

**Paradigms and questionnaires:
studying the verbal tone system of a Bantu language***

Michael R. Marlo

University of Missouri

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This paper describes a methodology for studying the verbal tonal systems of Bantu languages, emphasizing techniques for constructing paradigms and identifying the types of data that should be collected by researchers in order to produce comprehensive descriptive analyses. In the simple approach advocated here, which is not new but which also has not been articulated in print before, the researcher surveys a number of properties that are known to influence the realization of tone in Bantu in order to determine which ones trigger tonal alternations. On the basis of this survey, the researcher can then construct systematic questionnaires for data collection in which the appropriate grammatical factors affecting surface tonal patterns are permuted. The main thrust of this paper is delineating these factors known to influence tonal outputs in Bantu languages, providing background on the micro-typology of Bantu verbal tonal systems and discussing how these considerations impact the data-gathering process.

1. Introduction

This paper continues in the spirit of two recent workshops in (1), organized as part of National Science Foundation-funded research projects, which highlighted important methodological issues concerning linguistic data collection and analysis.

(1) Recent NSF-funded workshops

- a. the [*Afranaph Development Workshop*](#) organized by Ken Safir at Rutgers University, December 10-11, 2010
- b. the [*Workshop on How to Study a Tone Language*](#), organized by Steven Bird, Mark Donohue, Larry Hyman, and Mark Liberman, at the University of California, Berkeley, February 18-20, 2011, as part of their project, *Prosodic Systems in New Guinea*

The *Afranaph* project, begun in 2003, has proceeded in two phases. In the first phase, in-depth questionnaires were used to explore anaphora in a number of African languages, and an online database was developed to disseminate the data and allow for searching across and within languages. The recent *Afranaph Development Workshop* marked the onset of the second phase of the project, one of whose goals is to extend the *Afranaph* database and infrastructure into new empirical domains. The *Prosodic Systems* workshop took as its starting point a position paper by Larry Hyman, Hyman (2010), which lays out a series of three stages for studying a tonal system. Other papers in the workshop responded to Hyman's paper or discussed other methodological issues in studying the prosodic systems of un(der)described languages.

Building on the momentum of these workshops, this paper aims to assist researchers in the production of comprehensive descriptions and analyses of the complex tonal patterns of Bantu languages. Like the projects proposed at the *Afranaph* workshop, the present paper seeks to take advantage of growing typological knowledge about an important linguistic phenomenon to formulate a questionnaire-based methodology for cross-linguistic data elicitation that will lead to better linguistic descriptions of individual languages. Like the *Prosodic Systems* project, the focus here is on methodological issues researchers face in studying tonal systems.

The main emphasis of the present paper is on explicating stage (ii) of Hyman's (2010) three-step program in (2)—discovering tonal alternations by considering phrasal and paradigmatic contexts—and specifically the question of how to collect the appropriate data in the appropriate contexts in Bantu languages.

(2) Stages for studying a tonal system (Hyman 2010)

- (i) determining the surface tonal contrasts by considering words in isolation
- (ii) discovering tonal alternations by considering phrasal and paradigmatic contexts
- (iii) interpreting the data and producing the tonal analysis

The general approach described here is not new and is also rather straightforward. However, this approach has not been articulated in print before, and there is a need for such a statement, given the current state of training in African linguistics in the United States. Unlike in the past generation or two, in which research in African linguistics and language training in the US was cen-

tered at major hubs like UCLA and the University of Illinois, many experts in African linguistics and Bantu tonology today are less concentrated in individual institutions and frequently do not train graduate students in African language and linguistic studies. At the same time, more students than before are being exposed to African languages through Field Methods courses (Odden 2011), and a statement on the methodology for studying tonal systems would be beneficial to these students and possibly even to the instructors who are working for the first time on Bantu or tone. Moreover, the author has encountered a considerable desire for explