko-bálok-y-à/ kobálochà 'to cause to fall'</td>
</tr>
<tr>
<td>b. kobikà</td>
<td>'to arrive' /ko-bik-y-à/ kobichà 'to cause to arrive'</td>
</tr>
<tr>
<td>c. kothoðkà</td>
<td>'to be bad' /ko-thóok-y-à/ kothoðchà 'to cause to be bad'</td>
</tr>
<tr>
<td>d. kóómbokà</td>
<td>'to dissolve /ko-óNbook-y-à/kóómboorchà 'to cause to dissolve a (of a meeting-intr)'</td>
</tr>
<tr>
<td>e. kwíímbokà</td>
<td>'to unswell' /ko-iNbok-y-à/ kwíímbochà 'to cause to unswell'</td>
</tr>
<tr>
<td>f. ko.enokà</td>
<td>'to go home' /ko-Cenok-y-à/ ko.enochà 'to cause to go home'</td>
</tr>
</tbody>
</table>

Examples in (3.3a-c) show verb roots which end in g. When the causative y is added in (3.3d), the sequence g + y palatalizes to j. Verb roots in (3.3e,f) end in y. As will be discussed further in §3.3.4.1, a morpheme-final glide migrates to pre-final vowel position. Thus, the root-final y moves to pre-final vowel position and a gy sequence results. Palatalization is applicable and gy surfaces as j.

(3.3) Verbs

<table>
<thead>
<tr>
<th>Verb</th>
<th>Causative form</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kwaangaàngà</td>
<td>'to wander'</td>
</tr>
<tr>
<td>b. kotálaàngà</td>
<td>'to count randomly'</td>
</tr>
<tr>
<td>c. kokonaàngà</td>
<td>'to hit a little'</td>
</tr>
<tr>
<td>d. /ko-mo-aNgaNg-y-à/</td>
<td>komwaangaànjà 'to make him wander'</td>
</tr>
<tr>
<td>e. /ko-kóoly-aNg-à/</td>
<td>kokóolaànjà 'to make ask for more information'</td>
</tr>
<tr>
<td>f. /ko-teëlemy-aNg-à/</td>
<td>koteëlemaànjà 'to frighten repeatedly'</td>
</tr>
</tbody>
</table>

The second context where palatalization occurs is when the class 7 OP ké coalesces with a following vowel. In this context, e becomes y, resulting in a ky sequence which palatalizes to ch. However, I first demonstrate that e → y when coalescence occurs by examining data with the class 4 and class 9 OP me. Data in (3.4a,b) motivate me as the underlying form of the OP. (3.4c,d) show that when me coalesces with a following vowel, e surfaces as y.
Data in (3.5a,b) motivate the form of the class 7 OP, by placing ké before a consonant-initial verb stem. When ké is placed before a vowel, as in (3.5c-f), the vowels coalesce and e → y. As a result the y palatalizes the k, resulting in surface ch.

3.3.2 Desyllabification of moraic nasals

Kikamba has underlying moraic nasals which desyllabify on the surface. There are three contexts which provide evidence for these nasals. The first moraic nasal is the IsOP. Like all object prefixes, this morpheme surfaces just before the verb stem. Examples are found in (3.6).
Since Kikamba prohibits onsetless syllables and coda consonants, the 1sOP $N$ must link to the following syllable and become part of the onset. However, since moras may not occur in an onset, the moraic nasal loses its mora by a rule of Nasal desyllabification, a rule also posited for Kimatuumbi (Odden 1996). Nasal desyllabification can be seen in Rule 3.1 (Note that I use the heading ‘Rule’ throughout this dissertation as a general label for diagrams, which includes rules, constraints, and illustrations).

Rule 3.1 Nasal desyllabification

\[
\begin{array}{c}
\mu \\
\downarrow \\
rt \\
[+\text{nasal}]
\end{array}
\]

After the nasal delinks from the mora, two things happen. First, the mora reassociates to a preceding vowel, thus compensatorily lengthening the infinitive prefix $ko$ in the examples in (3.6). The underlined vowels in (3.6) show that the prefix $ko$ has a long vowel in the 1sOP forms. Second, the nasal becomes part of the following onset. When this happens, there is spreading of [voice] to the following obstruent onset, and assimilation of the nasal to the place of articulation of that initial consonant, thus yielding a voiced, homorganic nasal-consonant cluster onset. This is illustrated in Rule 3.2.

Rule 3.2 Result of Nasal desyllabification

\[
\begin{array}{c}
\sigma \\
\downarrow \\
\mu \\
rp \\
ko \\
N \\
t \\
ala
\end{array}
\]
Nasal desyllabification, as seen with the addition of the IsOP, reflects a general fact about Kikamba phonology. That is, nasals are never moraic on the surface, and nasal-consonant clusters always induce lengthening of preceding vowels. Examples in (3.6) directly show that the moraic nasal lengthens a preceding vowel, since the vowel of the infinitive prefix ko is short in the absence of the IsOP N.

The second context where the desyllabification of underlying moraic nasals is seen is within verb roots. It is important to point out, however, that the presence of a moraic nasal in this context is not as clear within verb roots as it is in the IsOP data. Since these verb roots are monomorphemic, there are no length alternations to indicate that there is a synchronic moraic nasal. In other words, verbs such as those in (3.7) synchronically appear to be verb stems with long vowels. However, given that moraic nasals are desyllabified on the surface, whether these verb stems have a long vowel or a short vowel underlingly is not as important as the fact that these stems contain two moras, as seen in the surface forms in (3.7).

(3.7) | UR | Surface form | Meaning |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-sé Nb-a/</td>
<td>kosémbà</td>
<td>'to run'</td>
</tr>
<tr>
<td>b. /ko-li Nd-a/</td>
<td>koliîndà</td>
<td>'to cover'</td>
</tr>
<tr>
<td>c. /ko-bi Ng-a/</td>
<td>kobiîngà</td>
<td>'to shut'</td>
</tr>
<tr>
<td>d. /ko-ma Nth-a/</td>
<td>komaànthà</td>
<td>'to search'</td>
</tr>
<tr>
<td>e. /ko-kó Nz-à/</td>
<td>kokóônzà</td>
<td>'to fold'</td>
</tr>
<tr>
<td>f. /ko-lo Nj-à/</td>
<td>koloônjà</td>
<td>'to chase away'</td>
</tr>
</tbody>
</table>

Empty C-initial verbs with nasal-consonant clusters also appear to have long vowels synchronically as well. These verbs have two moras in the verb stem. I mention the empty C verbs separately because at the phrase level, the empty C deletes and these

---

6 See Clements (1986) for discussion of this phenomenon in other languages.
verb roots surface with a short vowel in the imperative. Thus, empty C-initial verbs behave differently from consonant-initial stems in the imperative.

<table>
<thead>
<tr>
<th>(3.8) UR</th>
<th>Surface form</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-CeNd-à/</td>
<td>ko.ëndà</td>
<td>'to go'</td>
</tr>
<tr>
<td>b. /ko-CiNd-à/</td>
<td>ko.iìndà</td>
<td>'to submerge'</td>
</tr>
<tr>
<td>c. /ko-CaNb-à/</td>
<td>ko.aàmbà</td>
<td>'to make noise'</td>
</tr>
</tbody>
</table>

Finally, verb stems which begin with vowels lend another layer of complication. When a vowel-initial verb stem surfaces with a preceding prefix, vowel coalescence occurs, as seen in (3.9). Before coalescence, however, a stem-level rule of Initial shortening is applicable. This rule causes the initial vowel of vowel-initial verb stems to surface as short in the imperative and after the IsOP, and will be explained in §4.2.3. Then after the addition of the prefix in (3.9), the first syllable surfaces as a plain long vowel.

<table>
<thead>
<tr>
<th>(3.9) UR</th>
<th>Surface form</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-aNbat-à/</td>
<td>kwaambatà</td>
<td>'to go up'</td>
</tr>
<tr>
<td>b. /ko-eNd-à/</td>
<td>kweëndà</td>
<td>'to like'</td>
</tr>
<tr>
<td>c. /ko-eNz-à/</td>
<td>kweënzà</td>
<td>'to dig'</td>
</tr>
</tbody>
</table>

Phrase-level effects also support the analysis of underlying moraic nasals inducing vowel length on the surface because at the phrase level, a word-initial moraic nasal induces lengthening of the preceding vowel. Whenever a monomoraic modifier begins with a moraic nasal prefix (as in classes 8, 9, 10), the modifier surfaces as monomoraic. In other words, the moraic nasal prefix loses its mora on the surface: the mora stray-erases. However, such a modifier can optionally cliticize to a preceding head. When this happens the mora from the modifier’s prefix does not stray-erase, but induces lengthening of the final vowel of the preceding head. Examples are seen in (3.10).
This is an example of a minimal word effect: just in case the adjective modifying a head noun is monomoraic, the adjective optionally cliticizes to the head noun. And within the word, the mora from the nasal may not stray erase: it remains to lengthen a preceding vowel. This data is actually more complex than described here and is addressed again in Chapter 6.

### 3.3.3 Delateralization

The derived consonant $d$ derives not only from $t$, but also from $l$. Examples are seen in (3.11).

(3.11) a. /ko-lées-à/ koléèsà ‘to climb a mountain’
b. /ko-N-lées-y-à/ koondéèsyà ‘to cause me to climb a mountain’

I follow Odden’s analysis of Kimatuumbi (1996) in assuming a rule of Delateralization, whereby $l$ loses its [+lateral] specification after a nasal segment, as seen in Rule 3.3.

**Rule 3.3 Delateralization (Odden 1996)**

```
\begin{array}{c}
\text{rt} \\
[+\text{nasal}] \\
\text{rt} \\
[+\text{lateral}]
\end{array}
```

This conforms with the surface generalization that $*nl$ is not a possible onset in Kikamba.
3.3.4 Glides

3.3.4.1 Glide migration: Phonological circumscription

The migration of the morpheme-final glides \( y \) and \( w \) to pre-final vowel position was briefly introduced in Chapter 2 in the discussion of derivational extensions. I will now go into more detail about the facts relating to this phenomenon. Hyman 1992 explains that in Cibemba, the passive morpheme \( u \), and the causative morpheme \( i \) always occur in pre-final vowel position. That is, even when other morphemes are added which usually occur just before the final vowel, it is always the passive \( u \) or causative \( i \) which surfaces in pre-final vowel position. Hyman refers to this as morphemic circumscription, because as he observes for Cibemba, it is just these two morphemes which are subject to the condition.

Kikamba has a similar phenomenon. In (3.12), examples are given with the passive \( w \) and the causative \( y \). Notice that when other suffixes are added, the passive and causative always surface in pre-final vowel position, as seen in (3.12a-c).

(3.12) a. /ko-tál-eC-w-à/ kotâlelwà ‘to be counted for’
b. /ko-suNg-eC-w-à/ kusuungewà ‘to be guarded for’
c. /ko-bâlok-an-y-à/ kobâlokanyà ‘to cause e/o to fall’

In Kikamba, not only the morphemes \( y \) and \( w \) migrate, but a \( y \) which is part of a morpheme can migrate as well. Data in (3.13) are examples with the other causative morpheme \( ethy \) in pre-final vowel position.

\[7\] The Cibemba data is much more complex than indicated here. Hyman (1992) explains that circumscription of the morphemes \( u \) and \( i \) is a part of the phenomenon of imbrication in Cibemba, which also includes circumscription of a final consonant as well. His analysis is presented in the framework of prosodic morphology of McCarthy and Prince (1986, 1990) and Lombardi and McCarthy (1991).
(3.13) a. /ko-tal-an-ethy-à/ kotálanethyà 'to cause e/o to count'
b. /ko-suNg-an-ethy-à/ kosuunganethyà 'to cause to guard e/o'
c. /ko-bul-an-ethy-à/ kobulanethyà 'to cause e/o to grab'

In Kikamba, the order of derivational suffixes (besides w and y) is quite flexible. Thus, (3.14) shows that the morpheme ethy may precede another suffix. Just in case ethy is followed by another suffix, the final y of the morpheme migrates to pre-final vowel position, not the entire morpheme.

(3.14) a. /ko-tal-ethy-an-a/ kota'lethanyà 'to cause people to count e/o'
b. /ko-suNg-ethy-an-a/ kosuungethanyà 'to cause to guard e/o'
c. /ko-bul-ethy-an-a/ kobulethanyà 'to cause e/o to grab'

Moreover, it is not only the y of ethy which displays this property. If a verb root ends in y, that y will also migrate to pre-final vowel position when another suffix intervenes between the verb root and the final vowel. Examples are seen in (3.15).

(3.15) a. kobulyà /ko-buly-el-a/ kóbulelyà 'to grab for'
b. kobulyà /ko-buly-el-an-a/ kóbulelanyà 'to grab for e/o'
c. kobulyà /ko-bulany-el-a/ kóbulanelyà 'to mix for (e/o)'
d. kókólyà /ko-kóly-an-à/ kókólanelyà 'to ask e/o'
e. kókëthyà /ko-këethy-an-à/ kókëethanyà 'to greet e/o'
f. kotábyà /ko-táby-an-à/ kotábanýà 'to tell e/o'
g. kolumyà /ko-lumy-an-à/ kólumanyà 'to hit e/o hard'

Thus, any time w or y is in root-final or suffix-final position, the glide always migrates to pre-final vowel position, even if another morpheme intervenes.

---

8 It is important to point out that the only data we have for w migration is the passive morpheme itself. There are no verb roots analogous to (3.15a) /buly- 'grab,' that end in w. The couple that can be found are easily analyzable as lexicalized passives, such as kóolwà 'to forget' related to
3.3.4.2 Onset glide fusion

This brings up the question of what happens if both \( y \) and \( w \) are in pre-final position. Examples of such cases would be either a \( y \)-final verb root in the passive; or a verb with both a causative \( ethy \) or \( y \) and a passive \( w \). Before giving data with both glides, I give passive and causative data to reiterate that the passive is \( w \) and the causative ends in \( y \) in (3.16).

(3.16) Verb Causative Passive
a. kotálâ ‘to count’ ko-tál-ethy-à ko-tál-w-à
b. kokona ‘to hit’ ko-kon-ethy-à ko-kon-w-à
c. kosuùngà ‘to guard’ ko-suung-ethy-à ko-suùng-w-à

When both a \( y \) and a \( w \) are present in pre-final vowel position, there is no way to tell which segment comes ‘first.’ Just in case both \( y \) and \( w \) surface in pre-final vowel position, they fuse into a single glide and surface as \( q \), represented as \( \breve{w} \) in the transcription. Examples are seen in (3.17).

\[ kòòlà \] ‘to be forgotten.’ Thus, there are no test cases to determine if the \( w \) from the final position in a verb root would migrate past another suffix to pre-final vowel position.
The two glides fuse into one because two glides cannot occur together in an onset.
So just in case both \( w \) and \( y \) are in pre-final vowel position, one of the two glides spreads its Vpl node to the other glide, and its root node delinks from the syllable. There is no evidence for whether the Vpl node of the first or second glide delinks and loses its root node, so the rule could be formulated either way. I represent this as Rule 3.4.

Rule 3.4  
Onset glide fusion
This rule can also account for two y’s in pre-final vowel position. If a y-final verb root is put into the causative, then two y’s would be in the onset of the syllable containing the final vowel. However, only one surfaces, as seen in the examples in (3.18).

(3.18) a. /ko-lumy-ethy-à/  kolumethyà  ‘to cause to hit hard’
     b. /ko-kóoly-ethy-à/  kokóolethyà  ‘to cause to ask’
     c. /ko-thuky-ethy-à/  kothukethyà  ‘to cause to shake’
     d. /ko-buly-ethy-à/  kobulethyà  ‘to cause to grab’
     e. /ko-kuly-ethy-à/  kokulethyà  ‘to cause to scratch’
     f. /ko-mely-ethy-à/  komelethyà  ‘to cause to swallow’
     g. /ko-kuusy-ethy-à/  kokuusethyà  ‘to cause to pull’
     h. /ko-táby-ethy-à/  kotábethyà  ‘to cause to tell’

Thus, while the place feature of the second y spreads leftward, it has no surface effect since both sounds are coronal.

There is one more context where there is evidence of deletion of a glide after another glide and that is with the reflexive morpheme. In Kikamba, the reflexive morpheme has two forms, depending on whether the following segment is a consonant or a vowel. The verbs which begin with an empty C can take both allomorphs. And since the empty C blocks coalescence between vowels, the allomorphs of the reflexive are clearly seen preceding an empty C. The examples in (3.19) show that the two allomorphs of the reflexive are éyé and é.

(3.19) a. /ko-éyé-Caloiol-à/  kwééyé.alyoòlà  ‘to change self’
     b. /ko-éyé-Cûm-à/  kwééyé.úmá  ‘to curse self’
     c. /ko-é-Caloiol-à/  kwé.alyoòlà  ‘to change self’
     d. /ko-é-Cûm-à/  kwé.úmá  ‘to curse self’

The form which occurs with consonant-initial verbs is é, as in (3.20). As seen in (3.19c,d) and (3.20), the reflexive é coalesces with the o of the infinitive prefix ko, resulting in Glide formation and compensatory lengthening (see §3.4.1). The compensatorily lengthened vowel surfaces before a consonant in (3.20), but shortens before an empty C.
in (3.19c,d) by the rule of Sequential shortening. This is because a long vowel cannot be followed by another vowel in Kikamba and the situation is repaired by shortening the first vowel (see Chapter 4 for a full discussion of empty C-related vowel shortening).

(3.20) a. /ko-é-tál-à/ kwéétálá ‘to count self’  
    b. /ko-é-kon-à/ kwéékonà ‘to hit self’

The éyé allomorph is found with vowel-initial verb stems as seen in (3.21). Assuming the second é of éyé coalesces with the initial vowel of the verb stem, then the result is two y’s in an onset. Since this is prohibited, the second y deletes by the rule of Onset glide fusion, seen in Rule 3.4.

(3.21) a. /ko-éyé-átoC-à/ → kwééyyáato.à → kwééyáato.à ‘to split self open’  
    b. /ko-éyé-ák-eC-à/ → kwééyyáake.à → kwééyáake.à ‘to build for self’

3.3.5 Vowel harmony

Kikamba has a rule of Vowel harmony by which e and o spread their height features rightward to a following mid vowel, resulting in the lowering of e and o to é and ë, respectively. In Parkinson (1996), this type of harmony is classified as complete height harmony. Examples of Vowel harmony are seen in (3.22).

(3.22) a. /ko-ísáthy-eC-an-à/ kokéethÑanyà ‘to greet for e/o’  
    b. /ko-thesl-eC-à/ kotheslelà ‘to kick for’  
    c. /ko-má-ín-eC-à/ koménznë.à ‘to shave for them’  
    d. /ko-má-3n-eC-à/ kom55në.à ‘to see for them’

Vowel harmony is formulated as Rule 3.5. In order to ensure that the vowel which spreads its height features is only é or ë, the first vowel must be specified for a Vpl node (assuming a is not specified for Vpl).
Rule 3.5 Vowel harmony (word level-iterative)

\[
\begin{array}{c}
\text{Height}
\end{array}
\]

The low vowel \(a\) and the high vowels \(i\) and \(u\) are opaque to Vowel harmony: they block harmony and do not participate in it. The vowels \(i\), \(u\), and \(a\) cannot be the target of the rule because \(a\) is not specified for any instances of the feature [closed], and \(i\) and \(u\) are specified for two instances of the feature [closed] under the height node. In Parkinson's cross-linguistic study of vowel height phenomena, he notes that Vowel harmony and coalescence are not possible if there is greater than one height difference between the two vowels. Since \(e\) and \(o\) are not specified for any instances of the feature [closed], the height node from \(e\) or \(o\) is prohibited from spreading to a following \(i\) or \(u\). Example (3.23a) shows that the Vowel harmony which changes \(ee\) \(\rightarrow\) \(eee\) in (3.23b) is blocked when \(a\) intervenes, as with the suffix \(aang\).

(3.23) a. toyâang’člštâângéete
b. toyâang’člštéété

‘we hadn’t snored a little’ (rem stat)
‘we hadn’t snored’

It is also important to point out that Vowel harmony precedes vowel coalescence. Evidence for this is that an \(e\) or \(o\) resulting from Mid vowel fusion does not induce harmonizing of a following \(e\) or \(o\), as seen in (3.24). Moreover, such data demonstrate that the subject prefixes \(mee\) and \(kee\) and the negative marker \(tee\) must be derived from \(a\)
plus a progressive marker e, since these prefixes do not induce harmonizing of a following e or o (see Chapter 2 for an explanation and examples of these prefixes). Mid vowel fusion is discussed further in §3.4.1.

(3.24) a. némc.okó.óma.à ‘they are biting it’
b. komésse.à ‘to come for them’
c. komóokele.à ‘to get up for them’
d. komóombo.e.à ‘to unmold for them’

3.4 Syllabic structure and vowel coalescence

Kikamba is a typical Bantu language with CV syllable structure. All syllables prefer to begin with a consonant, and all consonants are syllabified as onsets: there are no coda consonants. In Kikamba, vowel length is distinctive: there are short vowels and long vowels. Whitely and Muli (1962:5) claim that there are two additional vowel lengths: half-long and very long. Thus, the four vowel lengths in Kikamba are referred to as short, half-long, long, and very long. Examples of these four proposed vowel lengths from Whiteley and Muli are found in (3.25), but they are transcribed in the system used in this dissertation.

(3.25) Vowel length contrasts in Kikamba (Whiteley and Muli 1962:5-6)

<table>
<thead>
<tr>
<th>Vowel Length</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short</td>
<td>kotòlá</td>
<td>‘to break’</td>
</tr>
<tr>
<td>Half-long</td>
<td>kotùũbà</td>
<td>‘to become blunt’</td>
</tr>
<tr>
<td>Long</td>
<td>koko.ama</td>
<td>‘to grunt, growl’</td>
</tr>
<tr>
<td>Very long</td>
<td>kosya.a.a⁹</td>
<td>‘to give birth frequently’</td>
</tr>
</tbody>
</table>

⁹ The last form is the only example stated to have a very long vowel in their discussion of vowel length. Given that the length in this form is different from the three contexts in (3.25a-c), this could represent one of two things: a short vowel followed by a long vowel, or three short vowels in a row. I have not come across this form in my data, so I cannot attest to its validity. However, based on the fact that long vowels never occur word-finally, I conclude that this form ends in a sequence of three short vowels.

85
A language contrasting four vowel lengths is a questionable claim. As pointed out by Ladefoged and Maddieson (1996:320-1), there is only one example to date of a language (Mixe, described in Hoogshagen 1959) which convincingly demonstrates a contrast between even three vowel lengths. Estonian is also a famous case of a language contrasting three vowel lengths. However, as pointed out by Lehiste (1970), the three contrasting lengths in Estonian are in part attributable to higher level prosodic structure. Specifically, Lehiste explains the contrasting lengths as a result of the interaction between feet and syllable structure. My fieldwork on Kikamba has revealed a similar situation. What Whitely and Muli refer to as four contrastive vowel lengths is in fact the interplay of two factors: vowel length and syllable structure. These factors are very important because they result in a four way distinction in surface vowel duration in Kikamba.10

A sequence of two vowels may either be in the same syllable, or in different syllables, and within a syllable a vowel may be long or short. What Whitely and Muli refer to as a half-long vowel is one in which two vowels are in the same syllable, or simply a long vowel. What Whitely and Muli refer to as a long vowel is one in which there is a sequence of two vowels in separate syllables, or simply a bisyllabic short vowel sequence. And a very long vowel is a short vowel followed by a long vowel of the same quality in a separate syllable.

Thus, a vowel can either be short or long, and it may be followed by either a short vowel in a separate syllable, or a long vowel in a separate syllable. The distinction between a monosyllabic long vowel as in (3.26i), and a bisyllabic short vowel sequence as in (3.26m) specifically will be shown to be phonetically distinct in Chapter 4. Examples of near minimal pairs which demonstrate the interplay of vowel length and syllabification can be seen in (3.26). The pairs in (3.26a-f) contrast a monosyllabic short vowel...

10 In fact, given the possibility of several morphemes in a row, it is possible to have a “fifth” or greater vowel length, which is simply three or more short syllables in a row, as exemplified in (3.25d).
vowel with a monosyllabic long vowel. (3.26g-j) contrast a monosyllabic short vowel with a bisyllabic sequence of short vowels. (3.26k-m) contrast a monosyllabic short vowel and a monosyllabic long vowel with a bisyllabic short vowel sequence. And finally, (3.26n-q) is an example contrasting all four surface vowel lengths: monosyllabic short vowel, monosyllabic long vowel, bisyllabic short vowel sequence, and a bisyllabic sequence of a short vowel followed by a long vowel.

(3.26) a. kókëthà ‘to harvest’
b. kókëthỳà ‘to greet’
c. kòkonà ‘to hit’
d. kòkòonza ‘to fold’
e. kòtànukà ‘to chew’
f. kòtànànà ‘to be happy’
g. kòkòmá ‘to sleep, lie down’
h. kòkò.òmà ‘to growl’
i. kòkità ‘to thatch’
j. kòki.ìtà ‘to touch lightly’
k. kòne.ènà ‘to handle carefully, use sparingly’
l. kòne.èngà ‘to give’
m. kòne.ènà ‘to speak’
n. kòbo.tà ‘to enter’
o. kòbò.òtà ‘to accomplish something’
p. kòbò.òbà ‘to go limp (as in plant w/o water)’
q. kòkò.òtà ‘to stretch, pull’

An important issue in Kikamba phonology is how such a syllabification contrast arises. The mechanism by which it arises is an empty root node which is present as the onset of some vowel-initial syllables. This root node prevents vowels from syllabifying together into the same syllable, and thus leads to the context where vowels surface in adjacent, but separate syllables. A detailed explanation of the empty C will be the topic of Chapter 4.

In this chapter, I focus on the behavior of adjacent vowels, those not separated by an empty C. When vowels are adjacent at the root node, they syllabify into a single syllable. In general, syllabification also results in vowel coalescence. That is, when
vowels syllabify together, segmental changes also take place. However, as will be seen in §3.5, syllabification of more than two moras in separate morphemes provides evidence that syllabification and vowel coalescence are in fact separate processes, and that vowels can coalesce if they are adjacent, even if they are in separate syllables. In this section, however, I deal with the syllabification and coalescence of two-morpheme sequences. I assume syllabification takes place at the beginning of every level, i.e., the stem level, the word level, and the phrase level. Thus, when two morphemes are concatenated, syllabification takes place. This is illustrated in Rule 3.6.

Rule 3.6 Syllabification

In the discussion of vowel coalescence which follows, I assume that the vowels have syllabified together, and I focus on the segmental changes which can result from vowels being in adjacent positions.

3.4.1 Word-internal vowel coalescence

The driving force behind rules which syllabify adjacent vowels together is that languages disprefer onsetless syllables. Therefore, an illicit, onsetless syllable will fuse,
or syllabify, with a preceding syllable in order to obtain an onset. Ito (1989) calls this principle the Onset principle, which is the requirement for word-internal syllables to have an onset. Languages which obey the onset principle do not necessarily do so word-initially.\(^\text{11}\)

Evidence for CV syllable structure and the prohibition against onsetless syllables comes from vowel coalescence phenomena, which demonstrate that adjacent vowels syllabify into the same syllable. Syllabifying vowels in the same syllable results in various vowel coalescence processes across languages. As seen in Chapter 2, Kikamba verb stems, noun stems, and modifier stems almost always appear with a prefix. Since these stems can be vowel-initial as well as consonant-initial, the prefix-stem boundary provides one environment for coalescence. In the verbal system, there are subject prefixes, tense/aspect prefixes, and object prefixes which can attach to the beginning of a verb stem. Thus, vowel coalescence occurs between prefixes as well between prefixes and stems.

In Kikamba, there are two types of evidence to indicate that syllabification and vowel coalescence have taken place: segmental evidence and tonal evidence. The segmental evidence varies depending on the nature of the vowels involved. First of all, if two vowels which come together through morpheme concatenation are identical, they simply syllabify together with no change in vowel quality. While there is no change in vowel quality to indicate the two vowels are in the same syllable, vowel length indicates that they are. A surface long vowel is phonetically distinct from a bisyllabic sequence of identical vowels. For example, in the infinitive ko + óma, o + o coalesce into a single long vowel: kôômá ‘to be dry.’ And this vowel is phonetically distinct from the bisyllabic sequence of o + o in the verb ko.ómá ‘to bite.’

\(^\text{11}\) Axininca Campa is another language with onsetless word-initial syllables, whereas word-internal syllables require onsets. For an optimality theoretic account, see McCarthy and Prince (1993).
When the vowels which coalesce are different, there are two basic repair strategies. These are Glide formation and Mid vowel fusion. Glide formation changes a non-low vowel /i, e, o, u/ into a glide when it precedes another vowel, and the following vowel is compensatorily lengthened. In a subset of the contexts where Glide formation applies, the glide subsequently deletes via Homorganic glide deletion if the second vowel is a high vowel, or if the second vowel is a mid vowel with the same height features as the glide. In the absence of a surface glide, vowel quality and length indicate that coalescence has taken place. The other repair strategy is Mid vowel fusion, which is the process by which the low vowel /a/ coalesces with a non-high vowel (e, e, o, o) to produce a long vowel with the height features of /a/ and the place features of the second vowel. Kikamba does not allow coalescence between /a/ and a following high vowel (/i, u/). This is typical cross-linguistically given that /a/ is not adjacent to /i, u/ in height (see Parkinson 1996).

Tonal evidence also indicates whether vowels syllabify into the same syllable. In Kikamba, there is a prohibition against tautosyllabic rising tones. An apparent rising tone is an indication that two vowels are in separate syllables and have not coalesced. Thus, resolution of a rising tone into a level tone indicates two vowels are within the same syllable. The reason that tone provides evidence of syllable structure is that tone can only link to moras and syllables, i.e., prosodic structures. Thus, when the application of tone rules results in a surface tone pattern which is different from the underlying tone pattern, this indicates that vowels have syllabified into the same syllable. Specifically, when a

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12 It is possible that /e/ and /o/ might also participate in word-internal vowel coalescence, but there is no way to determine this, because these vowels are never in a position to coalesce with another vowel word-internally.

13 The generalization is that a glide deletes after glide formation just in case the second vowel is of the same height or higher than the first vowel. This means that the information about the source of the glide is not lost. I propose a possible explanation for this fact is that two featural representations may represent the same glide phonetically. See §3.4.1.1 for details.
mora is followed by another mora within the same syllable which bears a higher tone than the first mora, the tonal node linked to the second mora spreads leftward creating a level tone. This can happen only if the two moras are in the same syllable, since tone rules only have access to prosodic structure. See §5.2.2 for details and examples of Rising tone neutralization.

A brief overview of the results of vowel coalescence can be seen in Table 3.5.

Table 3.5: Word-internal vowel coalescence

<table>
<thead>
<tr>
<th>1st V</th>
<th>i</th>
<th>e</th>
<th>e</th>
<th>a</th>
<th>o</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>ii</td>
<td>yee</td>
<td>yée</td>
<td>yaa</td>
<td>yoo</td>
<td>yuu</td>
</tr>
<tr>
<td>e</td>
<td>ii</td>
<td>ee</td>
<td>yée</td>
<td>yaa</td>
<td>yoo</td>
<td>yuu</td>
</tr>
<tr>
<td>a</td>
<td>ai</td>
<td>ee</td>
<td>ee</td>
<td>aa</td>
<td>cc</td>
<td>cc</td>
</tr>
<tr>
<td>o</td>
<td>wii</td>
<td>wee</td>
<td>wée</td>
<td>waa</td>
<td>wcc</td>
<td>oo</td>
</tr>
</tbody>
</table>

There are no combinations shown for e or o as the first vowel because these sounds never occur in a morpheme-final position where they would be able to coalesce with a following vowel. The vowel u is left out as well because the only place there is evidence for this vowel coalescing with a following vowel is in monosyllabic verb roots (see Chapter 6). And since the analysis of such data is unclear, I cannot make any strong claims about the word-internal coalescence of the combination u + vowel. Finally, the combinations ai and au always surface without any changes in vowel quality.

In §3.4.1.1, I discuss Glide formation and Homorganic glide deletion. In §3.4.1.2, I discuss Mid vowel fusion and coalescence with the vowel a.

3.4.1.1 Glide formation and glide deletion

In Glide formation, the first of two underlyingly adjacent vowels becomes a glide and the second is compensatorily lengthened. In the examples in (3.27), the vowel o in
the infinitive prefix *ko* becomes a glide, and the vowel of the verb stem is compensatorily lengthened. Examples (3.27a-b) motivate *ko* as the underlying form of the infinitive prefix.

(3.27) a. /ko-tál-à/ kotálâ ‘to count’
b. /ko-kon-à/ kokonà ‘to hit’
c. /ko-ín-à/ kwíínà ‘to dance’
d. /ko-ék-à/ kwééká ‘to do’
e. /ko-ëlekel-à/ kwëëélékelà ‘to face towards’
f. /ko-ák-à/ kwááká ‘to build’
g. /ko-ót-à/ kwóótâ ‘to warm self’

While it is clear that vowel coalescence has taken place, it is not obvious that the initial vowel of the verb stems in (3.27c-g) are underlyingly short. In fact, there is a rule of Initial shortening which shortens the long vowel in vowel-initial verb stems (see Chapter 4). Thus, vowel quality and length do not indicate whether these verb stems have an underlyingly short or long vowel.

However, tone and its interdependence with syllable structure can help determine vowel length in stems. If a verb has a H tone, the H surfaces on the first stem mora, as on the syllable *su* in *kosúkumâ* ‘to push.’ If that first stem mora is also in the penultimate syllable of the verb stem, the H surfaces as a SH tone due to the rule of [+extreme]-Spread 2, as evidenced in (3.28a) (see Chapter 5). Furthermore, the SH tone surfaces on the final syllable of the verb if both the penultimate and final syllables are short, as in (3.28b), due to [+upper]-Spread and [+extreme]-Spread 2 (see Chapter 5).

(3.28) a. /ko-míil-à/ komíilâ ‘to twist’
b. /ko-tál-à/ kotálâ ‘to count’

Thus, (3.28a) has a long vowel and (3.28b) has a short vowel in the verb stem. Since the verb stems in (3.27c-d,f-g) have the same tone pattern as those in (3.28b), these verbs have a short vowel underlyingly.

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For vowel-initial stems, there is only one verb which has a tonal pattern like the long-vowel stem komiḷa: the verb is kōokà ‘to come.’ Since the tone pattern on kōokà is the same pattern found on verbs with a long vowel in the stem, the logical conclusion is that this verb stem has a long vowel. In all other verbs which begin with an initial long vowel, the length of the initial vowel can be attributed to the compensatory lengthening effect of a moraic nasal. Unexpectedly, however, all examples with a moraic nasal surface with the same tone pattern seen in (3.28b). In other words, they have the same tone pattern as seen in verbs with an initial short vowel in the verb stem. This is due to a rule of Initial shortening which shortens an initial long vowel at the stem level (see Chapter 4 for details). If the verb stem in kōokà ‘to come’ has two initial moras like kōōmbà ‘to mold’ and other verbs with a moraic nasal, then kōokà should pattern with kōōmbà after Initial shortening takes place, but it does not. Thus, whether the verb stem underlying kōokà is ōok or ōk cannot be determined because a rule is still needed to shift the H tone to the prefix mora in order to get the correct tone pattern on kōokà. I have assumed throughout this work that the underlying form for kōokà is the long vowel stem -ōok, but there is no reason the assumption cannot be made that it has a short vowel instead: ōk.

The tone pattern on the last two moras of kōōmbà ‘to mold’ is the same as the tone pattern on kotālā ‘to count,’ which indicates that the verb stem ends up with a short vowel. Furthermore, the tone pattern on the first syllable of kōōmbà is also important. Since the tone on the first syllable is a level SH tone kō- and not a rising tone ko, this indicates that the prefix has syllabified with the initial vowel of the verb stem. Recall that the rule of Rising tone neutralization will only create a level tone within a syllable (see §5.2.2 for details).

The next set of examples shows the vowel e undergoing Glide formation in the class 4 and class 9 object prefix me when coalescing with a following vowel. The forms in (3.29a,b) motivate the basic form of the prefix preceding a consonant-initial verb stem.
(3.29) a. /ko-me-tál-à/  b. /ko-me-kon-à/  c. /ko-me-ómb-à/  d. /ko-me-okit-à/  e. /ko-me-óm-y-à/  
   kometálā  komekonā  komyōōmbā  komyookitā  komyōōmyā  ‘to count it’ (cl.4,9)  
   ‘to hit it’  ‘to mold it’  ‘to fight it’  ‘to dry them’

(3.30) provides examples of the class 7 object prefix ké preceding a vowel-initial verb root. (3.30a,b) show ké before a consonant-initial root to motivate the underlying form of the prefix. In (3.30c-g), vowel coalescence has taken place, as evidenced by compensatory lengthening of the second vowel, but the glide does not surface. This is due to the rule of Palatalization which causes ky to surface as ch (see §3.3.1). Since Palatalization crucially relies on input from Glide formation, Glide formation must be ordered before Palatalization.

   kokétálā  kokékonā  kocháákā  kochóótehyā  kochúúmethyā  kochóólekelā  kochóómyā  ‘to count him’ (cl.7)  
   ‘to hit him’  ‘to build it’  ‘to make him warm self’  ‘to cause him to come out’  ‘to face towards it’  ‘to dry it’

There has not yet been any data showing coalescence where the first vowel is i or u. There are several reasons why such data is limited. First consider prefixes. There are no prefixes that contain u. Thus u cannot coalesce with a following prefix or a stem-initial vowel. There are two prefixes with the vowel i. One is the negative prefix Ci, but this is restricted to occurring with consonant-initial verb stems, or before an empty C (see Chapter 2). There is also an object prefix Ci which can surface before other vowels, but this adds an additional complication because the empty C onset surfaces as s when this prefix coalesces with a following vowel; see Chapter 4 for discussion.

The other place where vowel coalescence is possible is between verb roots or suffixes and a following suffix or final vowel. In fact, there are no segments which could
be analyzed as a root-final or suffix-final vowel except the y and w that migrate to pre-final vowel position from certain verb roots, the passive and the causative. Since these segments always occur in pre-final vowel position, they always surface as glides. Thus, there is no direct evidence for claiming the passive, the causative, and other morpheme-final high vocoids are vowels and not glides in Kikamba.

Glide formation is a general vowel coalescence process and can be found not only in verb stems, but in noun stems and modifier stems as well. The examples in (3.31) show Glide formation with the initial vowel o and e in noun stems.

<table>
<thead>
<tr>
<th>(3.31)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /mo-aki/</td>
<td>mwaâkì</td>
<td>‘fire’ (cl.3)</td>
<td></td>
</tr>
<tr>
<td>b. /mo-âná/</td>
<td>mwâáná</td>
<td>‘vacancy, space’ (cl.3)</td>
<td></td>
</tr>
<tr>
<td>c. /mo-ató/</td>
<td>mwaató</td>
<td>‘beehive’ (cl.3)</td>
<td></td>
</tr>
<tr>
<td>d. /o-áthí/</td>
<td>waâthí</td>
<td>‘song’ (cl.11,14)</td>
<td></td>
</tr>
<tr>
<td>e. /o-áná/</td>
<td>waâná</td>
<td>‘childhood’ (cl.11,14)</td>
<td></td>
</tr>
<tr>
<td>f. /to-angà/</td>
<td>twaângà</td>
<td>‘cassava’ (cl.13)</td>
<td></td>
</tr>
<tr>
<td>g. /to-embú/</td>
<td>twembú</td>
<td>‘little chameleons’ (cl.13)</td>
<td></td>
</tr>
<tr>
<td>h. /me-aki/</td>
<td>myaâkì</td>
<td>‘fires’ (cl.4)</td>
<td></td>
</tr>
<tr>
<td>i. /me-âná/</td>
<td>myâáná</td>
<td>‘vacancy, space’ (cl.4)</td>
<td></td>
</tr>
<tr>
<td>j. /me-ató/</td>
<td>myaató</td>
<td>‘beehives’ (cl.4)</td>
<td></td>
</tr>
<tr>
<td>k. /me-uñè/</td>
<td>myuunè</td>
<td>‘shade’ (cl.4)</td>
<td></td>
</tr>
<tr>
<td>l. /e-angà/</td>
<td>yaângà</td>
<td>‘cassava’ (cl.5)</td>
<td></td>
</tr>
<tr>
<td>m. /ke-âCá/</td>
<td>chá.â</td>
<td>‘finger’ (cl.7)</td>
<td></td>
</tr>
<tr>
<td>n. /ke-ébá/</td>
<td>chéébá</td>
<td>‘sorrow’ (cl.7)</td>
<td></td>
</tr>
</tbody>
</table>

Glide formation is also seen in modifiers, when a prefix is added to a vowel-initial modifier. The examples in (3.32) are of noun-modifier pairs, where coalescence occurs between the prefix and the modifier stem.
<table>
<thead>
<tr>
<th>Adjectives:</th>
<th>Meanings</th>
<th>Clauses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /mo-áthē/</td>
<td>moti mwaáthē ‘evil seller’</td>
<td>(1)</td>
</tr>
<tr>
<td>b. /to-áthē/</td>
<td>tomoti twááthē ‘evil sellers’</td>
<td>(13)</td>
</tr>
<tr>
<td>c. /e-áthē/</td>
<td>eweeto yaáthē ‘evil wife’</td>
<td>(5)</td>
</tr>
<tr>
<td>d. /ke-áthē/</td>
<td>keng’éi chááthē ‘evil thief’</td>
<td>(7)</td>
</tr>
<tr>
<td>e. /ke-ômô/</td>
<td>keendo chōomô ‘dry thing’</td>
<td>(7)</td>
</tr>
<tr>
<td>f. /ke-ônzû/</td>
<td>keng’é.i chonzu ‘weak thief’</td>
<td>(7)</td>
</tr>
<tr>
<td>g. /ke-ânâké/</td>
<td>keng’é.i chánâké ‘handsome thief’</td>
<td>(7)</td>
</tr>
<tr>
<td>Deverbal adjectives:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. /mo-asé/</td>
<td>mo.o mwaasé ‘carved digging stick’</td>
<td>(3)</td>
</tr>
<tr>
<td>i. /mo-eché/</td>
<td>mo.o mweeché ‘thrown digging stick’</td>
<td>(3)</td>
</tr>
<tr>
<td>j. /me-asé/</td>
<td>me.o myaasé ‘carved digging sticks’</td>
<td>(3)</td>
</tr>
<tr>
<td>k. /me-úsósyé/</td>
<td>mekëbe myúsósyé ‘filled cans’</td>
<td>(4)</td>
</tr>
<tr>
<td>l. /me-ôbë/</td>
<td>mekùnzu myòbë ‘tied wires’</td>
<td>(4)</td>
</tr>
<tr>
<td>m. /me-ëNdé/</td>
<td>mekâëti myëndë ‘liked breads’</td>
<td>(4)</td>
</tr>
<tr>
<td>n. /e-ênz-ë/</td>
<td>eloondu yeénzë ‘shaved sheep’</td>
<td>(5)</td>
</tr>
<tr>
<td>Possessive modifiers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o. /o-akwâ/</td>
<td>moondo waakwâ ‘my person’</td>
<td></td>
</tr>
<tr>
<td>p. /o-akû/</td>
<td>moondo waakû ‘your-sg person’</td>
<td></td>
</tr>
<tr>
<td>q. /o-akë/</td>
<td>moondo waakë ‘his person’</td>
<td></td>
</tr>
<tr>
<td>r. /o-aCî tô/</td>
<td>moondo waîtô ‘our person’</td>
<td></td>
</tr>
<tr>
<td>s. /o-eCë nú/</td>
<td>moondo weënú ‘your-pl person’</td>
<td></td>
</tr>
<tr>
<td>t. /o-ôCô/</td>
<td>moondo wo.ô ‘their person’</td>
<td></td>
</tr>
<tr>
<td>u. /e-akwâ/</td>
<td>me.oonda yaakwâ ‘my gardens’</td>
<td></td>
</tr>
<tr>
<td>v. /e-aîtô/</td>
<td>me.oonda yaîtô ‘our gardens’</td>
<td></td>
</tr>
<tr>
<td>w. /ke-âkwa/</td>
<td>keendo chaakwa ‘my thing’</td>
<td></td>
</tr>
<tr>
<td>x. /ke-åkë/</td>
<td>keendo chaâké ‘his thing’</td>
<td></td>
</tr>
<tr>
<td>y. /ke-ê nú/</td>
<td>keendo chëënù ‘your-pl thing’</td>
<td></td>
</tr>
<tr>
<td>z. /ke-ôôCô/</td>
<td>keendo chôô ‘their thing’</td>
<td></td>
</tr>
<tr>
<td>Other modifiers and numbers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aa. /o-ebâ/</td>
<td>moondo weebâ ‘which person?’</td>
<td>(1)</td>
</tr>
<tr>
<td>bb. /to-ÎNgê/</td>
<td>tomotwî twîngê ‘many fruit pickers’</td>
<td>(13)</td>
</tr>
<tr>
<td>cc. /e-ebâ/</td>
<td>me.oonda yeebâ ‘which gardens?’</td>
<td>(4)</td>
</tr>
<tr>
<td>dd. /to-élë/</td>
<td>tololo twëélë ‘2 little legs’</td>
<td>(13)</td>
</tr>
</tbody>
</table>

Glide formation is formulated in Rule 3.7. following the feature organization found in Parkinson (1996). The important point is that Glide formation entails the delinking of a segment from its mora. The segment then becomes a glide, and the mora...
reassociates to the root node of the second vowel, yielding a compensatorily lengthened vowel.

Rule 3.7 Glide formation and compensatory lengthening

While Glide formation itself is a straightforward process, an additional layer of complication is added when the two vowels which come together are homorganic, non-low vowels. Specifically, the combinations uu, uo, oo, ou, ii, ie, ee, or ei have not yet been considered. Of these combinations, only ii, ie, ei, ee, ou, and oo are considered because uu and uo are not possible combinations of morphemes word-internally.

The combination ie is relatively straightforward because it results in the expected Glide formation and compensatory lengthening, as seen in the examples in (3.33). However, in all of these cases, the vowel i is preceded by an empty C. And just in case i coalesces with a following vowel, the empty C surfaces as s. See Chapter 4 for details.
(3.33) a. kosyèèmà  b. kosyoàkà  c. syá.i  d. syeèndô  e. syeèkô
   ‘to hunt’  ‘to return’  ‘(different types of) tea’  ‘things’  ‘cobra, spoon’

When the homorganic vowels ou, ei, and ii combine, a glide does not surface, as seen in (3.34).

(3.34) a. /ko-ké-ileel-à/ kokíileèlà  ‘to put on it’
   b. /ko-ûm-à/ kûûmâ  ‘to come out’
   c. /ko-Cí-ileel-à/ kosíleèlà  ‘to put on them’

A glide does not surface because a rule of Homorganic glide deletion deletes a glide before a homorganic, high vowel. This rule follows Glide formation. Thus, underlying ko-ké-ileel-à becomes intermediate kokyîileèlà, and finally surfaces as kokîileèlà. Homorganic glide deletion is formulated in Rule 3.8.

Rule 3.8  Homorganic glide deletion

\[
\begin{array}{c}
\sigma \\
  \mu \\
  \mu \\
  \text{root} \\
  \text{Cpl} \\
  \text{voc} \\
  \alpha Vpl
\end{array}
\]

\[
\begin{array}{c}
\sigma \\
  \mu \\
  \mu \\
  \text{root} \\
  \text{Cpl} \\
  \text{voc} \\
  \alpha Vpl \\
  \text{Height} \\
  \text{[closed]} \\
  \text{[closed]}
\end{array}
\]
In the absence of a glide, tone and vowel quality still indicate that vowel coalescence has taken place. In (3.34a,b), the prefix vowel from ké and ko is not present in surface kótleela and kúumá, respectively. Moreover, the underlyingly short vowel of the verb stem surfaces as long. In (3.34b), there is a long u and the o from the prefix deletes. In (3.34a), there is a long i and the e from the prefix deletes. This indicates that compensatory lengthening has taken place, and therefore, the vowels have coalesced. Thus, vowel quality and length indicate that coalescence takes place in (3.34). In addition, in (3.34b) kúumá, tone indicates vowel coalescence takes place. Since tautosyllabic rising tones are not permitted, the SH on the second half of the long vowel spreads leftward to create a level, SH syllable by Rising tone neutralization (§5.2.2).

Moreover, the presence of the s in (3.34c) indicates that vowel coalescence has taken place. In Chapter 4, I show that an empty C followed by a y is subject to a rule of [sy]-Spirantization whereby the empty C surfaces as s. Since the s in (3.34c) is underlyingly an empty C, there must be a stage at which there is a y present to trigger [sy]-Spirantization. Thus, [sy]-Spirantization must be ordered between Glide formation and Homorganic glide deletion. (See §4.2.2.1 for details.)

The identical, mid vowel sequences oo and ee also coalesce. When the two mid vowels are identical, they syllabify into a single syllable and undergo Glide formation, but the glide does not surface, as seen in (3.35), only the long vowel surfaces.

\[(3.35)\]
\[
a. /ko-óm-à/ \quad kóomá \quad 'to dry'
\]
\[
b. /ko-ké-ék-à/ \quad kokééká \quad 'to do/possess it'
\]

This is because, subsequent to Glide formation, the vowel sequences oo and ee are also subject to a rule of Glide deletion. In these examples, however, the second vowel is not high. What seems to be driving this glide deletion is that, even after Glide formation has taken place, the two vocoids have identical feature specifications. Thus, another rule of glide deletion is required to explain these facts. The rule will be called Homorganic, identical height glide deletion and is formulated as Rule 3.9.
Rule 3.9  Homorganic/Identical height glide deletion (IHGD)

This is interesting because after the vowel has become a glide, any information about the source of the glide, i.e. whether it comes from the mid vowel e or the high vowel i, is presumably lost. But this data shows that the y from e deletes (as in (3.35b) kokééká ‘to do’), but the y from i does not (as in (3.33a) kosyéemà ‘to hunt’). The only logical interpretation of this data is that the rule is sensitive to the source of the glide. Thus, the glide deletes in kokéékâ, where it is the same height as the mid vowel e. Such an analysis entails that, while there is only one y phonetically in Kikamba, for example, that segment could be represented underlyingly by different featural specifications. While such an analysis may be controversial, I see this as the most plausible way to handle the Kikamba facts.

In the absence of a surface glide, tonal evidence also indicates that the syllables coalesce. An apparent rising tone is an indication that two vowels are in separate syllables and have not coalesced. For example, one indication that the oo sequence in ko.ômâ ‘to bite’ are in separate syllables is the L-SH rising tone on the two vowels. Rising tone neutralization is not applicable because this rule only applies within a syllable. In contrast, a rising tone does not surface in (3.35a); a level SH tone surfaces. The point here
is that the SH tone spreads back to the first mora of the long vowel because of the prohibition against tautosyllabic rising tones. Spread of the SH leftward would not occur if the two o’s were in separate syllables, because the L-SH sequence would not violate the prohibition on tautosyllabic rising tones, as it does not in ko.ômà ‘to bite.’

(3.35b) is the same type of example. The H on the verb stem surfaces as SH because of the spread of [+extreme] and [+upper]. If the vowels of the prefix and stem do not syllabify together, then the surface form should be *kokéékâ, with a H-SH rising tone on the penultimate syllable. However, the penultimate syllable surfaces as SH-SH due to Rising tone neutralization, which applies to resolve tautosyllabic rising tones into level tones, thereby providing evidence that kéé is a single syllable.

Both L-SH and H-SH resolving into a SH-SH sequence is the result of a rule of Rising tone neutralization. Specifically, when two moras are in the same syllable, and the tonal node of the second mora is specified for the feature [+upper], this is a prohibited sequence, and the tone features associated with the second mora spread leftward via the tonal node, resulting in a syllable with a level tone. This rule is formalized in §5.2.2.

Examples of Glide formation and deletion with homorganic mid vowels can also be found in other word classes such as nouns, as seen in (3.36).

(3.36) a. /mo-ônò/ mōônō ‘salt (cl.3)’
    b. /ke-ekó/ keèkó ‘spoon; cobra (cl.7)’

At this point, it is important to mention rule ordering. Notice that if the two vowels are not homorganic or if the second vowel is lower than the first vowel, the k of the prefix ké palatalizes to ch. This is due to the palatalization rule mentioned in §3.3.1, which palatalizes velars to palatals before a y. When homorganic, non-low vowels coalesce, and the second vowel is of the same height or higher than the first, as in kokîîleelá and kokéékâ, there is no palatalization of the k. In kokîîleela, the glide deletes before Palatalization has a chance to occur. Since Glide formation necessarily occurs before the glide deletes and Palatalization needs to be ordered after the glide deletes, this
is evidence that Glide formation and Palatalization are separate processes. In *kokêékã*, the vowels have identical feature specifications, so after Glide formation occurs, the glide must delete by Rule 3.9. Deletion of the glide could be seen as some type of immediate repair strategy (Paradis 1988). Alternatively, the sequences *chi* and *che* never occur on the surface. Thus, ordering could be avoided by simply ruling out Palatalization after Glide formation on the grounds that an unacceptable surface sequence would be created in forms like * kokíileelà*.

Sample derivations in (3.37) show several examples of Glide formation. In addition, Palatalization applies in (3.37c), Homorganic/Identical height glide deletion applies in (3.37d), and Homorganic glide deletion applies in (3.37e). Tone rules are explained in detail in §5.2.1.

(3.37) Non-homorganic VC:  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Homorganic VC:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. GF only</td>
<td>b. GF only</td>
<td>c. PAL</td>
<td>d. IHGD</td>
</tr>
<tr>
<td></td>
<td>/ko-end-à/</td>
<td>/ko-me-óm-à/</td>
<td>/ko-ké-óm-à/</td>
<td>/ko-óm-à/</td>
</tr>
<tr>
<td>GF</td>
<td>kweéndà</td>
<td>komyóómà</td>
<td>kokyóómà</td>
<td>kwóómà</td>
</tr>
<tr>
<td>HGD</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>IHGD</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PAL</td>
<td>N/A</td>
<td>N/A</td>
<td>kochóómà</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Surface forms (after application of tone rules)  
[kweéndà]  [komyóómà]  [kochóómà]  [kóómà]  [kokííleelà]  

3.4.1.2 Mid vowel fusion and vowel coalescence with *a*

In Kikamba, the low vowel *a* can also coalesce with a following vowel. Just in case the first vowel is *a*, and the second vowel is non-high, the result is a long, low vowel, as summarized in Rule 3.10. This will be referred to as Mid vowel fusion.

14 The combination *a + a* always results in a long *aa* and can be handled by Mid vowel fusion.
Rule 3.10   Mid vowel fusion

\[
a + \varepsilon \rightarrow \varepsilon \varepsilon \\
a + \varepsilon \rightarrow \varepsilon \\
a + \varepsilon \rightarrow \varepsilon \\
a + \varepsilon \rightarrow \varepsilon \\
a + \varepsilon \rightarrow \varepsilon \\
\]

In (3.38c-f) are examples of this process, using the 3pOP má. (3.38a,b) demonstrate the form of the prefix with consonant-initial verb roots, in order to motivate the underlying form as má.

(3.38) a. kotálá
     ‘to count’ /ko-má-tál-à/   komátalá  ‘to count them’

b. kokonà
   ‘to hit’ /ko-má-kon-à/  komákona  ‘to hit them’

c. kwëndà
   ‘to like’ /ko-má-eNd-à/  komëndà  ‘to like them’

d. kwësà
   ‘to take’ /ko-má-s-eC-à/  komësê.à  ‘to take them’

e. kwënzà
   ‘to dig’ /ko-má-eNz-eC-à/  komëzenê.à  ‘to dig for them’

f. kookitá
   ‘to fight’ /ko-má-okit-à/  komôkità  ‘to fight them’

As expected, Mid vowel fusion can be found in other word classes as well, as seen in (3.39).

(3.39) a. /ma-endô/
     meëndô  ‘things’ (cl.6)

b. /ma-Cothyo/
   mo.othyo ~ ma.othyo ‘faces’ (cl.14)

c. /ma-owáú/
   moowá.ú  ‘illnesses’ (cl.14)

d. /ma-ökâ/
   mõökâ  ‘arms’ (cl.15)

e. /ka-eNbú/
   keembû  ‘chameleon’ (cl.12)

f. /ma-ëñú/
   matu mëñú  ‘your-pl clouds’ (cl.6)

g. /ma-ëbâ/
   ando mëbbâ  ‘which people’ (cl.2)

Assuming the Parkinson (1996) model of vowel height, Mid vowel fusion is represented as Rule 3.11.
Finally, another important point to bring up is the interaction between Mid vowel fusion and Vowel harmony. In Kikamba, low vowels derived from Mid vowel fusion do not trigger Vowel harmony, as seen in (3.38e): \textit{komeenze.à} ‘to dig for them.’ Harmonizing of \textit{e} and \textit{o} following an underlying \textit{e} or \textit{o} precedes vowel coalescence, which is why the applied surfaces as \textit{e} in (3.38d): \textit{konihose.à} ‘to take them.’ This fact makes Vowel harmony a useful diagnostic as to whether a surface \textit{e} or \textit{o} is derived or underlying. This ordering relationship is made explicit in the derivation in (3.40): Vowel harmony precedes Mid vowel fusion.

(3.40) 
\begin{align*}
\text{MVF} & \quad \text{komómb-eC-à/} & \text{VH} & \quad \text{N/A} \\
\text{VH} & \quad *\text{komómb-èC-à} & \text{MVF} & \quad \text{komómb-è} \text{à} \\
\end{align*}

Finally, both segmental and tonal evidence indicate that \textit{a} never coalesces with \textit{i} and \textit{u} at the word level. In the examples in (3.41), the vowel qualities remain distinct, one indication that vowel coalescence has not taken place. Compare (3.41a,c) with (3.41b,d) respectively, where the verb root does in fact coalesce with a prefix.
(3.41) a. /ko-má-ín-eC-à/ \[\text{komáíne.à} \] \[\text{‘to sing for them’}\]
b. /ko-mo-ín-eC-à/ \[\text{komwííne.à} \] \[\text{‘to sing for him’}\]
c. /ko-má-úmy-à/ \[\text{komáúmyå} \] \[\text{‘to take them out’}\]
d. /ko-ké-úmy-à/ \[\text{kochúúmyå} \] \[\text{‘to take him out’ (cl.7)}\]

Since segmental data does not indicate that coalescence has taken place in (3.41a,c), we look at tonal evidence to see if vowels have coalesced. Due to the repair strategy of Rising tone neutralization within a syllable, we would not expect to see a rising tone when two vowels have coalesced into a single syllable. For example, when the toneless infinitive prefix ko fuses with the H tone on the stem-initial vowel ó of the verb stem ókel ‘get up’, the entire first syllable surfaces as a level H: kôôkelà. But when má precedes the verb root úmy in (3.41c), a rising tone surfaces, an indication that the two vowels are in separate syllables. Thus, at the word level, there is evidence that ai and au do not coalesce.

Likewise, while rare because there are not many roots beginning with i and u, uncoalesced ai and au are found in nouns and other word classes as well, as seen in (3.42). When the prefix is not a, coalescence takes place. When the prefix is a, the vowels retain their original quality and Rising tone neutralization is not applicable. In addition, the plural form in (3.42b) indicates that ai does not coalesce because if it were a syllable, then the SL on the final vowel should spread leftward to the penultimate long syllable. Thus, this further supports the claim that coalescence between a and u,i is not applicable at the word level.

(3.42) Singular \[\begin{align*}
a. \text{íkå} \\
b. \text{mwi.i} \\
c. \text{ma.i.o ma.íngé} \\
d. \text{tomoondo twiíngé} \\
e. \text{me.oonda mííngé}
\end{align*}\]
Plural \[\begin{align*}
a. \text{ma.íkå} \\
b. \text{a.i.i} \\
c. \text{ma.i.o ma.íngé} \\
d. \text{tomoondo twiíngé} \\
e. \text{me.oonda mííngé}
\end{align*}\]

‘fireplace(s)’ (cl.5/6)
‘one(s) who keep(s)’ (cl.1/2)
‘many bananas’ (cl.6)
‘many people-dim’ (cl.13)
‘many gardens’ (cl.4)
3.4.2 Coalescence of multiple syllables

In §3.4.1, the vowel coalescence processes occur when two short vowels syllabify into the same syllable. However, syllabification and vowel coalescence are complicated by two factors: (1) one of the vowels which coalesces can be long, and (2) multiple short syllables may coalesce. What happens in these situations is discussed below.

3.4.2.1 Coalescence with a long vowel

When one of the vowels which coalesces is a long vowel, the resulting syllable is still a long vowel. This is because syllables are maximally bimoraic. Some examples are seen in (3.43). (3.43a,d,i) show that the prefixes kaa and naa surface with a long vowel preceding a consonant-intial verb stem. And when a long vowel precedes a short vowel, a long vowel still results.

(3.43) a. /to-kāa-tāl-a/ tokāatālā ‘we will count’
b. /to-kāa-āk-a/ tokāākā ‘we will build’
c. /to-kāa-ōb-a/ tokōōbā ‘we will tie’
d. /ntē-kaa-tāl-a/ ndēkaatālā ‘I will not count’
e. /ntē-kaa-ānaNg-a/ ndēkāañaangā ‘I will not build’
f. /ntē-kaa-alany-a/ ndēkaalanyā ‘I will not arrange’
g. /ntē-kaa-ōNb-a/ ndēkōōmbā ‘I will not mold’
h. /ntē-kaa-ētek-a/ ndēkēētekā ‘I will not answer’
i. /ne-ne-naa-tāl-iC-e/ nēnēnāatālilē ‘I counted’ (hest perf)
j. /ne-ne-naa-ōn-iC-e e-tu/ nēnēnōni.ētu ‘I saw a cloud’

The result of syllabification is seen in Rule 3.12. The long and short segment syllabify into a single syllable, resulting in an unacceptable, trimoraic sequence. One of the moras subsequently deletes, and the two segments coalesce; the relevant coalescence process is Mid vowel fusion.
Rule 3.12  Syllabification of a long vowel + a short vowel

Although they occur more rarely, a short and a long vowel may surface in adjacent positions and coalesce. The examples in (3.44) demonstrate what happens. Once again, a bimoraic long vowel surfaces. Examples in (3.44c,d) are particularly interesting because without an understanding of vowel coalescence and syllabification, there is no reason for the verb stem to completely disappear from the surface form.

(3.44) a. /ko-óok-à/  
    kōōkâ  ‘to come’

b. /ne-to-tál-eet-ɛ/  
   nētōtālēetê  ‘we have counted’ (hod stat)

c. /ne-to-Cē-eet-ɛ/  
   nētō.ēetê  ‘we have eaten’

d. /ne-ne-Cē-eet-ɛ/  
   nēnē.ēetê  ‘I have eaten’

And finally, when two long vowels come together, a bimoraic long vowel is still the result, as seen in (3.45b).

(3.45) a. /to-Ci-kaa-tál-ɛ/  
    toikaatālê  ‘lets not count’ (subjunc)

b. /to-Ci-kaa-óok-ɛ/  
    toikōókê  ‘lets not come’

Once again, only two moras are left since syllables are maximally bimoraic, and the segments coalesce, undergoing the relevant coalescence process for the segments involved. Thus, the coalescence of two segments always results in a single bimoraic syllable.
3.4.2.2 Coalescence of several short vowels

As seen above, when either two short vowels, or a long vowel and a short vowel coalesce, the result is the same. The surface form is always a bimoraic syllable. This data shows that syllabification of vowels into a single syllable results in coalescence. However, three consecutive vowels yields a different result, thereby showing that syllabification is a separate process from vowel coalescence. In the examples in (3.46a) and in (3.46c), two vowels coalesce, resulting in a long vowel. But if the verb stem is vowel-initial as in (3.46b,d-f), the context of three adjacent vowels is created.

(3.46) a. /ne-ne-a-tál-a/ nénàatalâ ‘I just counted’ (imm past)
b. /ne-ne-a-ák-a/ nénà.ákâ ‘I just built’
c. /ne-má-a-tál-iC-e/ némáatalîê ‘they counted’ (rem perf)
d. /ne-má-a-5b-iC-e/ némô.ôbî.ê ‘they tied’
e. /ne-má-a-ane-k-iC-e/ némá.anékî.ê ‘they hung up to dry’
f. /ne-má-a-é-t-iC-e/ némê.étî.ê ‘they called’

When three separate vowels coalesce, two surface syllables result, not one syllable. This is an indication that syllabification happens first, with the first two vowels in the sequence syllabifying together. For example, in Rule 3.13, three morphemes come together in the verb. When syllabification takes place in this form, only the first two of the three adjacent vowels may syllabify together. This is expected given the assumption that syllables are maximally bimoraic. After syllabification, the resulting form in Rule 3.13 is a long vowel followed by a short vowel. (I assume one of the root nodes for a deletes since they are identical.) Since a long vowel followed by an onsetless syllable is prohibited, Sequential shortening is applicable, and two adjacent, monomoraic syllables result. However, vowel coalescence is still applicable, because a + a are adjacent at the level of the root node and are thus, subject to Mid vowel fusion. The vowels may still coalesce, but will not syllabify into a single syllable, because syllabification only happens once, at the beginning of a level, which in this case would be the word level. To
summarize, a three-vowel sequence continues to coalesce to produce an acceptable segmental sequence, but only undergoes syllabification once, resulting in a two-syllable sequence.

Rule 3.13 Syllabification of several short vowels

\[ \text{némö.ábí.ë} \quad \text{‘they tied’} \]

The fact that syllabification can only happen once, and vowel coalescence continues to occur across syllable boundaries provides evidence that syllabification and vowel coalescence are separate processes.

3.4.3 Phrase-level vowel coalescence

Vowel coalescence also occurs at the phrase level. Empty Cs which block coalescence within the word (see Chapter 4) delete before the phrasal phonology, allowing all vowel\#vowel combinations to theoretically coalesce. At the phrasal level, while the empty C is not relevant, there are other factors which influence vowel coalescence, such as tone and the length of the vowels involved, which will be seen shortly.

The outcome of vowel coalescence in the simplest case of a final short vowel coalescing with an initial short vowel in the next word follows the basic pattern seen in the word-internal cases. In the absence of Glide formation and Mid vowel fusion, changes in vowel quality and tone indicate that vowels coalesce at the phrasal level. Table 3.6
summarizes the results of phrase-level vowel coalescence. These results are the same as word-internal vowel coalescence, with notable exceptions to be discussed.

Table 3.6: Phrase-level vowel coalescence

<table>
<thead>
<tr>
<th>1st V</th>
<th>i</th>
<th>e</th>
<th>a</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>ii</td>
<td>ie~yee</td>
<td>ia</td>
<td>yoo</td>
</tr>
<tr>
<td>e</td>
<td>ei</td>
<td>ee</td>
<td>ea</td>
<td>yoo~eo</td>
</tr>
<tr>
<td>a</td>
<td>ai</td>
<td>ee</td>
<td>aa</td>
<td>cc</td>
</tr>
<tr>
<td>e</td>
<td>ei</td>
<td>ee~(w)ee</td>
<td>ca</td>
<td>cc</td>
</tr>
<tr>
<td>o</td>
<td>oi</td>
<td>wee~oe</td>
<td>waa</td>
<td>oo</td>
</tr>
<tr>
<td>u</td>
<td>ui</td>
<td>wee</td>
<td>ua</td>
<td>uu</td>
</tr>
</tbody>
</table>

While theoretically more combinations of vowels are possible, some combinations are not attested. There are no cases of combinations with e or o as the second vowel because these vowels rarely occur in initial position in a morpheme. There are no combinations where u is the second vowel for the same reason: these vowels are not present or are rarer across morphemes.

For the patterns which we do find, I will provide examples to show that vowel coalescence at the phrase level mimics word-internal coalescence. The most salient difference is that the high and mid vowels sometimes glide and sometimes do not. This is partially correlated with the place of articulation of the consonant preceding the coalesced vowel sequence. The low vowel a combines with e, e, o, and o at the phrase level just as it does word-internally, which provides one of the strongest types of evidence for phrase-level coalescence. When e and o are the first in a pair of vowels at the phrase-level, glide formation is possible as an alternate pronunciation to simple diphthongization. Moreover, there are contexts where the e or o is completely lost before a mid vowel.
Tonal changes also strongly indicate that syllables fuse at the phrasal level. Since tautosyllabic rising tones are repaired by Rising tone neutralization, a rising tone which is resolved into a level H or SH tone at a syllable boundary indicates there is coalescence at the phrasal level.

We now consider some examples where Rising tone neutralization is possible. In (3.47a), the noun ends in a SL tone in isolation, which deletes when a complement follows the noun (see Chapter 5). Since the tone on the first vowel of the modifier is a SH tone, that means a surface rising tone should surface if the two vowels remain in separate syllables. However, the SH spreads leftward creating a level SH tone. In (3.47b), deletion of [+extreme] in the presence of a following modifier leaves the last vowel of ekúno toneless. The first vowel of the modifier has a H tone, and instead of a rising tone, the syllables coalesce resulting in a level H tone. This is an example where the syllable surfaces as a diphthong rather than a glide. Thus, tonal evidence argues for phrase-level coalescence. And in (3.47c), the H on the subject prefix of the verb spreads leftward to the last syllable of moema, resulting in a level H tone.

(3.47) a. andō /ando ânā/ andwâánâ ‘4 people’
b. ekúnô /ekúno ébálókéêë/ ekúnoébálókéêë ‘a fallen mushroom’
c. moema /...moema átale/ ne.endá moemáátale ‘I want moema to count’

The other indication that vowel coalescence has taken place is that Mid vowel fusion is applicable at the phrase level. In the examples in (3.48), a + o yields oo and a + e yields ee at the phrase level.

(3.48) a. /motábányâ obálókéêë/ motábányâobálókéêë ‘fallen preacher’
b. /moóndô óla otánéeskona/ moóndóólootánéeskona ‘man who didn’t hit’
c. /ebaatá enêné/ ebaatâenêné ‘a big duck’
d. /mbusvyâ ebálókéêë/ mbusvyêebálókéêë ‘fallen rhino’
e. /ma.imâ ekômi/ maimegkômi ‘10 holes’
This is further confirmed in examples where a H tone spreads leftward by Rising tone neutralization, as seen in (3.49).

(3.49) a. /ebula ébâlókéeté/  
    b. /té moéma ótálelé/  
    ebuléébâlókéeté  
    té moemóótálelé  
    ‘fallen blanket’  
    ‘its not Moema you-sg count’

Other vowel quality changes are seen when the first o f the two vowels is e or a. These facts are interesting because this is our first look at what happens when e or a is the first of the two vowels, since these vowels are never in a position to be the first of two vowels word-externally. The result is coalescence, but whether we have diphthongization or glide formation is a variation that may at least partially be correlated with the onset consonant. In addition the height features spread rightward just in case the second of the two vowels is a mid vowel e or o, as seen in (3.50).

(3.50) a. /me.oongo etató/  
    b. /me.oongo enà/  
    c. /ewsētò ela.ú/  
    d. /me.omà ebâlókéete/  
    e. /mekesbe ebâlókéete/  
    f. /mbo.5 ekōmí/  
    g. /male̱ñgê ekōmí/  
    me.ooongøetató  
    me.ooongenà  
    ewstelaelu  
    me.oomebâlókêete  
    mekebesebâlókêete  
    mbo.5ekomi  
    maleñgêekomi  
    ‘30’  
    ‘40’  
    ‘generous wife’  
    ‘fallen doors’  
    ‘fallen tins’  
    ‘10 buffalo’  
    ‘10 pumpkins’

In the examples in (3.51), a rising tone resolves into a level H tone, and the height features of the first vowel spread to the second, indicating that vowels coalesce at the phrase level.

(3.51) a. /mo.omà óbâlókéeté/  
    b. /mokebe óbâlókéeté/  
    mo.oomósbâlókéeté  
    mokebesebâlókéeté  
    ‘fallen door’  
    ‘fallen tin’

15 As I am unsure at this point of the accuracy of the correlations I have found between onset consonant and glide formation versus diphthongization, I omit the data in this thesis.
Finally, while $a + i.u$ does not show either segmental or tonal evidence of coalescence at the word level, phrasally there is reason to believe it does coalesce into a single syllable. Just in case $a$ is followed by a high toned $i$, the H spreads leftward by Rising tone neutralization, and the syllable surfaces with a level H tone, thus indicating that all syllables coalesce at the phrase level. Examples are seen in (3.52).

(3.52) mbusyà /mbusya ìbálókéété/ mbusyá ìbálókéété ‘fallen rhinos’

This data is particularly important because coalescence between $a + i$ and $a + u$ is different at the word and phrase level. There is always coalescence at the phrase level, whereas these combinations never coalesce word-internally.

One final tonal argument that vowels coalesce at the phrasal level comes from downstep. In the cases seen thusfar, a lexical SL tone on a noun deletes when the noun is followed by a complement. This is motivated by SL-Alignment (see Chapter 5), which states that a SL must occur at the right edge of X-Max. However, there are some modifiers that do not form a phrase with a preceding noun, and thus, the lexical SL is not required to delete since it is already at the right edge of X-Max. Just in case this happens, the SL triggers absolute downstep of the tone on the second syllable of the modifier, with the downstep indicated by a ‘!’ . This can only happen if the first syllable of the modifier is in the same syllable as the final vowel of the noun which bears the SL tone. In examples where the modifier begins with a real consonant, such as in (3.53a-d), there is no syllable fusion, and therefore no downstep. Thus, downstep argues for vowel coalescence at the phrasal level.
### 3.5 Conclusion

The phonological processes described in this chapter apply to all word classes, and are an integral part of Kikamba phonology. The data in this chapter show that vowel coalescence is an integral part of the repair strategy for onsetless syllables, and that Kikamba has a strong prohibition against onsetless syllables.
CHAPTER 4

THE EMPTY C

4.1 Introduction

As seen in Chapter 3, bisyllabic vowel sequences generally do not occur word-internally, unless they are the result of more than two vowels in a row. When two vowels come together through morpheme concatenation, they syllabify together and vowel coalescence takes place. However, a crucial part of Kikamba phonology is that sometimes these vowel sequences do not coalesce and hiatus is maintained between the two vowels. In other words, the adjacent vowels remain in separate syllables. Moreover, the distinction between vowel hiatus and vowels in the same syllable coalescing is contrastive: there are several near-minimal pairs among verb roots where the difference is whether coalescence has taken place or not and whether the vowels are in the same syllable or not. Compare the verbs in (4.1).

(4.1)  a. /ko-ɛNd-å/ kweɛndå 'to like'
b. /ko-CɛNd-å/ ko.ɛɛndå 'to go'\footnote{This empty root node will be represented underlyingly with a 'C' as in /ko-CɛNd-å/. Both identical and non-identical vowel sequences in separate syllables will be represented with a syllabification dot '.', i.e. [ko.ɔmå] and [ko.ùmå]. Note the '.' in (4.1a) [ko.ɛɛndå].}
This hiatus is correlated with the fact that Kikamba has lost many consonants historically, as discussed in Chapter 1. While Hinnebusch (1974) gives an interesting diachronic picture of how these facts in Kikamba have developed, it does not explain the synchronic fact that the environment for this vowel hiatus appears to be unpredictable. I demonstrate that vowel hiatus is not unpredictable. Vowel hiatus is maintained in very specific definable cases in Kikamba. The first case is when a long vowel is followed by a short vowel as a result of the coalescence of three vowels, as was explained in Chapter 3. The second case where vowel hiatus is maintained is when Sequential shortening leads to a bisyllabic short vowel sequence, as will be explained further in this chapter. And finally, vowel hiatus is maintained just in case an empty consonantal root node separates two vowels, which is the focus of this chapter. An empty consonantal root node is a non-moraic root node which is unspecified for features. This root node is non-moraic because it never syllabifies as a syllable nucleus, but only as an onset. The empty consonantal root node will henceforth be referred to as the empty C.

In this chapter, I discuss a large body of evidence supporting the existence of the empty C, and its subsequent phonological deletion. After examining this evidence, I show that there is similar evidence for such phenomena in a variety of other languages. I will then look at alternative accounts of the empty C data. Finally, I show that the empty C phenomenon in Kikamba is significant because it presents a challenge to current interpretations of underspecification.

4.2 The case for the empty C

There are many types of evidence for the empty C. The first is the apparently unpredictable maintenance of vowel hiatus when two vowels come together through morpheme concatenation. As seen in Chapter 3, adjacent vowels syllabify together and coalesce. However, in a subset of Kikamba lexical items, this fails to take place. The second type of evidence for the empty C is that under certain circumstances, the empty C
surfaces as a real consonant. Specifically, the empty C surfaces as an s whenever it is followed by a y, and as an l in certain verbal and nominal forms. Furthermore, the presence of the empty C in verb stems dictates which excrescent consonant surfaces with the IsOP N. Empty C-initial verbs surface with excrescent d and vowel-initial verbs surface with excrescent b. A third argument for the empty C is that it explains why a certain subset of verb stems take both the é and the éyé allomorphs of the reflexive prefix, whereas vowel-initial verbs take éyé and consonant-initial verbs take é. And finally, the empty C explains why vowel shortening is prevented in certain verb stems after the IsOP.

However, other data show that certain rules crucially apply only if the empty C is not present, providing evidence for the phonological deletion of the empty C. For example, the imperative provides evidence for a rule of vowel shortening that can only take place if the empty C is not present. Thus, the empty C must be deleted at the phrase level. Other data provide us with evidence both for the presence of the empty C, and its deletion. For example, a rule of Prefix k-deletion deletes k from the prefix ko if the following syllable has an onset. The k may not be deleted when ko precedes an empty C-initial verb, indicating that the C is not present as the onset of the initial syllable of the verb stem. In spite of this, vowel hiatus is maintained between ko and the initial vowel of the verb stem.

These facts indicate that there is a contrast between word-level and phrase-level syllabification. To determine the possible phonetic correlates of this analysis, vowel durations were measured both word-internally and at phrasal boundaries. Two vowels separated by an empty C word-internally have significantly longer duration than a long vowel, since the two vowels separated by an empty C represent two syllables. Furthermore, since the empty C deletes, two vowels which come together at the phrase level coalesce and resyllabify as single syllables, and have durations comparable to that of long vowels. Thus, these differences in duration support the phonetic reality of different syllabifications for vowel sequences at the word level versus phrase level. Since vowel duration facts correspond to whether an empty C is phonologically present or not,
the phonetic facts lend credibility to the empty C approach. Taken together, this constitutes strong evidence for the empty consonantal root node in Kikamba.

4.2.1 Maintenance of vowel hiatus over vowel coalescence

This section shows environments where syllabification and vowel coalescence processes would be expected to occur, but do not. By positing an empty C in the initial position of the verb stems discussed, the failure of syllabification and coalescence can be explained. I also show that the failure of vowels to syllabify together and coalesce is a widespread phenomenon that can also be found in nouns, adjectives, numerals, and demonstratives, and in all cases, is attributable to the presence of the empty C.

4.2.1.1 Glide formation and glide deletion

One result of vowel coalescence is Glide formation with compensatory lengthening. Examples are seen in (4.2).

(4.2) a. /ko-ín-à/ kwéína 'to dance'
b. /ko-ék-à/ kwééká 'to do'
c. /ko-ëlek-ël-à/ kwéëlekélà 'to face towards'
d. /ko-ák-à/ kwááká 'to build'
e. /ko-óšt-à/ kwóštá 'to warm self'

These roots contrast lexically with the roots in (4.3), whose initial vowel does not syllabify with a preceding vowel or participate in coalescence. Verb stems beginning with a variety of vowels demonstrate that maintenance of vowel hiatus is independent of vowel quality.
Rule 4.1 illustrates that vowels coalesce when they are adjacent at the level of the root node.

Rule 4.1 Vowel coalescence of root-adjacent vowels

\[
\begin{array}{c}
\sigma \\
/ \mu \\
/ \mu \\
/ \text{root} \\
/ \text{root} \\
/ \text{root} \\
\end{array}
\rightarrow
\begin{array}{c}
\sigma \\
/ \mu \\
/ \mu \\
/ \text{root} \\
/ \text{root} \\
/ \text{root} \\
\end{array}
\]

Since only root-adjacent vowels coalesce, the most straightforward way to block vowel coalescence is to assume that vowels are not underlyingly adjacent at the level of the root node. Vowels in un-coalesced vowel-vowel sequences are not adjacent because they are separated by an empty C. The contrast between an empty C-initial verb stem and a vowel-initial verb stem is illustrated in Rule 4.2 with the minimal pair from (4.1), with only relevant syllable structure indicated.

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2 Examples (4.2e) kwɔɔità, (4.3c) ko.alyoolà, and (4.3d) ko.ɔɔità show that a SL tone on a final mora spreads left to the penultimate mora in two cases: when the penultimate syllable has a H tone, or when it is long. Other tone rules result in a H tone surfacing as SH (see Chapter 5). Since the SL does not spread left in examples such as (4.3a) ko.ebà and (4.3b) ko.ekà, this is evidence that the bimoraic vowel sequence in such verb stems is also bisyllabic. Details are given in Chapter 5.
Rule 4.2 Syllable structure of adjacent vowel sequence versus the same sequence separated by an empty C

\[ \text{a. } [\text{ko} \cdot \text{æ} \cdot \text{endâ}] \]
\[ \text{b. } [\text{kwe} \cdot \text{endâ}] \]

In Rule 4.2a, vowel coalescence between \( o \) and \( e \) is blocked because the empty C present in the verb root /ko-CeNd-a/ functions as the onset of the initial syllable of the verb stem, and blocks coalescence. Notice that in Rule 4.2b, vowel coalescence takes place. Therefore, assuming the presence of the empty C correctly predicts that certain vowel sequences remain in separate syllables.

The examples in (4.4) are of the front, mid vowel \( e \) in the class 4,9 object prefix \( me \) in pre-verb stem position.

(4.4) a. /ko-me-\( \text{óm} \)-y-\( \text{à} \)/ komyôdomyâ ‘to dry them’ (cl.4)
    b. /ko-me-Côm-\( \text{á} \)/ kome.ômâ ‘to bite them’

(4.4a) is another example of Glide formation and compensatory lengthening. In (4.4b), on the other hand, the empty C blocks coalescence and the two vowels remain in separate syllables.

Examples in (4.5) demonstrate that Palatalization is also blocked by the presence of the empty C. This is an expected outcome, since Palatalization takes its input from Glide formation, and the glide necessary for Palatalization is not present. Notice that there is no Palatalization in the verbs posited to begin with an empty C, and vowel hiatus is maintained between the vowel \( e \) of the H-toned, class 7 object prefix \( kê \) and the initial vowel of the verb stem. Compare (4.5e) to (4.5f), a verb stem whose initial vowel always coalesces with a preceding vowel.

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Again, the maintenance of vowel hiatus can be attributed to the presence of the empty C in (4.5e) compared to (4.5f), as seen in Rule 4.3.

The examples in this section show a clear distinction between verb stems that cause the preceding vowel to become a glide and those that do not. This is exactly what positing the empty C predicts. Verb roots such as Cůt ‘dream’ in (4.5e) koké.štòtà have an initial vowel that does not fuse with a preceding vowel because the empty C blocks coalescence and syllabification with a preceding vowel. On the other hand, the verb root št ‘warm’ in (4.5f) kochoštetyà begins with an onsetless syllable that must fuse with a preceding vowel in order to obtain an onset. In this case, the result is Glide formation and compensatory lengthening.

Data repeated in (4.6) show that the glide from Glide formation deletes just in case it is followed by a homorganic high vowel. (See Chapter 3 for an explanation of the evidence that coalescence has taken place in these forms.)
In contrast to these examples, the initial vowel of verb stems in (4.7) do not syllabify with or coalesce with a preceding vowel.

(4.7)  
\[ \begin{align*} 
\text{a. /ko-ké-CiNd-à/} & \rightarrow \text{koké.iîndà} & \rightarrow \text{[kókí] 'to submerge it'} \\
\text{b. /ko-Cûm-à/} & \rightarrow \text{ko.ûmâ} & \rightarrow \text{[kûûmâ] 'to curse'} 
\end{align*} \]

There are three types of evidence which indicate that vowel coalescence does not take place in these forms: vowel quality, vowel length, and tone. First consider vowel quality and length. In (4.7a,b), the adjacent vowels retain the same quality on the surface as they do in the underlying representation. And in (4.7b), there is no evidence of compensatory lengthening of \( u \). In (4.7a), the initial vowel of the verb stem is long, since vowels are always long preceding nasal-consonant clusters, as explained in Chapter 3. In fact, the initial stem vowel surfaces as long in addition to the preceding prefix vowel. Since syllables in Kikamba are maximally bimoraic, as is generally assumed for languages, three adjacent surface moras cannot be in the same syllable, which provides another indication that coalescence and syllabification into a single syllable have not taken place.

Examples repeated in (4.8a,b) show coalescence between \( oo \) and \( ee \). Glide formation occurs and the glide is subsequently deleted by Homorganic/Identical height glide deletion (see Chapter 3).

(4.8)  
\[ \begin{align*} 
\text{a. /ko-ûm-à/} & \rightarrow \text{kwûûmâ} & \rightarrow \text{[kûûmâ] 'to come out'} \\
\text{b. /ko-ké-ék-à/} & \rightarrow \text{kokyéêkà} & \rightarrow \text{kokoêkà 'to do/possess it'} \\
\text{c. /ko-Côm-à/} & \rightarrow \text{ko.ômâ} & \rightarrow \text{kokoêkà 'to bite'} \\
\text{d. /ko-ké-Ceb-à/} & \rightarrow \text{kokoê.ebà} & \rightarrow \text{kokoê.ebà 'to pay it'} 
\end{align*} \]

\(^3\) This fact can be obscured by Initial shortening of the stem vowel in vowel-initial verbs. See §4.2.3.
In examples in (4.8c) and (4.8d), vowel length and tonal evidence show that coalescence does not take place, and that the vowels remain in separate syllables. In terms of tone, recall that there is a prohibition against tautosyllabic rising tones. Thus, if vowel coalescence were to take place in (4.8c), Rising tone neutralization would change the L-SH sequence to SH-SH, which does not happen.

In addition, SL on a word-final mora spreads leftward to the penultimate syllable if the penultimate syllable is long. And if the long penultimate syllable has a H tone, the syllable surfaces as SH, as exemplified by komīlā ‘to twist.’ But in (4.8d), the SL on the final does not spread to the penultimate syllable, and the H on the antepenultimate mora surfaces as H, not SH. Thus, the initial vowel of the verb stem and the preceding prefix vowel of (4.8d) remain in separate syllables and do not coalesce.

There is one more important piece of evidence indicating that coalescence does not take place across an empty C. Measurements of vowel duration indicate that there is a phonetic difference between identical vowels that coalesce, and those that do not, i.e., those separated by an empty C. This is illustrated in the examples in (4.9).

(4.9)  
(a) /kō-to-Cōm-ethy-ā/ [kotō.ómethyā] ‘to cause to bite us’
(b) /kō-tō-ōm-ethy-ā/^[4] [kotōómethyā] ‘to dry us’

Vowel sequences which do not coalesce, such as (4.9a), have longer duration than those that do coalesce, such as (4.9b). The average length of tokens such as (4.9a) is 232 ms., and that of (4.9b) is 127 ms.,^[5] indicating that examples such as (4.9a) are bisyllabic and examples such as (4.9b) are monosyllabic. Therefore, longer duration of underlying

^[4] Note that the causative morpheme [ethy] does not create a causative, because the base verb is intransitive. The causative suffix makes the verb transitive.

^[5] In order to test this, five tokens of each of these forms were elicited. There is phonetic evidence for the distinct syllabification of these two forms, which provides evidence for the otherwise abstract empty C. More extensive evidence for this claim is found in §4.2.6.
identical vowel sequences indicates that coalescence has not taken place in forms such as (4.8c) ko.ômâ and (4.8d) koko.ebà, and has taken place in forms such as (4.8a) kôômâ and (4.8b) kokêékâ.

4.2.1.2 Mid vowel fusion

Mid vowel fusion is the process by which a coalesces with a following non-high vowel to produce a long, low vowel. Examples from Chapter 3 are repeated in (4.10).

(4.10) a. /ko-má-eNd-à/ komêéndà ‘to like them’ a + e —> ee
    b. /ko-má-ós-eC-à/ komóóse.à ‘to take them’ a + o —> oo
    c. /ko-má-eNz-eC-à/ koméenze.à ‘to dig for them’ a + e —> ee
    d. /ko-má-ókit-à/ komóókità ‘to fight them’ a + o —> oo

In contrast to these examples, there is no Mid vowel fusion in the examples in (4.11). This can easily be explained if an empty C is posited in stem-initial position for these verbs.

(4.11) a. /ko-má-Ceb-à/ komá.ebà ‘to pay them’
    b. /ko-má-CeNd-eC-à/ komá.ééndé.à ‘to go on behalf of them’
    c. /ko-má-Cöot-eC-à/ komá.óoté.à ‘to dream for them’
    d. /ko-má-Cóm-à/ komá.ómá ‘to bite them’

The verb stems discussed in §4.2.1 all begin with phonetic vowels. Based on the behavior of adjacent vowels seen in Chapter 3, two vowels should always syllabify together and coalesce when they are adjacent. However, they do not. There is a clear distinction between verb stems which allow coalescence and those which do not. The verb stems which fail to undergo Mid vowel fusion are exactly the same verb stems which fail to undergo Glide formation and consequently, glide deletion or Palatalization. This behavior is predictable if it is represented at the underlying level with an empty C.
The empty C functions as the onset of the stem-initial syllable and alleviates any pressure to fuse the verb stem-initial syllable with the preceding syllable. The presence of this empty C blocks syllable fusion, since the onset principle is satisfied, and accurately predicts that it is exactly this set of verbs whose initial elements never undergo any of the vowel coalescence processes: Glide formation, Homorganic glide deletion, Homorganic/Identical height glide deletion, or Mid-vowel fusion.

4.2.1.3 Maintenance of vowel hiatus in other word classes

The maintence of vowel hiatus where vowel coalescence would otherwise be expected to occur can be seen in word classes other than verbs, and can be attributed to the fact that there are empty Cs in nouns, modifiers, and other word classes as well. This is expected if the empty C is one of the ‘segments’ in Kikamba: it should have a wider distribution than just the initial position of verb stems. All cases where vowel hiatus is maintained are attributable to the presence of the empty C. In the examples in (4.12), empty Cs are found in stem-final and stem-medial position in verbs.

(4.12) Stem-medial empty Cs
a. /ko-éCob-à/ kwé.obà ‘to become white’
b. /ko-koCom-à/ koko.omà ‘to growl’
c. /ko-tóCek-à/ kotó.ekà ‘to burst’

Stem-final empty Cs
d. /ko-thiC-à/ kothi.à ‘to grind’
e. /ko-noC-à/ kono.à ‘to sharpen’
f. /ko-sánoC-à/ kosáno.à ‘to comb’

(4.13) provides examples of noun stems which begin with an empty C. Thus, when the noun class prefix of the noun is added, hiatus is maintained between the vowel of the prefix and the noun. Notice that noun class prefixes 8 and 11 also begin with an empty C.
(4.13) a. /mo-Cem-ì/ mo.emì ‘farmer’ (cl.1)
b. /a-Cem-ì/ a.emì ‘farmers’ (cl.2)
c. /a-C5ot-ì/ a.otì ‘dreamers’ (cl.2)
d. /mo-Cómɔ/ mo.omɔ ‘door’ (cl.3)
e. /me-Cómɔ/ me.omɔ ‘doors’ (cl.4)
f. /e-CaNgĩ/ e.aangĩ ‘arrow’ (cl.5)
g. /ke-Cemà/ ke.emà ‘hill’ (cl.7)
i. /Ci-Cemà/ i.emà ‘hills’ (cl.8)
j. /Co-Cémè/ o.émè ‘tongue’ (cl.11)

In addition to stem-initial position, empty Cs also occur word-internally in many nouns, as seen in (4.14), including stem-medial, and stem-final position.

(4.14) a. /mo-CuC-ì/ mo.û.i ‘one who cooks’ (cl.1)
b. /a-CuC-ì/ a.û.i ‘ones who cook’ (cl.2)
c. /mo-eCi/ mwe.i ‘root’ (cl.3)
d. /me-eCi/ me.i ‘roots’ (cl.4)
e. /e-CiCo/ e.i.o ‘banana’ (cl.5)
f. /ma-CiCo/ ma.i.o ‘bananas’ (cl.6)
g. /ke-ng’essCi/ keng’eri ‘thief’ (cl.7)
h. /Ci-ng’essCi/ ing’eri ‘thieves’ (cl.8)
i. /N-saCe/ nza.é ‘zebra/zebras’ (cl.9/10)
j. /Co-CiCé/ o.i.é ‘plain’ (cl.11)
k. /0-leCu/ le.ú ‘food’ (cl.14)
l. /ma-leCu/ mle.ú ‘food’ (cl.6)
m. /0-kaCo/ ka.ó ‘war’ (cl.14)
n. /ma-kaCo/ maka.ó ‘wars’ (cl.6)
o. /ko-CoCö/ ko.o.ô ‘leg’ (cl.15)
p. /ma-CoCö/ ma.o.ô ‘legs’ (cl.6)

In addition to nouns, there are other modifiers that resist vowel coalescence, both with the agreement prefix, and word-internally. (4.15) provides examples of empty Cs in

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6 Evidence that this form has an underlying long stem vowel comes from the diminutive. When ‘thief’ is put into the diminutive, [lateral]-Harmony occurs and ‘little thief’ surfaces as kang’ëli. The hiatus in class 7/8 results in Sequential shortening, since a long vowel cannot be followed by another vowel. This is explained further in §4.2.5 on Sequential shortening.
adjectives, numbers, and demonstratives. This lack of coalescence is abundant throughout the grammar and can be explained by the presence of the empty C.

\[4.15\] Adjectives
a. /Caasá/ keng'êí ke.aasá 'tall thief' (cl.7)
b. /Cit5/ mwe.e mo.itô 'heavy body' (cl.3)
c. /kóCó/ moondo moko.ô 'old person' (cl.1)
d. /séCó/ ngîte nzê.ô 'good dog' (cl.9)
e. /nóCú/ keng'êí keno.u 'fat thief' (cl.7)
f. /moC5Nzo/ ando mo.ônzo '7 people' (cl.2)
g. /keCéNdá/ ando ke.endá '9 people' (cl.2)

Demonstratives
h. /mo-CoNda ó-Có/ mo.oondô 'this garden' (cl.3)
i. /ma-tu á-Cá/ matwâ.ô 'these clouds' (cl.6)
j. /ke-beti kó-Cé/ kebeti kó.é 'this wife' (cl.7)
k. /ka-ng’êCí ká-Cá/ kâng’êelî ká.â 'this little thief' (cl.12)
l. /ko-5ko kó-Có/ kówôkô kô.ô 'this arm' (cl.15)

4.2.2 The empty C surfaces as a real consonant

Surface alternations of vowel hiatus versus a surface consonant provide additional evidence for empty Cs. In §4.2.2.1, I demonstrate the contexts where empty C surfaces as s. In §4.2.2.2, I show cases where the empty C surfaces as l.

4.2.2.1 The empty C surfaces as s

Empty C surfaces as s preceding a y. I will refer to the process of empty C becoming s before y as [sy]-Spirantization. There are three contexts where the empty C precedes a y: the causative, the class 8,10 OP, and the class 8,10 noun class prefix.
The first context is empty C plus the causative suffix (see Chapter 2 for details on the causative). The causative is a derivational suffix added after the verb stem, and before the final vowel. Examples of the γ causative added to infinitives are seen in (4.16).

(4.16) a. /ko-tál-y-à/  kotályá  ‘to help count’
b. /ko-kon-y-à/  kokonyà  ‘to help hit’
c. /ko-bâlok-y-à/  kobálochà  ‘to cause to fall’

In all the examples in (4.16), a consonant precedes the causative morpheme γ. In contrast, the verb roots in (4.17) end in an empty C, and when the γ-causative is added, [sy]-Spirantization occurs and the empty C surfaces as s. Examples are shown in (4.17), along with non-causative infinitives. The non-causative forms show that vowel hiatus is maintained between the verb root and final vowel, thus demonstrating the presence of an empty C.

(4.17) a. kosâno.à  /ko-sânoC-y-à/  kosânosyà  ‘to help comb’
b. kotho.o.à  /ko-thoCoC-y-à/  kotho.osyà  ‘to help harvest’
c. kothi.à  /ko-thiC-y-à/  kothisyà  ‘to help grind’
d. komi.à  /ko-miC-y-à/  komisyà  ‘to help blow nose’
e. kokò.o.à  /ko-kòCàC-y-à/  kokòsìyà  ‘to help cough’

In addition to verb roots, certain suffixes also end in empty C. For example, the perfective is ìC, the applied is ìC, and the aspect suffix indicating an ongoing action in the past ‘used to,’ the habitual ‘always,’ and the future ‘have been doing X’ is aC. It is clear these suffixes end in empty C because they consistently resist coalescence with a following vowel. Examples of vowel hiatus with these suffixes is seen in (4.18).
(4.18) Perfective /iC/

a. /né-tô-a-kon-iC-é/
   nētwāakonī.ē  ‘we hit months ago’

b. /né-tô-né-a-kon-iC-e/
   nētonāakoni.ē  ‘we hit yesterday’

c. /né-tô-kon-iC-ē/
   nētōkonī.ē  ‘we hit this morning’

Applied /eC/

d. /ko-suung-eC-ā/
   kosuunge.ā  ‘to guard for’

e. /ko-tô-âmbat-eC-ā/
   kotwāâmbate.ā  ‘to climb for us’

f. /ko-ék-eC-ā/
   kwēēke.ā  ‘to do for’

g. /ko-thiC-eC-ā/
   kōthi.e.ā  ‘to grin for’

h. /ko-sānoC-eC-ā/
   kosāno.e.ā  ‘to comb for’

i. /ko-öt-eC-ā/
   kwōôte.ā  ‘to dream for’

j. /ko-Cōt-eC-ā/
   kō.soôte.ā  ‘to warm self for’

k. /ko-Cēk-eC-ā/
   ko.eke.ā  ‘to stop for’

l. /ko-tēm-eC-ā/
   kotēme.ā  ‘to chop for’

m. /ko-nōC-eC-ā/
   kōnc.ē.ā  ‘to sharpen for’

Ongoing action /aC/ 8

n. /né-tô-a-kon-âC-a/
   nētwāakonâ.â  ‘we used to hit’

o. /né-to-ko-kon-aC-a/
   nētō.okonā.â  ‘we have been hitting’

p. /né-tô-kon-aC-â/
   nētōkona.â  ‘we always hit’

Recall from Chapter 2 that regardless of the order of the derivational suffixes, a stem- or suffix-final glide migrates to pre-final vowel position. (4.19b,d) show examples of the phonological circumscription of a y surfacing next to the consonant n: ny. (4.19e-m) show y migrating to pre-final vowel position, a position which leaves y adjacent to a suffix-final empty C. An empty C followed by y is the context for [sy]-Spirantization and thus, the empty C surfaces as s.

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7 (4.18i-m) represent the vowel harmony variants of this suffix. e is realized as e when an e or ç precedes it in the verb stem. See Chapter 3 for a discussion of Vowel harmony.

8 Note that in (4.18n-p), the final vowel following the aC suffix is also a. Thus, it is not immediately obvious that vowel coalescence is blocked. However, recall from the discussion of Homorganic glide deletion that identical vowels separated by an empty C have significantly longer duration than a monosyllabic long vowel. Further data supporting this will be seen in §4.2.7.
Phonological circumscription of \( y \)

\begin{itemize}
  \item a. /ko-\textregistered\textethy-\textata/ kokë\textethy\textata \quad \text{‘to greet’}
  \item b. /ko-\textregistered\textethy-an-\textata/ kokë\textethy\textata\textata \quad \text{‘to greet e/o’}
  \item c. /kon-\textethy-\textata/ konethy\textata \quad \text{‘to cause to hit’}
  \item d. /kon-\textethy-an-\textata/ konethy\textata\textata \quad \text{‘to cause to hit e/o’}
\end{itemize}

Phonological circumscription of \( y \) resulting in \( /sy/-\text{Spirantization} \)

\begin{itemize}
  \item e. /ne-to-ne-a-t\textregistered\textethy-iC-e/ netonaatabisy\textata \quad \text{‘we told yesterday’}
  \item f. /né-né-né-a-\textregistered\textethy-iC-e/ nénénáakë\textethysy\textata \quad \text{‘I greeted’}
  \item g. /ne-to-ne-a-kon-\textethy-iC-e/ netonaakonethisy\textata \quad \text{‘we caused to hit’}
  \item h. /né-tó-né-a-ú\textregistered\textethy-iC-e.../ nétónaúso.isy\textata kekusy\textata \text{‘we filled a calabash’}
  \item i. /ko-t\textregistered\textethy-eC-\textata/ kotë\textethy\textata \quad \text{‘to tell for’}
  \item j. /ko-te\textethy-eC-\textata/ kotë\textethy\textata \quad \text{‘to help for’}
  \item k. /ko-suung\textethy-an-eC-\textata/ kosuungethanesya\textata \quad \text{‘to cause e/o to guard for e/o’}
  \item l. /ne-ta-asoby-aC-\textata/ ndasôbasya\textata \quad \text{‘I didn’t used to whittle’}
  \item m. /tô-Ci-t\textregistered\textethy-aC-\textata.../ tô.itéléthasy\textata \quad \text{‘we didn’t make s/o count’}
\end{itemize}

The second context where the empty \( C \) becomes \( s \) is in the class 8,10 OP \( Ci \). In (4.20), just in case the vowel of the class 8,10 OP coalesces with a following vowel, the \( i \) of \( Ci \) undergoes Glide formation and surfaces as \( y \). As a result, the empty \( C \) is adjacent to \( y \), and \([sy]-\text{Spirantization} \) is applicable, so \( Ci \) surfaces as \( sy \), as seen in (4.20).

\begin{itemize}
  \item a. /ko-Ci-\textregistered-o\textethy-\textata/ kosyôômy\textata \quad \text{‘to dry them’ (cl.8,10)}
  \item b. /ko-Ci-átoC-\textata/ kosyâ\textata.tọ.\textata \quad \text{‘to split them open’}
  \item c. /ko-Ci-ë\textethy-\textata/ kosyë\textethy\textata \quad \text{‘to dig them’}
  \item d. /ko-Ci-\textregistered-s-eC-\textata/ kosyôsë.\textata \quad \text{‘to take for them’}
\end{itemize}

Compare data in (4.20) to data in (4.21). (4.21a,b) are provided to motivate the form of the object prefix as \( Ci \) before a real consonant. In (4.21c-f) the prefix is underlyingly \( Ci \) because when an empty \( C \) follows the prefix, vowel coalescence is blocked, and the prefix surfaces as \( i \), not \( y \). And as a result, \([sy]-\text{Spirantization} \) is not applicable.

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Furthermore, after Glide formation, the glide deletes if followed by a homorganic high vowel, as in /ko-me-ileel-à/ → komyiileelà → [komiileelà] ‘put on them’ (cl.4). [sy]-Spirantization provides direct evidence for Homorganic glide deletion because the glide has to be present for the empty C to surface as s. If the glide is not present on the surface, then it must delete. This is illustrated in (4.22): the class 8,10 OP occurs before a verb stem beginning with i and the empty C surfaces as s, even though no glide is present. And data in (4.21) shows that the empty C does not surface as s before i, it is the presence of y that triggers empty C → s. Thus, vowels coalesce resulting in [sy]-Spirantization, but the y later deletes by a rule of Homorganic glide deletion, as in (4.22a). Compare to (4.22b) where coalescence is blocked by the empty C.

(4.21) a. /ko-Cí-tál-à/ ko.ítalá ‘to count it’ (cl.8,10)
b. /ko-Cí-kon-à/ ko.ikonà ‘to hit it’
c. /ko-Cí-Cúm-à/ ko.í.úmà ‘to bite them’
d. /ko-Cí-CateCeC-à/ ko.í.atce.à ‘to follow them’
e. /ko-Cí-Ceb-à/ ko.í.ebà ‘to pay them’
f. /ko-Cí-C5ot-eC-à/ ko.í.5ote.à ‘to dream for them’

Since the only difference between these forms is the s, the s provides evidence that syllable fusion takes place in verbs such as ‘put’ and not in verbs such as ‘submerge.’

In the causative, an empty C adjacent to y due to morpheme concatenation results in the empty C surfacing as s. In the class 8,10 OP Ci, empty C will always surface as s if i coalesces with a following vowel, since i becomes y due to Glide formation. In these two contexts, empty C surfaces as s in verbs. The third context for [sy]-Spirantization is found in nouns: the class 8 prefix for noun stems is Ci, which is the same as the class 8,10 OP (see Chapter 2 for details). (4.23) shows that if a noun stem begins with an empty C, coalescence with a prefix is blocked, and thus the empty C cannot surface as s.

(4.22) a. /ko-Cí-ileel-à/ kosíiileelà ‘to put on them’ (cl.8,10)
b. /ko-Cí-CiNd-à/ ko.í.i índà ‘to submerge them’

In the causative, an empty C adjacent to y due to morpheme concatenation results in the empty C surfacing as s. In the class 8,10 OP Ci, empty C will always surface as s if i coalesces with a following vowel, since i becomes y due to Glide formation. In these two contexts, empty C surfaces as s in verbs. The third context for [sy]-Spirantization is found in nouns: the class 8 prefix for noun stems is Ci, which is the same as the class 8,10 OP (see Chapter 2 for details). (4.23) shows that if a noun stem begins with an empty C, coalescence with a prefix is blocked, and thus the empty C cannot surface as s.

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(4.23) a. /Ci-CaCɔ/  i.a.ɔ  ‘bridges’ (cl.8)
b. /Ci-CeCɔ/  i.e.ɔ  ‘cries’
c. /Ci-Cemà/  i.emà  ‘hills’
d. /Ci-Cáatɔ/  i.aatɔ  ‘shoes’
e. /Ci-CuCumɔ/  i.u.umɔ  ‘roars’

But if a class 8 noun is vowel-initial, the noun stem will coalesce with the prefix Ci. In this case, Glide formation results and the empty C surfaces as s, as seen in (4.24).

(4.24) a. /Ci-eNbu/  syeembu  ‘chameleons’ (cl.8)
b. /Ci-ekɔ/  syeèkɔ  ‘spoon; cobra’
c. /Ci-eNdɔ/  syeèndɔ  ‘things’
d. /Ci-ûumwâ/  syuumwâ  ‘weeks’

d. 4.2.2.2 The empty C surfaces as l

In addition to s, the empty C also surfaces as l. There are two environments where empty C surfaces as l. The first environment where this occurs is in the perfective suffix iC and the applied suffix eC when a preceding verb root contains l, and the second environment is in the augmentative and diminutive noun classes.

In the examples in (4.25), vowel hiatus is maintained between the perfective suffix iC and the final vowel e, as expected when an empty C intervenes.

(4.25) a. /né-tó-ñub-iC-è/  nétôñubî.è  ‘we chose’ (hod perf)
b. /né-tó-ñub-an-iC-è/  nétôñubání.è  ‘we chose e/o’
c. /né-né-náa-ñub-iC-è/  nênêñáañubî.è  ‘I chose’ (hest perf)
d. /né-tó-náa-bik-iC-è/  nétôñáabiki.è  ‘we arrived’
e. /né-né-a-bik-iC-è/  nênáabikî.è  ‘I arrived’ (rem perf)
f. /né-tó-a-ñub-iC-è/  nétwáañubî.è  ‘we chose’

But just in case the verb root contains an l, (4.26) shows that the empty C surfaces as l.
This is also true of the applied suffix. In (4.27), the applied added to an infinitive results in vowel hiatus between the applied and the final vowel a.

The data in (4.28) also show examples of the applied suffix eC in infinitives, but in these examples, the verb root contains an l. And just in case the verb stem has an l, the empty C surfaces as l. Note that (4.28f) represents a vowel harmony variant of the applied suffix.

Such data provides evidence for a rule of [lateral]-Harmony. Just in case a verb stem contains an l, the [lateral] feature spreads rightward to the empty C, and the empty C surfaces as l. This is formulated as Rule 4.4.
Rule 4.4  [lateral]-Harmony

Since / is the only lateral in Kikamba, I assume the other features are underspecified and get filled in by default.

It is important to mention that the suffix aC behaves exceptionally with respect to [lateral]-Harmony. Whereas [lateral] spreads from a verb root containing / to a following empty C as in (4.26) and (4.28), [lateral] does not spread to the empty C in the suffix aC, and therefore, this suffix surfaces without an / when the verb root contains an /.

The presence of the empty C is still indicated by the longer duration of the bisyllabic sequence. Examples from the various tenses which take aC are seen in (4.29).

(4.29) a. /né-tó-tál-aC-á/  nétótála.â  ‘we always count’ (hab)
    b. /né-tó-bálok-aC-á/  nétóbáloka.â  ‘we always fall’
    c. /tó-Cí-tál-áC-á/  tóítálá.â  ‘we don’t always count’
    d. /tó-Cí-bálok-áC-á/  tóibálóká.â  ‘we don’t always fall’
    e. /né-to-ko-tál-aC-a/  néto.otálá.â  ‘we have been counting’ (prog)
    f. /né-to-ko-bálok-aC-a/  néto.obáloka.â  ‘we have been falling’
    g. /né-tó-a-túl-áC-á/  nétwáátálá.â  ‘we used to count’ (rem prog)
    h. /né-tó-a-bálok-áC-a/  nétwáábálóká.â  ‘we used to fall’
    i. /to-e-túl-áC-á.../  tweetálá.â ngókô  ‘we were counting chickens’ (prog)

The second context where empty C surfaces as / is in augmentative (class 5/6) and diminutive (class 12/13) nouns. These four classes are also the only four noun classes which are productively able to take nouns from any class and assign them to another noun class. Each of these noun classes is marked by a prefix and a floating [lateral] specification. When one of these four prefixes is added to a noun with an empty C, the [lateral] feature spreads to the empty C and the empty C surfaces as /, as seen in (4.30).
There is limited evidence for the floating [lateral] being able to spread to an empty C in a proper name put into the diminutive. As seen in (4.31), one example was acceptable and another was not. Based on such limited data, I make no claims about whether [lateral] may spread to an empty C in a proper name or not.

### Augmentatives-cl.5/6

<table>
<thead>
<tr>
<th>Class 5/6 Noun Stem</th>
<th>Augmentative Form</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ekûfô~makûfô</td>
<td>ekônîlô~makônîlô</td>
<td>big sack(s)</td>
</tr>
<tr>
<td>chàânö~syàânö</td>
<td>yàâlô~màâlô</td>
<td>big finger(s)</td>
</tr>
<tr>
<td>nza.ë<del>nomë</del>nëmë</td>
<td>esâlô~masàlô</td>
<td>big zebra(s)</td>
</tr>
<tr>
<td>o.émë~némë</td>
<td>e.olêmë~ma.olêmë</td>
<td>big tongue(s)</td>
</tr>
<tr>
<td>owàû<del>mòwàû</del>mòwàû</td>
<td>e.owàâlô</td>
<td>severe illness(es)</td>
</tr>
</tbody>
</table>

Interestingly, if a class 5/6 noun stem already contains an /, there is no augmentative form for that noun. Examples of class 5/6 nouns which already have /, and cannot be put into the augmentative are seen in (4.32).

### (4.32) Augmentatives-cl.5/6

<table>
<thead>
<tr>
<th>Class 5/6 Noun Stem</th>
<th>Augmentative Form</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ekûôlyô</td>
<td>*augmentative form</td>
<td>‘question’</td>
</tr>
<tr>
<td>elû.û~malû.û</td>
<td>*augmentative form</td>
<td>‘Irish potato’</td>
</tr>
<tr>
<td>elà.à~malà.à</td>
<td>*augmentative form</td>
<td>‘flower’</td>
</tr>
<tr>
<td>el55ndû~mal55ndû</td>
<td>*augmentative form</td>
<td>‘sheep’</td>
</tr>
</tbody>
</table>
There are two final points to bring up regarding [lateral]-Harmony. The first is whether [lateral]-Harmony is limited to the word, and the second is how does [lateral]-Harmony interact with the rule of Delateralization (see Chapter 3), which changes / to d. 

First consider whether [lateral]-Harmony may cross a word boundary and surface in a following modifier. The data gathered on this point is inconclusive: in (4.33a) [lateral] cannot spread, but in (4.33b-f), it can.

\[(4.33) \begin{align*}
a. \quad /Caasá/ & \quad \text{‘tall’} & \text{mamotábányá ma.aasá} & \quad \text{‘tall preachers-der’} \\
b. \quad /Cetú/ & \quad \text{‘heavy’} & \text{mamotábányá maletú} & \quad \text{‘heavy preachers’} \\
c. \quad /Cetú/ & \quad \text{‘heavy’} & \text{eletú} & \quad \text{‘heavy (referring to stone)’} \\
d. \quad /Citú/ & \quad \text{‘slow’} & \text{mamotábányá malitú} & \quad \text{‘slow preachers’} \\
e. \quad /Citó/ & \quad \text{‘pregnant’} & \text{mamotábányá malítò} & \quad \text{‘pregnant preachers’} \\
f. \quad /thwiiCi/ & \quad \text{‘rich’} & \text{emotábányé ethwii̩li} & \quad \text{‘rich preachers’}
\end{align*}\]

However, the empty C surfacing as / in (4.33b-e) may not be the result of [lateral] spreading from the preceding noun across a word boundary. Another interpretation of this data is that the agreement prefix added to an adjective modifying an augmentative noun also has a floating [lateral] specification. If so, an empty C in such an adjective should also surface as l. In example (4.33c), the word ‘heavy’ elicited in isolation in reference to ‘stone’ (cl.5) did in fact surface with l: eletú, indicating that the agreement prefix also bears the floating [lateral] feature.

Whether the floating [lateral] comes from the nominal prefix in the preceding noun, or the agreement prefix in the adjective itself, there is still the question of why there is no spreading to the empty C in (4.33a): ma.aasá. Interestingly, this is exactly the same environment where [lateral]-Harmony was prohibited in verb stems. Just in case the suffix is aC followed by the final vowel a, spreading to the empty C is prohibited. Perhaps the reason is that [lateral] is prohibited from spreading to an empty C if that empty C separates two low vowels: aCa. There is no obvious reason why [lateral] should be prohibited from spreading in only this environment. Another possible interpretation of the data is that the adjective stem -Caasá is a lexical exception to [lateral]-Harmony.
Moreover, while diminutive and augmentative agreement prefixes on adjectives bear a floating [lateral], agreement prefixes on other modifiers do not. For example, demonstratives do not allow / to surface in place of empty C, as seen in (4.34).

(4.34) tokókó tó.ó *...tóló ‘these small chickens’ (cl.13)

However, this data may indicate that [lateral]-Harmony is prohibited from spreading / to an empty C between identical vowels.

Other data indicate that [lateral]-Harmony within a modifier is optional.

(4.35) a. /laCu/ ‘generous’
    b. mamotábányá malalú ‘generous preachers-der’
    c. mamotábányá mala.ú ‘generous preachers’
    d. mamotábányá maséel5 malalú ‘good generous preachers’
    e. mamotábányá masé.5 mala.ú ‘good generous preachers’
    f. mamotábányá masé.5 malalú ‘good generous preachers’

In (4.35b,d), [lateral] spreads to the empty C in the modifier. However, the adjective -la.ú also begins with an /, so there is no way to tell whether the excrescent / is a result of the floating [lateral] or the [lateral] specification of the / in the adjective. However, we expect the presence of [lateral] in the adjective to block the association of the floating [lateral] to the empty C, indicating that the excrescent / surfaces as a result of spreading from the underlying / in the adjective itself, or is simply inserted in the empty C slot in this morphological context. Either way, (4.35c,e) show that the empty C surfacing as / in the root is optional: no / surfaces in the position of the empty C. Finally, (4.35f) shows that, whether the [lateral] specification spreads from the / in the adjective root, or whether / is inserted in the place of an empty C in the augmentative, it is clear that the [lateral] specification does not come from the augmentative prefix on the noun. Otherwise, there is no explanation for the floating [lateral] skipping one empty C to surface on an empty C later in the phrase. In conclusion, the evidence indicates that [lateral]-Harmony is a word-
level rule which does not apply at the phrase-level. In addition, data with lexical / indicate that what may be going on is that / is inserted in the morphological context of the augmentative and diminutive.

The second point is the interaction of [lateral]-Harmony with Delateralization, which could potentially bleed the contexts where [lateral]-Harmony could occur. Recall that Delateralization changes / → d after a nasal. If Delateralization precedes [lateral]-Harmony, then an empty C later in the word could not surface as /l. If [lateral]-Harmony precedes Delateralization, then a [lateral] specification in a verb root should spread to a following empty C before the /l loses its [lateral] specification. Consider the verb roots in (4.36), which all begin with /l.

(4.36) a. /ko-lêNñg-ã/  kolêngã  ‘to aim’
   b. /ko-liNd-ã/  koliNdã  ‘to cover’
   c. /ko-loNñg-ã/  kolołngã  ‘to straighten’

The context for Delateralization is following the 1sOP N (see §4.2.3 for details on the 1sOP). If we consider data with both the 1sOP and a following empty C, such as found in the applied suffix in (4.37), we can examine the interaction of these two rules.

(4.37) a. /ko-N-leNñg-eC-ã/  koondêngelã  ‘to aim at/for me’
    cl.15-1sOP-verb-app-FV
   b. /ko-N-loNñg-eC-ã/  koondoongelã  ‘to straighten for me’
   c. /ko-N-liNd-eC-ã/  koondiindelã  ‘to cover me a hole’
   d. Derivation of (4.37a)
      [lateral]-Harmony  koondêngelã  Delateralization  koondêngelã
      Delateralization  koondêngelã  [lateral]-Harmony  koondêngelã
      *koondêngelã

---

9 This data also has implications for Ganda Law. See §4.2.3.
Since the correct surface forms are those where the empty C surfaces as l, [lateral]-Harmony must precede Delateralization. This lends support to the conclusion that [lateral]-Harmony is not a phrase-level rule, because a phrase-level rule should not apply before the word-level rule concatenating the IsOP with the verb.

I conclude that [lateral]-Harmony is a word-level rule which precedes Delateralization, and there are cases where it does not apply. Some of these cases seem to be free variation, as within modifiers of augmentative nouns, and others are more systematic: the suffix $aC$ never allows [lateral] to spread to it. However, the critical point is that even in cases where the empty C does not surface as l, vowel hiatus is always maintained between the two vowels on either side of the empty C.

4.2.3 The Is OP and other moraic nasal morphemes

Moraic nasal morphemes provide support for the empty C in two ways. As mentioned in Chapter 3, a moraic nasal cannot occur as a syllable onset. If the initial syllable of a stem has no onset, then an excrescent consonant surfaces. Thus, the first way nasal morphemes support the empty C is that the presence of an empty C at the beginning of a stem dictates which excrescent consonant surfaces. I will show that the IsOP added to a verb stem beginning with an empty C induces the excrescent consonant $d$. I will also show that the agreement prefix added to adjectives following cl.8, 9, and 10 nouns also induces the excrescent consonant $d$ just in case the adjective stem begins with an empty C. Second, there is a rule which shortens an initial long vowel at the stem level, if the syllable is onsetless. Verb stems which begin with an empty C fail to undergo this rule, and surface with a long vowel when the IsOP is present.
4.2.3.1 The form of the IsOP

The IsOP is a moraic nasal unspecified for place of articulation, and is represented as $N$. When added to a consonant-initial root, $N$ assimilates the place of articulation of a following consonant, and its mora compensatorily lengthens the preceding vowel of the prefix $ko$, which surfaces as $koo$. Examples with all possible initial consonants except the nasals are seen in (4.38).

\[(4.38) \begin{align*}
\text{a.} & /ko-N-bálok-y-à/ \quad \text{koombálochà} \quad \text{‘to make me fall’} \\
\text{b.} & /ko-N-tal-à/ \quad \text{koondálà} \quad \text{‘to count me’} \\
\text{c.} & /ko-N-kon-à/ \quad \text{koongonà} \quad \text{‘to hit me’} \\
\text{d.} & /ko-N-thaáníok-ethy-à/ \quad \text{koonthaañokethyà} \quad \text{‘to cause me to jump’} \\
\text{e.} & /ko-N-súkum-à/ \quad \text{koonzúkumà} \quad \text{‘to push me’} \\
\text{f.} & /ko-N-lées-y-à/ \quad \text{koondéèsyà} \quad \text{‘to make me climb mountain’}
\end{align*}\]

The next set of data in (4.39) are verbs beginning with nasals. Just in case a verb stem begins with a nasal, the IsOP fuses with that nasal to create a geminate nasal onset. Since geminates are prohibited in Kikamba, the nasal desyllabifies, and the mora links to the preceding vowel, compensatorily lengthening it. This is similar to Kimatuumbi, where long syllabic nasals may shorten, inducing Nasal desyllabification of the short syllabic nasal, resulting in the compensatory lengthening of a preceding vowel (Odden 1996:137-138). Since the nasal onset does not surface as a geminate, the only indication that the IsOP is present is the long $o$ of the infinitive prefix $ko$.

\[\]

\[10 \text{ Actually, } ch \text{ is also a possible onset. But, recall that } k \text{ palatalizes to } ch \text{ only if followed by a glide. Therefore, in order for } ch \text{ to surface at the beginning of a verb stem, the verb stem must begin with } k \text{ followed by a high, front vowel which is followed by another vowel, thus inducing Glide formation. There is only one such example found to date in Kikamba: } /ko-ki-a/ \rightarrow [kochá] \text{ ‘to dawn,’ and it is impossible for this form to be preceded by a IsOP.}\]
If the verb stem begins with a vowel, the moraic nasal desyllabifies and its mora compensatorily lengthens the preceding prefix syllable. In addition to the nasal becoming part of the following onset, vowel-initial verbs require that the excrescent consonant $b$ is inserted in the onset, as seen in (4.40).

(4.40) a. /ko-N-áC-y-à/ koombásyá ‘to lose me’  
    b. /ko-N-ák-à/ koombákà ‘to strengthen me’  
    c. /ko-N-ák-eC-à/ koombáke.à ‘to build for me’  
    d. /ko-N-akany-eC-à/ koombakanesyà ‘to light for me’  
    e. /ko-N-aNbat-y-à/ koombambatyà ‘to cause me to go up’  
    f. /ko-N-aNbat-eC-à/ koombambate.à ‘to go up for me’  
    g. /ko-N-ánaNg-à/ koombánaàngà ‘to spoil me’  
    h. /ko-N-eCan-eC-à/ koombe.ane.à ‘to be enough for me’  
    i. /ko-N-ek-à/ koombekà ‘to possess me’  
    j. /ko-N-eNz-eC-à/ koombenze.à ‘to dig for me’  
    k. /ko-N-éNz-à/ koombsnzâ ‘to shave me’  
    l. /ko-N-Nd-à/ koombsndà ‘to like me’  
    m. /ko-N-ín-eC-à/ koombine.à ‘to sing for me’  
    n. /ko-N-ileel-à/ koombileèlà ‘to place something on me’  
    o. /ko-N-ólany-à/ koombólanyà ‘to confuse me’  
    p. /ko-N-okit-à/ koombokità ‘to fight me’  
    q. /ko-N-óNb-à/ koombómbà ‘to mold me’  
    r. /ko-N-óy-eC-à/ koombóye.à ‘to steal for me’  
    s. /ko-N-ðn-à/ koombónbà ‘to see me’  
    t. /ko-N-úmel-à/ koombúmelà ‘to appear to me’  
    u. /ko-N-éw-à/ koombéwâ ‘to hear me’
The IsOP lends support to the empty C analysis because the excrecent consonant which surfaces in empty C-initial stems is not b, but d, as seen in (4.41). While the majority of empty C-initial verb stems surface with d, notice that some forms take b and g: these are lexically-marked exceptions.

(4.41) Stems that take d

a. /ko-N-CaC-eC-à/  koonda.e.à  'to divide for me'
b. /ko-N-Ceb-à/  koondebà  'to pay me’
c. /ko-N-Cek-à/  koondekà  ‘to leave me’
d. /ko-N-Céet-eC-è/  koondeëte.è  ‘to bring for me’
e. /ko-N-CèC-à/  koonde.à  ‘to rear/raise me’
f. /ko-N-CeC-eC-à/  koonde.e.à  ‘to cry for me’
g. /ko-N-CiC-eC-à/  koondi.e.à  ‘to chase birds for me’
h. /ko-N-CiCit-à/  koondi.ita  ‘to treat me’
i. /ko-N-CoC-eC-à/  koondo.e.à  ‘to buy for me’
j. /ko-N-CoC-à/  koondo.à  ‘to bewitch me’
k. /ko-N-Côt-ethy-à/  koondôôtëthyà  ‘to cause me to dream’
l. /ko-N-CuC-eC-à/  koondu.e.à  ‘to bleed on me’
m. /ko-N-CûC-eC-à/  koondo.ù.e.à  ‘to cook for me’

Stems that take b

n. /ko-N-Colok-y-à/  koombolochà  ‘to cause me to fly’

Stems that take g

o. /ko-N-CateCeC-à/  koongate.e.à  ‘to follow me’
p. /ko-N-Cáth-à/  koongáthà  ‘to shoot me’
q. /ko-N-Cely-à/  koongęlyà  ‘to try on me’
r. /ko-N-Cely-eC-à/  koongęleyà  ‘to try on for me’
s. /ko-N-CalioI-à/  koongalyoolà  ‘to change me’
t. /ko-N-CalioI-eC-à/  koongalyoolélà  ‘to translate for me’

---

11 In the two grammars that exist to date on this language, there is either no attempt to define when one form or the other occurs, in terms of the two classes of verb roots that are clearly present in Kikamba, (see Farnsworth); or the attempt at the description fails to capture the correct generalization (see Whiteley and Muli).
Aside from the exceptions listed in (4.41), the same set of verbs which do not allow coalescence with a preceding vowel surface with $d$ in the IsOP. And, the same set of verbs which always coalesces with a preceding vowel surface with $b$ in the IsOP. This indicates that the choice of excrescent consonant is sensitive to the distinction between verbs beginning with an empty C and verbs beginning with vowels.

Related to the IsOP data is the application of Ganda law to IsOP forms in Kikamba. This rule is traditionally known as Ganda law, since it was first noticed in Luganda (Meinhof 1984:183-184). When two successive syllables have nasal + plosive onsets, the plosive from the first syllable is deleted. In Luganda, the resulting nasal retains its assimilated place of articulation, as seen in (4.42) (Meinhof 1984:183). This suggests that (nasal) place assimilation precedes the deletion of the plosive.

$$(4.42) \begin{align*}
    \text{a.} & /\text{ngenda}/ & [\text{ng'enda}] & \text{‘I go’} \\
    \text{b.} & /\text{a-mbanze}/ & [\text{a-manze}] & \text{‘he pressed me much (for payment)’}
\end{align*}$$

When Ganda law applies in Kikamba, the excrescent consonant deletes and the 1sOP surfaces as $n$, regardless if the verb stem begins with an empty C or a vowel. However, the conditioning environment for Ganda Law in the two verb stem types is different. (4.43) demonstrates that $d$ in empty C-initial verbs deletes when the following syllable has a nasal onset.
(4.43) a. /ko-N-CaNd-y-à/ koonàndyà ‘to cause me to rot’
b. /ko-N-CaNdek-eC-à/ koonaandeke.à ‘to write for me’
c. /ko-N-CeNd-eC-à/ koonëndë.à ‘to go for me’
d. /ko-N-CoNgamy-à/ koonoongamyà ‘to stop me’
e. /ko-N-CiNd-à/ kooniîndà ‘to submerge me’
f. /ko-N-CiNd-ethy-à/ kooniîndethyà ‘to cause me to submerge’
g. /ko-N-CiNd-oC-à/ kooniindo.à ‘to unsubmerge me’
h. /ko-N-CîNgæC-eC-à/ koonîngë.e.à ‘to take in cattle for me’
i. /ko-N-Cem-eC-à/ kooneme.à ‘to weed for me’
j. /ko-N-Cóm-à/ koonômà ‘to bite me’
k. /ko-N-Cûm-à/ koonûma ‘to curse me’
l. /ko-N-Cûm-à/ koonûma ‘to be difficult for me’
m. /ko-N-Cóm-a-Com-à/ koonóma.omà ‘to bite me repeatedly’
n. /ko-N-CuCum-eC-à/ koonuume.à ‘to make car noise for me’
o. /ko-N-CuCum-y-à/ koonu.umyà ‘to make me putter’

Data in (4.44) show that, while $b$ remains before most nasal onsets in a following syllable (4.44a-d), the $b$ deletes when the following syllable begins with $m$ (4.44e-g), which is a subset of the environments affected for empty C-initial verbs. Also notice that there are still some exceptions among the verbs whose syllables following the 1sOP are m-initial, and that for some verbs, both forms were elicited, as seen in (4.44h-i).  

12 It should be noted that at least once for all the verbs in (4.44), the informant gave a form with [mb] as possible, but she did not feel confident about this. This shows that the rule is quite restricted and not widely applicable to real vowel-initial verbs.
Finally, notice that whereas in Luganda, assimilation of the nasal to the place of articulation of the excrescent consonant precedes deletion of the plosive, in Kikamba place assimilation necessarily follows plosive deletion. Otherwise, there would be no explanation for why the nasal does not surface as *m after *b deletes in the vowel-initial verbs. The form for ‘to cause me to be dry’ in (4.44a) is *koomômyâ; in Kikamba, the nasal always surfaces as *n when the plosive deletes.

An alternative way to explain this data would be to simply block insertion of an excrescent consonant when the following syllable begins with a nasal. Specifically, insertion of excrescent *d would be blocked in empty C-initial verbs when the following syllable begins with a nasal, and insertion of excrescent *b would be blocked in vowel-initial verbs when the following syllable begins with an *m, a labial. That way, a consonant would not have to be inserted, just to be deleted later.

A look at the Proto-Bantu forms may give some insight as to why *b and *d are the excrescent consonants, but does not provide a complete answer. Data in (4.45) show Proto-Bantu forms corresponding to a set of empty C-initial verbs (Guthrie 1971). In (4.45a-c), the form of the prefix corresponds to the original consonant, suggesting the original consonant is still part of the morpheme.
(4.45) Proto-Bantu | Kikamba verb stem | 1sOP form
--- | --- | ---
a. *-buduk-* | ‘fly’ | koombolochà ‘to cause me to fly’
b. *-do6t- | ‘dream’ | koondóetethya ‘to make me dream’
c. *-gadud- | ‘change’ | koongalyoölà ‘to change me’
d. *-dúm- | ‘bite’ | koonómà ‘to bite me’
e. *-gend- | ‘go’ | koonénde.à ‘to go for me’
f. *-dác- | ‘shoot at’ | koongáthà ‘to shoot me’
g. *-gáb- | ‘divide’ | koonda.e.à ‘to divide for me’

However, in (4.45d) *koonómà* and (4.45e) *kooneende.à*, Ganda law deletes the excrescent consonant and *n* surfaces as the 1sOP. Although the environment for Ganda law is clear, (4.45d,e) show that the original, initial consonant is not synchronically relevant, since the source of the empty C is velar in (4.45e), but coronal in (4.45d). Moreover, (4.45f) *koongáthà / koombáthà* and (4.45g) *koonda.e.à* show that the consonant which surfaces in the 1sOP may not correspond at all to the Proto-Bantu form. Therefore, some shift in which consonant occurs with which verb stem has taken place in the synchronic grammar of Kikamba.

Knowing the original initial consonant for the vowel-initial verbs in (4.46) also does not predict that these verbs will surface with *b* when the 1sOP is added (Guthrie 1971).

---

13 The proto-form may also be *-guduk-*. However, it is clear that this verb is an empty C-initial verb stem which takes *mb* for the 1sOP.

14 My informant uses the first form, but has heard the second used.

15 This verb stem both begins and ends with an empty C.
(4.46) Proto-Bantu  Kikamba verb stem  IsOP form

a. *-bak- 'build' -âk- koombâke.à 'to build for me'
b. *-panik- 'hang up' -anek- koombaneke.à 'to hang up for me'
c. *-yo(n)t- 'warm' -5t- koomb6te.a 'to warm for me'
d. *-yend- 'like/love' -end- koombéendà 'to like me'
e. *-yum- 'dry' -om- koonomyâ 'to dry me'

In (4.46a) koombâke.à, b surfaces in a form with an original b. In (4.46b), b surfaces in a position where there was originally a [labial]. In (4.46c,d) b surfaces in forms posited to begin with a proto-y. And finally, Ganda law applies to vowel-initial roots in the environment of a following m-syllable onset, as seen in (4.46e), although this verb had a proto-y.

The picture that emerges is that, diachronically, there is only limited correspondence between the excrescent consonant and the original consonant. This partial predictability cannot explain the synchronic facts of Kikamba. The historical picture does not predict what the synchronic excrescent consonant will be. Even if there were some way of predicting which consonant would surface based on the proto-form, it would still be necessary to have a mechanism for inserting the correct consonant. In other words, it would still need to be specified for each verb. By positing the empty C as the initial segment of one class of phonetically vowel-initial verbs, the choice of excrescent consonant in IsOP forms and the variable environments for Ganda law can be explained, thereby making reference to an inconsistent diachronic explanation unnecessary.

Similar patterns are seen in adjective stems following class 8, 9, and 10 nouns. For these classes, the agreement prefix added to adjectives is a moraic nasal. If the adjective begins with a consonant, the nasal assimilates the place of articulation of the consonant, and the consonant assimilates the voicing of the nasal. Examples are repeated in (4.47).

16 This likely proto-form is a blend of Guthrie's suggested *-pakek- and *-manik (1971).
(4.47) a. /N-bané/  ng’ombe mbané  ‘branded cows’ (cl.10)
b. /N-tûûné/  ngûungà ndûûné  ‘red cave’ (cl.9)
c. /N-lâatyé/  ŋama ndâatyé  ‘fetched meat’ (cl.9)
d. /N-kôCô/  mbô.ô ngó.ô  ‘old buffalo’ (cl.9)
e. /N-séCô/  ngókô syâakwa nzé.ô  ‘my good chickens’ (cl.10)
f. /N-kité/  ñoombâ ngiité  ‘thatched house’ (cl.9)

Analogous to the IsOP, when an adjective begins with a vowel, the excrescent consonant \( b \) surfaces when a moraic nasal prefix is added, as in (4.48).

(4.48) a. /N-aCelú/  ngîte mbáélú  ‘suitable dog’ (cl.9)
b. /N-aCu/  nzó.u mbáú  ‘lost elephant’ (cl.9)
c. /N-âlúCé/  mbîso mbulú.ô  ‘stirred pot’ (cl.9)
d. /N-éNzé/  mbó.i mbénzé  ‘shaved goat’ (cl.9)
e. /N-ânê/  ŋamó mbâné  ‘seen animal’ (cl.9)
f. /N-âké/  ñoombá mbâké  ‘built house’ (cl.9)
g. /N-ûnê/  ngó mbûné  ‘collected firewood’ (cl.10)
h. /N-éCú/  syêndo mbé.ú  ‘ripe things’ (cl.8)
i. /N-áthé/  ing.é.i mbáthé  ‘evil thieves’ (cl.8)

But when the adjective stem begins with an empty \( C \), the excrescent consonant which surfaces is \( d \), as seen in (4.49). However, just as with IsOP forms, the empty \( C \) sometimes surfaces as \( g \).

(4.49) a. /N-CôCé/  ŋamó ndâ.ô  ‘bewitched animal’ (cl.9)
b. /N-CúCé/  mbôsso ndú.ô  ‘cooked beans’ (cl.10)
c. /N-CuCú/  ŋônî ndu.û  ‘gentle bird’ (cl.9)
d. /N-Cîtô/  ŋamó ndîtô  ‘heavy animal’ (cl.9)
e. /N-Câthé/  mbusya ngâthé  ‘shot rhino’ (cl.9)

Moreover, Ganda law applies to adjectives as well, with exactly the same environments as seen for verb stems. \( d \) deletes in empty \( C \)-initial adjective stems if the following onset is nasal. And \( b \) deletes in vowel-initial adjective stems just in case the following onset is labial. Examples are seen in (4.50).
Before moving on, I mention that data on whether or not Ganda law applies to l-initial stems is inconsistent. In §4.2.2.2, I showed that [lateral]-Harmony precedes Delateralization, which is why an empty C surfaces as l, even though the verb stem-initial l becomes d by Delateralization: ko-N-léNg-eC-a → koondéengelà ‘to aim at me.’ If Ganda law were applicable, the surface form would be *koonèsngelà. However, the d does not delete, suggesting that Ganda law precedes Delateralization. Data from (4.37) is repeated in (4.51), in order to compare an empty C-initial verb with excrescent d and a t-initial verb with an l-initial verb.

(4.51) 

<table>
<thead>
<tr>
<th></th>
<th>/ko-N-Cóm-a/</th>
<th>/ko-N-tóm-a/</th>
<th>/ko-N-léNg-eC-a/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>‘to bite me’</td>
<td>‘to send me’</td>
<td>‘to aim at/for me’</td>
</tr>
<tr>
<td>Excrecent C insertion</td>
<td>ko-N-dóm-a</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ganda law: d-deletion</td>
<td>ko-N-óm-a</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Voicing assimilation</td>
<td>N/A</td>
<td>ko-N-dóm-a</td>
<td>N/A</td>
</tr>
<tr>
<td>[lateral]-Harmony</td>
<td>N/A</td>
<td>N/A</td>
<td>ko-N-léeng-el-a</td>
</tr>
<tr>
<td>Delateralization</td>
<td>N/A</td>
<td>N/A</td>
<td>ko-N-déeng-el-a</td>
</tr>
</tbody>
</table>

[koonómá] [koondómá] [koondéengelà]¹⁷

However, other data collected indicates that Ganda law is applicable in some l-initial verb stems and in l-initial deverbal adjectives when preceded by the 1sOP. Examples in (4.52) show adjective stems which begin with l.

¹⁷ e → ē due to Vowel harmony, which is not mentioned here because it does not affect the current discussion. See Chapter 3 for details on Vowel harmony.
When these adjectives modify a class 8, 9, or 10 noun, the agreement prefix on the adjective is a moraic nasal. This environment induces Delateralization of \( l \), and we expect \( nd \) as the onset of the adjective. However, the data gathered show that the \( d \) resulting from Delateralization deletes by Ganda law, meaning Ganda law applies after Delateralization. This data is found in (4.53).

(4.53) a. syeek\( \omega \) nööngâlû ‘straight spoons’
  b. mbusya nööngâlû ‘straight knife handle’
  c. ndí.i niíngókû ‘unwound threads’
  d. ndáta nó mú ‘firmly-fixed stick’
  e. ithíma niíndékû ‘plugged up wells’
  f. ing'ë.i numyë ‘hard-hit thieves’

Still other data indicate that sometimes Ganda law applies and sometimes it does not. In the data in (4.54a), Ganda law does not apply, but in (4.54b,c), Ganda law does apply.

(4.54) a. némaándåambéléilyë¹⁸ ‘they ate noisily on me’
  b. némaání índélélé ‘they plugged up for me’
  c. némaáñööngilyë ‘they chased me off’

¹⁸ Notice that in (4.54a,b), there is an extra \( eC \) in the suffix. I am not sure why this should be the case, it is possible the meaning requires two applied suffixes. At any rate, this is the data as it was elicited, and I leave this as an unanswered question.
If in the same tense, Ganda law sometimes applies and sometimes does not, I conclude that Ganda law follows Delateralization, but it is an optional rule. Recall that some infinitives had alternations where Ganda law did or did not apply: see (4.44h) *koonûmyâ* or *koombûmyâ* ‘to get me out of a place.’

4.2.3.2 Vowel length after the IsOP

In addition to the excrescent *d* in the IsOP, vowel length in the verb stem after the IsOP supports the empty C analysis. The data in (4.55a-e) represent verb stems that begin with a vowel. In (4.55a), the tone pattern indicates that the stem vowel is long underlyingly.19 In (4.55b-e), the stem vowel is also long, but these long vowels are derived from an underlying moraic nasal losing its mora when it syllabifies with a following onset. In spite of the fact that these stem vowels are long, they all surface as short following the IsOP *mb*, as seen in the second column. This is due to a rule of stem-initial shortening of long vowels. Before any prefixes are added, a stem with an initial long vowel is subject to this rule. After this rule has a chance to apply, various prefixes may be added at the word level. Thus, the initial vowel in (4.55a-e) surfaces as short after the IsOP. The verb stems in (4.55f,g) begin with a real *b* in the onset and are provided to show that if a verb stem begins with a real consonant, shortening of the long vowel is not applicable because the long vowel is not in initial position in the verb stem.

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19 It is not possible to determine if the stem vowel in the verb *kôôkâ* is long or short underlyingly. Regardless of the length, a rule is needed to shift the H tone to the prefix mora in order to obtain the correct surface tone pattern. Thus, I assume it is long, but the assumption could also be made that it is short underlyingly (see §3.4.1.1 and further explanation below).
The rule explaining the shortening of long vowels in (4.55a-e) will be called Initial shortening: a stem-initial long vowel shortens at the stem level. In other words, Rule 4.5 shortens an initial onsetless syllable in a verb stem. The initial vowel of the verb stems in (4.55a-e) is onsetless at the stem level, before any prefixes are added.

Rule 4.5 Initial shortening (stem level)

Since later rules of vowel coalescence cause Initial shortening to be obscured, its effect can only be seen directly post-consonantal, i.e. after the IsOP.

On the other hand, verb stems which begin with empty C never allow Initial shortening to take place. (4.56) provides examples of these verbs. In (4.56a), the underlying long vowel surfaces as long and in (4.56b-d), the long vowel preceding the nasal consonant cluster also surfaces as long. Therefore, the empty C serves as a syllable onset and prevents Initial shortening.

(4.56) a. /ko-N-Cât-eC-à/ koondôte.à 'to dream for me'
    b. /ko-N-CaNdék-eC-à/ koonaandeke.à 'to write for me'
    c. /ko-N-CêNd-eC-à/ koongende.à 'to go for me'
    d. /ko-N-CoNgamy-à/ koonoongamyà 'to stop me'
Thus, the empty C is present at the stem level, when Initial shortening takes place. This is an important point because in the following section, there is evidence that the empty C deletes.

It is also important to point out the tone difference in infinitives between (4.55a) kóokà and other monosyllabic H-tone verb stems as exemplified in (4.55d,e) kwëenzá and kóombá. (4.55a) kóokà is the only example found of a vowel-initial, monosyllabic verb stem which has the same tone pattern as H-tone verbs with long vowels. The problem is that kóokà should have the same tone pattern as kwëenzá and kóombá because they are H-toned monosyllabic vowel-initial verbs. Even though the latter two forms have a moraic nasal, all such forms are subject to Initial shortening, and so should end up with a penultimate H-tone syllable. Then, when coalescence takes place with the infinitive prefix ko, and the tone rules of [+extreme]-Spread 1 and 2, and Rising tone neutralization apply, the result should be two SH syllables. However, kóokà ‘to come’ is the only example where the H tone shifts to the prefix mora, instead of remaining on the penultimate mora. This is illustrated in Rule 4.6.

Rule 4.6 Shift of H tone to prefix vowel in kóokà ‘to come’ after Nasal desyllabification and Initial shortening have taken place

\[ \begin{array}{c}
\text{H} \\
\mu \\
k\text{o} \\
\end{array} \quad \begin{array}{c}
\text{H} \\
\mu \\
k\text{o} \\
\end{array} \]

a. /ko-óok-à/ \rightarrow [kóokà]  
b. /ko-ëNzà/ \rightarrow [kwëenzá]

4.2.3.3 Vowel length in the imperative

While the empty C prevents initial vowel shortening at the stem level, it does not prevent shortening at the phrase level. Evidence from the imperative shows that, as
opposed to IsOP forms, all vowel-initial verbs shorten in the imperative form. The singular imperative is formed by taking the verb stem and adding the final vowel $a$, as seen in (4.57). The tone pattern will be discussed in Chapter 5.

(4.57)  
<table>
<thead>
<tr>
<th>Infinitive</th>
<th>Imperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-tâl - â/ kotâlâ</td>
<td>tâla</td>
</tr>
<tr>
<td>b. /ko-ng’olot-à/ kong’olotà</td>
<td>ng’olota</td>
</tr>
</tbody>
</table>

However, when a verb stem begins with a long vowel, the initial vowel shortens in the imperative. This indicates that Initial shortening is also applicable at the phrase level, as seen in Rule 4.7.

Rule 4.7  
Initial shortening (phrase level)

An example of this shortening is given in (4.58a-f). (4.58g) is provided to demonstrate that long vowels in real consonant-initial verbs do not shorten.

(4.58) a. /ko-ôok-à/ kôôkà  óka  ‘come!’
b. /ko-aNbat-à/ kwaambatà  ambàta  ‘go up!’
c. /ko-eNz-à/ kweènzà  ènza  ‘dig!’
d. /ko-éNz-à/ kwéénzà  énza  ‘shave!’
e. /ko-ôNb-à/ kôômbá  ómba  ‘mold!’
f. /ko-ôNgel-à/ kwôongelà  ôngélà  ‘increase!’
g. /ko-soNg-à/ kosôongà  sóônga  ‘dance!’

The long vowel of a verb stem is shortened only if the vowel is in initial position in the verb stem. This is because the initial syllables in these verb stems have no onset to
block Initial shortening. Therefore, verbs posited to begin with empty C should escape Initial shortening in the imperative: the empty C should block Initial shortening just as it does at the stem level. However, as seen in (4.59), the empty C is ignored and the initial long vowel shortens, demonstrating the empty Cs have been deleted at the phrase level.

(4.59)  
<table>
<thead>
<tr>
<th></th>
<th>ko-Cōot-à/</th>
<th>ko.ōota</th>
<th>ēta</th>
<th>‘dream!’</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>ko-Caasy-à/</td>
<td>ko.aasýā</td>
<td>asyā</td>
<td>‘pay dowry!’</td>
</tr>
<tr>
<td>b</td>
<td>ko-CaNdek-à/</td>
<td>ko.aandékā</td>
<td>andékā</td>
<td>‘write!’</td>
</tr>
<tr>
<td>c</td>
<td>ko-CfnD-à/</td>
<td>ko.csndá</td>
<td>énda</td>
<td>‘go!’</td>
</tr>
</tbody>
</table>

Thus, while our case for hiatus phenomena being the result of the empty C is a strong one, evidence suggests that at the phrase level the empty C deletes.

4.2.4 Distribution of morphemes

4.2.4.1 Prefixal né-reduction and related e-deletion

The empty C also patterns with a subset of real consonants in some contexts. The e of the 1sgSP né optionally deletes before obstruents and obligatorily deletes before vowels. The empty C verbs pattern to the exclusion of both vowel-initial verbs and a subset of the consonant-initial verbs. That is, there is a three way contrast among verb stems: vowel-initial verbs behave one way, a subset of the consonant-initial verbs behave another way, and the rest of the consonant-initial verbs and the empty C-initial verbs exhibit a third pattern. The examples used below are from the habitual present tense, a tense where the SP occurs directly in front of the verb stem.

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20 See Odden 1996 for a similar rule in Kimatuumbi which reduces ne as a morphological rule. An alternative account of this data would be one in which the proposed morphemes have an empty vowel, and e becomes the default vowel which is filled in pre-sonorant consonant, and pre-empty C position.
The data in (4.60) provide examples of vowel-initial verbs. When the IsSP né is added to vowel-initial verbs, the é deletes due to né-reduction and the mora remains to compensatorily lengthen the stem vowel. The form in (4.60b) with the 2pSP mó is provided to demonstrate that with other subject prefixes, vowel coalescence occurs, resulting in Glide formation and compensatory lengthening.21

(4.60) a. /né-né-ák-aC-á/ nénááka.á ‘I usually build’
b. /né-mó-ák-aC-á/ némwááka.á ‘you-pl usually build’
c. /né-né-eNd-aC-á/ nénéénda.á ‘I usually like’
d. /né-né-eky-aC-á/ neneecha.á ‘I usually throw’
e. /né-né-in-aC-á/ nenina.á ‘I usually sing’
f. /né-né-ób-aC-á/ nenooba.á ‘I usually tie’
g. /né-né-okel-aC-á/ nenookela.á ‘I usually get up’
h. /né-né-umaal-aC-á/ nenuumaala.á ‘I usually exit (go out)’

The examples in (4.61) show obstruent-initial verb stems preceded by the IsSP né. For these verbs, né-reduction is optional. There are two possible pronunciations: one with the IsSP surfacing as né, and one with only n. Whereas the mora remains to lengthen the stem vowel in the data in (4.60), there is not an adjacent vowel which lengthens in the data in (4.61). In this case, the mora reassociates to the n, creating a moraic nasal. Since a moraic nasal cannot stand before a consonant, it loses its mora to the preceding vowel, and then resyllabifies as the onset of the first syllable of the verb stem, as seen in (4.61). This behavior is analogous to the behavior of the IsOP in §4.2.3.

(4.61) Surface form with IsSP Surface form after e-deletion
a. /né-né-tál-aC-á/ nénétála.á néëndála.á ‘I usually count’
b. /né-né-kit-aC-á/ nénékita.á néëngita.á ‘I usually thatch’
c. /né-né-suNg-aC-á/ nénésuunga.á néënzunga.á ‘I always guard’
d. /né-né-thím-aC-á/ nénéthíma.á néënthíma.á ‘I usually measure’

21 See Chapter 2 for more examples of coalescence between subject prefixes and verb stems.
Data in (4.62) of the habitual tense show that the rule is not applicable if the verb stem begins with a sonorant.

(4.62) a. /né-né-lées-aC-á/ nénéléesa.â *nééndéesa.â ‘I climb mountains’
b. /né-né-máNth-aC-á/ nénémáantha.â *néémáantha.â ‘I always search’
c. /né-né-ñub-aC-á/ nénéñuba.â *nééñuba.â ‘I always choose’
d. /né-né-noC-aC-á/ nénéno.a.â *nééna.a.â ‘I always sharpen’
e. /né-né-ng’ot-aC-á/ nénéng’otata.â *nééng’otata.â ‘I always snore’
f. /né-né-wáC-aC-a/ nénéwá.a.â *néénwá.a.â ‘I am usually ill’

Data in (4.63) show that nê-reduction is also not applicable if the verb stem begins with an empty C. However, vowel hiatus is maintained between the e and the vowel of the verb stem, providing evidence that the empty C is present. Thus, the empty C-initial verb stems pattern with the sonorants in not allowing nê-reduction.

(4.63) a. /né-né-CaNdek-aC-á/ néné.aandeka.â *néénâandeka.â ‘I usually write’
b. /né-né-Cóot-aC-á/ néné.óota.â *néénóota.â ‘I usually dream’
c. /né-né-CéNd-aC-á/ néné.eénda.â *néénéénda.â ‘I usually go’

While this rule is a morphological rule in Kimatuumbi (Odden 1996), it seems to be a phonological rule in Kikamba. The context for deletion of e is following a coronal and preceding a vowel. There are several prefixes which begin with a coronal: the verb-focus prefix nê, the negative marker te, and the negative 1sSP nde.

When the verb focus prefix nê precedes the 2sSP and 3sSP o, the e deletes. Examples are found in (4.64a,b). When the negative marker te occurs before a vowel-initial verb stem, the e also obligatorily deletes, as seen in (4.64c). The negative subject

22 If there were no empty consonantal root nodes in these forms, we would expect the e to delete with compensatory lengthening, as seen in (4.60) with [nénââku.â] ‘I usually build’ and [nénéénda.â] ‘I usually like.’
prefix *nde* also undergoes *e*-deletion when preceding a vowel-initial verb stem, as seen in (4.64d).

(4.64)  
| a. /né-ó-tál-iC-e/  | nóótálilê          | 'you-sg counted’ (hod perf) |
| b. /né-o-tál-iC-e/  | nóótálilê          | 'he counted’ (hod perf)    |
| c. /to-te-ák-eet-e/ | totákéetê          | 'we hadn’t built’ (hod stat) |
| d. /nde-ún-eet-e/  | ndûûnéetê          | 'I didn’t fetch’ (hod stat) |

What all these examples have in common is that the consonant preceding *e* is a coronal. The rule of *e*-deletion is formulated as Rule 4.8.

Rule 4.8  *e*-deletion

4.2.4.2 The Reflexive prefix

The reflexive morpheme is a prefix which occurs in the same position as other object prefixes do. The reflexive supports the empty C analysis because there are three patterns, based on whether the verb stem begins with a vowel, a consonant, or an empty C. There are two allomorphs of the reflexive. The allomorph *é* occurs with consonant-initial verbs. The allomorph *éyé* occurs with vowel-initial verbs. And both alternates are
possible with empty C-initial verbs. The verb stems which begin with empty C motivate
the underlying forms of the reflexive prefix, and can be seen in (4.65).

(4.65) a. /ko-é-yé-Caliol-à/
    kwééyé.alyoòlà  ‘to change self’
b. /ko-é-yé-Cûm-à/
    kwééyé.úmá  ‘to curse self’
c. /ko-é- Caliol-à/
    kwé.alyoòlà  ‘to change self’
d. /ko-é-Cûm-à/
    kwé.úmá  ‘to curse self’

There are two important things to note here. The first is that there is no coalescence
between the reflexive prefix and the initial vowel of the verb stem. This is expected since
vowels separated by an empty C do not coalesce. Second, there is coalescence between
the reflexive prefix and the preceding vowel o of the infinitive prefix ko, since there is
nothing to block syllable fusion. But in (4.65c,d), the coalesced syllable kwee surfaces as
kwe, i.e., with a short vowel. This is due to a rule of Sequential shortening, seen in §4.2.5.

Consonant-initial stems are seen in (4.66) and the only pronunciation for the
reflexive with these verb stems is é.

(4.66) a. /ko-é-tál-à/
    kwéétálà  ‘to count self’
b. /ko-é-kon-à/
    kwéékonà  ‘to hit self’
c. /ko-é-buly-à/
    kwéébulyà  ‘to grab self’
d. /ko-é-lÉNg-à/
    kwéélÉcngà  ‘to aim at self’
e. /ko-é-maneCy-à/
    kwéémanesyà  ‘to teach self’
f. /ko-é-ñub-à/
    kwééñubà  ‘to choose self’

The vowel-initial verbs display a third pattern with respect to the reflexive prefix.
For these verbs, as seen in (4.67), éyé is the only allomorph possible. There is Glide
formation and compensatory lengthening between the final é of the reflexive and the
initial vowel of the verb stem, resulting in intermediate forms with a geminate y onset.
The second y deletes by the rule of Onset glide fusion, seen in Chapter 3, §3.3.4.2. A
sample derivation is seen in (4.67c).
Neither IsSP data nor reflexive data refute the empty C analysis. Positing an empty C results in a three-way contrast among verb stems. Empty C-initial verb stems are like vowel-initial verb stems in beginning phonetically with a vowel. They are also like consonant-initial verbs in having an onset that prevents coalescence with a preceding vowel. A three-way contrast in the representation of verb stems predicts a three-way contrast in behavior with respect to phonological rules. Evidence from é-deletion and the behavior of the reflexive morpheme demonstrates just that.

4.2.4.3 Prefix k-deletion

The rule of prefix k-deletion provides evidence for the empty C analysis as well. Recall that imperative data from §4.2.3 demonstrates that the empty C is not present at the phrase level, since shortening of an initial long vowel affects all phonetically vowel-initial verbs. Data in this section demonstrate that the empty C is present when word-level syllabification takes place, but deletes later in the word level, blocking the Prefix k-deletion rule from applying to verb stems which began with an empty C. Furthermore, this data confirms that the empty C deletes within the word level.

There are two prefixes in which k deletes: the 2sOP ko and the infinitive prefix ko. In vowel-initial verbs, as seen in (4.68), the k does not delete. However, these forms motivate ko as the underlying form of the prefix and demonstrate the well-documented phenomenon of vowel coalescence. In the following examples, the vowel of ko coalesces with the initial vowel of the verb stem.
(4.68) a. /ko-ko-ák-à/ kokwaâkâ ‘to build you-sg’
b. /ko-ko-ôn-à/ kokwooonâ ‘to see you-sg’
c. /tô-kâa-ko-ëNz-a/ tókâakweeënâ ‘we will shave you-sg’
d. /nâ-ô-mä-ko-ëNz-e/ nóomâkweeëné ‘they may shave you-sg’

Data in (4.69) provide examples of Prefix k-deletion in consonant-initial verbs.

An initial formulation of the rule would be: delete k in the 2sOP prefix ko just in case the following syllable begins with a consonant.

(4.69) a. /ko-ko-tâl-à/ ko.tâlâ ‘to count you-sg’
b. /ko-ko-bâlok-y-à/ ko.bâlochâ ‘to make you-sg fall’
c. /tô-kâa-ko-tâl-a/ tókâ.otâlâ23 ‘we will count you-sg’
d. /na-o-mâ-ko-tâl-e/ nóomâ.otâlé ‘they may count you-sg’

Although the k deletes, notice that vowel hiatus is crucially maintained between o and the preceding vowel, since syllabification at this level has already taken place. Syllabification occurs only once within a given level, and will not take place again within that level, even if other constraints, i.e., against adjacent vowels in hiatus, are violated.

In the data seen in §4.2.1, §4.2.2, and §4.2.3, the empty C behaves like a real consonant. It blocks vowel coalescence and it surfaces as a real consonant when certain features spread to it. Thus, we expect Prefix k-deletion to apply to empty C-initial verbs. However, empty C-initial verbs unexpectedly pattern with the vowel-initial verbs. In other words, Prefix k-deletion does not apply to empty C-initial verbs, as seen in (4.70).

(4.70) a. /ko-ko-CalioI-à/ koko.alioolâ ‘to change you-sg’
b. /ko-ko-Coöt-eC-à/ koko.ôote.à ‘to dream for you-sg’
c. /ko-ko-CoNgam-y-à/ koko.onongamyà ‘to cause you-sg to stop’
d. /tô-kâa-ko-Cem-eC-a/ tókâako.eme.à ‘we’ll cultivate for you-sg’
e. /na-o-mâ-ko-Cem-eC-a/ nóomâko.eme.ë ‘3p may cultivate for 2s’

23 The shortening of kâa to kâ is due to the rule of Sequential shortening, seen in §4.2.5.
That is, they behave as though they begin with a vowel phonologically, as well as phonetically. Thus, the empty C cannot be present, since the empty C-initial verbs behave like the vowel-initial verbs do. In spite of this, vowel hiatus is crucially still maintained between the vowel of ko and the initial vowel of the verb stem, providing evidence that the empty C is present when word level syllabification takes place. Once syllabification takes place at a level, resyllabification cannot take place, regardless of what other rules have taken place since, such as Prefix k-deletion. This leads to the conclusion, which will be discussed in §4.4, that the empty C deletes at the word level. Thus, the k of the 2sOP ko deletes when it is post-vocalic and followed by a syllable with an onset.

Prefix k-deletion is not limited to the 2sOP. There are two tenses, the present and the progressive tenses, which require the L-toned infinitive prefix ko in the verb. This prefix is also subject to Prefix k-deletion. Examples of the present tense are seen in (4.71). As expected, the infinitive prefix keeps the k of ko and coalesces with the initial vowel of the verb stem in (4.71a,b). The consonant-initial verbs take o, as seen in (4.71c,d). And in (4.71f,g), the empty C-initial verbs take ko: Prefix k-deletion is blocked. (4.71e) is provided to demonstrate that when ko is post-nasal, and not post-vocalic, the rule cannot apply.

<table>
<thead>
<tr>
<th>(4.71)</th>
<th>V-initial verbs</th>
<th>C-initial verbs</th>
<th>Empty C-initial verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. nético kwéenzá</td>
<td>b. nético kwááká</td>
<td>f. nético ko amokà</td>
</tr>
<tr>
<td></td>
<td>‘we are shaving’</td>
<td>‘we are building’</td>
<td>‘we are waking up’</td>
</tr>
<tr>
<td></td>
<td>c. nético otálá</td>
<td>d. nético obikà</td>
<td>g. nético ko ebà</td>
</tr>
<tr>
<td></td>
<td>‘we are counting’</td>
<td>‘we are arriving’</td>
<td>‘we are paying’</td>
</tr>
<tr>
<td></td>
<td>(e. née ngotálá)24</td>
<td>‘I am counting’)</td>
<td></td>
</tr>
</tbody>
</table>

24 (4.71c) is a 1sSP form. The underlying form of the 1st singular subject prefix is ne. There is a rule deleting the e of the 1sSP when it precedes an obstruent; the n subsequently syllabifies with ko. Since this rule precedes Prefix k-deletion, k-deletion will not have a chance to apply. ko is no longer post-vocalic at the point when Prefix k-deletion applies, it is post-nasal. See §4.2.4.1.
To show that Prefix k-deletion is not caused or affected by the quality of the preceding vowel, we can place the two negative markers téé and Cí before ko in this tense. Evidence that the second of these negative markers begins with an empty C is that vowel hiatus is maintained with a preceding subject prefix vowel: to.i, not *twii, for example. When the negative prefix is added, exactly the same pattern emerges. In (4.72a-b), the vowel-initial verbs take ko, and coalescence occurs. In (4.72c-e), the consonant-initial verbs take o. And finally, (4.72f-g) demonstrate that the empty C-initial verbs take the allomorph ko.

(4.72) Infinitive Present tense, M/C negative

<table>
<thead>
<tr>
<th>V-initial verbs</th>
<th>C-initial verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tó-Cí-ko-ák-a/</td>
<td>/tó-tée-ko-ák-a/</td>
</tr>
<tr>
<td>a. kwâáká</td>
<td>to.íkwâáká</td>
</tr>
<tr>
<td>b. kweèndà</td>
<td>to.íkweèndà</td>
</tr>
<tr>
<td>c. kobâändà</td>
<td>to.íobâändà</td>
</tr>
<tr>
<td>d. kotâlá</td>
<td>to.ítotâlá</td>
</tr>
<tr>
<td>e. kokonà</td>
<td>to.íkonà</td>
</tr>
<tr>
<td>f. ko.eba</td>
<td>to.íko.eba</td>
</tr>
<tr>
<td>g. ko.eèndà</td>
<td>to.íko.eèndà</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>totéekwâáká</td>
<td>‘we are not building now’</td>
</tr>
<tr>
<td>totéekweèndà</td>
<td>‘we are not want(ing) now’</td>
</tr>
<tr>
<td>toté.obâändà</td>
<td>‘we are not planting now’</td>
</tr>
<tr>
<td>toté.otâlá</td>
<td>‘we are not counting now’</td>
</tr>
<tr>
<td>toté.okonà</td>
<td>‘we are not hitting now’</td>
</tr>
<tr>
<td>totééko.eba</td>
<td>‘we are not paying now’</td>
</tr>
<tr>
<td>totééko.eèndà</td>
<td>‘we are not going now’</td>
</tr>
</tbody>
</table>

Another tense which takes ko is the progressive tense. This tense is represented in (4.73). Once again, the vowel-initial verbs take ko in (4.73a-c), the consonant-initial verbs take o if post-vocalic in (4.73d,e), and the empty C-initial verbs take ko in (4.73f,g).
V-initial verbs

a. nétōkwááka.à ‘we have been building’
b. nétōkwééyâ ‘we have been requesting’
c. nétōkuúma.à ‘we have been exiting from’

d. nétō_ong’olota.à ‘we have been snoring’
e. nétō_osuunga.à ‘we have been guarding’
f. nétōko_alyoolo.o.à ‘we have been translating’
g. nétōko_.ebra.à ‘we have been paying’

C-initial verbs

Examples of these tenses with an OP provide further evidence for the rule of Prefix k-deletion. Recall that an OP is placed between the infinitive marker ko and the verb stem. Thus, Prefix k-deletion should apply if the OP begins with a consonant, regardless of whether the verb stem itself begins with a vowel, a consonant, or an empty C. (4.74) provides examples with the 3sOP mo. As predicted, all three types of verb stem surface with the o allomorph in forms where a consonant-initial OP follows ko.

Empty C-initial verbs

(4.74) Verb Stem Type

<table>
<thead>
<tr>
<th>Verb Stem Type</th>
<th>V-initial</th>
<th>C-initial</th>
<th>Empty C-initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. V-initial</td>
<td>nétō_omwááke.e.à ‘we’ve been building for him’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. C-initial</td>
<td>nétō_omosuunga.à ‘we’ve been guarding him’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. empty C-initial</td>
<td>nétō_omo.eba.à ‘we’ve been paying him’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the other hand, a vowel-initial OP should prevent Prefix k-deletion regardless of the type of verb stem. The reflexive OP éyé coalesces with the preceding ko in (4.75), and the environment for Prefix k-deletion is no longer met. So, even the consonant-initial verb stem tál in (4.75) does not allow Prefix k-deletion.

(4.75) Verb Stem Type

<table>
<thead>
<tr>
<th>Verb Stem Type</th>
<th>V-initial</th>
<th>C-initial</th>
<th>Empty C-initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. V-initial</td>
<td>nétōkwééyâáká ‘we are building ourselves’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. C-initial</td>
<td>nétōkwéétálá ‘we are counting ourselves’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. empty C-initial</td>
<td>nétōkwééyê.alyoolo.à ‘we are changing ourselves’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25 The glide has deleted by a rule of Homorganic glide deletion (see Chapter 3 and Roberts-Kohno 1995).
The third type of OP to consider is one which begins with an empty C. If an OP begins with an empty C, Prefix k-deletion should not apply because the empty C deletes, leaving the syllable following \(ko\) onsetless. Examples are seen in (4.76). However, the class 8,10 OP has an empty C which surfaces as \(s\) just in case the \(i\) coalesces with a following vowel, as seen in §4.2.2.1. In other words, when the vowel of class 8,10 OP \(Ci\) coalesces with the vowel of a vowel-initial verb stem, the empty C will surface as \(s\). Since the syllable following \(ko\) has an onset, the \(k\) should and does delete in this case, as seen in (4.76a).

(4.76) Verb Stem Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. V-initial</td>
<td>neto.osyääká</td>
<td>‘we are building it’</td>
</tr>
<tr>
<td>b. C-initial</td>
<td>netokoi.tálá</td>
<td>‘we are counting it’</td>
</tr>
<tr>
<td>c. empty C-initial</td>
<td>netokoi.i.ebe.à</td>
<td>‘we are paying for it’</td>
</tr>
</tbody>
</table>

Since these two prefixes may surface in adjacent positions in a verb form, i.e., the infinitive marker \(ko + 2sOP\) \(ko\) in one of the tenses above, it is possible to test whether Prefix k-deletion may apply more than once in a given form. Examples of vowel-initial and empty C-initial verbs are seen in (4.77). In these examples, the \(k\) of the infinitive prefix deletes because the structural description of the rule is met. But the \(k\) of the 2sOP does not delete. In (4.77a), the \(k\) of the 2sOP does not delete because coalescence occurs and the structural description of the rule is no longer met. And in (4.77b), \(ko\) is followed by an onsetless syllable, thus making it impossible for \(k\) to delete.

(4.77) Verb Stem Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. V-initial</td>
<td>nétó.okwááke.a.à</td>
<td>‘we have been building for you-sg’</td>
</tr>
<tr>
<td>b. Empty C-initial</td>
<td>nétó.oko.eba.à</td>
<td>‘we have been paying you-sg’</td>
</tr>
</tbody>
</table>

The verbs which begin with a real consonant provide the crucial data which reveals that the rule applies to the first of two \(ko\) syllables, as seen in (4.78).
In the examples in (4.78), only the first $k$ from the infinitive prefix $ko$ deletes. The $k$ of the 2sOP does not delete in spite of the fact that the structural description of the rule is met. Thus, the Prefix $k$-deletion rule applies only once in a given form, to the first in a sequence of two $ko$ syllables. Prefix $k$-deletion is formulated in Rule 4.9.

Rule 4.9 Prefix $k$-deletion

The examples in this section have shown that Prefix $k$-deletion can only apply if the following syllable is onsetless. The example in (4.71e) showed that the rule only deletes post-vocalic $k$. The examples in (4.79) further demonstrate this because the infinitive in (4.79a) retains the prefix $k$ even though the following syllable has an onset. In (4.79c), where the infinitive is post-vocalic, the $k$ deletes. (4.79b,d) are provided for comparison. The $k$ remains in both examples because the following syllable is onsetless.

(4.79) a. /ko-tál-à/ kotálá ‘to count’  
    b. /ko-Cem-à/ ko.emà ‘to dig’  
    c. /to-e-εNd-à ko-tál-à/ twe.endá kotálá ‘we want to count’  
    d. /to-e-εNd-à ko-Cem-à/ twe.endá ko.emà ‘we want to dig’

26 My informant noted that some people pronounce this word as nétóko.otálá. In this dialect, we would say the rule applies from right-left, bleeding the application of the rule to the first $k$. 

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A final point to make regarding this rule is that it is a lexical rule. It must be lexical because there is a third prefix, the cl.15 OP kô, which never undergoes the rule of Prefix k-deletion. Data in (4.80) demonstrates this fact by contrasting the cl.15 OP with the 2sOP.

(4.80) a. /ko-ko-titiC-â/ ko otiti.â 'to rub you-sg'
b. /ko-kó-titiC-â/ kokótiti.â 'to rub it’ (arm, cl.15)
c. /ko-ko-bâk-â/ ko obâká 'to smear on you-sg'
d. /ko-kó-bâk-â/ kokóbâká 'to smear on it’ (cl.15)
e. /né-né-ko-ko-tál-aC-a/ nééngo otâla.a 'I’ve counted you-sg’
f. /né-né-kó-ko-tál-aC-a/ nééngokótâla.a 'I’ve counted it’ (cl.15)
g. /ne-kâa-ko-kon-a/ ngâ okonâ 'I will hit you-sg’
h. /ne-kâa-kó-kon-a/ ngâákókonâ 'I will hit it’ (cl.15)

However, if Prefix k-deletion is affected by the final vowel of the preceding word as in (4.79), this indicates that Prefix k-deletion is a phrase-level rule, not a word-level rule, thus resulting in conflicting evidence for the status of Prefix k-deletion.

4.2.5 Sequential shortening

The last piece of phonological evidence for the empty C analysis comes from the behavior of sequences of vowels separated by an empty C. The examples in (4.81) show a surface long vowel, resulting from vowel coalescence, followed by a consonant. As expected, the vowel sequence that coalesces surfaces as long. Notice that e in (4.81b) deletes by the rule of e-deletion given in §4.2.4.1.

(4.81) a. /né-tô-a-táI-a/ nêtwaatâlâ ‘we just counted’
b. /né-né-a-sëNba-a-a/ nénâasësmba.â ‘I always run’
c. /né-tëe-ko-ák-a/ ndëëkwâákâ ‘I’m not biting’
If the verb stem begins with an empty C, the vowel should also surface as long, since the presence of the empty C serves as the onset of the following syllable, and blocks the vowel of the verb stem from coalescing with a preceding vowel. Data in (4.82) show that the empty C does in fact block coalescence with a following vowel, demonstrating the presence of the empty C. However, the vowels which surface as long in (4.81) surface as short in (4.82).

(4.82) a. /né-tó-a-Cóm-á/ nétéwá-ómâ ‘we just bit’
   b. /né-né-a-Cænd-a-a/ nénéëñenda.â ‘I always go’
   c. /ndée-ko-tál-a/ ndé.otálâ ‘I’m not counting’
   d. /ndóo-ko-tál-a/ ndó.otálâ ‘you-sg are not counting’
   e. /ndá-e-ko-tál-a/ ndá.otálâ ‘he is not counting’

Thus, a long vowel followed by an onsetless syllable is a prohibited sequence, and thus motivates the vowel shortening rule of Sequential shortening seen in Rule 4.10. This vowel shortening rule applies to shorten a long vowel just in case a long vowel is followed by an onsetless syllable.

Rule 4.10  Sequential shortening

Data in (4.83a-f) show that a long vowel shortens before a following short onsetless syllable. (4.83g) demonstrates that a long vowel shortens when the following onsetless syllable has a long vowel as well. (4.83g-i) further show Sequential shortening is not a mirror image process: a vowel followed by a long vowel, i.e., V + V:, is not subject to the rule. Therefore, the long vowel in the tense/aspect prefix éet does not shorten.

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| (4.83) | a. /ko-éC-à/ | kwé.â | ‘to tell’ |
| b. /né-né-éC-aC-à/ | néné.a.â | ‘I always tell’ |
| c. /né-tó-éC-aC-à/ | nétwé.a.â | ‘we always tell’ |
| d. /né-né-a-CeC-à/ | néné.e.â | ‘I just cried’ |
| e. /né-tó-a-CoC-à/ | nétwâ.o.â | ‘we just bought’ |
| f. /ko-ôCaC-à/ | kó.a.â | ‘to kill’ |
| g. /né-mó-éC-ëet-ë/ | némwé.ëetê | ‘you-pl told’ |
| h. /né-má-CoC-ëet-ë/ | néma.o.ëetê | ‘they have bought’ |
| i. /né-tó-noC-ëet-ë/ | nétóno.ëetê | ‘we have sharpened’ |

The data in (4.84) demonstrate that Sequential shortening is not limited to verbs, but can also be found in noun stems.

| (4.84) | a. /ke + a.à/ | cha.â | ‘cow dung’ |
| b. /mo + 6.î/ | moñáambo mó.i | ‘clever lion’ |
| c. /me + 6.î/ | meñáambo myó.i | ‘clever lions’ |

Perhaps the most important evidence for Sequential shortening is that there are surface alternations between the empty C and a real consonant where the length of the vowel depends on whether a real consonant surfaces or not. For example, the stems in (4.85) have an empty C in the underlying representation which causes the vowels on either side of the empty C to syllabify in separate syllables.

| (4.85) | a. /ke-ng’ééCî/ | keng’éî | ‘thief’ (cl.7) |
| b. /mo-eCè/ | mwe.è | ‘body’ (cl.3) |
| c. /me-eCî/ | mwe.i | ‘root’ (cl.3) |
| d. /me-eCî/ | me.i | ‘roots’ (cl.4) |
| e. /mo-éCl/ | mwé.î | ‘month’ (cl.3) |
| f. /me-éCl/ | myé.î | ‘months’ (cl.4) |
| g. /mo-éCaCà/ | mwé.a.à | ‘order’ (cl.3) |
| h. /o-eCà/ | we.à | ‘work’ (cl.14) |
| i. /ko-âC-à/ | kwâ.â | ‘to be lost-intr’ |
| j. /ko-éC-à/ | kwe.à | ‘to scrape out’ |
When the nouns in (4.85) are put into either the diminutive or the augmentative, [lateral] spreads to the empty C by [lateral]-Harmony, and the empty C surfaces as l. This can be seen in the data in (4.86a-h) (See §4.2.2.2 for an explanation of [lateral]-Harmony).

(4.86) a. /ka-ng^ééCî/  
    b. /ka-mo-eCê/  
    c. /e-mo-eCî/  
    d. /to-mé-eCî/  
    e. /ka-mo-eCî/  
    f. /to-me-éCî/  
    g. /ka-mo-éCaCô/  
    h. /ka-o-eCâ/  
    i. /ko-âCy-à/  
    j. /ko-eCy-à/

    kang^éélf  
    kamweéélê  
    emweélî  
    tomeélî  
    kamweélî  
    tomyéélî  
    kamweéélô  
    kaweélå  
    kwásyâ  
    kwèsyâ

    ‘thief-dim’ (cl.12)  
    ‘body-dim’ (cl.12)  
    ‘root-aug’ (cl.5)  
    ‘roots-dim’ (cl.13)  
    ‘month-dim’ (cl.12)  
    ‘months-dim’ (cl.13)  
    ‘order-dim’ (cl.12)  
    ‘work-dim’ (cl.12)  
    ‘to lose-tr’  
    ‘to cause to scrape out’

(4.86i,j) are examples of verbs where [sy]-Spirantization takes place. And when the empty C surfaces as a real consonant, Sequential shortening cannot apply and a long vowel surfaces. (4.86i) is the transitive verb corresponding to the intransitive verb in (4.85i). (4.86j) is the causative form of the verb in (4.85j), which also exhibits a long vowel. See §4.2.2.1 for details on [sy]-Spirantization.

The data presented here is similar to that motivating Prefix k-deletion. The conditioning environments for both rules require that the empty C not be present. With Sequential shortening, if the empty C were present as a syllable onset, vowel shortening should be blocked, but Sequential shortening applies because the syllable following the long vowel is onsetless. Thus, consonant-initial and empty C-initial verb stems do not behave the same with respect to these rules. On the other hand, the empty C must have been present because vowel hiatus is maintained in the place where an empty C is posited. In addition, Sequential shortening provides another rule demonstrating that syllabification occurs at the beginning of a level, and does not reapply within a level, even when illicit syllables are created by subsequent rules.
4.2.6 Phonetic evidence

Phonetic evidence also supports the empty C analysis. In the phonology, there is a word-internal contrast between vowel sequences originally separated by an empty C, and those that were not. Using an empty C to express this contrast correctly illustrates that the difference is in how sequences of sounds are syllabified. Those not separated by an empty C fuse into a single syllable, and those separated by an empty C remain a bisyllabic sequence. Thus, all else being equal, a bisyllabic sequence of vowels should have longer duration than a monosyllabic long vowel. In order to test this, I measured identical vowel-vowel sequences, represented by ViVi, and non-identical vowel-vowel sequences, represented by ViVj. For both types of sequences, I compared fused vowel sequences with vowel sequences separated by an empty C. After measuring the duration of the vowel sequences, I performed an analysis of variance (ANOVA) on the data.

Examples in (4.87) represent the word-internal syllables measured. Recall that the empty C is represented with ‘C’ in the underlying representation, and the resulting syllabification is indicated by the syllabification ‘dot’ (.) in the surface form.

(4.87) Identical vowels
ViVi /ko-tó-óm-y-à/ kotóómyá ‘to dry us’
ViCVi /ko-tó-Cóm-à/ kotó.ómá ‘to bite us’

Non-identical vowels
ViVj /ko-má-óm-y-à/ komáómyá ‘to dry them’
ViCVj /ko-má-Cóm-à/ komá.ómá ‘to bite them’

Table 4.1 shows the results of the measurements: a bisyllabic short vowel sequence has significantly greater duration than a monosyllabic long vowel, both when the syllable nucleus contains a single vowel quality and two vowel qualities.
Table 4.1 shows that a sequence of identical short vowels is distinct from a single long vowel, and that a sequence of non-identical vowels is distinct from its fused, long vowel counterpart. This provides evidence for the empty C because this durational contrast arises just in case an empty C is present to block syllable fusion, which results in the vowel sequence surfacing as two syllables.

Moreover, imperative data suggest that syllabification at the phrase level should result in all vowel sequences coalescing at word boundaries, since the empty C has deleted before the phrasal phonology. In other words, there should be no difference between empty C-initial verbs and vowel-initial verbs at the phrase level in terms of duration when following a preceding vowel: the duration data with both types of verbs should be the same.

Once again, phonetic evidence supports this prediction. In order to test this, I measured syllable durations of post-lexical vowel sequences that were identical Vi#Vi and non-identical Vi#Vj, using the imperative with a preceding subject. Examples are seen in (4.88) with the measured vocalic sequence underlined.

(4.88) Identical vowels
- Vi#Vi: Mweema _atha
- Vi#CVi: Mweema _atha

(4.88) Non-identical vowels
- Vi#Vj: Mweema _okita
- Vi#CVj: Mweema _oma

"Mweema, govern!"
"Mweema, shoot!"
"Mweema, fight!"
"Mweema, bite!"

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As seen in Table 4.2, the difference in phrasal level vowel duration between vowel-initial verbs and underlying empty C-initial verbs is not significant.

Table 4.2:
Duration differences between phrasal long vowels: V # V versus V # CV

<table>
<thead>
<tr>
<th>Phrasal long vowel</th>
<th>Duration</th>
<th>N</th>
<th>Phrasal long vowel with empty 'C'</th>
<th>Duration</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vi#Vi</td>
<td>150 ms</td>
<td>25</td>
<td>Vi#CVi</td>
<td>163 ms</td>
<td>7</td>
<td>(p &gt; .22)</td>
</tr>
<tr>
<td>Vi#Vj</td>
<td>191 ms</td>
<td>19</td>
<td>Vi#CVj</td>
<td>181 ms</td>
<td>19</td>
<td>(p &gt; .27)</td>
</tr>
</tbody>
</table>

That is, when we look at duration of vowel sequences at the phrasal level, there is no significant difference between the behavior of empty C-initial syllables versus vowel-initial syllables at word boundaries. Thus, the empty C has deleted leaving nothing to block syllable fusion, thereby allowing phrase-level syllabification to fuse these syllables.

The previous data demonstrates that the presence of the empty C in terms of its affect on syllabification, and thus on vowel duration, is only measurable in word-internal syllabification, not phrase-level syllabification. To be sure this accurately reflects the facts, phrase-level durations are compared with the results of each of the word-internal durations. If phrase level durations are the same as word-internal bisyllabic short vowel sequences, then there is no resyllabification at the phrasal level. Moreover, this would be problematic because it means that vowel-vowel sequences at the phrase level suddenly behave as though they are bisyllabic, suggesting an empty C being added during phrase-level syllabification. If, on the other hand, phrase-level durations are the same as word-internal monosyllabic long vowels, this would argue for resyllabification at the phrasal level.

Table 4.3 indicates that the difference between phrase-level durations and monosyllabic long vowel durations is not significant. That is, the average vowel duration of a word-internal long vowel is the same as that of post-lexical V#V.
Table 4.3: Durational contrast between V#(C)V and VV

<table>
<thead>
<tr>
<th>Phrasal long vowel</th>
<th>Duration</th>
<th>N</th>
<th>Monosyllabic long vowel</th>
<th>Duration</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vi#(C)Vi</td>
<td>153 ms</td>
<td>32</td>
<td>ViVi</td>
<td>150 ms</td>
<td>194</td>
<td>(p &gt; .686)</td>
</tr>
<tr>
<td>Vi#(C)Vj</td>
<td>186 ms</td>
<td>38</td>
<td>ViVj</td>
<td>179 ms</td>
<td>25</td>
<td>(p &gt; .342)</td>
</tr>
</tbody>
</table>

Moreover, a bisyllabic word-internal vowel sequence has significantly greater duration than post-lexical V#V, as seen in Table 4.4.

Table 4.4: Durational contrast between V#(C)V and V.V

<table>
<thead>
<tr>
<th>Phrasal long vowel</th>
<th>Duration</th>
<th>N</th>
<th>Bisyllabic vowel sequence</th>
<th>Duration</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vi#(C)Vi</td>
<td>153 ms</td>
<td>32</td>
<td>Vi.Vi</td>
<td>214 ms</td>
<td>39</td>
<td>(p &lt; .001)</td>
</tr>
<tr>
<td>Vi#(C)Vj</td>
<td>186 ms</td>
<td>38</td>
<td>Vi.Vj</td>
<td>211 ms</td>
<td>58</td>
<td>(p &lt; .001)</td>
</tr>
</tbody>
</table>

These results are summarized in (4.89).

(4.89) Summary of vowel duration data:
  a. Duration of word-internal VV and VCV are different.
  b. Duration of VV (word-internal) and V#V (phrasal) are the same.
  c. Duration of VCV (word-internal) and V#V (phrasal) are different.

Therefore, this constitutes evidence that syllabification is distinctive at the word level as determined by the presence of empty Cs. At the phrasal level, vowel sequences resyllabify as single syllables demonstrating that the empty Cs have been deleted.
4.3 Evidence from other languages

Kikamba is not the only language with evidence for an empty C. In this section, I show a wide variety of languages which have similar phenomena that have also been explained by positing an empty C.

4.3.1 Onondaga

Michelson (1986) presents evidence for an empty C from the Northern Iroquoian language Onondaga. In (4.90a,b), there are examples of a vowel coalescence rule by which $a + i$ coalesces to surface as $\varphi$. However, in the stems in (4.90c,d), vowel coalescence is blocked: Michelson claims that this group of irregular $i$-initial stems begins with an empty C.

\begin{align*}
(4.90) & \text{Vowel-intial forms} \\
& a. /ka-i'te:/ \quad \text{ka'ete'} \quad \text{'it's at home'} \\
& b. /ha-ihnohne/ \quad \text{henohe} \quad \text{'his skin'} \\
& \text{Empty C-initial forms} \\
& c. /ka-Cihwiyo/ \quad \text{kaihwiyo} \quad \text{'the good word'} \\
& d. /sa-Cihwa'/ \quad \text{saihwa'} \quad \text{'it's your fault'}
\end{align*}

Another Onondaga rule deletes the second vowel in a sequence if the first is a mid vowel ($e$, $o$, or $\varphi$). Otherwise, the first vowel is deleted. The rule is regularly blocked in stems beginning with an empty C, as seen in (4.91).

\begin{align*}
(4.91) & \text{Vowel-intial forms} \\
& a. /t-bo-atiyeta'/ \quad \text{thotiyet'a} \quad \text{'he's pulling it'} \\
& b. /sa-ehsaki/ \quad \text{sehsaki} \quad \text{'you-sg had hunted for it many Xs'} \\
& \text{Empty C-initial forms} \\
& c. /te-ye-Cehwetats/ \quad \text{teyehwetats} \quad \text{'she's making an opening'} \\
& d. /sa-Cehyake/ \quad \text{sahyak} \quad \text{'you-sg are suffering'}
\end{align*}
In addition, stems posited to begin with empty Cs take the same allomorphs that real consonant-initial stems do, as seen in Table 4.5 with the Neuter agent prefix, and the Masculine plural agent prefix.

Table 4.5: Onondaga data

<table>
<thead>
<tr>
<th>Verb stem Type</th>
<th>Neuter agent prefix</th>
<th>Masculine plural agent prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consonant-intial</td>
<td>/te-ka-têha'/</td>
<td>/hati-nôhwe's/</td>
</tr>
<tr>
<td></td>
<td>‘it flies, it can fly’</td>
<td>‘they like it’</td>
</tr>
<tr>
<td>Vowel-initial</td>
<td>/te-w-êtake/</td>
<td>/hen-e's/</td>
</tr>
<tr>
<td></td>
<td>‘two days’</td>
<td>‘they are walking around’</td>
</tr>
<tr>
<td>Empty C-initial</td>
<td>/te-ka-Cêhwe'tats/</td>
<td>/ç-hati-ehka'/</td>
</tr>
<tr>
<td></td>
<td>‘it’s making an opening’</td>
<td>‘they will gather’</td>
</tr>
</tbody>
</table>

There is also a rule of Stem-joiner insertion which inserts an a between a consonant-final incorporated noun stem and a consonant-intial verb stem. Again, the empty C-initial roots require the insertion of a, as seen in (4.92), just like the consonant-initial verb stems do.

(4.92) a. Consonant-initial stem
/ka-nêy-kehe'/
kanêyakêhe’ ‘there’re many stones on the ground’
b. Empty C-initial stem
/yo-hy-Ci/
ohyâ:i ‘the fruit is ripe’

Finally, there is a context in which the empty slot may surface as a real segment. A rule of Glide formation by which o spreads the feature [round] and i spreads the feature [high] to a following empty slot results in the empty C surfacing as w and y, respectively, as seen in (4.93).

(4.93) a. /ho-Cêhyake'/
howêhyâ:kê ‘he’s suffering’
b. /hoti-Cêhyake'/
hotiyêhyâ:kê ‘they are suffering’
4.3.2 Seri

Marlett and Stemberger (1983) provide a set of 21 verbs from the Hokan language Seri which begin with an empty C. These verbs behave exactly the same with respect to four vowel deletion processes: where the rule otherwise applies with a vowel-initial stem, it is blocked with these 21 verbs. These processes are called Short low vowel deletion, Coalescence, Deletion, and O-deletion. Examples from Short low vowel deletion and Coalescence are seen in (4.94).

(4.94) Short low vowel deletion
Vowel-initial forms
a. /yo-ataX/ yo:taX 'go' (distal)
b. /yo-eme/ yo:me 'be used up' (distal)
Empty C-initial forms
c. /yo-CamWx/ yoamWx 'be brilliant' (distal)
d. /yo-Cenx/ iyoenx 'play stringed instrument' (distal)

Coalescence
Vowel-initial forms
a. /yo-otx/ yatx 'arise' (distal)
b. /yo-o:ša/ yaša 'talk-pl' (distal)
Empty C-initial forms
c. /yo-Coř/ yooř 'argue'(distal)
d. /yo-Co:šx/ yoo:šx 'sprinkle'(distal)

There is also a context where the empty C may surface as a real consonant. Seri has an irrealis prefix whose underlying form is si-. When a verb stem begins with a consonant, the i deletes by a rule of I-deletion. In these verbs, the s of the prefix will then become part of the onset of the following syllable, as seen in (4.95a).

(4.95) a. /si-meke/ smeke 'be lukewarm' (irrealis)
b. /si-CaX/ ssaX 'be hard' (irrealis)

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Furthermore, the verbs posited to begin with an empty skeletal slot also undergo I-deletion, behaving as though they begin with a consonant. Just in case the verb begins with an empty C, the s will spread to the empty slot, resulting in a geminate s. Thus, the empty C in Seri may surface as an s, as seen in (4.95b).

4.3.3 Turkish

Turkish data presented in Clements and Keyser (1983) is similar to data from Seri and Onondaga. The difference is that Turkish has an empty slot in the final position of certain noun stems. This empty slot blocks certain deletion processes. For example, the 2p possessive suffix is \textit{lnlz}. When this suffix is added to a vowel-final noun, the initial \textit{I} deletes. However, when added to a noun posited to end with an empty C, the environment for vowel deletion is not met, so \textit{I} does not delete. Stems ending in both a long and short vowel are given to demonstrate that the length of the final vowel is irrelevant to the application of the rule. See (4.96).

(4.96) Short vowel-final forms
\begin{tabular}{lll}
al. /oda-lnlz/ & odani-z & ‘room’ 
b. /ari-lnlz/ & arini-z & ‘bee’ 
\end{tabular}

Long vowel-final forms
\begin{tabular}{lll}
c. /imla:-lnlz/ & imla:niz & ‘spelling’ 
d. /bina:-lnlz/ & bina:niz & ‘building’ 
\end{tabular}

Empty C-final forms
\begin{tabular}{lll}
e. /daC-InIz/ & daini z & ‘mountain’ 
f. /cicC- InIz/ & cicini z & ‘avalanche’ 
\end{tabular}

In addition, Turkish has a rule of consonant deletion whereby the initial consonant of the dative suffix \textit{yE}, and the 3s possessive suffix \textit{sf} deletes when following a consonant-final noun. As seen in (4.97), the nouns which end in an empty C pattern with the consonant-final nouns by inducing consonant deletion in these forms.

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Consonant-final forms

a. /kep-yE/, /kep-sI/ kepe, kepi 'cap'

b. /sap-yE/, /sap-sI/ sapa, sapi 'stalk'

Empty C-final forms

c. /daC-yE/, /daC-sI/ daa, daï 'mountain'

d. /ciC-yE/, /ciC-sI/ cie, cii 'dew'

Finally, note that the phonetic evidence presented in §4.2.7 is supported by the Turkish data of Clements and Keyser 1983, and seen in (4.98).

(4.98) a. /daC/ da: 'mountain' (nominative)
b. /daC-a/ daa 'mountain' (dative)

The claim is that the dative form daa is perceptually longer than the nominative form da:, and "involves a type of phonation sometimes termed 'vowel rearticulation': a mode of production in which the vowel is uttered with two intensity peaks" (Clements and Keyser 1983:72). There are two intensity peaks in the dative because it is bisyllabic: the empty skeletal slot serves as the onset of the syllable containing the second a. This is in essence the same claim for identical vowel sequences separated by an empty C in Kikamba: they are longer because they are bisyllabic sequences.

4.3.4 Bantu languages

There is evidence in other Bantu languages for empty C phenomena as well. In this section, I present evidence from two other Kenyan languages: Kikuyu, a language very closely related to Kikamba, and Bukusu.

4.3.4.1 Kikuyu

Downing (1992) presents evidence for an empty C, or 'ghost consonant,' in Kikuyu. Kikuyu has many vowel sequences, some of which behave as bisyllabic
sequences, and some of which behave as monosyllabic long vowels or diphthongs. This led Peng (1991) to the conclusion that syllable structure in Kikuyu is unpredictable. However, Downing shows that by assuming an underlying empty C, syllabification is in fact predictable in Kikuyu. The clearest evidence for the empty C comes from reduplication data. The data in (4.99) show that when a stem is reduplicated, it is the first two syllables which are reduplicated. In addition, the second vowel of the reduplicant is the vowel a.

(4.99) Stem Reduplicative stem
a. -ra'na -ra'na-ra'na 'boast'
b. -thakara -thakara-thakara 'be beautiful'
c. -tha'tereria -tha'tereria-tha'tereria 'exaggerate'
d. -nsn'ehara -nsn'ehara-nsn'ehara 'shiver with cold'

The data in (4.100) shows examples with vowel sequences. Data in (4.100a-c) are verb stems that contain monosyllabic diphthongs. Since they are monosyllabic, the diphthong reduplicates as a unit, along with the following syllable. Vowel sequences in (4.100d-f) are separated by an empty C, and count as two syllables when reduplicated. Thus, reduplication in Kikuyu supports the empty C analysis.

(4.100) Stem Reduplicative stem
a. -rie:ra -rie:ra-rie:ra 'keep out'
b. -tha:tha -tha:tha-tha:tha 'implore'
c. -the:i:thia -the:i:thia-the:i:thia 'greet'
d. -bu:era -bu:era-bu:era 'be invisible'
e. -ci:ora -ci:ora-ci:ora 'clear'
f. -co:anera -co:anera-co:anera 'walk quickly' (associative)

4.3.4.2 Bukusu

Mutonyi (1992) provides evidence for an empty C in Bukusu. Recall from §4.2.3 that the Kikamba IsOP is a moraic nasal which surfaces as mb before a vowel-initial verb.
stem and \textit{nd} before an empty C-initial verb stem. According to Mutonyi (1992), the Bukusu IsSP is also a moraic nasal, and has two different forms with phonetically vowel-initial verbs. In (4.101a-c), the IsSP surfaces as \textit{n}. These are exactly the same set of verbs which always coalesce with a preceding vowel prefix as seen in the infinitive forms. And in (4.101d-f), the IsSP surfaces as \textit{mb}. These are exactly the same verbs which surface with hiatus maintained between the prefix and the verb stem in the infinitive.

(4.101) IsSP-verb

\begin{tabular}{llll}
\text{Infinitives} & \text{IsSP-verb} & \text{Infinitives} & \text{IsSP-verb} \\
\text{\textit{náála}} & \text{\textit{n-al-a/}} & \text{\textit{I spread’}} & \text{\textit{xuxwaala}} & \text{\textit{to spread’}} \\
\text{\textit{nooma}} & \text{\textit{n-om-a/}} & \text{\textit{I dry’}} & \text{\textit{xúxwooma}} & \text{\textit{to dry’}} \\
\text{\textit{niima}} & \text{\textit{n-im-a/}} & \text{\textit{I stand’}} & \text{\textit{xúxwiima}} & \text{\textit{to stand’}} \\
\text{\textit{mbaxa}} & \text{\textit{n-Cax-a/}} & \text{\textit{I paint’}} & \text{\textit{xúu.axa}} & \text{\textit{to paint’}} \\
\text{\textit{mboona}} & \text{\textit{n-Coon-a/}} & \text{\textit{I drive out’}} & \text{\textit{xuu.ona}} & \text{\textit{to drive out’}} \\
\text{\textit{mbina}} & \text{\textit{n-Cin-a/}} & \text{\textit{I tease’}} & \text{\textit{xuu.ina}} & \text{\textit{to tease’}} \\
\end{tabular}

Moreover, this behavior is also correlated with imperative data. In (4.102a-c), we see that exactly the same set of verbs which coalesce with a prefix vowel surface with a \textit{y}-onset in the imperative. And in (4.102d-f), it is exactly the set of verbs which resist coalescence which are not required to surface with an onset.

(4.102) Imperatives

\begin{tabular}{llll}
\text{\textit{yaala}} & \text{\textit{yaala}} & \text{\textit{spread!’}} & \text{\textit{yaala}} \\
\text{\textit{yooma}} & \text{\textit{yooma}} & \text{\textit{dry!’}} & \text{\textit{yooma}} \\
\text{\textit{yiima}} & \text{\textit{yiima}} & \text{\textit{stand!’}} & \text{\textit{yiima}} \\
\text{\textit{axa}} & \text{\textit{axa}} & \text{\textit{paint!’}} & \text{\textit{axa}} \\
\text{\textit{oona}} & \text{\textit{oona}} & \text{\textit{drive out!’}} & \text{\textit{oona}} \\
\text{\textit{ina}} & \text{\textit{ina}} & \text{\textit{tease!’}} & \text{\textit{ina}} \\
\end{tabular}

Thus, it is clear that there is evidence for empty C phenomena in other languages. Of the cases cited in the literature, Kikamba constitutes the strongest case to date.
4.4 Theoretical implications

In this section, I first show that alternatives to the empty C approach, such as a diacritic analysis or an abstract underlying segment, are problematic and do not explain the facts as well as the empty C does. I then show how a derivational approach handles the existence and deletion of the empty C.

4.4.1 A diacritic analysis

One possible analysis of these synchronic alternations is to lexically mark a subset of Kikamba verbs stems with an exception feature: either [+vowel coalescence] if the verb stem coalesces with a preceding vowel, or [-vowel coalescence] if vowel hiatus is maintained with a preceding vowel. However, there are two reasons why such an account of the hiatus phenomena would be undesirable.

The first and most important reason why a diacritic account is undesirable is because it is exactly the same set of verb stems which are exceptional to one vowel coalescence rule which are exceptional to all vowel coalescence rules. In other words, vowel coalescence is a term which refers to several rules: Glide formation, Homorganic and Identical height glide deletion, and Mid vowel fusion. Word-internally, all these vowel coalescence rules are blocked in the position occupied by an empty C. And moreover, it is only in such positions where an empty C surfaces as a real consonant. This convergence of evidence surrounding the position held by the empty C seems quite accidental in a diacritic approach. A diacritic approach misses these generalizations, and by Occam’s Razor, should be abandoned over an empty C approach.

A second problem is that the phenomenon surrounding the presence of the empty C is not limited to verb stem-initial position. If it were only vowel-initial verb roots which behaved this way, and it was only with an immediately preceding prefix, then an exception feature analysis would be more tenable. However, recall from §4.2.1 that
vowel hiatus occurs in a wide variety of positions. For example, (4.103) has examples of verb stems where vowel coalescence is blocked at the end of or within a verb stem.

(4.103)a. /ko-thiC-ā/  kothi.ā  ‘to grind’
b. /ko-tōCek-ā/  kotō.ekā  ‘to burst’
c. /ko-boCob-ā/  kobo.oba  ‘to go limp’

Thus, all rules of vowel coalescence can fail to occur with a preceding vowel, a following vowel, or between two word-internal vowels. If failure to undergo rules of vowel coalescence (VC) were limited to these examples, a case could possibly still be made for a diacritic analysis: simply mark verb stems as [+ vowel coalescence] or [-vowel coalescence]. However, marking a verb stem as a unit with such a feature would be problematic for the examples in (4.104).

(4.104)a. /ko-Cē-a/  koya ‘to eat’

[-VC] [+VC]
b. /ko-éC-a/  kwē.ā  ‘to tell’

[+VC] [-VC]
c. /ko-ČeC-a/  ko.e.ā  ‘to cry’

[-VC] [-VC]

Assuming that failure to undergo vowel coalescence is the exception feature, i.e., [-vowel coalescence], the verb stems in (4.104) would need to be marked as exceptional either on the left side, the right side, or on both sides, depending on where vowel hiatus is maintained. (4.104a) would have to be marked as exceptional on the left side and (4.104b) would have to be marked as exceptional on the right side. And (4.104c) has to be marked as exceptional on both ends. Moreover, since these verb stems all contain a single vowel, such a system assumes vowels have a right and left “side” which may exceptionally not participate in rules of vowel coalescence, an unprecedented claim at best. Thus, what started out as a simple exception feature expands to mark every vowel on the right, left, or both as to whether it fails to undergo vowel coalescence. In addition,
this ‘exceptionality’ is not limited to verb stems, but is found in all other word classes, also in various positions. If failing to undergo vowel coalescence is exceptional, the exception feature is as widely distributed as the segments themselves, another undesirable outcome.

4.4.2 An abstract underlying segment

A second possibility is to analyze the empty C as an abstract underlying segment. Dresher (1985) argues against the empty C account of Marlett and Stemberger (1983), and against such an account for Turkish and Finnish in Clements and Keyser (1983) in favor of an abstract underlying segment. He addresses two points: the first is that an abstract underlying segment is not necessarily more abstract than an underlying empty root node in terms of learnability. According to Dresher, the learnability of an abstract underlying consonant in a linear theory is equivalent to an empty C-slot in a multi-tiered theory of phonology. The same evidence could lead a language learner to either conclusion. Thus, they are equivalent in terms of learnability. In other words, once a language learner has figured out that the verb stems in Seri, for example, begin with a consonant, it is of little importance whether the segment has features or not.

After dismissing this argument in favor of empty C-slots, Dresher goes on to make his second point: having underlying segments with features is more consistent with underspecification theory than having a segment that remains unspecified. An empty C is a segment that in most cases does not get filled in with features, which means the empty element remains empty throughout the derivation. Allowing an element that does not get filled in with features is, in effect, separating the notion of the creation of an empty slot from the notion of compensatory lengthening. This ignores the primary insight into compensatory lengthening phenomena to date: when a segment deletes, the direct result is that another segment spreads to fill its place.
Furthermore, allowing an empty slot to remain empty, Dresher claims, is equivalent to creating a ternary system of features. In order to maintain a binary system, elements should get filled in immediately. Since the empty Cs often do not get filled in immediately, the only interpretation that makes sense in underspecification theory is for the empty C to be the default consonant. But if it is the default consonant, it should get filled in at the end of the derivation. However, in most of the examples from Kikamba, the empty C never gets filled in.

Besides the problems considered by Dresher based on underspecification theory, what might lead to positing an abstract, underlying consonant for a particular language? The most obvious reason is that, in most cases, the empty C can be traced back to the historical loss of a consonant. In Onondaga, the empty node arises from the historical loss of \( r \). The empty root node at the beginning of the 21 irregular verbs of Seri are also claimed to derive from a historical consonant. And Kikamba is well-known for its historical loss of the consonants \( b, d, g \) (Hinnebusch 1974).

However, in spite of Dresher’s points, I think the evidence weighs in favor of the empty C. One argument against Dresher’s suggestion that abstract underlying segments are better than empty Cs is that often, there is no trace of the historical consonant. In the case of Onondaga, there is no synchronic indication that the empty slot derives from \( r \). Furthermore, assuming the empty slot is actually an abstract underlying \( r \) means that we need to say that \( r \) becomes a \( w \) after a round vowel, a \( y \) after \( i \), and a vowel after a consonant preceding a vowel. This means we would be forced to write the unavoidably unnatural rules deriving all these cases from an underlying \( r \) (Michelson 1986). In the case of Seri, Marlett and Stemberger also see such an analysis as unnecessarily abstract. They claim there is no phonological basis for choosing the underlying segment, and to choose an abstract consonant for the sake of specifying an underlying segment would be arbitrary and unprincipled (Marlett and Stemberger 1983). In regards to Turkish, Clements and Keyser state that there is no indication of what the abstract consonant might be, so to choose one would be undesirably arbitrary (Clements and Keyser 1983).
In Kikamba, the segment surfaces in certain contexts, but to choose one as underlying is unsatisfactory. We cannot choose the / as underlying because then we could not distinguish between a real / and an abstract / that only surfaces in onset position if there is a preceding / in the word: the environments would be unpredictable. For similar reasons, we cannot choose s or d. An arbitrary segment would need to be chosen.

A second problem for the abstract underlying segment analysis is that, for the vast number of contexts where vowel hiatus is maintained without a consonant surfacing, rules would be needed to delete the features of the abstract underlying consonant. And again, exception features would have to be added to distinguish cases where the underlying segment deletes from cases where it does not. Whether this phenomenon is represented with a fully specified consonant or an empty root node, a root node is still necessary. A root node will block coalescence, without the added problem of explaining why it does not surface most of the time.

Dresher goes on to say that the only way an empty C analysis makes sense is for default consonants to be restricted from being completely unspecified, and for underspecification theory to be revised so as to allow for empty slots to remain empty. Unless such assumptions are made explicit, the proposal that empty slots are abstract, underlying segments specified for features, Dresher concludes, is a more constrained theory than one which posits empty nodes. Considering that a nonlinear approach allows for the separation of prosodic structure from the segmental tier, and that the hierarchy of the feature tree allows the separation of root nodes from the features which characterize them, I suggest that underspecification theory be revised to allow empty root nodes to remain empty. A segmental root node unspecified for features is a predictable, expected outcome of a nonlinear approach to phonology, and a conclusion that is intuitively correct, and supported by the facts of several languages, especially Kikamba.
4.4.3 A derivational account of empty Cs

After having shown that this phenomenon is best analyzed as an unspecified root node, or the empty C, the question arises as to how to handle the presence and deletion of the empty C. In order to analyze the empty C in a derivational framework, three levels are needed: the stem level, the word level, and the phrase level. (4.105) provides the order of the processes discussed in this chapter. Notice that the split between those processes sensitive to the empty C versus those blind to it is handled very easily: processes sensitive to the empty C apply before empty C deletion and those blind to the empty C are ordered after deletion.

(4.105) Stem
Syllabification/Vowel coalescence
Initial shortening (stem)

Word
Syllabification/Vowel coalescence
Excrescent consonant insertion (1sOP /-N-/)
[lateral]-Harmony
Empty C Deletion
Prefix k-deletion (2sObject prefix, Infinitive prefix ko)

Phrase
Syllabification/Vowel coalescence
Sequential shortening
Initial shortening (phrasal)

For example, the presence of the empty C prevents stem-level application of Initial shortening after the 1sOP, as in (4.106a). However, Initial shortening applies to all phonetically vowel-initial verbs in the imperative, as seen in (4.106b), indicating the empty C is no longer present.

(4.106)a. /ko-N-C₅₀t-eC-â/ koond₅₀t-â ‘to dream about me’
   b. /C₅₀t-a/ ₅ₐ ‘dream!’

Other segmental rules indicate that the empty C deletes specifically within the word level. For example, as seen in (4.107), the excrescent consonant associated with the
IsOP \( N \) is inserted prior to deletion of the empty C, which is precisely how the correct consonant is chosen. Insertion of the excrescent consonant takes place at the word level, not the stem level, since it is triggered by the pre-stem IsOP \( N \).

(4.107) IsOP form

<table>
<thead>
<tr>
<th>V-stem</th>
<th>Empty C-stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-( N)-ath-( à )/</td>
<td>ko-( Nb)-ath-a</td>
</tr>
<tr>
<td>ko-( N)-C( øt)-eC-( à )/</td>
<td>ko-( Nd)( øt)-eC-a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Excrecent consonant insertion</th>
<th>Empty C deletion</th>
<th>Prefix k-deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko,( Nb)-ath-a</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ko,( Nd)( øt)-eC-a</td>
<td>ko-( nd)( øt)-e.-a</td>
<td>N/A</td>
</tr>
<tr>
<td>[ko,( ombathā)]</td>
<td>ko,( ombathā)]</td>
<td>[ko,( ombathā)]</td>
</tr>
<tr>
<td>‘to govern me’</td>
<td>‘to govern me’</td>
<td>‘to govern me’</td>
</tr>
</tbody>
</table>

In contrast, prefixal \( k \) deletes in (4.108a), but not in (4.108b), indicating the empty C deletes before the Prefix k-deletion rule has a chance to apply in (4.108b). After the empty C deletes in (4.108b), the initial syllable of the verb is onsetless, so Prefix k-deletion cannot apply. This rule is also a word-level lexical rule, as demonstrated in §4.2.5.

(4.108) 2sOP form

<table>
<thead>
<tr>
<th>C-stem</th>
<th>Empty C-stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /ko-ko-tāl-( à )/</td>
<td>N/A</td>
</tr>
<tr>
<td>b. /ko-ko-( Calio)-lā/</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Excrecent consonant insertion</th>
<th>Empty C deletion</th>
<th>Prefix k-deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko,( tāl)-( à )/</td>
<td>ko,( tāl)-( à )/</td>
<td>ko,( tāl)-( à )/</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ko,( otāl)-( à )/</td>
<td>ko,( otāl)-( à )/</td>
<td>ko,( otāl)-( à )/</td>
</tr>
<tr>
<td>[ko,( otāl)-( à )/]</td>
<td>[ko,( otāl)-( à )/]</td>
<td>[ko,( otāl)-( à )/]</td>
</tr>
<tr>
<td>‘to count you-sg’</td>
<td>‘to count you-sg’</td>
<td>‘to count you-sg’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Empty C-stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>ko,( tala)/</td>
</tr>
<tr>
<td>[ko,( tala)/]</td>
</tr>
<tr>
<td>‘to govern me’</td>
</tr>
</tbody>
</table>

Therefore, the segmental rules indicate that the empty C deletes in the middle of the word-level phonology.
4.5 Conclusion

This chapter has demonstrated strong evidence supporting the existence of an empty root node unspecified for features. There is both phonological and phonetic evidence for positing the empty C. Moreover, empty C data has been posited for a wide variety of languages. Such data provides evidence for autosegmental representations, and leads us to consider alternative definitions of underspecification. While I have chosen to analyze Kikamba empty C data in a derivational framework, such data can potentially contribute to the discussion of nonderivational theories of phonology such as Optimality theory as well.
CHAPTER 5

TONE

5.1 Introduction

In this chapter I describe and analyze the tone system of Kikamba. In §5.2, I discuss the features required to describe the four tones in Kikamba. I also explain the general tone rules that apply throughout the language: [+extreme]-Spread 1, [+extreme]-Spread 2, [+upper]-Spread, and Rising tone neutralization. In §5.3, I describe the verbal tone patterns, which can be accounted for by the three principles of V2H tone assignment, Final tone assignment, and Penultimate L tone assignment, as well as the general tone rules. I also introduce the Phrasal SL tone, a tone which is associated with assertive verbs. Finally, I discuss several effects in Kikamba which can be attributed to the Obligatory Contour Principle. In §5.4, I describe the tone patterns found in nouns. I show how the surface patterns provide evidence for the same general tone rules active in the verbal system. In addition, I show that agent nominalizations derived from verbs have the same V2H tone assignment parameter seen in the verbal system. The topic of §5.5 is the syntax-phonology interface. I show how the feature [+extreme] is sensitive to the right edge of X-Max, but behaves differently depending on whether the tone is grammatical, lexical, or phrasal. I also present some final evidence demonstrating that SH and SL share the tone feature [+extreme].
5.2 The Kikamba tone system

Kikamba is a Bantu language with four tones: Super-Low (SL), Low (L),
High (H), and Super-High (SH). In (5.1), we see that all four tones can be found on the surface
in both nouns (5.1a-d) and verbs (5.1e-h).

(5.1)

a. SL (¨) e.i.à ‘lake’ ke.emà ‘hill’
b. L (unmarked) e.i.o ‘banana’ ngatata ‘wildebeest’
c. H (¨) nda.á ‘louse’ e.imá ‘hole’
d. SH (¨) e.i.á ‘weed’ kethímá ‘well’
e. SL notoka ‘to hit’ (infinitive)
f. L ndoto ‘that we may hit’ (subjunctive)
g. H toikaakona ‘we will not hit’ (future)
h. SH koyá ‘to eat’ (infinitive)

Of these four tones, the SH tone is interesting because it is a combination of the
features of the H tone and the SL tone. The feature representation can be seen in (5.2).

(5.2)

SH = [+upper, +extreme]
H = [+upper, -extreme]
L = [-upper, -extreme]
SL = [-upper, +extreme]

Rule 5.1 illustrates the underlying feature representations for Kikamba tones, assuming
the underspecification theory of Pulleyblank (1986).

---

1 When a Kikamba vowel is unmarked for tone, it is a L tone. In cases where it is necessary to
explicitly mark the presence of a L tone, it will be marked with a macron (¨).
Rule 5.1  Illustration of underspecified tonal representations

<table>
<thead>
<tr>
<th>Tonal</th>
<th>Tonal</th>
<th>Tonal</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+upper]</td>
<td></td>
<td>[+extreme]</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Super-Low</td>
</tr>
</tbody>
</table>

H is represented as [+upper] and SL is represented as [+extreme]. [+Upper] refers to primary register, and the feature [extreme] indicates a tone that is at the periphery of the tonal space. L is the unspecified default tone. SH is the combination of the features which define H and SL and is illustrated in Rule 5.2 as a tonal node which bears the two tone features [+extreme] and [+upper].

Rule 5.2  Illustration of a SH tone

Tonal

[+upper]  [+extreme]

Super-High

The evidence for this claim comes from the behavior of tones in certain phonological contexts. There are three tone sandhi rules which govern how tones surface. They apply throughout the grammar across all word classes. Two of these rules involve the spreading of the [+extreme] feature of the SL tone, and one involves the spreading of the [+upper] feature of the H tone.

5.2.1  General tone rules

The general tone sandhi rules in Kikamba provide evidence that the mora is the tone bearing unit. The first important point is that the SL tone in Kikamba has a limited
distribution: it is constrained to surface only at the right edge of a maximal projection. This constraint says to align the right edge of a SL tone with the right edge of X-Max, as seen in (5.3).

(5.3)  SL-Alignment  
       Align (SL,R,X_{max},R)  

(Odden and Roberts-Kohno, In press)

Given this constraint, any SL in a word is always found in final position since the end of a word constitutes a right edge. The infinitive is one grammatical context that requires a Final-SL tone, and the SL surfaces on the final vowel of the word. In the examples of infinitives in (5.4), stems of various lengths are given to show that the SL tone always surfaces on the final vowel.
Consonant-initial verb stems

a. CVC /ko-kon-à/ kokonà ‘to hit’
b. CVCV /ko-buly-à/ kobulyà ‘to grab’
c. CVCCVC /ko-bithok-à/ kobithokà ‘to come out of hiding’
d. CVCCVCV /ko-thoCcy-à/ kotho. syà ‘to sell’
e. CVCCVCVCV /ko-minukely-à/ kominukelyà ‘to finish off’
f. CVVCVC /ko-bóothoC-à/ kóóotho.à ‘to pierce’
g. CVVCVCV /ko-sóomethy-à/ kósóomethyà ‘to teach’
h. CVNCVC /ko-beNdok-à/ kobeendokà ‘to change-intr’
i. CVNCVCV /ko-taNdethy-à/ kotaandethyà ‘to trade’

Empty Consonant-initial verb stems

j. CVC /ko-Ceb-à/ ko.ebà ‘to pay’
k. CVCCVC /ko-Camok-à/ ko.amokà ‘to wake up’
l. CVCCVCVC /ko-CateCeC-à/ ko.ate.e.à ‘to follow’
m. CVNCVC /ko-CaNdek-à/ ko.aandekà ‘to write’
n. CVNCVCVC /ko-CaNdek-w-à/ ko.aandekwà ‘to be employed’
o. CVNCVCVCV /ko-CíNgCeC-à/ ko.inge.e.à ‘to take in cattle’

Vowel-initial verb stems

p. VC /ko-eC-à/ kwé.à² ‘to scrape out’
q. VCVC /ko-ékeCth-à/ kwéékethà ‘to hiccup’
r. VCVCV /ko-alany-à/ kwaalanyà ‘to plan, arrange’
s. VCVCVC /ko-élékel-à/ kwéelekélà ‘to face towards’
t. VNCVC /ko-oNgel-à/ kwoongelà ‘to increase’

In (5.5), we have examples of verbs ending in grammatical SL tone which are followed
by modifiers. When a head is followed by a modifier, the constraint which says SL has to
occur at a right edge is violated. And just in case this happens, the SL tone, i.e. the feature
[+extreme], deletes from the verb as seen in (5.5). The modifiers which follow the verbs
are the nouns ma.i.o ‘bananas’ and ngókó ‘chickens’ and their tones do not change in any
way as a result of the deletion of the SL tone in the preceding head verb. Deletion of SL
tone is important because it reveals the nature of a SH tone as being a combination of the
tone features of [+upper] and [+extreme], as will be seen shortly.

² We might expect this form to surface as: kwéé.à. However this is the context where Sequential
Shortening applies, so the surface form is kwé.à, with SL surfacing only on the final vowel. See
Chapter 4.
(5.5)  

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kokonà</td>
<td>'to hit'</td>
<td>kokona maio</td>
</tr>
<tr>
<td>b. kobulyà</td>
<td>'to grab'</td>
<td>kobulya ngókó</td>
</tr>
</tbody>
</table>

If the penultimate syllable of the infinitive is long, the SL tone surfaces not only on the final vowel, but also on the penultimate mora. That is to say, a SL tone will spread leftward to a penultimate mora just in case that syllable is long. Examples of various stem lengths are seen in (5.6).

(5.6)  

Consonant-initial verb stems  

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a. CVVC</td>
<td>/ko-beeb-à/</td>
<td>kobèebà</td>
</tr>
<tr>
<td>b. CVVCV</td>
<td>/ko-kuuCy-à/</td>
<td>kokuusyà</td>
</tr>
<tr>
<td>c. CVCVVC</td>
<td>/ko-sitaak-à/</td>
<td>kositaakà</td>
</tr>
<tr>
<td>d. CVNC</td>
<td>/ko-suNg-à/</td>
<td>kosuungà</td>
</tr>
<tr>
<td>e. CVCVNC</td>
<td>/ko-tál-aNg-à/</td>
<td>kotálaangà</td>
</tr>
</tbody>
</table>

Empty consonant-initial verb stems  

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>f. CVVC</td>
<td>/ko-Cook-à/</td>
<td>koocokà</td>
</tr>
<tr>
<td>g. CVVCV</td>
<td>/ko-CaaCy-à/</td>
<td>koaasyà</td>
</tr>
<tr>
<td>h. CVCVVC</td>
<td>/ko-Calioł-à/</td>
<td>koalyolà</td>
</tr>
<tr>
<td>i. CVNC</td>
<td>/ko-CëNd-à/</td>
<td>koëndà</td>
</tr>
</tbody>
</table>

Vowel-initial verb stems  

<p>| | | |</p>
<table>
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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>j. VC</td>
<td>/ko-ath-à/</td>
<td>kwaàthà</td>
</tr>
<tr>
<td>k. VCV</td>
<td>/ko-aCy-à/</td>
<td>kwaasyà</td>
</tr>
<tr>
<td>l. VCVVC</td>
<td>/ko-úmaal-à/</td>
<td>kuúmaalà</td>
</tr>
<tr>
<td>m. VCVVCV</td>
<td>/ko-ësiily-à/</td>
<td>kwësiìlyà</td>
</tr>
<tr>
<td>n. VNCVVC</td>
<td>/ko-ôNbooK-à/</td>
<td>kóombooKà</td>
</tr>
<tr>
<td>o. VNC</td>
<td>/ko-eNd-à/</td>
<td>kwëndà</td>
</tr>
<tr>
<td>p. VCVNC</td>
<td>/ko-ânaNg-à/</td>
<td>kwâanaangà</td>
</tr>
<tr>
<td>q. VNCVNC</td>
<td>/ko-anGaNg-à/</td>
<td>kwaangaangà</td>
</tr>
</tbody>
</table>

The behavior of long penultimate syllables also demonstrates that the mora is the tone bearing unit in Kikamba. When the feature [+extreme] spreads leftward to the long penultimate syllable, only the penultimate mora surfaces as SL, not the entire syllable.

The spreading of [+extreme] is a manifestation of a constraint which says SL is prohibited from following a long syllable. The constraint is illustrated in Rule 5.3 and is satisfied, as we have seen in (5.6), by the spreading of [+extreme] leftward.
Evidence that the tone on both the penultimate and final moras are the same tone comes from the behavior of the tone when a complement follows the verb. If a verb ending in a SL tone is followed by a complement, this violates the constraint requiring SL to occur at the right edge of X-Max. When the head is followed by a modifier as in (5.7), the feature [+extreme] deletes. Thus, the SL tone on both syllables is the same SL tone because they both delete with a following modifier.

(5.7)  
\begin{itemize} 
\item a. kosuùngà 'to guard' 
\item b. kokuùsyà 'to pull' 
\end{itemize}
\begin{itemize} 
\item kosuunga ma.i.o 'to guard bananas' 
\item kokuusya ngókó 'to pull chickens' 
\end{itemize}

The first rule spreading the feature [+extreme] is formulated as Rule 5.4.

Rule 5.4  
\begin{itemize} 
\item [+extreme]-Spread 1 
\end{itemize}

---

1 This rule is a modified version of SL-Spread (Roberts-Kohno 1996, 1999).
After the [+extreme] feature of the SL tone spreads leftward to the long penultimate syllable, a second tone spreading rule applies. Just in case the first mora of the long syllable bears a H tone, [+extreme] spreads leftward to the H-tone mora. When the features of a H tone and a SL tone are on the same mora, the resulting tone is a SH tone. Thus, in all the examples in (5.8), the antepenultimate mora has a SH tone.

(5.8) Consonant-initial verb stems
a. CVVC /kō-bōt-ā/ kobōtà ‘to accomplish’
b. CVVCV /kō-kōsorny-ā/ kokōsornyà ‘to greet’
c. CVNC /kō-kōnza/ kokōnza ‘to fold’

Empty consonant-initial verb stems
d. CVVC /kō-Cēt-ē/ kō.Cētè ‘to bring’
e. CVVCV /kō-Cīoly-ā/ kōsyōolyà ‘to peel’
f. CVNC /kō-liNg-ā/ kōliNgà ‘to take in cattle’

Vowel-initial verb stems
g. VVC /kō-ōk-ā/ kōkà ‘to come’

(5.9) shows that the presence of a modifier once again induces deletion of the feature [+extreme]. And in the absence of the feature [+extreme], the SH on the penultimate syllable surfaces as a plain H, which supports the claim that a SH tone is the combination of the features [+upper] and [+extreme].

(5.9) a. kosyōōlā ‘to peel’ kosyōola ma.i.o ‘to peel bananas’
b. kokēēthya ‘to greet’ kokēēthya ngōkō ‘to greet chickens’

This rule of [+extreme]-Spread 2 is formulated as Rule 5.5.
Rule 5.5  \([+\text{extreme}]-\text{Spread} 2^4\)

\[
\begin{array}{c}
[+\text{upper}] \\
\text{Tonal} \\
\mu \\
\end{array}
\begin{array}{c}
[+\text{extreme}] \\
\text{Tonal} \\
\mu \\
\end{array}
\]

In addition, alternate pronunciations of the same phrase further support the rule of \([+\text{extreme}]-\text{Spread} 2\), and of SH being composed of the features \([+\text{extreme}]\) and \([+\text{upper}]\). In the copula constructions in (5.10), the verb \textit{ne} can be pronounced as either H or SH. It may only be pronounced as SH if \([+\text{extreme}]\) has spread leftward by \([+\text{extreme}]-\text{Spread} 1\) and \([+\text{extreme}]-\text{Spread} 2\). This indicates that, while all V+V combinations must undergo syllable fusion at the phrase level, the tone rule of \([+\text{extreme}]-\text{Spread} 1\) is optional.\(^5\) In other words, \([+\text{extreme}]-\text{Spread} 1\) is optional at the phrase level after syllable fusion has occurred.\(^6\) After phrase-level syllable fusion, \([+\text{extreme}]-\text{Spread} 1\) may spread first to the long penultimate syllable, and then to the mora specified as \([+\text{upper}]\), in which case the result is a SH tone. If \([+\text{extreme}]-\text{Spread} 1\) does not occur, \([+\text{extreme}]-\text{Spread} 2\) cannot occur because the structural description of the rule is not met. Thus, SL remains solely on the final mora of the phrase. Compare the two pronunciations of the phrases in (5.10a,b). In addition, compare (5.10a,b) to (5.10c), which has only one pronunciation. Since the

\(^4\) This rule spreads \([+\text{extreme}]\) to a preceding H-tone mora whether it is in the same syllable or not. This is modified from the Roberts-Kohno (1996,1999) account which used Raising to handle this data.

\(^5\) Syllable fusion occurs across word boundaries, resyllabifying a word-initial vowel with a preceding word-final vowel. See Roberts-Kohno 1995 and Chapter 3 for a complete explanation of syllable fusion.

\(^6\) Within words, \([+\text{extreme}]\) spread is always obligatory when a SL tone follows either a long vowel or a H-tone syllable.
penultimate syllable is short and L-toned in (5.10c), [+extreme] spread is not an option. In this case, the H on né may only surface as plain H.

\[
\begin{array}{lll}
\text{(5.10)} & \text{a. etù} & \text{‘cloud’} & \text{néetù} \sim \text{nèètù} & \text{‘its a cloud’} \\
& \text{b. ekò} & \text{‘big leopard’} & \text{nèekò} \sim \text{nèèkò} & \text{‘its a big leopard’} \\
& \text{c. ke.emà} & \text{‘hill’} & \text{nè ke.emà} & \text{‘its a hill’}
\end{array}
\]

Finally, there is one other rule which relates to the SL tone, which is exemplified by the data in (5.11). Just as in (5.8) and (5.9), the feature [+extreme] from the SL tone on the final mora of the verb spreads leftward to an adjacent H-tone mora. But in these examples, the H and SL tone are on adjacent, monomoraic syllables. Just in case H and SL are on adjacent monomoraic syllables, [+upper] spreads rightward as well, resulting in two SH-tone syllables, as seen in (5.11).
(5.11) Consonant-initial verb stems

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. CV</td>
<td>/ko-bi-à/</td>
<td>kobyà⁷</td>
<td>‘to be burned-intr’</td>
</tr>
<tr>
<td>b. CVC</td>
<td>/ko-tál-à/</td>
<td>kotálà</td>
<td>‘to count’</td>
</tr>
<tr>
<td>c. CVCV</td>
<td>/ko-kóCy-à/</td>
<td>kokósyà</td>
<td>‘to chase’</td>
</tr>
<tr>
<td>d. CVVC</td>
<td>/ko-tóaC-à/</td>
<td>kotwà.à⁸</td>
<td>‘to take away’</td>
</tr>
</tbody>
</table>

Empty consonant-initial verb stems

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>e. CV</td>
<td>/ko-Cé-à/</td>
<td>koyà</td>
<td>‘to eat’</td>
</tr>
<tr>
<td>f. CVC</td>
<td>/ko-Câth-à/</td>
<td>ko.âthà</td>
<td>‘to shoot’</td>
</tr>
<tr>
<td>g. CVVC</td>
<td>/ko-CíaC-à/</td>
<td>kosyà.à</td>
<td>‘to produce’</td>
</tr>
</tbody>
</table>

Vowel-initial verb stems

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>h. VC</td>
<td>/ko-bi-à/</td>
<td>kwóbà⁹</td>
<td>‘to tie’</td>
</tr>
<tr>
<td>i. VCV</td>
<td>/ko-éty-à/</td>
<td>kwéétyà</td>
<td>‘to request’</td>
</tr>
<tr>
<td>j. VNC</td>
<td>/ko-ÉNz-à/</td>
<td>kwéênzà</td>
<td>‘to shave’</td>
</tr>
</tbody>
</table>

Evidence that the SH tone is attributable to a combination of the features [+upper] and [+extreme] comes from their behavior when a complement follows. The presence of a complement induces deletion of the SL on the final mora of the verb. When the [+extreme] feature is gone, only the feature [+upper] remains and a plain H surfaces on the penultimate syllable, as seen in (5.12).

(5.12) a. kotálà | ‘to count’ | kotálà ma.i.o | ‘to count bananas’
| b. kobîthà | ‘to hide’ | kobîtha ngókó | ‘to hide chickens’

The rule [+upper]-Spread is formulated as Rule 5.6.

---

⁷ This form surfaces with a short vowel due to pre-pausal shortening of long vowels. This is also the case with (5.11e) koyà ‘to eat.’

⁸ Although the H is on the antepenultimate mora, vowel coalescence and Sequential shortening (See Chapter 4) leave H and SL on adjacent moras, which is the environment where [+upper]-Spread and [+extreme]-Spread 2 are applicable. This is also true for (5.11g) kosyà.à ‘to produce.’

⁹ Rising tone neutralization applies in (5.11h-j) resulting in a level SH penultimate syllable.
Rule 5.6 [+upper]-Spread\textsuperscript{10}

Moreover, since H-tone verbs with a long penultimate syllable behave differently from those with a short penultimate syllable, this provides evidence for the mora as the tone bearing unit. If the syllable were the tone bearing unit, we would not expect the difference in tone pattern we find in the minimal pair in (5.13).

(5.13) a. kotôlâ  
    b. kotôôlâ  

(5.14) summarizes the general tone rules.

(5.14) Summary of general tone rules
[-extreme]-Spread 1: [+extreme] spreads leftward to the second mora of a long penultimate syllable.
[-extreme]-Spread 2: [+extreme] spreads leftward to an adjacent H-tone mora.
[+upper]-spread: [+upper] spreads rightward to an adjacent SL-tone mora.

\textsuperscript{10} This is a modified version of SH-Doubling (Roberts-Kohno 1996, 1999).
5.2.2 Rising tone neutralization

In Kikamba, there are a variety of contexts where a mora is followed by a mora which bears a higher tone in the same syllable. Theoretically, this would result in a syllable with a rising tone. However, tautosyllabic rising tones are prohibited in Kikamba. A principle of Rising tone neutralization (RTN) is active which causes such tone sequences to be resolved into level tones. Thus, whenever a mora is followed by a mora which bears a higher tone, the tonal node of the second mora in the syllable spreads leftward, creating a level tone. This rule is formalized as Rule 5.7.

Rule 5.7 Rising tone neutralization

The first context where Rising tone neutralization is applicable is when a L-tone and a H-tone morpheme come together due to morpheme concatenation. For example, the infinitive prefix and several object prefixes have a L tone on the surface. When these prefixes precede a H-toned, vowel-initial verb stem, the syllables coalesce, as explained in Chapter 3. In the absence of other applicable principles, the syllable should surface with a rising tone. However, in this context, a level H tone surfaces. Examples are seen in (5.15).
(5.15) RTN Context 1: Prefix + verb stem

a. /ko-ák-an-eC-à/ kwáákane.à *kwáákane.à ‘to build for e/o’
b. /ko-mo-ák-eC-à/ komwááke.à *komwááke.à ‘to build for him’
c. /ko-me-ák-eC-à/ komyááke.à *komyááke.à ‘to build for them’ (cl.4)

Moreover, if the H-tone syllable is also the penultimate syllable, and a final grammatical SL is assigned, as it is for infinitives, then the L-tone syllable surfaces as level SH, due to the rules of [+extreme]-Spread 2 and [+upper]-Spread from §5.2.1. Examples are seen in (5.16).

(5.16) a. /ko-5n-a/ kw55na *kw3ona ‘to see’
b. /ko-âk-à/ kwâaka *kwaâkâ ‘to build’
c. /ko-mo-5n-à/ komw55na *komwoona ‘to see him’
d. /ko-me-oNb-à/ komyoomba *komyo6mba ‘to mold them’ (cl.4)

Neutralization of a rising tone where the first of two moras has a H tone also indicates that Rising tone neutralization necessarily follows the application of the other tone rules seen in §5.2.1. In the example in (5.17), the object prefix surfaces with a SH tone, not a H tone. This indicates that after [+upper]-Spread and [+extreme]-Spread 2, the SH spreads leftward to the first mora of the long vowel kēé.

(5.17) /ko-ké-ék-à/ kokéékâ *kokééka ‘to possess it’ (cl.7)

There are also cases where Rising tone neutralization is apparently not applicable between a prefix and a stem. These are cases which look like rising syllables on the surface, but are actually cases of bisyllabic sequences separated by an empty C. Examples are found in (5.18).

(5.18) a. /ko-má-óm-à/ komá.ómá ‘to bite them’
b. /ko-mo-óm-à/ komo.ómá ‘to bite him’
Furthermore, *ai* and *au* sequences do not coalesce within words, either segmentally or tonally. Thus, examples such as (5.19) demonstrate the behavior of *ai* and *au*. Even though these are verb stems which normally coalesce with a prefix, a rising tone remains on the surface with the addition of *má*.

(5.19) a. /ko-má-ít-à/ komáiîta ‘to strangle them’
    b. /ko-má-úmy-à/ komáúmyà ‘to take them out’

The second context where Rising tone neutralization is applicable is within a syllable in a verb stem, as will be seen in §5.3. One principle which is applicable in certain tenses is the insertion of a H tone on the second mora of the verb stem. Evidence that the H is inserted on the second mora and not the second syllable is that in verb stems with an initial long vowel, the H surfaces in the first syllable, not the second. Rising tone neutralization is necessary to explain these forms because L-tone verb stems surface with a level H tone on the first syllable in tenses which take a V2H tone. Examples from the imperative, a tense which takes a grammatical V2H tone, are seen in (5.20).

(5.20) RTN Context 2: Verbs with an initial long vowel in the Imperative, a V2H tense
    a. /sóNg-a/ sóonga *sōongâ ‘dance!’
    b. /baNd-a/ báanda *baandâ ‘plant!’

The third context where Rising tone neutralization is applicable is when a L-tone syllable and a H-tone syllable coalesce at the phrase level. Examples form Chapter 3 are repeated in (5.21).

(5.21) RTN Context 3: Phrase-level coalescence
    a. /ebulâ ébálókéété/ ebulêgêbálókéété ‘fallen blanket’
    b. /tê moema ōtálelé/ tê moemōsštâlelé ‘its not moema you-sg counted’
In the next sections, these general tone rules are seen to explain the patterns found in the verbal and nominal systems.

5.3 Tone patterns in verbs

Verb stems have a number of different tone patterns on the surface, depending on the tense, aspect and clause type that the verb appears in. In Chapter 2 we saw that the verb stem is the part of the verb beginning with the verb root, and including the suffixes. In fact, there are 17 verb stem tone patterns in Kikamba. However, far from being a random collection of unrelated patterns, this range of melodies emerges from the interaction of a small set of independent tone assignment parameters with the general tone rules given in §5.2. In addition, there is a phrase-level tone assignment parameter which assigns a SL tone to affirmative, main clause, i.e., assertive, verbs. This section explains the system of morphologically-induced tone melodies. The grammatical tone assignment principles at work are outlined in (5.22). Some tenses make use of only one of these parameters, while others combine parameters.

(5.22) Grammatical Tone Assignment Principles
1. Melodic V2-High (henceforth, V2H) tone assignment:
   Assign a H tone to the second μ of the verb stem.
2. Final tone assignment:
   Assign a H, L, SL, SH, or H/SL Falling tone to the final μ of the verb stem.
3. Penultimate L tone assignment:
   Assign a L tone to the penultimate μ of the verb stem.

In Kikamba, as in many Bantu languages, tense-aspect distinctions are marked not only by selection of appropriate prefixes and suffixes, but also by the stem tone pattern. Kikamba has a large number of tone patterns available to it partially because, unlike other Bantu languages, Kikamba has four surface tones. The verbs in Table 5.1 demonstrate the 17 surface tone melodies for verb stems, using the lexically H-tone verb stem talaang, meaning ‘count randomly.’ In the first example in Table 5.1, talaange is the verb stem.
In the second column are the principles which generate the tone pattern. These principles are discussed in detail below. The third column identifies the relevant tense/aspect information, as well as the gloss of the example.
Table 5.1: Tone patterns in Kikamba verb stems

<table>
<thead>
<tr>
<th>Tone pattern on verb stem</th>
<th>Applicable principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. tó[ talaangsé</td>
<td>Lexical tone deletes</td>
</tr>
<tr>
<td></td>
<td>‘that we may count’</td>
</tr>
<tr>
<td></td>
<td>subjunctive</td>
</tr>
<tr>
<td>2. moondóóól5kaa[ talaanga</td>
<td>Lexical tone</td>
</tr>
<tr>
<td></td>
<td>‘man who will count’</td>
</tr>
<tr>
<td></td>
<td>future, 3s A/RC</td>
</tr>
<tr>
<td>3. moondóólá twaa[ talaángilé</td>
<td>Lexical tone, V2H</td>
</tr>
<tr>
<td></td>
<td>‘man we counted’</td>
</tr>
<tr>
<td></td>
<td>remote perf, A/RC</td>
</tr>
<tr>
<td>4. toikaal talaangá</td>
<td>Lexical tone, F-H</td>
</tr>
<tr>
<td></td>
<td>‘we will not count’</td>
</tr>
<tr>
<td></td>
<td>future, N/MC</td>
</tr>
<tr>
<td>5. ko[ talaànga</td>
<td>Lexical tone, F-SL</td>
</tr>
<tr>
<td></td>
<td>‘to count’</td>
</tr>
<tr>
<td></td>
<td>infinitive</td>
</tr>
<tr>
<td>6. tó[ talaánga.ā</td>
<td>Lexical tone, V2H, F-SL</td>
</tr>
<tr>
<td></td>
<td>‘we don’t always count’</td>
</tr>
<tr>
<td></td>
<td>habitual, N/MC</td>
</tr>
<tr>
<td>7. [ talaάånga</td>
<td>Lexical tone, V2H, F-L</td>
</tr>
<tr>
<td></td>
<td>‘count!’</td>
</tr>
<tr>
<td></td>
<td>imperative</td>
</tr>
<tr>
<td>8. twaa[ talaάånga</td>
<td>Lexical tone, V2H,</td>
</tr>
<tr>
<td></td>
<td>Final-SH</td>
</tr>
<tr>
<td></td>
<td>‘when/after we count’</td>
</tr>
<tr>
<td></td>
<td>subsequent/future cond</td>
</tr>
<tr>
<td>9. moondóóól5o[ talaángéete</td>
<td>Lexical tone, V2H, Penult-L</td>
</tr>
<tr>
<td></td>
<td>‘man who has counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal stat, 3s A/RC</td>
</tr>
<tr>
<td>10. moondóólá tó [talaángilé</td>
<td>Lexical tone, V2H, Penult-L, Final-H</td>
</tr>
<tr>
<td></td>
<td>‘man who we counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal perf, A/RC</td>
</tr>
<tr>
<td>11. toif talaángéete</td>
<td>Lexical tone, V2H, Penult-L, Final-H/SL</td>
</tr>
<tr>
<td></td>
<td>‘we have not counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal stat, N/MC</td>
</tr>
<tr>
<td>12. nétónáa[ talaangilé</td>
<td>Lexical tone, Ph-SL</td>
</tr>
<tr>
<td></td>
<td>‘we counted’</td>
</tr>
<tr>
<td></td>
<td>hesternal perf, A/MC</td>
</tr>
<tr>
<td>13. nétwáal talaángílê</td>
<td>Lexical tone, V2H, Ph-SL</td>
</tr>
<tr>
<td></td>
<td>‘we counted’</td>
</tr>
<tr>
<td></td>
<td>remote perf, A/MC</td>
</tr>
<tr>
<td>14. nétó[ talaanga.ā</td>
<td>Lexical tone, F-H, Ph-SL</td>
</tr>
<tr>
<td></td>
<td>‘we always count’</td>
</tr>
<tr>
<td></td>
<td>habitual, A/MC</td>
</tr>
<tr>
<td></td>
<td>‘we have counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal stat, A/MC</td>
</tr>
<tr>
<td>16. nóoo[ talaángéette</td>
<td>Lexical tone, V2H, Penult-L, Phrasal-SL</td>
</tr>
<tr>
<td></td>
<td>‘he has counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal stat, 3s A/MC</td>
</tr>
<tr>
<td>17. nóoo[ talaángílê</td>
<td>Lexical tone, V2H,</td>
</tr>
<tr>
<td></td>
<td>Final-L, Phrasal-SL</td>
</tr>
<tr>
<td></td>
<td>‘he counted’</td>
</tr>
<tr>
<td></td>
<td>hodiernal perf, 3s A/MC</td>
</tr>
</tbody>
</table>
Kikamba has a lexical distinction between H-tone verbs and toneless verbs.11 However, there is one tense where the lexical H tone deletes and therefore, all verb stems surface as toneless. This tense is the subjunctive. Examples of verbs with a H tone which surface as toneless are seen in (5.23).

\[(5.23) \text{Infinitive} \quad \begin{array}{ll} \text{a. kotála} & \text{Subjunctive} \\
\text{b. komfílà} & \text{to count} \quad \text{tó} \text{falaange} \quad \text{‘that we may count’} \\
\text{c. kosáno.à} & \text{‘to twist’} \quad \text{miile} \quad \text{‘that we may twist’} \\
\text{‘to comb’} & \text{tó} \text{f sano.e} \quad \text{‘that we may comb’} \\
\end{array}\]

All other tenses have a distinction between H-tone and toneless verb stems. In H-tone verb stems, the H is assigned to the first stem mora. In the infinitives in (5.24), the verb stems have an initial long vowel which surfaces with a falling tone, and not a level H tone. If the syllable were the tone bearing unit, it might be expected that the initial syllable of the verb stems in (5.24) would surface with a level H tone, but instead the first syllable surfaces as a falling tone. While such data does not prove the mora is the tone bearing unit, it supports the analysis.

\[(5.24) \begin{array}{ll} \text{a. kosómethyà} & \text{‘to teach’} \\
\text{b. kotáambokà} & \text{‘to travel around, take a journey’} \end{array}\]

Certain tenses are characterized only by the presence of the lexical tone pattern, as seen in (5.25). Thus, verb stems either surface with a L tone, as seen in the examples with the toneless verb stem kon ‘hit,’ or with a H tone on the first stem mora, as seen in the examples with the H-tone verb stem tál ‘count.’

\[11\text{I assume verbs which surface with a L tone are toneless underlingly and receive a L tone by default. However, for convenience I refer to these verbs as L-tone verbs.}\]
Lexical tone pattern

Future, 3s relative clause
a. moondôólôokaal kona 'man who will hit'
b. moondôólôokaal tala 'man who will count'

Future, 3s negative relative clause
c. moondôólôotákaal kona 'man who will not hit'
d. moondôólôotákaal tala 'man who will not count'

Immediate past, 3s relative clause
e. moondôolâ wââal kona 'man who just hit'
f. moondôolâ wââal tala 'man who just counted'

Habitual, 3s relative clause
g. moondôólôokal kona.a 'man who always hits'
h. moondôólôokal tala.a 'man who always counts'

Before continuing with an explanation of the tone patterns, I explain the relative clause forms in this section. Most relative clause forms will have the structure: moondô ôlâ + verb. This means 'man/person who...'. The form ôlâ precedes a subordinate clause verb. The stem is là and the prefix ô is used because it agrees with the head noun moondô. The two words moondô and ôlâ coalesce which is why a long, level H-tone syllable results: moondôólâ. This is explained by the general tone rules in §5.2: SL on moondô deletes because lexical SL may only occur at the right edge of a maximal projection. Furthermore, when moondo and ôlâ coalesce, a rising tone is created on a syllable, which is prohibited and thus repaired by Rising tone neutralization (see §5.2.2). In addition, the third person, singular subject prefix is ô. When là coalesces with ô, it creates the long syllable lôo in (5.25a-d,g,h) by the rule of Mid vowel fusion (see §3.4.1.3). In (5.25e,f), the subject prefix ô coalesces with the tense/aspect prefix a, resulting in the pronunciation wââ in the subordinate verb.

5.3.1 Tone assignment principle 1: Melodic V2H tone assignment

The next set of verbs exhibits the first grammatical tone assignment principle: Melodic V2H tone assignment. This principle does two things. First, it assigns a H tone
to the second mora of a verb stem. Second, this H tone spreads rightward to a following vowel and will continue to spread until it reaches a mora that already bears a tone. I first show that the V2H spreads, and then provide the evidence that this H tone is assigned to the second mora.

In the examples in (5.26), the V2H is the only tone assigned to the verb stem, besides the initial H tone in H-tone verb roots. Thus, the V2H should spread to the end of the verb. And as seen in (5.26), regardless of the length of the verb stem, all vowels after and including the second mora bear a H tone. Recall from Chapter 2 that verbal extensions are very productive, and have a fairly free order after the verb root. As a result, it is simple to generate many forms within a tense of varying length to demonstrate that the V2H spreads.

(5.26) V2H tone pattern
Remote perfective, relative clause
a. moondóólá twaa[ koní.é]  ‘man who we hit’
b. moondóólá twaa[ táli.lé]  ‘man who we counted’
c. moondóólá twaa[ koné.í.é]  ‘man who we hit for’
d. moondóólá twaa[ táli.élé]  ‘man who we counted for’
e. moondóólá twaa[ konéthísyé]  ‘man who we caused to hit’
f. moondóólá twaa[ táliéthísyé]  ‘man who we caused to count’
g. moondóólá twaa[ konáné.í.é]  ‘man who we hit for e/o’
h. moondóólá twaa[ táliáné.í.élé]  ‘man who we counted for e/o’
i. moondóólá twaa[ konáángí.é]  ‘man who we hit a little’
j. moondóólá twaa[ táliáangílélé]  ‘man who we counted randomly’
k. moondóólá twaa[ konáángé.í.élé]  ‘man who we hit a little for’
l. moondóólá twaa[ táliáangé.ílélé]  ‘man who we counted randomly for’
m. moondóólá twaa[ konáángéthísyé]  ‘man who we caused to hit a little’
n. moondóólá twaa[ táliáangéthísyé]  ‘man who we caused to count randomly’
o. andwáálá twaa[ konáángáangéthísyé]  ‘men who we caused to hit e/o a little’
p. andwáálá twaa[ táliáangáangéthísyé]  ‘man who we caused to count e/o randomly’

This is not the only tense marked by V2H tone assignment. Other examples are seen in (5.27).
In all the examples in (5.26) and (5.27), the second mora of the verb stem is also the second syllable. In order to demonstrate that the H tone is assigned to the second mora and not the second syllable, it is necessary to look at verb roots with initial long vowels. Since the second mora and the second syllable are different vowels, these verb stems show that the V2H is assigned to the mora. Consider the remote stative forms of the H-tone verb komiïlå ‘to twist’ and the L-tone verb kotuùtà ‘to sweep’ in (5.28). If the V2H is assigned to the syllable, then it should surface on the second syllable of the verb stem. If the V2H is assigned to the mora, then it should surface on the second mora of a long vowel, which is in the first syllable of the verb stem.

The first column in (5.28) represents the behavior of verbs in Kikamba. For H-tone verbs, an initial long vowel surfaces as level H tone and not as a Falling tone. For L-tone verbs, the first syllable surfaces with a H tone not with a L tone. In fact, with the addition of a V2H tone to a L-tone long vowel, the entire syllable surfaces as a level H tone, not as a rising tone. Due to the rule of Rising tone neutralization discussed in §5.2.2, a H tone cannot surface on the second mora of a long vowel alone: it must spread leftward to the first mora of the long vowel, resulting in a level H tone. Thus, the behavior of verb roots with initial long vowels show that the V2H tone is assigned to the second mora, and not the second syllable.
(5.29) provides additional examples of V2H tone assignment and V2H tone spread from other tenses: the future, the imperative, and the hodiernal perfective tenses. While these tenses have other tone assignment principles at work which will be discussed in later sections, the other tones are ignored for the moment. This data confirms that the V2H is assigned to the second mora, and not the second syllable. In (5.29a-d,g,h), a L-tone verb surfaces with a level H tone on the first syllable of the verb stem. In (5.29e,f), a H-tone verb surfaces with a level H tone on the first syllable of the verb stem.

(5.29) Infinitive

<table>
<thead>
<tr>
<th>Future, assertive</th>
<th>V2H on second mora</th>
<th>V2H on second syllable</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kotuũtà</td>
<td>tokaa[ tuútútútã</td>
<td>*tokaa[ tuutûtútã      ‘we will sweep sloppily’</td>
</tr>
<tr>
<td>Imperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. kobeendo.ã</td>
<td>[ bêéndó.a</td>
<td>*[ beendó.a            ‘change!’</td>
</tr>
<tr>
<td>c. kobaãndã</td>
<td>[ béanda</td>
<td>*[ baandã             ‘plant!’</td>
</tr>
<tr>
<td>d. koñeènã</td>
<td>[ néeña</td>
<td>*[ néeñã              ‘lick!’</td>
</tr>
<tr>
<td>e. kobĩŋgã</td>
<td>[ bíŋgã</td>
<td>*[ bíŋgã              ‘shut!’</td>
</tr>
<tr>
<td>f. kosôôngã</td>
<td>[ sóôngã</td>
<td>*[ sóongã             ‘dance!’</td>
</tr>
<tr>
<td>Hodiernal perfective, assertive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. kosuũngã</td>
<td>nětó[ suũngiê</td>
<td>*nětó[ suungiê       ‘we guarded’</td>
</tr>
<tr>
<td>h. kobaãndã</td>
<td>němã[ báandiê</td>
<td>*němã[ baandiê       ‘they planted’</td>
</tr>
</tbody>
</table>

Forms with melodic V2H tone assignment can be accounted for by two rules. First, Rule 5.8a assigns a H tone to the second mora of the verb stem. This V2H subsequently spreads rightward by Rule 5.8b.

Rule 5.8 V2H tone rules

```
  H
  |
  |
[stem] µ µ
   µ µ
```

a. V2H tone assignment  b. V2H tone spread (iterative)

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The V2H tone is the only tone which is allowed to spread in Kikamba, which raises the question of why other tones do not spread. One possibility is that other tones, such as lexical tones, must remain linked only to those vowels which they are underlyingly associated with. Thus, since this V2H tone is a melodic tone not underlyingly associated with any vowels, it is allowed to spread. There are other melodic tones, as will be seen in the next section. All melodic tones except for the penultimate L tone are linked to the final vowel, so there are no vowels available for the tone to spread to. Since the penultimate L is followed by a vowel, it is theoretically possible for the L tone to spread. However, there is no way to tell whether the penultimate L tone spreads or not. If there is no tone assigned to the final vowel, either the penultimate L spreads right, or the final vowel receives a L tone by default. Thus, there are no alternations showing that a penultimate L tone spreads.

5.3.2 Tone assignment principle 2: Final tone assignment

The second grammatical principle assigns a tone to the final vowel of the verb: the possible final tones are SL, SH, H, L, and a Falling tone. The data in (5.30) provide examples of tenses which are assigned a final H tone.

(5.30) Final H tone pattern
Future, negative
a. toikaa[ konaná  ‘we will not hit e/o’
b. toikaa[ tálanelá  ‘we will not count for e/o’
Consecutive
c. twáa[ konaná    ‘then we hit e/o’
d. twáa[ tálanelá   ‘then we counted for e/o’
Immediate past, relative clause
c. moondóólá twáa[ koná  ‘man who we just hit’
d. moondóólá twáa[ tálá  ‘man who we just counted’
Habitual, relative clause
e. moondóólá to[ kona.á  ‘man who we always hit’
f. moondóólá to[ tála.á  ‘man who we always count’
Another tone which can be assigned to the final mora of the verb is a SL tone. (5.31) provides examples of tenses in which a SL tone is assigned to the final mora of the verb. Tenses which are assigned a final SH, L, or Falling tone are covered in the next section.

(5.31) Final SL tone pattern

<table>
<thead>
<tr>
<th>Progressive, negative</th>
<th>Infinitive</th>
<th>Remote perfective, negative</th>
<th>Hodiernal perfective, negative relative clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. totē.o[kona.à</td>
<td>c. ko[koàn</td>
<td>e. tôyāā[konanā</td>
<td>g. moondōōlā toinaa[konethyà</td>
</tr>
<tr>
<td>‘we haven’t been hitting’</td>
<td>‘to hit’</td>
<td>‘we didn’t hit e/o’</td>
<td>‘man who we didn’t cause to hit’</td>
</tr>
<tr>
<td>b. totē.o[tala.à</td>
<td>d. ko[tálanè</td>
<td>f. tôyāā[ tálanè</td>
<td>h. moondōōlā toinaa[tálethyà</td>
</tr>
<tr>
<td>‘we haven’t been counting’</td>
<td>‘to count for e/o’</td>
<td>‘we didn’t count e/o’</td>
<td>‘man who we didn’t cause to count’</td>
</tr>
</tbody>
</table>

5.3.3 Combinations of tone assignment parameters

I now turn to melodies involving combinations of tone assignment parameters. The first set of data in (5.32) shows tenses which are characterized by the addition of a V2H tone and a final SL tone. Such data can be analyzed in one of two ways. Either the V2H spreads rightward and SL can be assigned to a mora already bearing a tone, or both V2H and SL are assigned, and V2H may spread to a mora already bearing a SL tone. Either way, the point is that SL is the only tone which may occur with another tone on a mora word-finally. H/SL surfaces as a Falling tone because there are two tonal nodes. And only in word-final position may a mora bear two tonal nodes. See §5.5 explaining the predictable difference between a H/SL Falling tone and a SH tone.
In contrast to the data in (5.32), the imperative data in (5.33) are characterized by a V2H tone and a final L tone. The V2H is assigned to the second mora, and the L tone is assigned to the final mora. After these tones have been assigned, the V2H spreads rightward. Spreading stops at the penult, since the final mora already bears a L tone, as seen in (5.33). This contrasts with data in (5.32) where V2H can spread to a mora bearing a SL tone. Thus, this is a context where a final L tone behaves differently from a final SL tone. In §5.5 there is evidence that this difference between the behavior of a L tone versus a SL tone is neutralized in falling tones.

The next combination of parameters is V2H tone and final SH tone. It is noteworthy that the Subsequent tense is the only tense marked by a final SH tone. A V2H tone is assigned to the second stem mora, and a SH tone is assigned to the final mora. V2H spreads rightward up to the penultimate mora. Examples are seen in (5.34).
(5.34) V2H and Final SH tone pattern
Subsequent/Future conditional
a. twáa[tálá] ‘after we counted’
b. twáa[bálóka] ‘after we fell’
c. twáa[ng’òlstá] ‘after we snored’
d. twá[.émáné.á]12 ‘after we dug for e/o’

Other than this tense, the distribution of SH versus Fall is predictable in verbs. H + SL on the final mora of a verb surfaces as a falling tone when it is pre-pausal. Otherwise, a falling tone surfaces as SH phrase-medially (see §5.5 for details).

The next combination of parameters is V2H tone plus a penultimate L tone. The V2H and penultimate L are assigned and then the V2H spreads rightward until it reaches the penultimate mora. The final mora receives a L tone by default.

(5.35) V2H and Penultimate L tone pattern
Hodiernal stative, 3s relative clause
a. moondôôl5o[konáangéetc] ‘man who has hit a little’
b. moondôôl5o[táláangéetc] ‘man who has counted a little’

The next combination of parameters is a V2H tone, a penultimate L tone, and a final H tone. This pattern is found in the tenses in (5.36). As expected, the grammatical tones are assigned and the V2H spreads. However, spreading stops at the penultimate mora because it already bears a L tone.

12 Notice that (5.34d) is a verb stem that begins with an empty C: /ko-Cem-a/ → ko.emà ‘to dig.’ Vowel hiatus is maintained with a preceding vowel; but after the empty C deletes, t wa a  is subject to Sequential shortening (see Chapter 4).
(5.36) V2H, Penultimate L, and Final H tone pattern
Hodiernal perfective, relative clause
a. moondòôlà tô[ konâängi.e 'man who we hit a little'
b. moondòôlà tô[ tâlâângílè 'man who we counted a little'
Hodiernal stative, relative clause
c. moondòôlà tô[ konâângéetè 'man who we hit a little'
d. moondòôlà tô[ tâlâângéetè 'man who we counted a little'
Hodiernal stative, negative relative clause
e. moondòôlà tô[tô konéetè 'man who we haven’t hit yet’
f. moondòôlà tô[tô tâléetè 'man who we haven’t counted yet’

(5.37) shows another combination of parameters. The hodiernal stative is characterized by a V2H, a penultimate L, a final H, and a final SL tone. All tones are assigned and then V2H spreads rightward until it reaches a mora already bearing a tone. Thus, spreading stops at the antepenultimate mora because the penultimate mora bears a L tone.

(5.37) V2H, Penultimate L, and Final H/SL tone pattern
Hodiernal stative, negative
a. toi[ konâângéetè 'we have not hit a little'
b. toi[ tâlâângéetè 'we have not counted a little'

5.3.4 Phrasal SL tone on assertive verbs

In addition to the grammatical SL assigned to various tenses, there is also a phrasal SL tone which is associated with affirmative, main clause (henceforth, assertive) verbs. The difference between these two tones is that grammatical tones, as well as lexical tones to be discussed in §5.4.1, remain on the word they are assigned to, unless they delete, and do not shift to other words in the phrase. A phrasal tone, on the other hand, is associated with a higher prosodic unit, an assertive phrase in the case of Kikamba, and does not necessarily surface on the assertive verb itself. While the phrasal SL tone surfaces at the right edge of the verb if the verb is at the right edge of a maximal
projection, the SL shifts to the right edge of a following complement which is within the phrasal unit, or maximal projection headed by the assertive verb. Since the phrasal SL tone is assigned to a higher prosodic unit, and is always realized in a peripheral position, it could be categorized as a type of boundary tone in Kikamba (Itô and Mester, 1995:835).

The behavior of the phrasal SL tone is different from the grammatical final SL tone discussed in §5.2.1 which deletes when a complement follows. Thus, the behavior of the SL tone when it is at the right edge of a maximal projection can be used as a diagnostic as to whether a SL tone is phrasal or grammatical. In addition, the grammatical tone assignment parameters may combine with the phrasal SL to arrive at the surface form in various assertive tenses. All the verbs discussed in this section are assertive, and all are assigned a phrasal SL tone.

In (5.38a), there are examples of the hesternal perfective tense. This tense is only marked by a phrasal SL tone, and is not marked by any grammatical tones. Evidence that the SL tone is phrasal and not grammatical is that it shifts off the verb to surface at the right edge of a following complement (see §5.5 for more details). In isolation, (5.38c) ma.i.o ‘bananas’ surfaces with a plain L tone on the final mora. This is evidence that the SL tone on ‘bananas’ in (5.38b) is the phrasal SL from the assertive verb.

(5.38) Phrasal SL tone pattern
Hesternal perfective, assertive
a. nétónàa[ koni.è ‘we hit’
b. nétónàa[ koni.è ma.i.ò ‘we hit bananas’
c. ma.i.o ‘bananas’

The tenses in (5.39) are characterized by a V2H tone and a phrasal SL tone. The V2H spreads rightward, and with the addition of the phrasal SL tone, the final syllable of the verb surfaces with a H/SL falling tone. When a complement is present, the SL tone shifts to the right edge of the complement.
(5.39) V2H and Phrasal SL tone pattern

**Future, assertive**
- a. tokàaf konà
- b. tokàaf konà maiò
- c. tokàaf táláángâ
- d. tokàaf táláángâ maiò

**Remote perfective, assertive**
- e. nétwàaf konè
- f. nétwàaf konè maiò
- g. nétwàaf táláángilè
- h. nétwàaf táláángilè maiò

'we will hit’
'we will hit bananas’
'we will count randomly’
'we will count bananas randomly’

In the data in (5.40), the tenses are characterized by a final H tone and a phrasal SL tone. The addition of the phrasal SL results in a surface falling tone when the verb is in final position. When a complement follows, the SL shifts to the complement to surface at the right edge of X-Max.

(5.40) Final H and Phrasal SL tone pattern

**Immediate past, assertive**
- a. nétwàaf konà
- b. nétwàaf konà maiò
- c. nétwàaf táláangâ
- d. nétwàaf táláangâ maiò

**Habitual, assertive**
- e. nétôf kona.â
- f. nétôf kona.â maiò
- g. nétôf táláanga.â
- h. nétôf táláanga.â maiò

'we just hit’
'we just hit bananas’
'we just counted randomly’
'we just counted bananas randomly’

'we always hit’
'we always hit bananas’
'we always count randomly’
'we always count bananas randomly’

The next pattern is a V2H, a penultimate L, a final H, and a phrasal SL tone. V2H spreads to the antepenultimate mora because the penultimate mora already bears a L tone. When a complement follows, the phrasal SL tone shifts to the complement following the verb.
The pattern for the third singular assertive form of the hodiernal stative is V2H tone, penultimate L tone, and phrasal SL tone. In (5.42), the V2H does not spread to the penultimate mora because it already bears a L tone. After the V2H spreads to the antepenultimate mora, the general tone rules of [+extreme]-Spread 1 and [+extreme]-Spread 2 are applicable (see §5.2.1), and the penultimate syllable surfaces with a SH tone. This is shown in (5.42).

A derivation shows that what looks like a complicated pattern is reducible to the rules and tone assignment principles already seen. In (5.42e), lexical tone is assigned to the first
mora of the verb stem. In (5.42f,g), the V2H and penultimate L tones are assigned. After these tones have been assigned, V2H spreads rightward, as in (5.42h), until it reaches a mora that already bears a tone. In (5.42i), the phrasal SL links to the final mora. In (5.42j), the SL spreads left by [+extreme]-Spread I. Since a H tone is adjacent to a SL tone, [+extreme]-Spread 2 occurs, as seen in (5.42k), resulting in the surface form.

The data in (5.43) represents the final combination of parameters. The third singular assertive form of the hodiernal perfective is characterized by a V2H tone, a final L tone, and a phrasal SL tone. Once again, a different surface pattern is easily explained by the principles already stated. After the assignment of lexical tone in (5.43e), V2H is assigned to the second stem mora in (5.43f) and a final L is assigned in (5.43g). Then V2H spreads rightward up to the penultimate mora. Since the final mora already bears a tone, V2H cannot spread to the final, as seen in (5.43h). In (5.43i), the phrasal SL tone is assigned to the final mora. This results in H and SL on adjacent, monomoraic syllables, which is the relevant environment for the rules of [+extreme]-Spread 2 and [+upper]-Spread. Thus, these forms surface with SH tones on the last two syllables.

(5.43) V2H, Final L, and Phrasal SL tone pattern
Hodiernal perfective, 3s assertive
a. nóo[ konéiÊ] ‘he hit for’
b. nóo[ konéiÊ maiô ‘he hit for bananas’
c. nóo[ tâléiÊ] ‘he counted for’
d. nóo[ tâléiÊ maiô ‘he counted for bananas’
Derivation of (5.43c)
e. Lexical tone assignment 
  nóo[ tâléiê]
f. V2H tone assignment 
  nóo[ tâléiê]
g. Final L tone assignment 
  nóo[ tâléîê]
h. V2H tone spread 
  nóo[ tâléîê]
i. Phrasal SL tone assignment 
  nóo[ tâléîê]
j. [+extreme]-Spread 2 
  nóo[ tâléîê]
k. [+upper]-Spread 
  nóo[ tâléîê]
5.3.5 Obligatory contour principle effects in Kikamba

The Obligatory contour principle (henceforth, OCP) states that there is a tendency for languages to avoid adjacent identical tones (Odden 1995). This generally refers to adjacent H tones. In Kikamba, H tones are generally not constrained from occurring on adjacent syllables, thus the OCP is violable. However, there are a few noteworthy effects that indicate the OCP has some effect on surface forms in Kikamba.

The first OCP effect is seen in verb stems which have more tones assigned to them than available moras to bear the tones. In the affirmative, relative clause form of the hodiernal perfective, a V2H tone, a penultimate L tone, and a final H tone are assigned to the verb stem. When the verb stem contains only three moras, there are not enough moras for all the tones to be realized. Both the V2H and the penultimate L tone cannot be assigned to the penultimate mora because contour tones are only allowed pre-pausally.

In (5.44), we see that L-tone verb stems and H-tone verb stems choose different strategies for the surface tone pattern. In (5.44a,b), L-tone verb stems choose the V2H tone and not the penultimate L tone. However, H-tone verb stems, as in (5.44c,d) choose the penultimate L tone over the V2H tone.

(5.44) Hodiernal perfective, relative clause
L-tone verbs \( \rightarrow \) Choose V2H tone
a. moondóolâ tô[ konié ‘man who we hit’
b. moondóolâ tô[ ebié ‘man who we paid’
H-tone verbs \( \rightarrow \) Choose Penultimate L tone
c. moondóolâ tô[ tálilé ‘man who we counted’
d. moondóolâ tô[ tômi.é ‘man who we sent’

This is explained by prohibiting three separate, adjacent H-tone moras in a verb stem. In the data in (5.44c,d) the V2H is simply not assigned; the assignment of penultimate L occurs instead. This constraint is illustrated in Rule 5.9.
Rule 5.9  Prohibition on sequence of H tones

*  H  H  H  

[stem  μ  μ  μ ]

The tone pattern of the assertive form of the hodiernal perfective is identical to the affirmative relative clause forms seen in (5.44) except for the addition of the the phrasal SL tone. In the examples in (5.45), the H-tone verbs once again are seen to not allow the assignment of a V2H.

(5.45) Hodiernal perfective, assertive
    toneless verbs \( \rightarrow \) Choose V2H tone
    a. nétô[ koni.ē]    ‘we hit’
    b. nétô[ ebîê]    ‘we paid’
    H-tone verbs \( \rightarrow \) Choose Penultimate L tone
    c. nétô[ tālîlē]    ‘we counted’
    d. nétô[ tômi.ē]    ‘we sent’

The V2H is not assigned in H-tone verbs at all, because by doing so, there would be three adjacent H-tone moras word-finally, which is prohibited. Thus, the OCP can cause a H tone not to be assigned at all, if by assigning the H to a mora, the OCP is violated. A derivation of (5.44a,c) is found in (5.46a) and (5.45a,c) is found in (5.46b).

(5.46) a. Derivation of (5.44a,c)

<table>
<thead>
<tr>
<th>Lexical tone assignment</th>
<th>V2H tone assignment</th>
<th>Penultimate L tone assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>koni.ē</td>
<td>koni.ē</td>
<td>N/A, penultimate ( \mu )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>already bears a tone</td>
</tr>
<tr>
<td>Final H tone assignment</td>
<td>V2H tone spread</td>
<td>Surface form</td>
</tr>
<tr>
<td>koni.ē</td>
<td></td>
<td>moondóólá tókonîé</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>moondóólá tótālîlē</td>
</tr>
</tbody>
</table>

\( \text{223} \)
b. Derivation of (5.45a,c)

Lexical tone assignment  
nétô[ koni.ê]  
nétô[ koni.ê]

V2H tone assignment  
nétô[ koni.ê]  
N/A, OCP-violation

Penultimate L tone assignment  
N/A, penultimate H already bears a tone

Final H tone assignment  
nétô[ koni.ê]  
nétô[ táli.ê]

V2H tone spread  
N/A  
N/A

Phrasal SL tone assignment  
nétô[ koni.ê]  
nétô[ táli.ê]

Surface form  
nétôkonî[ê]  
nétótálilê

Preventing a V2H from being assigned is an effect also seen in bimoraic imperatives. The imperative has the tone assignment parameters V2H and final L tone assignment, as demonstrated in examples such as táláánga ‘count randomly!’ However, in a bimoraic stem only one mora is available for the two tones to get assigned to: the final vowel. In the case of a bimoraic H-tone stem, only the final L tone is assigned, as seen in (5.47). It is not possible for both the V2H and final L tones or only the H tone or to be assigned, as in *tálà and *tálá, respectively.

(5.47) a. tála  
‘count!’

b. óma  
‘bite!’

c. tóla  
‘break!’

The data show that only the final L is assigned. Thus, assigning a H tone to the final mora when it is adjacent to a H-tone stem-initial mora is also a violation of the OCP and is prohibited: the V2H does not surface at all. The constraint in Rule 5.9 could be modified as in Rule 5.10.

Rule 5.10 Prohibition on sequence of H tones (modified)

*  
| H | H | H |

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Monomoraic H-tone verb stems and bimoraic L-tone verb stems in the imperative behave differently. In monomoraic stems, the L is added to the H-tone stem, resulting in a falling tone as in /yà ‘eat!’ It is impossible to tell whether the H tone is a stem H or a V2H tone because one of these tones surfacing would be indistinguishable from both of these tones surfacing on a monomoraic imperative. In L-tone bimoraic imperative verbs, both the V2H tone and the final L tone surface on the final mora, as in /konà ‘hit!’, resulting in a final falling tone. Due to the behavior of monomoraic and bimoraic L-tone verbs, the lack of a V2H tone in tâla ‘count!’ in (5.47) is interpreted as an OCP effect.

It is also noteworthy that the H + L on the final mora of konà surfaces as a falling tone. This indicates that the presence of a falling tone alone does not constitute evidence of the presence of a SL tone: longer forms such as tâlanèla ‘count for e/o’ in (5.33) are necessary to determine whether the falling tone is created by a H + L tone or a H + SL tone. See §5.5 for more details.

A second manifestation of the OCP is that a verb stem-initial H tone will delete if preceded and followed by a H tone. The H tone on the verb stem tâl remains in (5.48a,c). But in (5.48b,d), a H-tone object prefix preceding the verb root induces deletion of the H tone on tâl, since there are three adjacent H-tone moras word-finally.

(5.48) Immediate past
a. nénâamotâiâ ‘I just counted him’
b. nânâamâtalå ‘I just counted them’

Consecutive
c. náamotâlå ‘then I counted him’
d. náamâtalå ‘then I counted them’

Rule 5.11 demonstrates this deletion of a stem H tone.

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Data with vowel-initial verbs demonstrate that whether or not the H tone on the stem mora and the pre-stem mora is the same is irrelevant. Any H preceding the verb stem which results in three adjacent H-tone moras induces deletion of the initial stem H tone. In (5.49a), a consonant-initial verb stem is provided to demonstrate that the future prefix *kaa* has a L tone. A derivation of (5.49b) is seen in (5.49e). When the verb stem is vowel-initial, the prefix *kaa* coalesces with the initial vowel of the verb stem. If the verb stem has a H tone, a L/H contour tone is created. But, since tautosyllabic rising tones are prohibited by Rising tone neutralization, the H will spread leftward to create a level H tone. And just in case this happens, the H on the verb stem deletes.

(5.49) Negative Future
a. *ndékaatálá* 'I will not count'
b. *ndékóóná* 'I will not see'
c. *ndékéstá* 'I will not call'
d. *ndékáaká* 'I will not build'
e. UR

Lexical tone assignment
Syllabification/Vowel coalescence\(^13\)
Final H tone assignment
Stem H-tone deletion 2
Surface form

<table>
<thead>
<tr>
<th></th>
<th>ndékaaóna</th>
<th>ndékóóna</th>
<th>ndékóóna</th>
<th>ndékóóna</th>
</tr>
</thead>
<tbody>
<tr>
<td>/nde-kaa-on-a/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This deletion is formalized in Rule 5.12.

\(^{13}\) See Chapter 3 for an explanation of the coalescence phenomena.
Rule 5.12  Stem H tone deletion-2

\[
\begin{array}{c}
H \\
\mu \\
\text{[stem \mu]} \\
\end{array}
\quad \quad \quad
\begin{array}{c}
H \\
\mu \\
\end{array}
\]

The tenses where V2H tone deletion occurs are those tenses which only have a final H tone, not a V2H tone. That is because, as seen in the data in (5.44), (5.45), and (5.47), a V2H in a stem of three moras or less cannot even be assigned, due to an OCP violation.

5.3.6 Summary of verb stem tone patterns

Table 5.2 summarizes the tone assignment parameters for the main clause tenses and Table 5.3 summarizes the tone assignment parameters for relative clause tenses.
Table 5.2: Stem tone patterns in Main clause tenses

<table>
<thead>
<tr>
<th>Main Clause Tenses</th>
<th>Affirmative (Assertive forms)</th>
<th>Affirmative, Object Focus</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Phrasal SL</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Immediate Past</td>
<td>Final H, Phrasal SL</td>
<td>Lexical tone</td>
<td>Final SL</td>
</tr>
<tr>
<td>Immediate Past, 3s</td>
<td>Phrasal SL</td>
<td>Lexical tone</td>
<td>Final SL</td>
</tr>
<tr>
<td>Future</td>
<td>V2H, Phrasal SL</td>
<td>N/A</td>
<td>Final H</td>
</tr>
<tr>
<td>Future, 3s</td>
<td>V2H, Phrasal SL</td>
<td>N/A</td>
<td>Final H</td>
</tr>
<tr>
<td>Progressive</td>
<td>Phrasal SL</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hesternal Progressive</td>
<td>V2H, Phrasal SL</td>
<td>Lexical tone</td>
<td>V2H, Final SL</td>
</tr>
<tr>
<td>Remote Progressive</td>
<td>V2H, Phrasal SL</td>
<td>V2H</td>
<td>V2H</td>
</tr>
<tr>
<td>Habitual</td>
<td>Final H, Phrasal SL</td>
<td>Lexical tone</td>
<td>V2H, Final SL</td>
</tr>
<tr>
<td>Habitual, 3s</td>
<td>Phrasal SL</td>
<td>Lexical tone</td>
<td>V2H, Final SL</td>
</tr>
<tr>
<td>Hodiernal Perfective</td>
<td>V2H, Penult L, Final H, Phrasal SL</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hodiernal Perfective, 3s</td>
<td>V2H, Final L, Phrasal SL</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hesternal Perfective</td>
<td>Phrasal SL</td>
<td>Lexical tone</td>
<td>Final SL</td>
</tr>
<tr>
<td>Remote Perfective</td>
<td>V2H, Phrasal SL</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hodiernal Stative, 3s</td>
<td>V2H, Penult L, Phrasal SL</td>
<td>V2H</td>
<td>V2H, Penult L, Final SL</td>
</tr>
<tr>
<td>Hesternal Stative</td>
<td>Phrasal SL</td>
<td>Lexical tone</td>
<td>Final SL</td>
</tr>
<tr>
<td>Remote Stative</td>
<td>V2H, Phrasal SL</td>
<td>V2H</td>
<td>V2H</td>
</tr>
<tr>
<td>Subjunctive</td>
<td>Lexical tone deletes</td>
<td>N/A</td>
<td>V2H, Final SL</td>
</tr>
<tr>
<td>Imperative singular</td>
<td>V2H, Final L</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Imperative plural</td>
<td>V2H, Final SL</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Infinitive</td>
<td>Final SL</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Subsequent</td>
<td>V2H, Final SH</td>
<td>Final SL</td>
<td>N/A</td>
</tr>
<tr>
<td>Consecutive</td>
<td>Final H</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>N/A</td>
<td>N/A</td>
<td>V2H</td>
</tr>
<tr>
<td>Negative Potential</td>
<td>N/A</td>
<td>N/A</td>
<td>V2H, Final SL</td>
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</tbody>
</table>
Table 5.3: Stem tone patterns in Relative clause tenses

<table>
<thead>
<tr>
<th>Relative Clause Tenses</th>
<th>Affirmative</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Final SL</td>
<td>Final SL</td>
</tr>
<tr>
<td>Immediate Past</td>
<td>Final H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Immediate Past, 3s</td>
<td>Lexical tone</td>
<td>Final SL</td>
</tr>
<tr>
<td>Future</td>
<td>Final H</td>
<td>Final H</td>
</tr>
<tr>
<td>Future, 3s</td>
<td>Lexical tone</td>
<td>Lexical tone</td>
</tr>
<tr>
<td>Progressive</td>
<td>Final SL</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hesternal Progressive</td>
<td>V2H</td>
<td>V2H</td>
</tr>
<tr>
<td>Remote Progressive</td>
<td>V2H</td>
<td>V2H</td>
</tr>
<tr>
<td>Habitual</td>
<td>Final H</td>
<td>V2H</td>
</tr>
<tr>
<td>Habitual, 3s</td>
<td>Lexical tone</td>
<td>V2H</td>
</tr>
<tr>
<td>Hodiernal Perfective</td>
<td>V2H, Penult L, Final H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hodiernal Perfective, 3s</td>
<td>V2H, Final L</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hesternal Perfective</td>
<td>Final SL</td>
<td>Final SL</td>
</tr>
<tr>
<td>Remote Perfective</td>
<td>V2H</td>
<td>Final SL</td>
</tr>
<tr>
<td>Hodiernal Stative</td>
<td>V2H, Penult L, Final H</td>
<td>V2H, Penult L, Final H</td>
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<tr>
<td>Hodiernal Stative, 3s</td>
<td>V2H, Penult L</td>
<td>V2H, Final H</td>
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<tr>
<td>Hesternal Stative</td>
<td>Final SL</td>
<td>Final SL</td>
</tr>
<tr>
<td>Remote Stative</td>
<td>V2H</td>
<td>V2H</td>
</tr>
</tbody>
</table>

5.4 Tone patterns in nouns

In this section, I describe the lexical tone patterns found in nouns. Some of these tone patterns are found in only a few nouns, but other patterns are more common. The data in this section represents the nouns I have found in my fieldwork which follow the various patterns and are not claimed to be exhaustive lists. In §5.4.1, I describe the lexical tone patterns which are transparent. In other words, there are no alternations to suggest an underlying representation which is different from the surface forms. In §§5.4.2, I show that the general tone rules discussed in §5.2.1 are applicable to the nominal system as well as the verbal system. In §5.4.3, I show that nouns derived from verbs productively follow the pattern of assigning and spreading a V2H tone.
5.4.1 Lexical tone patterns

The first pattern found in nominals is one in which the entire noun stem surfaces with a L tone. Examples are seen in (5.50).

(5.50) a. mbooso 'beans' (cl.9)
b. ma.i.o 'bananas' (cl.6)
c. kalilo 'tiny banana' (cl.12)
d. kaboso 'beans-dim' (cl.12)
e. kebeleete 'box of matches' (cl.7)
f. mokebe 'can' (cl.3)
g. ngaale 'car' (cl.9)
h. ngatata 'wildebeest' (cl.9)
i. ngusu 'pocket' (cl.9)

The next pattern which occurs with frequency is one in which only the final mora of the noun stem is assigned a final H tone. These examples are seen in (5.51).

(5.51) a. e.aangí 'arrow' (cl.5)
b. e.o.i.é 'plain-aug' (cl.5)
c. ekooýó 'fish' (cl.5)
d. elêngé 'pumpkin' (cl.5)
e. esoobá 'bottle-aug' (cl.5)
f. ebaatá 'duck' (cl.5)
g. kekaabó 'basket' (cl.7)
h. keng'aang'â 'market' (cl.7)
i. keséésé 'station' (cl.7)
j. ketaandá 'bed' (cl.7)
k. kebaabá 'tin can' (cl.7)
l. kebiindú 'darkness' (cl.7)

There are also several patterns which only one or two nouns were found to have. In (5.52a), there is only a H tone on the first mora of the noun stem. In (5.52b), there is only a H tone on the penultimate mora. In (5.52c), there is a H on the first stem mora and
a H on the final mora. Finally, another nominal pattern is one where the entire noun stem has a H tone, as in (5.52d,e).

(5.52) a. /mo-é.eetu/  
    b. /mo-tuméCa/  
    c. /o-éCoCâ/  
    d. ntháámbáá  
    e. ngééngéé  

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>/mo-é.eetu/</td>
<td>mwé.eetu</td>
</tr>
<tr>
<td>b.</td>
<td>/mo-tuméCa/</td>
<td>motumé.a</td>
</tr>
<tr>
<td>c.</td>
<td>/o-éCoCâ/</td>
<td>wé.o.ó</td>
</tr>
<tr>
<td>d.</td>
<td>ntháámbáá</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>ngééngéé</td>
<td></td>
</tr>
</tbody>
</table>

The next set of data show various patterns, but what they all have in common is a final SH tone. Recall that a final SH is rare word-finally in verbs: it only happens in the future/subsequent tense. The data in (5.53a-c) are characterized by the presence of a final SH tone. In (5.53d-k), there is a H tone on the first stem mora and a SH tone on the final mora. Finally (5.53l-n) represent a pattern where there is a H tone on the first two stem moras and a SH tone on the final mora.

(5.53) a. ekič  
    b. kotó  
    c. ekwaasé  
    d. chúumwá  
    e. kaláató  
    f. ke.áató  
    g. kwáachá  
    h. keméná  
    i. étá.á  
    j. mbó.á  
    k. keng’éí  
    l. kasyóólá  
    m. katóómá  
    n. ndóómá  

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>ekič</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>kotó</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>ekwaasé</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>chúumwá</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>kaláató</td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>ke.áató</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>kwáachá</td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>keméná</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>étá.á</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>mbó.á</td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>keng’éí</td>
<td></td>
</tr>
<tr>
<td>l.</td>
<td>kasyóólá</td>
<td></td>
</tr>
<tr>
<td>m.</td>
<td>katóómá</td>
<td></td>
</tr>
<tr>
<td>n.</td>
<td>ndóómá</td>
<td></td>
</tr>
</tbody>
</table>
5.4.2 Lexical tone patterns with final SL tone

The examples with a final SL are important because they show that the general tone rules posited for the verbal system apply to the nominal system as well. The examples in (5.54) show that the addition of a final SL tone is one nominal pattern, just as was seen with verbs. Also, just as seen with verbs, the SL tone on the head noun deletes when a complement follows the noun, as seen in (5.54e).

(5.54)  
a. ekɔti  ‘back of neck’ (cl.5)  
b. ke.ɛmà  ‘hill’ (cl.7)  
c. mbusya  ‘rhino; knife handle’ (cl.9)  
d. kekuthù  ‘bush’ (cl.7)  
e. kekuthu kenène  ‘big bush’ (cl.7)

When the penultimate syllable is long, as seen in (5.55), the SL tone spreads leftward by [+extreme]-Spread 1, surfacing on both the penultimate and final moras. Once again, evidence for the spread of the SL tone is that when the noun is followed by a modifier the SL tone on both moras deletes, as seen in (5.55d,f).

(5.55)  
a. ekoombe  ‘granary’ (cl.5)  
b. kaàngà  ‘cassava-dim’ (cl.12)  
c. ekɔti  ‘coat’ (cl.5)  
d. ekɔti enène  ‘big coat’ (cl.5)  
e. keèndò  ‘thing’ (cl.7)  
f. keendo kenène  ‘big thing’ (cl.7)

There is also data showing that both a H tone and a SL tone can occur in noun stems, as seen in (5.56).

(5.56)  
a. mokaute  ‘navel’ (cl.3)  
b. mothéenzenə  ‘prize, gift’ (cl.3)  
c. mobáloki  ‘one who falls-intr’ (cl.1)
When the penultimate syllable is long and bears a H tone, both rules spreading the feature [+extreme] are applicable, and the penultimate H tone surfaces as SH, as seen in (5.57).

Evidence that the SH tone results from the spread of [+extreme] to a H-tone mora is seen when a modifier follows the noun: the SL deletes and the SH surfaces as a plain H tone, as seen in (5.57e).

(5.57) a. mbëssà ‘money’ (cl.9)
b. monaànà ‘friend’ (cl.1)
c. osóøongì ‘act of dancing’ (cl.11/14)
d. kebèélà ‘chair’ (cl.7)
e. kebëëla kenéné ‘big chair’ (cl.7)

When the H-tone penultimate syllable is short, and there is a final SL tone, [+extreme]-Spread 2 and [+upper]-Spread are applicable, and the two syllables surface as SH. These examples are seen in (5.58). Once again, evidence that the SH derives from the spread of [+extreme] and [+upper] comes from the behavior with a following modifier. As seen in (5.58f,h,j), the SL deletes and the SH surfaces as plain H. Notice that the noun in (5.58i,j) has a H on the first stem mora as well.

(5.58) a. otúkó ‘night’ (cl.14)
b. nthóne ‘shame’ (cl.9)
c. esaánì ‘plate’ (cl.5)
d. loósà ‘permission’ (cl.14)
e. ngité ‘dog’ (cl.9)
f. ngité néné ‘big dog’ (cl.9)
g. ekùnò ‘mushroom’ (cl.5)
h. ekuno enéné ‘big mushroom’ (cl.5)
i. esáándókò ‘box’ (cl.5)
j. esáándóko enéné ‘big box’ (cl.5)

Examples in (5.59) also have both a penultimate H tone and a final SL tone assigned to the noun stem. However, these are all examples with a long penultimate syllable. Since a L/H rising tone cannot occur on a long syllable, the penultimate tone
spreads leftward by Rising tone neutralization to create a level tone. Since these forms are also subject to [+extreme]-Spread 2 and [+upper]-Spread, the two final syllables surface as SH. (5.59o) shows that a following modifier induces deletion of the SL tone, and the SH syllable surfaces as a plain H tone.

(5.59) a. chëngọ 'cattle boma' (cl.7)  
b. ekúûndi 'passion fruit' (cl.5)  
c. elsoŏndú 'sheep' (cl.5)  
d. esuúngwá 'orange' (cl.5)  
e. ebũúti 'gun' (cl.5)  
f. ka.obwáãló 'board-dim' (cl.12)  
g. kakõõle 'monkey-dim' (cl.12)  
h. kemwaáná 'young boy' (cl.7)  
i. kwóókó 'arm' (cl.15)  
j. leëló 'road' (cl.14)  
k. mbëëmbá 'corn, maize' (cl.9)  
l. mokúûnzu 'piece of wire' (cl.3)  
m. monãámbo 'lion' (cl.3)  
n. mosííngí 'foundation' (cl.3)  
o. mosííngi monêné 'big foundation' (cl.3)

5.4.3 V2H tone in agent nominalizations ending in -a

Agent nominalizations which are derived from verbs have a V2H tone pattern. The H tone is assigned to the second mora of the stem. Stems whose initial syllable is long provide evidence that the V2H is assigned to the mora. In (5.60a), the initial syllable of the stem is short, so this form does not indicate whether the V2H is assigned to the second mora or the second syllable. In (5.60b,c), the initial syllable surfaces as level H, not as a falling tone, which is expected if V2H is assigned to the second mora. In (5.60d), the initial syllable of the stem surfaces as a level H tone, even though this verb stem is lexically toneless. Once again, the V2H is assigned to the second mora, and that H spreads leftward due to Rising tone neutralization, creating a level H-tone syllable. Although (5.60e) has an initial long vowel, the V2H does not surface on this syllable.
This is because V2H is assigned at the stem level. Before the noun class prefix \( a \) is added, Initial shortening applies to the stem. After Initial shortening, the V2H is assigned, and then the prefix \( a \) is added, resulting in an initial long vowel. The derivation is seen in (5.60f).

(5.60) Nouns with V2H tone

<table>
<thead>
<tr>
<th>Word</th>
<th>Syllabification</th>
<th>Initial shortening</th>
<th>V2H tone assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mo.alyólá</td>
<td>*mosúumbé</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. mosúúmbé</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. mosóméţyá</td>
<td>*mosóóméţyá</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. mo.áándékwá</td>
<td>*mo.áándékwá</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. eëndwá</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Stem UR</td>
<td>Syllabification</td>
<td>Initial shortening</td>
<td>V2H tone assignment</td>
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</tbody>
</table>

This section takes a more detailed look at how the SL tones of Kikamba interact with the syntax, an area known as the syntax-phonology interface. Recent work in phonology has tried to address the dependency of post-lexical rules of external sandhi on the syntax of a language. Data that has been collected from Bantu languages, as well as Chinese, and Indo-European languages such as Greek, French, and Italian, indicate that a large variety of phonological processes are dependent to a certain extent on syntax. “The essential question raised by data of this type is which aspects of syntactic structure are systematically called upon in characterizing the environments of phonological rules?”

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14 See Odden and Roberts-Kohno (In press) for an overview of the constraints on SL tone in Kikamba and an Optimality Theoretic account of these facts.

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(Inkelas and Zec 1995:536). The variety of data and the phonological rules that have been analyzed in one framework or another indicate that the question is far from being answered. Therefore, the question of how the phonological component interacts with syntax is not a trivial one. In order to explain how such rules interact with the syntax, there have been two major research trends. The first is the direct-reference theory, which claims that the phonology has direct access to syntactic information (Kaisse 1985, Odden 1987). The second is the prosodic theory, which claims that there is an intermediate level, called p-structure, which phonological rules “access” in order to determine if they are applicable or not. Proponents of the prosodic theory further break down into adherents of a relational-based theory (Nespor and Vogel 1986) and an end-based theory (Selkirk 1986). Furthermore, Hayes (1990) proposes Precompilation Theory, a potential solution to the question of how to handle the cases of sandhi that do require access to syntactic information. Among these approaches, either the End-based Theory of Selkirk (1986) or the direct reference theory of Kaisse (1985) can handle the facts of Kikamba: I show that the behavior of SL tone is sensitive to the right edge of a maximal projection.

In Kikamba, not only are SL tones sensitive to syntactic structure, but SH tones and falling tones are sensitive to syntactic structure as well. This is expected if [+extreme] is the feature which is constrained to surface at the right edge of a maximal projection. In this section, I will show how the complex surface tone patterns are explained by the interaction of two factors: (1) the source of the feature [+extreme], i.e., whether it is part of a lexical, grammatical, or phrasal tone, and (2) whether [+extreme] occurs as a SL tone, as a component of a falling tone, or as a feature in a SH tone.

5.5.1 Verbs: [+extreme] deletes in certain Grammatical tones

SL, SH, and H/SL falling tones are all tones which can be assigned by a tense to the final vowel of a verb. If a verb ending in a grammatical SL tone is followed by a
complement, [+extreme] is no longer at the right edge of X-Max, and [+extreme] deletes.

In (5.61) are examples of tenses which are assigned a final SL tone.

\begin{enumerate}
\item a. kotálelə
\item b. toyāś tálelə
\item c. moondóolə tótáätälelə
d. moondóolə tónáatälelə
e. moondóolə tóinaätälelə
\end{enumerate}

\begin{tabular}{l}
\textbf{(5.61)}
\end{tabular}

\begin{tabular}{l}
\textit{a.} kotálelə & \text{`to count for' (infin)} \\
\textit{b.} toyāś tálelə & \text{`we didn’t count for’ (rem perf)} \\
\textit{c.} moondóolə tótáätälelə & \text{`man who we didn’t count for’ (rem perf)} \\
\textit{d.} moondóolə tónáatälelə & \text{`man who we counted for’ (hest perf)} \\
\textit{e.} moondóolə tóinaätälelə & \text{`man who we didn’t count for’ (hod perf)}
\end{tabular}

Since SL is required to be aligned to the right edge of a phrase, the SL tone deletes when a complement follows the verb, as seen in the data in (5.62).

\begin{enumerate}
\item a. kotálelə
\item b. kotálela ngóko
\item c. toiotâla.à
d. toiotâla.a ngóko
\end{enumerate}

\begin{tabular}{l}
\textbf{(5.62)}
\end{tabular}

\begin{tabular}{l}
\textit{a.} kotálelə & \text{`to count for’ (infin)} \\
\textit{b.} kotálela ngóko & \text{`to count chickens for’} \\
\textit{c.} toiotâla.à & \text{`we haven’t been counting’ (prog)} \\
\textit{d.} toiotâla.a ngóko & \text{`we haven’t been counting chickens’}
\end{tabular}

It has already been demonstrated that SL tone and SH tone share the tone feature [+extreme]. If the reason SL must be aligned with the right edge of X-Max is that the feature [+extreme] must be aligned with the right edge of X-Max, then the prediction is that [+extreme] deletes from a SH tone if a tense ending in a SH tone is followed by a complement. However, this is not what happens. When a SH-final verb is followed by a complement, [+extreme] does not delete and the verb surfaces with SH even though it is not at the right edge of X-Max. Examples are seen in (5.63).

\begin{enumerate}
\item a. twáúwá
\item b. twáúwá maio
\end{enumerate}

\begin{tabular}{l}
\textbf{(5.63)}
\end{tabular}

\begin{tabular}{l}
\textit{a.} twáúwá & \text{`after we cooked’ (subsequent)} \\
\textit{b.} twáúwá maio & \text{`after we cooked bananas’}
\end{tabular}

The fact that SH remains is an indication that it is the SL tone and not the feature [+extreme] which must be aligned to the right edge of X-Max, at least for grammatical tones.

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There are also tenses which end in a H/SL falling tone. A falling tone patterns with the SH tone in that the feature [+extreme] does not delete when a complement follows the verb. Instead, when a verb ending in a falling tone is followed by a complement, the H/SL fall is realized as a SH tone, as seen in (5.64).

(5.64) a. toitàláángéetè  ‘we have not counted’ (hod stat)
b. toitàláángéetè maio  ‘we have not counted bananas’

Since the H/SL tone is realized as a SH tone, we know the feature [+extreme] does not delete. What does happen, however, is that the structure of the tones changes. A falling tone and a SH tone both consist of the features [+upper] and [+extreme], but a falling tone has two tonal nodes, whereas a SH tone has one tonal node. This difference is illustrated in Rule 5.13.

Rule 5.13 Illustration of a SH tone versus a Falling tone

A falling tone has two tonal nodes. A mora is prohibited from bearing two tonal nodes except in pre-pausal position. However, the fact that the mora has both the features [+upper] and [+extreme] needs to be preserved. Thus, the conflict is resolved by deleting the tonal node, and spreading [+extreme] to the tonal node of the H tone. The result is that pre-pausal fall surfaces as phrase-medial SH, as in (5.65).
This process is illustrated in Rule 5.14.

Rule 5.14  Illustration of tonal node deletion and subsequent spread of [+extreme]

In addition to SL, SH, and fall, a verb tense may also end in either a H tone or a L tone. (5.66) shows some examples.

Furthermore, data in (5.67) show that a following complement has no effect on tenses which end in a H or L tone. The final H or L remains on the final vowel of the verb when there is a following complement.
However, there is one important exception to this generalization. Data such as (5.66c) and (5.67c) demonstrate that the imperative has a V2H and a final L tone: *tála*. In this example, the verb stem has enough moras to accommodate the assigned grammatical tones. But the case of monomoraic and bimoraic imperatives is a little more complicated. In (5.68a), the imperative from the H-tone verb stem *tal* does not have a V2H tone. This is due to the OCP and was explained in §5.3.5.

(5.68)  

(5.67) a. tóyá*tálé.ée ngókó  
      b. ná*totalele ngókó  
      c. táléla ngókó  
      d. moondóólá twáatáléílé ngókó  
      e. moondóólá tótáléílé ngókó  
      f. moondóólá tôkaatálelâ ngókó

‘we hadn’t counted chickens for’ (rem stat)  
‘we may count chickens for’ (subjunc)  
‘count chickens for!’ (imper)  
‘man who we counted chickens for’ (rem perf)  
‘man who we counted chickens for’ (hod perf)  
‘man who we’ll count chickens for’ (fut)

(5.68b) shows that L-tone verb stems behave differently from H-tone stems. Although there are not enough moras to accommodate the V2H and the final L tones, both surface anyway, resulting in a falling tone. In the case of (5.68c) *yâ*, a H tone and a L tone surface on the same mora resulting in a falling tone as well.¹⁵

This is the only example of a falling tone derived from a H tone and a L tone. All other examples seen thusfar have been of a H tone plus a SL tone. The important point here is that a H/L falling tone is phonetically identical to a H/SL falling tone: they are indistinguishable. Phonological evidence that they are indistinguishable comes from the behavior of the falling tone when an object follows. A H/L falling tone behaves as though

¹⁵ Notice that it is impossible to tell whether the source of the H tone in such examples is the verb stem or the V2H because all monomoraic verb stems have a H tone, and thus, there are no alternations.
it were a H/SL falling tone when an object follows the imperative, as seen in (5.69). The H/L falling tone surfaces as a SH tone.

(5.69) a. konâ  
    b. konâ ngókó  
    c. yâ  
    d. yâ ngókó  

'hit!' (imper)  
'hit chickens!'  
'eat!' (imper)  
'eat chickens!'

In other words, a falling tone is always interpreted phonetically as a H tone plus a SL tone. And thus, when an object follows, [+extreme] is interpolated as the second half of the falling tone. The tonal node deletes, and [+extreme] spreads to the tonal node of the H tone, resulting in a SH tone when a complement follows the verb. This is illustrated in Rule 5.15.

Rule 5.15 Illustration of [+extreme] interpolation and tonal node deletion

```
[+upper]  
  ( [+extreme] )  
  Tonal  
    Tonal  
      μ  
    H/L tone (pre-pausal)
```

This section has shown how grammatical tones with the component [+extreme] are affected when they are within a phrase, and not at the right edge of X-Max. Grammatical SL tone deletes, grammatical SH remains unchanged, and grammatical H/SL loses a tonal node but keeps the feature [+extreme] and surfaces as SH due to a prohibition on phrase-medial contour tones. In addition, a falling tone from a H/L tone
combination is phonetically and phonologically indistinguishable from a falling tone from a H/SL combination.

5.5.2 Nouns: [+extreme] deletes in Lexical tones

In nouns, SL and SH can surface on the final vowel of a noun, but a lexical H/SL falling tone cannot. (In §5.5.3, there are examples showing that a phrasal SL tone can surface on a noun with a final H tone, thus creating a derived H/SL falling tone.) In this section, I demonstrate that both when the final tone is a SL and a SH tone, the feature [+extreme] deletes if the noun is not final in its X-Max phrase, thereby demonstrating that, for lexical tones, it is the feature [+extreme], and not just the SL tone, which must be aligned to the right edge of X-Max. Examples in (5.70) are of nouns which end in a SL tone.

(5.70) a. mo.emì 'farmer' (cl.1)
   b. matù 'clouds' (cl.6)
   c. kebetì 'wife' (cl.7)
   d. ibeti 'wives' (cl.8)
   e. ŋoñì 'bird' (cl.9)

When nouns ending in a SL tone are followed by a complement, the SL tone is not at the right edge of X-Max. Thus, the SL deletes as seen in the data in (5.71).

(5.71) a. mo.emì moitò 'heavy farmer' (cl.1)
   b. matu manîini 'small clouds' (cl.6)
   c. kebetî cháakwa 'my wife' (cl.7)
   d. ibeti ndwá.ú 'sick wives' (cl.8)
   e. ŋoñì yaakwá 'my bird' (cl.9)
Rule 5.16 illustrates that since the noun is not at the right edge of X-Max, the presence of the SL tone on the noun is in violation of the SL-Alignment constraint.

Rule 5.16 Illustration of the phrase structure of a Noun phrase

Unlike the data seen in (5.63) where a grammatical SH remains when a complement follows a verb, a complement following a noun ending in a SH tone does induce deletion of the tone feature [+extreme]. The examples in (5.72) show nouns which end in a lexical SH tone.

(5.72) a. koto 'ear' (cl.15)
     b. ŋamō 'animal' (cl.9)
     c. ekwaasë 'sweet potato' (cl.5)

And when a complement follows, [+extreme] deletes and SH surfaces as plain H, as seen in (5.73).

(5.73) a. koto konënë 'big ear' (cl.15)
     b. ŋamō níini 'small animal' (cl.9)
     c. ekwaasë enënë 'big sweet potato' (cl.5)

Since both lexical SH and lexical SL are sensitive to syntactic structure, we see that it is the feature [+extreme] which is constrained to surfacing at the right edge of X-Max in nouns.

The examples in (5.74) show that a following complement has no effect on the final tone of nouns ending in either a L tone or a H tone. This is important because it
shows that the alternations presented between final SL tone and final L tone are not due to some phonetic principle of pre-pausal lowering, but are phonological alternations.

(5.74) a. ma.i.o ‘bananas’ (cl.6) ma.i.o ma.asá ‘long bananas’
b. ngusu ‘pocket’ (cl.9) ngusu nēnē ‘big pocket’
c. ngatata ‘wildebeest’ (cl.9) ngatata ngóːō ‘old wildebeest’
d. ngókó ‘chicken’ (cl.9) ngókó nēnē ‘big chicken’
e. mabaatá ‘ducks’ (cl.6) mabaatá manēnē ‘big ducks’

Given that [+extremel is constrained to surface at a right edge of a maximal projection, deletion or lack of deletion of the feature [+extreme] on a noun can be used as a diagnostic in determining phrase structure. In other words, if a SH or SL tone does not delete phrase-medially, this indicates that the noun is at the right edge of X-Max and does not form a phrase with the following word. Different structures will now be considered.

The deletion of the SL tone in (5.75c-i) is an indication that these modifiers form a noun phrase with a demonstrative and other following modifiers.

(5.75) a. kalolo ‘little leg’ (cl.12) b. tololo ‘little legs’ (cl.13) c. kalolo kā.ā ‘this little leg’ d. tololo twiŋgē ‘many legs’ e. tololo tweegā ‘which legs’ f. tololo tweāna ‘how many legs’ g. kalolo kāaŋgē ‘another leg’ h. kalolo kāa moema ‘leg of Moema’ i. kalolo kāatolékilē ‘leg that broke’

In (5.76c-e), the SH on the class 9 noun ŋamō ‘animal’ surfaces as a plain H, indicating it is in the same phrase with a following complement, as expected. But the SL tone on the class 1 noun moōndō ‘person’ remains in (5.76e) because it is final in its own X-Max phrase. Phrasing is indicated by the subscripts: aasā ‘tall’ has the subscript 1 when it modifies moōndō, and the subscript 9 when it modifies ŋamō. Compare to
(5.76d): since 'person' is further modified by 'tall,' the SL on moöndö must delete. And the SL on moöndö does not delete if the noun is followed by a modifier which is part of a higher phrasal unit as in (5.76e).

(5.76)  
\begin{align*}
\text{a. } \text{nämō} & \quad \text{'animal' (cl.9)} \\
\text{b. } \text{moöndö} & \quad \text{'person' (cl.1)} \\
\text{c. } \text{nämō [yāa-moöndö]_{NP}} & \quad \text{'animal of a person'} \\
\text{d. } \text{nämōg [yāa-moöndo\textsubscript{1} moaasā\textsubscript{1}]_{NP}} & \quad \text{'animal of a tall person'} \\
\text{e. } \text{nämōg [yāa-moöndö\textsubscript{1}]_{NP} ndaasā\textsubscript{9}} & \quad \text{'tall animal of a person'}
\end{align*}

Data in (5.77) show that a subject is final in its X-Max phrase even though it is not pre-pausal, and thus, [+extreme] does not delete. (5.77a-e) show that the SL and SH on the nominal subject remain because [+extreme] is at the right edge of X-Max, and there is no motivation to delete it.

(5.77)  
\begin{align*}
\text{a. andō nēmābālōkīlē} & \quad \text{'people fell'} \\
\text{b. moöndö nōōnātālīlē} & \quad \text{'a person counted'} \\
\text{c. atwī nēmābālōkīlē} & \quad \text{'fruit-pickers fell'} \\
\text{d. motwē nōōnābālōkīlē} & \quad \text{'a head fell'} \\
\text{e. ngītē nookwī.ē} & \quad \text{'a dog died'}
\end{align*}

This is illustrated in Rule 5.17.

Rule 5.17 Illustration of the phrase structure of a Sentence

\[
\begin{array}{c}
\text{S} \\
\downarrow \quad \downarrow \\
\text{NP} \quad \text{VP} \\
\downarrow \quad \downarrow \\
N \quad V
\end{array}
\]

andō nēmābālōkīlē
Data in (5.78) show that there is no deletion of the SL tone from the noun when the noun is the first of two NPs in a VP. Compare (5.78a,c,e) which lexically end in a SL tone to (5.78b,d,f) where moema ends in a plain L tone.

(5.78) a. tôyââ'néenga moøndô maio  ‘we didn’t give the person bananas’
b. tôyââ nêenga moema maio  ‘we didn’t give Moema bananas’
c. tôyââ'néenga mo.ênì mokáte  ‘we didn’t give the guest bread’
d. tôyââ'néenga moema mokáte  ‘we didn’t give Moema bread’
e. tôyââ tálela mo.êmi ngôkô  ‘we didn’t count chickens for the farmer’
f. tôyââ tálela moema ngôkô  ‘we didn’t count chickens for Moema’

SL tone does not delete because the noun is final in its phrase, as illustrated in Rule 5.18.

Rule 5.18 Illustration of the phrase structure of a Verb phrase

Finally, [+extreme] remains within a conjunction. The SH tone in (5.79c) does not change because each conjunct forms an X-Max phrase and thus, [+extreme] is at the right edge of its phrase.

(5.79) a. ekwaasé  ‘sweet potato’ (cl.5)
b. ekwaasé yaakwa  ‘my sweet potato’
c. ekwaasé na-maio  ‘sweet potato and bananas’

Rule 5.19 illustrates the conjoining of two noun phrases.
Rule 5.19 Illustration of the conjunction of two Noun phrases

But if a modifier follows the noun, it is no longer final in its phrase and [+extreme] deletes, as seen in (5.80).

(5.80) a. ekwaasé yáakwa na-moséélé  ‘my sweet potato and rice’
     b. makwaasé ma.aasá na-maio  ‘long sweet potatoes and bananas’

Other studies of the syntax-phonology interface have found that, for many languages, the phonology can be sensitive to the end of a syntactic phrase (Kaisse 1985, Nespor & Vogel 1986, Selkirk 1986). However, no other study to date has described a language where the morphological agreement properties of the clause have determined where a phrase-final tone, namely the SL tone in Kikamba, can surface. This is the case that will be described now. In (5.81), a noun is modified by the numerals ‘1’ through ‘5.’ These numerals bear a noun class prefix which agrees with the head noun, and as expected, the final SL on the noun deletes when a noun is followed by one of these numerals.

(5.81) a. kaloló ‘little leg’ (cl.12)
      b. tololò ‘little legs’ (cl.13)
      c. kalolo kámwé ‘1 little leg’
      d. tololo twéélé ‘2 little legs’
      e. tololo tótañú ‘3 little legs’
      f. tololo tóná ‘4 little legs’
      g. tololo tótaánò ‘5 little legs’
However, as seen in (5.82), numerals greater than five do not agree morphologically with the head noun. When a noun is modified by one of these numerals, lexical [+extreme] on a noun does not delete.

(5.82) a. tololô thâanthâtô
   b. tololô mɔ.5nzâ
   c. tololô ŋááŋâ
   d. tololô kœndâ
   e. tololô ekômi
   f. tololô ngêlí

   ‘6 little legs’
   ‘7 little legs’
   ‘8 little legs’
   ‘9 little legs’
   ‘10 little legs’
   ‘1,000 little legs’

The feature [+extreme] also does not delete before the quantifier ‘all’.

(5.83) a. tololô twóonthê
   b. makwaasé ʒonthê

   ‘all little legs’
   ‘all sweet potatoes’

One possible explanation for this difference in behavior is that head noun + agreeing modifiers have a different syntactic structure than head noun + non-agreeing modifiers do. If the syntactic structures in Rule 5.20 are assumed, the difference in behavior of the lexical SL and SH on the head noun could be explained.

Rule 5.20 Illustration of the possible phrase structure for head noun plus agreeing versus non-agreeing modifiers

```
NP
  |NP
  |  |AP
  |  |  |N
  |  |  |  |ando
  |  |  |  |áâtató
  |  |  |  |  |NP
  |  |  |  |  |  |AP
  |  |  |  |  |  |  |N
  |  |  |  |  |  |  |  |andô kœndâ
```

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However, such a structural difference predicts that non-agreeing modifiers should always appear in phrase-final position. But the data in (5.84) show that this is not the case. Non-agreeing modifiers can appear anywhere within the phrase that agreeing modifiers do.

(5.84) a. andò kaëndā asé5 'nine good people'  
b. ando atáto asé5 'three good people'  
c. andò  sócùthë asé5 'all good people'

§5.5.1 and §5.5.2 have shown that the lexical SL of nouns and the grammatical SL of verbs delete from a head in the syntactic domain of a head followed by a complement. In order for the SL tone to delete, the complement must agree morphologically with the noun. Although the modifier ‘all’ agrees morphologically with the head noun, it still remains outside the domain which triggers deletion of SL tone. For the rest of the analysis, we focus on the generalization that says a SL tone deletes at the end of X-Max, ignoring the detail about the modifier ‘all.’ However, a theory of the syntax-phonology interface should be able to explain this fact.

5.5.3 Phrasal SL tone shifts to the right edge of X-Max

As stated before, the deletion of the feature [+extreme] in grammatical tones in verbs and in lexical tones in nouns is a manifestation of the constraint on the feature [+extreme] which says it may only occur at the right edge of X-Max. In addition to grammatical and lexical tones with the feature [+extreme], there is also a phrasal SL tone. This phrasal SL tone, as mentioned in §5.3.4, surfaces on the final vowel of assertive verbs. When the assertive verb is followed by a modifier, there is a conflict between the need for SL to surface on the assertive verb, and the requirement that it be aligned with the right edge of a maximal projection. The phrasal SL satisfies the SL-Alignment constraint by shifting rightward to appear on the complement of the assertive verb, or at the right edge of X-Max.
Before showing the shift of phrasal SL tone, I provide data to show that if the verb is non-assertive (i.e. negative or subordinate clause form), it does not necessarily end with a SL or falling tone, as seen in (5.85).

(5.85) a. moondóólá twáatáleíté  ‘man who we counted for’ (rem perf)
b. toikaatálá  ‘we won’t count’ (fut)
c. moondóólá tôkaatáleítá  ‘man who we’ll count for’ (fut)
d. moondóólá tôtákaatáleítá  ‘man who we won’t count for’ (fut)
e. moondóólá totáleita.á  ‘man who we count for’
f. moondóólá totatáleítá.á  ‘man who we don’t count for’
g. moondóólá tôtéítá.éété  ‘man who we have been counting for’
h. moondóólá tôtaatá.éété  ‘man who we have not been counting for’
i. tôyâa’taleíté  ‘we hadn’t counted’ (rem stat)
j. moondóólá twátaleíté.éété  ‘man who we had counted for’ (rem stat)
k. moondóólá tôtáleíté.éété  ‘man who we hadn’t counted for’ (rem stat)
l. nóótótałe  ‘we may count’ (subjunc)
m. toyâa’talá.á  ‘we didn’t used to count’ (hab)
n. moondóólá twáatáleítá.á  ‘man who we used to count for’ (hab)
o. moondóólá tôtáatáleítá.á  ‘man who we didn’t used to count for’ (hab)
p. tála  ‘count!’ (imper)

And when an object is placed after a non-assertive verb, the final tone on the verb does not change and the object does not acquire a final SL tone, as seen in (5.86).
If phrasal SL shifts to surface on a complement following an assertive verb, the question arises as to how far the SL tone will shift. (5.87) shows that if there are multiple complements following an assertive verb, the phrasal SL shifts only to the end of the first complement.

The immediately post-verbal complement mo.ema in (5.87) (and ma.i.o ‘bananas’ in (5.38) - (5.41)) are nouns which end in a plain L in isolation, and in a SL tone when the phrasal SL shifts. This is easily explained under the assumption that the L tone is the default tone. Since ma.i.o and mo.ema have no lexical tone assigned to them, they receive a L tone by default, unless phrasal SL shifts to them.
If the complement ends in a H tone, as in (5.88a), the addition of the phrasal SL yields a H/SL falling contour tone, as seen on the complement *kemiiná* in (5.88b), when the complement is pre-pausal. However, if the phrasal SL is phrase-medial, as in (5.88c), the H/SL contour surfaces as a SH tone.\(^{16}\)

(5.88) a. *kemiiná*  
    b. *nénékéné̌ngié kemiiná*  
    c. *nénékéné̌ngié kemiiná cháí*  
    d. *nétwáatálá ngókó*  
    e. *nétwáatálá ngókó kwaačá*

(proper name)  
'I gave it to Kemiina'  
'I gave tea to Kemiina'  
'we just counted chickens' (imm past)  
'we just counted chickens this morning'  

This is explained by the fact that contour tones are only allowed pre-pausally. When a contour tone is phrase-medial, there is a conflict between preserving the SL tone at the right edge of X-Max and the fact that contour tones are not allowed on a mora phrase-medially. The conflict is resolved by the spread of [+extreme] to the tonal node bearing the [+upper] specification and the deletion of one tonal node. An illustration of this process is repeated in Rule 5.21.

Rule 5.21  
Illustration of tonal node deletion and subsequent spread of [+extreme]

\(^{16}\) Recall that lexically, H+SL in nouns surfaces as SH in all contexts (unless the SL is deleted phrase-medially). No doubt the more general derivation of lexical SH from H+SL is related to this phrase-medial process (Odden and Roberts-Kohno, In Press).
Other examples can be found in the copula construction, as seen in (5.89c,f), where the phrasal SL tone surfaces on the adjective following the copula né. The adjective ‘long’ in (5.89a,e) ends in a H tone, so the addition of phrasal SL yields a H/SL falling contour tone in (5.89c,f). And when another complement follows the adjective in (5.89d), the phrasal SL is no longer at the right edge of X-Max, so the H/SL contour tone surfaces as a SH tone.

(5.89) a. mo.aasá
    b. okó
    c. okó né mo.aasâ
    d. okó né mo.aasâ byo
    e. mbooso nda.aasâ
    f. mbooso né nda.aasâ

‘long’ (cl.11)
‘(a piece of) firewood’ (cl.11)
‘firewood is long’
‘firewood is very long’
‘long beans’ (cl.10)
‘beans are long’

The phrasal SL will not shift to just any word following the verb; the word must be within the VP. For example, phrasal SL cannot shift to a postposed subject: in (5.90b), phrasal SL stays on the verb. In (5.90c), phrasal SL shifts only to the complement ngókó ‘chickens.’

(5.90) a. mo.ema akáabálókâ
    b. akáabálókâ mo.ema
    c. akáatálá ngókó mo.ema
    d. *akáatálá mo.ema ngókó

‘Moema will fall’ (fut)
‘Moema will fall’
‘Moema will count chickens’
‘Moema will count chickens’

Such data indicates that a postposed subject is a sister of the VP, and not a daughter. This is illustrated in Rule 5.22. Phrasal SL stops at the end of the VP. And since the H/SL is not pre-pausal, the falling tone surfaces before the postposed subject as a SH tone. Except for the condition that a head must be initial in a phrase, word order within a VP is fairly free. However, a postposed subject may never precede an object or adverb, as seen in (5.90d).
Assuming the syntactic structure in Rule 5.22 for postposed subjects, there is no reason for the SL tone to shift any further, because the SL-Alignment constraint is satisfied.

This account of the phrasal SL tone predicts that if the complement of an assertive verb is itself modified, that SL will shift further to the modifier of the post-verbal noun. In other words, the phrasal SL cannot stop on ma.i.o when a complement follows which ma.i.o is the head of, as in (5.91e).

(5.91) a. ma.i.o  
    b. motabanya  
    c. nenooniien maiÓ  
    d. nenooniien maio maamotabanyâ  
    e. *nenooniien maio maamotabanyâ  

′bananas′ (cl.6)  
′preacher′ (cl.1)  
′I saw bananas′ (rem perf)  
′I saw bananas of a preacher′

And if the modifier itself is the head of a modified phrase, phrasal SL shifts to the last word in that chain of modifiers, as seen in (5.92a,b,d). In the copulative construction in (5.92g), if mo.asâ is further modified, SL shifts further to the right edge of the modifier.
These syntactic constructions are recursive, and thus, the SL tone can theoretically shift an infinite distance from the verb in order to reach the end of X-Max, as demonstrated in the illustration of (5.92d) in Rule 5.23.

Rule 5.23 Illustration of the recursive shift of phrasal SL throughout a Verb phrase

In addition to the N-of-N construction, relative clauses and infinitival clauses may also have strings of modifiers which result in a phrasal SL shifting far to the right of the assertive verb to reach the right edge of X-Max. (5.93a,b) both contain the relative clause verb ékééngé étéete ‘which was clucking.’ Since (5.93a) is non-assertive, there is no reason
to place a phrasal SL on the complement of the verb. (5.93b), on the other hand, is assertive. Thus, phrasal SL surfaces on the relative clause: it is at the right edge of X-Max. (5.93d,e) show that when the relative clause is further modified by a noun, phrasal SL shifts rightward to appear on the noun ‘bananas.’ (5.93c) shows that a negative verb is not assigned a phrasal SL and ‘bananas’ surfaces with a plain L on the final. Finally, (5.93f) shows that when the noun modifying the relative clause verb is further modified by an adjective, SL surfaces on the adjective, i.e., at the right edge of X-Max. (5.93g-h) shows a further example of the existential with a relative clause. The SL surfaces on the relative clause verb in (5.93g) and when the relative clause verb is modified by a following noun in (5.93h), the SL shifts to the noun.

(5.93) a. ndéné'o na ngoko ékééngéétèetè 'I didn’t see a clucking chicken'
   b. nénénéx'ie ngoko ékééngéétèetè 'I saw a clucking chicken'
   c. ndéné'o na ngoko etoméetè maio 'I didn’t see a chicken who pecked bananas'
       I-didn’t see chicken rel-peck bananas
   d. nénénéx'ie ngoko etoméetè maio 'I saw a chicken who has pecked bananas'
       I-saw chicken rel-peck bananas
   e. nénénâakaathie twáana tôkuéetè maio
       'I praised children carrying bananas’
   f. nénénâakaathie twáana tôkuéetè maio maníini
       'I praised children carrying small bananas’
   g. bée ngoko ngaatálá 'there’s a chicken I’ll count'
   h. bée moondo ngâatâle lá ngoko 'there is a person I’ll count chickens for'

(5.94) shows how the search for the right edge of X-Max continues as long as a complement is further modified. In (5.94e-f), the adjective moníini ‘small’ is the first word which ends an X-Max phrase, so the phrasal SL from the verb rests here. But in (5.94f), this is not the last word in the sentence. To shift further in (5.94f) would be putting the SL on the right edge of the higher X-Max, which is prohibited. Since a contour tone on a single mora is prohibited except pre-pausally, a tonal node is lost and the H/SL sequence surfaces as a SH tone.
More examples are seen in (5.95c-f). A phrase-final H/SL fall alternates with a phrase-medial SH on 'house' in (5.95c,d) and on the word 'small' in (5.95e,f).

The phrasal SL assigned by an assertive verb will also move into an infinitival complement clause. If the infinitive verb is followed by a complement, the SL cannot be realized on the phrase-medial infinitive, since it is not phrase-final. Therefore, the SL assigned by the assertive verb shifts to the object of the lower clause, or the complement of the infinitival verb. The second example in (5.96) demonstrates that when the matrix verb is non-assertive, i.e. negative in this case, phrasal SL is not assigned and, therefore, does not shift to the complement of the infinitival verb.
Furthermore, if the following complement is modified in a chain of overlapping head-modifier relations, SL shifts to the end of that phrase.

(5.97) a. nénâëlëomotëethyotëma ma.i.ô ‘I should help him cut bananas’  
  ‘I should help him cut bananas that ripened’  
  ‘I should help him cut bananas that ripened in the garden’  
  ‘I should help him cut bananas that ripened in the garden of Moema’  

It was already seen that non-agreeing modifiers do not induce the deletion of a preceding SL tone on a noun, even though they are syntactically within the VP. Non-agreeing modifiers also have an effect on the phrasal SL. When phrasal SL shifts through a chain of complements, it will stop at the head noun and not on the following non-agreeing modifier, as seen in (5.98). Also notice that since H + phrasal SL is not prepausal, a SH tone surfaces on the final syllable of the noun.

(5.98) a. néonoônë maio má.atáchányá keéndá ‘I saw bananas of nine preachers’  
  ‘I saw bananas of all the preachers’  
  ‘he took 10 chickens’  
  ‘he took 9 chickens’  
  ‘I praised children carrying 9 bananas’  

Both the failure to induce SL deletion and the blocking of SL spread are manifestations of the same principle constraining SL to the right edge of X-Max.

There is another context where lack of morphological agreement can prevent the spread of SL. Just as it was seen that certain numerals were not subject to morphological agreement, there are also certain locatives which are not subject to morphological agreement. In (5.99c-d), the locative nouns e.ólù and mbëë require a noun class agreement
marker linking the locative element to a following noun. Since wa is an agreeing particle, the SL shifts to the following noun. Contrast this with (5.99g-h), where baasa and bakóbé require the non-agreeing particle na. Since na is not marked for agreement, the shifting SL tone stops on the locative noun. And since it is not pre-pausal, H + SL surfaces as a SH tone.

(5.99) a. eolú waa-ñoombá ‘above the house’
     b. mbeê waa-ñoombá ‘in front of the house’
     c. nekétíléle eolú waa-ñoombá ‘I cut it above the house’
     d. nekétíléle mbeê waa-ñoombá ‘I cut it in front of the house’
     e. baasa naa-ñoombá ‘far from the house’
     f. bakóbé naa-ñoombá ‘near the house’
     g. nekétíléle baasa naa-ñoombá ‘I cut it far from the house’
     h. nekétíléle bakóbé naa-ñoombá ‘I cut it near the house’

Furthermore, in some locative constructions, the structure locative-agreement-Noun can alternate with Noun-locative, as in (5.100). Whereas the SL can pass through to the lower noun in (5.100a,c), the SL stops at the noun in (5.100b,d) in the postposed locative construction, since the postposed locative does not agree with the noun.

(5.100) a. nétwâamibôéé etina wâñoombâ ‘we washed it behind the house’
     b. nétwâamibôéé ńoomb’ étînâ ‘we washed it behind the house’
     c. nétwâamibôé étînâ nthéené wâñoombâ ‘we washed it inside the house’
     d. nétwâamibôé ńoombâ nthéené17 ‘we washed it inside the house’

Finally, there are two contexts phrasal SL may not shift to. The first is in certain subordinate clauses, and the second is in WH-words. Of the three syntactic patterns for subordinate clauses, or embedded S’s, the first is subjunctive clauses. The subjunctive is used for purpose clauses, and following the verb enda ‘want.’ The examples in (5.101)

17 The locatives etinâ and nthéené have lexical SH tones on their final vowels, thus their tone is not determined by the presence of phrasal SL.
have an embedded subjunctive clause. In (5.101a-b), the SL assigned by the assertive verb surfaces on the complement of the verb, since the noun is at the right edge of X-Max, as expected. But if there is no object, we might expect the subjunctive verb would be the complement and SL would shift to the end of the phrase. However, the phrasal SL does not shift to the subjunctive clause: it stops on the matrix verb, as seen in (5.101c-e), and surfaces as SH since it is not pre-pausal.

(5.101)a. ne.ebiē mo.ema [á.eme] 'I paid Moema to dig'
b. ne.ebiē mo.ema [kemiina á.eme] 'I paid Moema so Kemiina would dig'
c. nemo.ebiē [á.eme] 'I paid him to dig'
d. twe.endá [mo.ema átalal] 'we want that Moema count'
e. netálilē [mo.ema ábaande] 'I counted so that Moema may plant'

This can be explained under the assumption that subjunctive clauses are not in the domain of the main clause verb, as seen in the syntactic structure in Rule 5.24.

Rule 5.24 Illustration of Sentence with subjunctive subordinate clause

A second group of embedded clauses are transparently permeable: these are infinitivals and when-clauses. In (5.102a,b,e,f), the SL surfaces at the right edge of the noun following the main clause verb. And in (5.102f) the SL combines with the H to surface as a SH since it is not pre-pausal. Unlike the subjunctive clauses, however, SL moves into the subordinate clause when the subordinate clause is the first complement.
following the matrix verb, as in (5.102g). (5.102c,d,h) further show that the SL shifts to the complement of the subordinate clause verb to surface at the end of the phrase.

(5.102)

a. néándékíie moémà [kobaàndà]  
   ‘I hired Moëma to plant’

b. néándékíie moémà [kobaanda ma.i.o]  
   ‘I hired Moëma to plant bananas’

c. némoândékie [kobaanda ma.i.ô]  
   ‘I hired him to plant bananas’

d. tweëndà [kobaandea mo.ëmà]  
   ‘we want to plant for Moëma’

e. nénémöösíie [mo.ëmà aiタルá]  
   ‘I saw them while Moëma was counting’

f. nénöönsíie kebëësë [keitála]  
   ‘I saw the boy counting’

g. nénöösíie [keitála]  
   ‘I saw him counting’

h. nénöösíie [keitála ma.i.ô]  
   ‘I saw him counting bananas’

The third type of subordinate clause, and the problematic clauses, are ‘that’-clauses. In (5.103a), the SL required by the assertive verb shows up at the right edge of the first complement, as expected. When the main clause verb is directly followed by a subordinate clause verb, the SL tone should either surface on the main clause verb if the shifting of SL is blocked, or shift into the subordinate clause verb. However, neither of these two possibilities occur. The SL does not remain on the main clause verb, and the SL does not shift into the subordinate clause because it is impermeable to SL-shift. Thus, the SL will delete when there is no post-verbal noun, as seen in (5.103b-g).

(5.103)

a. toké.éâ moémà [kebëësë kétale]  
   ‘we will tell Moëma the boy should count’

b. tokàaméâ [matala]  
   ‘we will tell them that they should count’

c. tokàaméâ [mo.ëma átale]  
   ‘we will tell them that Moëma should count’

d. nénóönsíie [mo.ëma néwaabálokíë]  
   ‘I saw that Moëma fell’

e. nénàasöönie [mo.ëma néwaakwië]  
   ‘I read that Moëma died’

f. kweënëkàkà [mo.ëma néwaatálilë]  
   ‘it seems that Moëma counted’

g. naisyé [mo.ëma néwaatálimë]  
   ‘I said that Moëma counted’ (rem

The issue is how to distinguish these two types of subordinate clauses. The explanation lies in the syntactic category of the embedded clauses. Permeable clauses, those that allow SL to shift into them, are IP clauses. And the impermeable ‘that’-clauses, those that block the shift of SL tone, are CP clauses. This is illustrated in Rule 5.25.

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This analysis is further supported by data in (5.104). The impermeable ‘that’-clauses may optionally be preceded by the complementizer kaná, but no complementizer is possible for the permeable IP-clauses.

(5.104)a. neóni̱ kaná mo综合素质 néwaabálókílê  ‘I see that Moema fell’
   b. *néni̱ni̱ kaná keítálá ma.i.ò  ‘I saw him counting bananas’

The second context where the phrasal SL fails to surface is in WH-words. In (5.105a,c,e,g,i,k), the SL assigned by the assertive verb surfaces on the post-verbal noun, as expected. But, when the WH-word directly follows the main clause verb, the SL does not surface, but deletes, as in (5.105b,d,f,h,j,l). The explanation for this is that WH-words cannot be the target of a SL shifting from a verb.
<table>
<thead>
<tr>
<th>(5.105) a. áúúí' éìò o.o</th>
<th>‘who did he cook a banana for?’</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. áúúí' ò.o</td>
<td>‘who did he cook for?’</td>
</tr>
<tr>
<td>c. waakuúé maiò ende.e</td>
<td>‘when did you carry bananas?’</td>
</tr>
<tr>
<td>d. waamákúí' énde.e</td>
<td>‘when did you carry them?’</td>
</tr>
<tr>
<td>e. wááíé ngókó bá</td>
<td>‘where did you kill the chicken?’</td>
</tr>
<tr>
<td>f. waakútíé bá</td>
<td>‘where did you sleep?’</td>
</tr>
<tr>
<td>g. waétié maiò nao</td>
<td>‘who did you bring bananas with?’</td>
</tr>
<tr>
<td>h. waétié nao</td>
<td>‘who did you bring with?’</td>
</tr>
<tr>
<td>i. waétié moemà méána</td>
<td>‘how many did you bring for Moëma?’</td>
</tr>
<tr>
<td>j. waétié méána</td>
<td>‘how many did you bring for’</td>
</tr>
<tr>
<td>k. waétié moemà mào</td>
<td>‘whose did you bring for Moëma?’</td>
</tr>
<tr>
<td>l. waétié mào</td>
<td>‘whose did you bring for?’</td>
</tr>
</tbody>
</table>

5.5.4 Further evidence for the tone feature [+extreme]

In this section, I mention three other arguments in support of the tone feature [+extreme], and of SH being a combination of the tone features [+upper] and [+extreme]. The first, and perhaps weakest evidence is distributional. The SL is constrained so that it must be aligned with the right edge of X-Max. Thus, SL tone does not appear in pre-penultimate position, except in a very specific context. SL will always be on either the final syllable, or on the penultimate + final syllable. Therefore, if SH is the combination of the features of H and SL, then SH should never occur anywhere except at the right edge of a stem on the penultimate or final syllable. And, in fact this is the case. Examples in (5.106) as well as in the data seen thusfar show a variety of surface tone patterns in Kikamba which adhere to this generalization.

(5.106) a. nééngotálá  | ‘I am counting’ |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b. nó.okóólyà</td>
<td>‘you-sg are pulling’</td>
</tr>
<tr>
<td>c. ekwaasé</td>
<td>‘sweet potato’</td>
</tr>
</tbody>
</table>

The only context in which a SH may surface in pre-penultimate position is on a prefix, or in other words, in pre-stem position. A SH may surface on a negative subject marker as in (5.107a), a negative marker as in (5.107b,c) or a definite noun class prefix as...
in (5.107d,e). While these contexts can be interpreted as exceptions to the SL-Alignment constraint, it is possible that an ad-hoc explanation may be that the boundary between prefixes and stems does constitute a right edge of some X-Max to be defined. If independent evidence for such a claim could be found, then examples like those in (5.107) would not have to be considered exceptions to the generalization.

(5.107) a. ndé.otálá 'he is not counting'
   b. totá.óméét̪é 'we had not bitten long ago'
   c. toyáátálá 'we didn’t count months ago'
   d. ōomwaató 'the beehive'
   e. mááléengé 'the pumpkins'

Second, the feature [+extreme] is restricted from surfacing in yes-no questions. Thus, the phrasal SL tone associated with assertive verbs, for example, will not surface in a yes-no question: [+extreme] deletes. In (5.108b), a final SL tone deletes. In (5.108c), a H/SL falling tone is found on the verb. When [+extreme] deletes in the yes-no question in (5.108d), the final mora of the verb surfaces as a plain H. And finally, in (5.108e), the last two syllables surface with a SH tone. H and SL are on adjacent, monomoraic syllables, and we get both [+upper]-Spread and [+extreme]-Spread 2. Since (5.108f) is a yes-no question, [+extreme] deletes and a plain H is left on the syllable ki. This is important because it also indicates that deletion of the feature [+extreme] must precede the general tone rules of [+extreme]-Spread 1, [+extreme]-Spread 2, and [+upper]-Spread. If these rules preceded deletion of the feature [+extreme], then we would incorrectly predict that (5.108e) nóbálókílé would surface as *nóbálókílé in a yes/no question. Thus, SH consists of the features [+upper] and [+extreme] because in the absence of SL, SH surfaces as H.
The feature [+extreme] deletes from a grammatically-assigned SL tone in yes-no questions as well. In (5.109a,c), we see the hodiernal stative, which takes a grammatical SL tone. [+extreme] spreads twice to the long penultimate syllable and we get H surfacing as SH. But when [+extreme] deletes in the question form in (5.109b,d), a plain H is left.

In (5.110), are examples of nouns which end in a lexical SL tone. When the noun is the complement of a verb, it retains its SL tone. However, in the question forms in (5.110c,f), [+extreme] deletes. In (5.110f) both SLs delete, supporting the claim that there is a single tone surfacing on two moras by [+extreme]-Spread 1.

In the examples in (5.111), there are nouns which have a surface SH tone. Examples like (5.111a) are due to the application of the general tone rules [+extreme]-Spread 1 and [+extreme]-Spread 2. Examples like (5.111d) result from the application of
[+upper]-Spread and [+extreme]-Spread 2. In (5.111g), both [+upper] and [+extreme] are on the same mora, so the syllable surfaces as SH. If SH consists of [+upper] and [+extreme], then we expect the SH to surface as a H when [+extreme] deletes in yes-no questions. And this is exactly what we see in (5.111c,f,i).

(5.111) a. mbëssà
    b. née mbëssà
    c. née mbëssà
    d. ngité
    e. née ngité
    f. née ngité
    g. ñamó
    h. née ñamó
    i. née ñamó

‘money’ (cl.9)
‘it is money’
‘is it money?’
‘dog’ (cl.9)
‘it is a dog’
‘is it a dog?’
‘animal’ (cl.9)
‘it is an animal’
‘is it an animal?’

In (5.111e,f), we see that [+extreme] deletion must precede the rules of [+extreme]-Spread 2 and [+upper]-Spread. Otherwise, we expect the noun ngité to incorrectly surface as *ngîté.

Finally, [+extreme] anywhere in the sentence deletes in yes-no questions. In (5.112b,d), the phrasal SL tone deletes in yes-no questions. In addition, the lexical SH and the SH marking the definite on ‘weeds’ surfaces as a plain H when [+extreme] deletes. In (5.112f), the deletion of [+extreme] causes the SH on the negative prefix and the SH on the verb stem to surface as plain H. In (5.112g,h), the phrasal SL surfaces with the lexical H on the adjective ‘many’ as a falling tone, but surfaces as plain H in the yes-no question. Finally, SH on ngókó ‘chickens’ and ñááñá ‘eight’ surfaces as plain H in yes-no questions. Thus, SH is composed of [+upper] and [+extreme] because it surfaces as H in the absence of the tone feature [+extreme].
Third, more evidence for SH consisting of H + SL has to do with how far a phrasal SL can shift. If SH and SL share the feature [+extreme], this predicts that the presence of the feature [+extreme] in a SH tone should prevent the phrasal SL from shifting to the right edge of X-Max, since they are on the same tier in the feature geometry. This prediction can be tested by looking at examples where SH may occur pre-penultimately, as in the definite form of nouns. The definite morpheme is realized as a SH tone added to the prefix component of the noun (see Chapter 2). In the examples in (5.113a,c), the phrasal SL tone surfaces on the object, as expected. But in (5.113b,d), the SL does not surface. This can easily be explained by assuming the SH tone has as one of its components the feature [+extreme], which blocks the shift of SL, or [+extreme], to the right edge of X-max.

5.5.5 A summary of the behavior of [+extreme] in Kikamba

This section has shown that certain tones are sensitive to the right edge of a maximal projection in Kikamba. What these tones have in common is that they all have
the feature [+extreme], except for the H/L Falling tone in bimoraic and monomoraic imperatives. The different behaviors support the distinction between grammatical, lexical, and phrasal tones. Grammatical tones are assigned to different tenses, lexical tones are underlyingly associated with certain noun and verb stems, and phrasal tones are tones assigned to certain phrase types, i.e., assertive phrases in Kikamba. I conclude this section on the syntax-phonology interface with a summary of the behavior of the feature [+extreme] in Kikamba, found in Table 5.4.

Table 5.4: Behavior of the feature [+extreme] in Kikamba

<table>
<thead>
<tr>
<th>Behavior of the feature [+extreme]</th>
<th>Tone is on a word within X-Max</th>
<th>Tone is at the right edge of X-Max; but not pre-pausal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexical SL</td>
<td>[+extreme] deletes</td>
<td>[+extreme] remains</td>
</tr>
<tr>
<td>Lexical SH</td>
<td>[+extreme] deletes</td>
<td>[+extreme] remains</td>
</tr>
<tr>
<td>Grammatical SL</td>
<td>[+extreme] deletes</td>
<td>[+extreme] remains</td>
</tr>
<tr>
<td>Grammatical SH</td>
<td>[+extreme] remains</td>
<td>[+extreme] remains</td>
</tr>
<tr>
<td>Grammatical H/SL</td>
<td>delete 1 tonal node: H/SL &gt; SH</td>
<td>delete 1 tonal node: H/SL &gt; SH</td>
</tr>
<tr>
<td>Grammatical H/L</td>
<td>delete 1 tonal node: H/L &gt; SH</td>
<td>delete 1 tonal node: H/L &gt; SH</td>
</tr>
<tr>
<td>Phrasal SL</td>
<td>SL tone → right edge of X-Max</td>
<td>SL tone remains</td>
</tr>
<tr>
<td>Phrasal H/SL</td>
<td>SL tone → right edge of X-Max</td>
<td>delete 1 tonal node: H-SL &gt; SH</td>
</tr>
</tbody>
</table>

5.6 Theoretical discussion of tone features

I have shown that there is evidence for using a register feature [+upper] and a peripheral feature [+extreme] to describe the fact that the highest and lowest tones in Kikamba form a natural class. In this section, I demonstrate that the traditional use of register and subregister features to describe four tone languages will not work for Kikamba.

It is generally assumed that the tonal space is divided into registers. A two tone language makes use of an upper register and a lower register. The feature [upper] describes register. As Odden (1995) points out, a three-tone language is expected to further need the feature [raised], because this is how one of the primary registers can be
divided into two sub-registers, since more tones require more features to distinguish the tones. [Upper] and [raised] are used in Yip 1980, Pulleyblank 1986, and Ao 1993 to distinguish 3 tones. Using this typology, Kikamba tones would be illustrated as in Rule 5.26.

Rule 5.26 Illustration of Kikamba tones using register and sub-register features

This typology simply does not work for Kikamba. There is nothing to spread from SL to H in order to get a SH tone. If both features spread, the [+upper] and [-raised] of the H would be delinked and we would end up with total tonal assimilation, as in Rule 5.27a. If only [-upper] was spread, the result would be the representation for a SL tone, as in Rule 5.27b. In other words, H would be replaced by a SL tone, which is not the correct result.
Rule 5.27  Illustration of tone rules making incorrect predictions for Kikamba

a.  

b.  

Although this feature system does not work for Kikamba, it does work for Ewe, as pointed out in Odden (1995). In Ewe, Mid becomes Raised H between two Hs: ētō’ mēgbē \(^{18}\) → ētō mēgbē ‘behind a mortar’ (Odden 1995:453). This follows nicely from the interpretation that even though Raised H and M are in different registers, Raised H and Mid are both [+High], or, in the upper half of their respective registers, as represented in Rule 5.28a,b. Thus, the Yip/Pulleyblank system works well because it is capturing the generalization (which is correct for Ewe) that in a four tone language, the highest and second-lowest tones pattern together, thereby forming a natural class.

\(^{18}\) When used for Ewe, the macron represents a Mid tone. Recall that for Kikamba, the macron represents an explicitly-assigned L tone and unmarked tones in Kikamba are all L tones.
However, this model fails to predict the existence of a four tone language in which the highest and second-lowest tones do not form a natural class. It may at first seem that the Kikamba tone system should be equivalent to a language like Ewe because they both have four tones. But for Kikamba, the tones do not pattern as they do in Ewe. As demonstrated, there is no way to use the features in Rule 5.28 to generate the correct results when the SL tone spreads to a H tone. The Kikamba system requires that the H tone (the second-highest tone) becomes a SH tone (the highest tone) due to the spreading of the lowest tone in the language, or in other words, a tone in the lower half of its subregister. In Ewe, the highest and second lowest tones share a subregister feature which captures a relationship which is not shared by the analogous tones in Kikamba. Thus, the subregister feature which Raised H and Mid share in Ewe is not relevant at all in Kikamba because the relationship between SH and L is not the same.

In fact, Kikamba has no use at all for the subregister feature [raised]: it is irrelevant. If on the other hand, a feature representation is assumed where the highest and lowest tones share a feature, the facts of Kikamba can be captured. As seen in Odden (1995), the use of a feature such as [+extreme] in Ewe would be completely superfluous. Ewe is a clear case where there are two registers each sub-divided into 2 subregisters, with no need for a third feature. Although couched in a linear framework before
underspecification theory, Ford had the correct idea in characterizing Kikamba (1976). He shows that by using the features [high] and [extreme], the surface alternations like those presented in this chapter can be accounted for. Kikamba presents clear evidence of a four-tone language which requires the feature [extreme] in the absence of the feature [raised].

5.7 Conclusion

In conclusion, this chapter has demonstrated that the complex system of verbal and nominal stem tone patterns in Kikamba can be accounted for by the interaction of a small set of tone rules and tone assignment principles, with ample evidence that the four tones of Kikamba require the tone features [+upper] and [+extreme]. Kikamba provides a fascinating case for the interaction between tone and syntax, specifically related to the SL tone and the feature [+extreme]. There is a lexical SL tone assigned to nouns, a grammatical SL tone assigned to verbs in certain tenses, and a phrase-level SL tone assigned to assertive verbs. All instances of SL tone are subject to a general constraint of SL-Alignment that says the SL must be aligned to the right edge of a maximal projection. In addition, the [+extreme] feature in a lexical SH tone also must be aligned to the right edge of a maximal projection. If it is not, [+extreme] deletes.

Moreover, this manifestation of the interface between syntax and phonology has been shown to be sensitive not only to phrase structure, but to morphological agreement patterns, and to categories of subordinate clauses. There is also evidence that SL tone is simply prohibited from certain sentence types, such as questions. This study has provided some important data for theories of both tone features and the syntax-phonology interface.
6.1 Overview

In this dissertation, I have laid out the basic facts of the phonology, morphology, and tone system of the Bantu language, Kikamba. In §6.2, I summarize the results of this study. In §6.3, I would like to mention some data that remain under-analyzed, but are important areas for further research, including §6.3.1, the phenomenon of downstep and the facts as they are understood at this point, §6.3.2, a minimal word phenomenon by which a word-initial mora which normally gets stray-erased surfaces at word boundaries, and §6.3.3, monomoraic verb stems and their behavior in various tenses.

6.2 Summary

This study of Kikamba has shown several things. First, it has provided a detailed description of the morphological structure of both the nominal and verbal systems. In Chapter 2, I described the noun class system, the system of agreement, stem formation, the derivational extensions, and the inflectional tense and aspect affixes which are added to verbs. In Chapter 3, I discussed syllabification and vowel coalescence, and showed that Kikamba does not permit onsetless syllables. In order to avoid onsetless syllables, an onsetless syllable will syllabify with a preceding syllable. Subsequent to syllabification,
adjacent vowels coalesce, resulting in various vowel coalescence processes such as Glide formation and Mid vowel fusion. Syllabification occurs at the phrase level as well as word-internally. Tone and vowel quality are indications that vowels coalesce at the phrase level. Interestingly, the sequences ai and au never undergo a change in quality. In addition, they do not undergo a change in tone at the word level, but they do undergo tonal changes at the phasal level, an indication that they coalesce at the phrasal level, but not word-internally. In addition, I provided data which show that syllabification and vowel coalescence are separate processes. When multiple syllables coalesce, syllabification only happens once, but adjacent vowels continue to coalesce, resulting in coalesced, bisyllabic vowel sequences. In Chapter 4, I discussed the empty C data. The empty C is a theoretical construct allowed by autosegmental phonology which allows us to explain why vowel sequences which normally undergo coalescence refuse to coalesce in specific environments.

Chapter 5 presented the data on tone. Kikamba has several tone rules active in the synchronic grammar involving the interaction of the SH tone and the SL tone, which indicates that they should share a tone feature: the feature [+extreme] is used, which captures the generalization that tones which are at the periphery of the tonal space form a natural class. I also demonstrate that Kikamba SL tone, and more generally the feature [+extreme], is sensitive to the right edge of a maximal projection, indicating that there is some interaction between the phonology and the syntax. I have also shown that lack of morphological agreement affects the way words are grouped into phrases, and thus affects the behavior of SL tone. The type of subordinate clause following a phrasal SL also influences the behavior of a SL tone. Such data is important to consider in theories of the syntax-phonology interface. Finally, I show that a theory of tone features using only a register and subregister feature cannot account for the Kikamba data.
6.3 Areas for further research

In this section, I outline a few areas that I have examined, but which are still not clear, and require further investigation. These are areas which I believe potentially contribute something to theoretical phonology. This section examines downstep, word minimality, and monosyllabic verb stems.

6.3.1 Downstep

Any study of Kikamba tone would be missing something if downstep and downdrift were not acknowledged. I have explained the basic facts regarding the distribution of the SL tone in Kikamba, and noted that the presence of a SL tone is correlated with a downstep in a following syllable (see Chapter 3). The connection between SL and downstep is an important one. This connection is also noted by Clements and Ford for Kikuyu (1979). In Kikuyu, there has been a historical shift of tone whereby the tones surface one syllable to the left of where they were in Proto-Bantu forms. Evidence for this is that Kikuyu forms consistently surface with a tone pattern where the tones are shifted to the right one syllable as compared with Kikamba, Tharaka, and Mwimbi (1979:187). Interestingly, this has resulted in a final SL tone not having a place to surface at the right edge of a word. And just in case there is a final SL which does not surface within a word, there is absolute downstep following the word. Thus, the SL does not delete, but is retained in the representation as a downstep.

In Kikamba, I have found that downstep is correlated with the presence of a SL tone as well. In fact, downstep in Kikamba is associated with the presence of both a SH tone and a SL tone. This indicates two things: one, SH tone and SL tone share the feature [+extreme] and two, it is the presence of the tone feature [+extreme] which is the trigger for downstep. Since there are no SH tones in Kikuyu, it is only the SL tone which induces
downstep. In (6.1), we see that a SH in the prefix induces downstep in a following syllable.

(6.1)  a. toyään!tálá
       b. tośe!kwéezá
       c. totaään!bálókà
       d. toÍ!táléeté

‘we didn’t count months ago’
‘we are not shaving’
‘we didn’t fall months ago’
‘we didn’t and are not still counting’

This data is particularly interesting because this is the only context where a SH tone, and thus, the tone feature [+extreme], is not at the right edge of a word. If the feature [+extreme] is constrained to appearing at the right edge of a word, then this indicates that the boundary between prefix and stem is a type of as-yet-undescribed prosodic boundary.

Definite nouns also provide examples of word-internal downstep, as seen in (6.2). In these examples, as well as those in (6.1), a SH in the prefix immediately followed by a SH in a stem triggers downstep of the second SH.

(6.2)  a. ob55
       b. ob6b65
       c. ngíté
       d. éé!ngité

‘news’
‘the news’
‘dog’
‘the dog’

The phonetic effect of downdrift is also present in Kikamba. If the two SH’s are not adjacent, the second SH is realized at a lower pitch level than the prefix SH in the examples in (6.3b,d).

(6.3)  a. ma.oβ55
       b. má.oβ55
       c. e.i.á
       d. é.i.á

‘news items’
‘the news items’
‘weed’
‘the weed’
The case for downstep is not clear because there are also cases where we expect downstep, but it does not occur. This is seen in (6.4).

(6.4) a. o.ēmf 'tongue'
     b. ō.ēmf 'the tongue'
     c. o.ūmf 'act of cursing'
     d. ō.ūmf 'the act of cursing'

What such cases have in common is that an empty C intervenes between the prefix and the root, or between the two SHs. It therefore appears that there is a correlation between the presence of the empty C and the lack of downstep.

One possible explanation could be that, after the empty C deletes, the SH tones are on moras which are attached to segments which are immediately adjacent. If the segments to which two identical tones are linked are also adjacent, then it is in just this environment that downstep cannot occur. Before any conclusion can be reached about why in these particular words downstep does not occur, however, a more extensive search of the environments where downstep can and cannot occur must be undertaken. One obvious place to look would be in possessives, adjectives, numerals, and quantifiers. All of these may agree with the noun and have a prefix. It is this boundary between prefix and root where downstep may potentially occur. I leave this as a very important and theoretically significant area for further research.

6.3.2 Minimal word effects

Like many languages, Kikamba demonstrates minimal word effects. This refers to the constraint some languages exhibit that words must be of some minimal length, either bisyllabic or bimoraic, depending on the language. Odden (ms.) has shown that some languages robustly demonstrate such effects (the Zezuru dialect of Shona), others do not seem to mind sub-minimal words (the Karanga dialect of Shona), and still others, perhaps
the majority fall somewhere in between (Kikerewe). What this means is that some bimoraic or bisyllabic words are tolerated, and when they are not, some repair strategy is used to make the words longer.

Kikamba, like Kikerewe, sometimes tolerates monomoraic words, and sometimes does not. Since nouns, modifiers, and verbs require an agreement prefix, the only place to find a monomoraic word in Kikamba is in class 9/10 nouns, or in class 8, 9, and 10 modifiers. These are the classes which take a moraic nasal prefix and thus, these are the words that could surface as monomoraic. The repair strategy for these subminimal words is optional cliticization to a head.

Recall from Chapter 2 and 3 that although the nasal is moraic underlingly, the mora delinks from the the nasal on the surface and links to a preceding vowel. For example, in Chapter 2 we saw /kɔ-N-kon-ɔ/ -> koongonà ‘to hit me,’ with a long vowel preceding the nasal. Although this may happen word-internally, when the nasal is word-initial the mora stray-erases.

Thus, class 9/10 nouns and class 8, 9, and 10 modifiers can surface as monomoraic. Examples are seen in (6.5).

(6.5) Nouns
a. ngɔ  ‘leopard’ (9)
b. nthɛ  ‘earth/country/ground’ (9)
c. ngɔ̀  ‘firewood’ (9)
d. ngi  ‘fly’ (9)
Modifiers
e. mbyò  ‘hot’ (8,9,10)
f. ndɛ  ‘sold’ (8,9,10)
g. ngwɔ̀  ‘dead’ (8,9,10)

But just in case they are preceded by a head, they cliticize to the head. Evidence for this cliticization is that the mora from the nasal prefix does not necessarily stray-erase, but optionally links to the final vowel of the head and lengthens the vowel. Examples are seen in (6.6).
(6.6) **Head + Modifier**

**Verb + Noun**

- a. kotála ngó  ~ kotálaangó  ‘to count firewood’
- b. kwaatha nthé  ~ kwaathaanthe  ‘to govern a country’
- c. koyá ngó  ~ koyáangó  ‘to eat a leopard’
- d. koloonja ngî  ~ koloonjaangî  ‘to chase away flies’

**Noun + Adjective**

- e. ndata mbyô  ~ ndatáambyô  ‘hot star’ (cl.9)
- f. mbéémba ndé  ~ mbéémbaandé  ‘sold maize’ (cl.9)
- g. nzóka ngwô  ~ nzókaangwô  ‘dead snake’ (cl.9)
- h. iwá ndye  ~ iwándyé  ‘eaten sugar cane’ (cl.8)
- i. mbääké ñwé  ~ mbääkéeñwé  ‘drunk snuff’ (cl.9)
- j. mbäiki ndwé  ~ mbäikiindwé  ‘picked beans’ (cl.10)

We also find cliticization of a subminimal word to a following head in the structure: function word + noun. Examples with the copula, the negative copula, the preposition ‘of’ and the conjunction ‘and’ are found in (6.7). In these cases, cliticization is obligatory.

(6.7) **né + noun**

- a. néenzóké  ‘it is a bee’ (cl.9)
- b. néembusyà  ‘it is a rhino’ (cl.9)
- c. néembáká  ‘it is a cat’ (cl.9)
- d. téengókó  ‘it is not a chicken’
- e. téembáká  ‘it is not a cat’
- f. téeng’ômbè  ‘it is not a cow’

**noun + ya + noun**

- g. ndá:yaangî  ‘fly’s mulberries’
- h. ekaasé yáambô:í  ‘goat’s sweet potato’

**noun + na + noun**

- i. mbáká naängô  ‘cats and leopards’
- j. ngò naambáká  ‘leopards and cats’
- k. mbáká naangíté  ‘cats and dogs’

However, the data is not that simple. A problem that arises is in the head + modifier relationship: there is inconsistency between the pattern verb + noun and noun +
adjective. Whereas the second noun can optionally cliticize to the first noun following a head verb in (6.8a-b), data I elicited shows that the second adjective cannot cliticize to the first adjective following a head noun in (6.8c-d).

(6.8)  

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<tbody>
<tr>
<td>a.</td>
<td>kotálela</td>
<td>moéma</td>
<td>ngò</td>
<td>~</td>
<td>kotálela</td>
<td>moémaangò</td>
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<tr>
<td></td>
<td>'to count leopards for moéma'</td>
<td></td>
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<tr>
<td>b.</td>
<td>kweenze.a</td>
<td>moéma</td>
<td>nthé</td>
<td>~</td>
<td>kweenze.a</td>
<td>moémaanthé</td>
</tr>
<tr>
<td></td>
<td>'to dig the earth for moéma'</td>
<td></td>
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<td></td>
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<tr>
<td>c.</td>
<td>mbáká</td>
<td>néné</td>
<td>ngwò</td>
<td>*</td>
<td>mbáká</td>
<td>nénéngwò</td>
</tr>
<tr>
<td>d.</td>
<td>ng’ombe</td>
<td>níni</td>
<td>ngwò</td>
<td>*</td>
<td>ng’ombe</td>
<td>níningwò</td>
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</tbody>
</table>

'large dead cat' 'few dead cows'

It is unclear what the expected result would be, but it is definite that more data is required before anything definitive on minimal word effects can be stated with certainty.

6.3.3 Monosyllabic verbs

Monosyllabic verbs provide interesting evidence for the interaction between coalescence and tone. The monosyllabic verbs I have found in Kikamba are listed in (6.9). In these infinitive forms, there are no surface vowels to indicate what the vowel of the verb root is.

(6.9)  

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<tbody>
<tr>
<td>a.</td>
<td>koyá</td>
<td></td>
<td>'to eat'</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td>kokwá</td>
<td></td>
<td>'to die'</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>c.</td>
<td>kochá</td>
<td></td>
<td>'to dawn'</td>
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<tr>
<td>d.</td>
<td>kotwá</td>
<td></td>
<td>'to gather honey'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>kotwá</td>
<td></td>
<td>'to pluck fruit'</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>f.</td>
<td>kotá</td>
<td></td>
<td>'to sell'</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>g.</td>
<td>koñwá</td>
<td></td>
<td>'to drink'</td>
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</table>

These verbs are interesting because coalescence has obscured the underlying form of the verb stem. In (6.10), we find the passive forms of the verb roots in (6.9).
(6.10) a. kotéëwà 'to be sold'
b. kotûùwà 'to be plucked'
c. koñûùwà 'to be drunk'
d. kotwëëwà 'to be gathered'
e. ko.ëëwà 'to be eaten'

Such forms initially indicate that the underlying form of these verb roots are as in (6.11).

(6.11) a. /tëë/ 'sell'
b. /túu/ 'pluck fruit'
c. /ñúu/ 'drink'
d. /tòë/ 'gather honey'
e. /Cëë/ 'eat'
f. /kúu/ 'die'

While this data seems relatively straightforward, when we get into other tenses, some inconsistent alternations begin to appear. For example, 'eat,' 'drink,' 'gather honey,' 'die,' 'sell,' and 'pluck fruit' all surface with an excrescent s in the habitual forms. Examples are seen in (6.12).

(6.12) a. nénééesa.â 'I always eat' (hab)
b. nééndúusa.â 'I always pluck fruit' (hab)
c. nééndwëësa.â 'I always gather honey' (hab)
d. nénénúusa.â 'I always drink' (hab)
e. nééndëësa.â 'I always sell' (hab)
f. nééngúusa.â 'I always die' (hab)

However, in other tenses, this excrescent s does not surface, as in the stative in (6.13).
(6.13) a. néné.etê
b. nénénwéetê
c. nééndwéetê
d. nééndwéetê
e. nééndêetê
f. nééngwéetê

'I have eaten' (hod stat)
'I have drunk'
'I have gathered honey'
'I have plucked fruit'
'I have sold'
'I have died'

This excrescent s also surfaces in infinitives when the reciprocal suffix is added, as seen
in (6.14).

(6.14) a. ko.ésanà
b. ko.ésane.à
c. koñúusane.à
d. kotúusane.à

‘to eat e/o’
‘to eat for e/o’
‘to drink for e/o’
‘to pluck fruit for e/o’

However, a form with an excrescent s was not offered when ‘gather honey for e/o’ was
elicited, but (6.15a) was. When ‘sell e/o’ was elicited, (6.15b) was offered. (6.15c) was
tentatively judged to be correct when asked, but was not an offered form.

(6.15) a. kotwé.ane.à
b. koté.anà
c. kotéssanà

‘to gather honey for e/o’
‘to sell e/o’
‘to sell e/o’

What the forms with excrescent s have in common is that the s shows up at the end of the
verb root, preceding the reciprocal an, and not before other derivational suffixes, such as
the applied eC. This is seen in (6.16).

(6.16) a. kotwé.à
b. kotwé.e.à
c. koté.e.à
d. koñwé.à ~ koñwé.e.à
e. kokwé.à ~ kokwé.e.à

‘to pluck fruit for’
‘to gather honey for’
‘to sell for’
‘to drink for’
‘to die for’
Examples (6.16d,e) indicate that there are alternations where either hiatus is maintained between the verb root and the applied eC or not. Cases where hiatus is maintained would indicate the presence of an empty C in the verb roots, and would also explain why an excrescent s could surface. However, in all other cases we have seen s only surfaces when a following y is present, which is clearly not the case in these monosyllabic verb roots.

This is not the only case where the quality of the vowel affects an excrescent consonant. In Chapter 4, we saw that lateral does not spread to an empty C that occurs between two a's. However, this is exactly the opposite of the monosyllabic verb data. With these verbs, it is only with a following a that s surfaces.

In addition to this data, in some examples with the verb ‘eat,’ the addition of tense/aspect morphemes and tones results in the apparent disappearance of the verb altogether. Compare the verb ‘eat’ with the underlined verb root ‘count’ in (6.17).

(6.17) a. koïa /ko-Cé-a/ ‘to eat’  
    b. kotâlâ /ko-tâl-a/ ‘to count’  
    c. nétô-ëetë ‘we have eaten’ (hod stat)  
    d. nétô-tâl-ëetë ‘we have counted’

While other forms can tell us about the underlying form of ‘eat,’ notice that the verb surfaces as long in (6.18a) but short in (6.18b).

(6.18) a. koëwà ‘to be eaten’  
    b. koësane.à ‘to eat for c/o’

There is clearly something unusual going on with these verb roots, compared to longer verb roots in Kikamba. A thorough and systematic study of their behavior would contribute to our understanding of the interaction of syllabification with segmental and tonal phenomena.
6.4 Conclusion

It is hoped that this study will contribute to a better understanding of Kikamba as well as to the study of both the Bantu family of languages and human language in general.


NELS 15: 105-117.


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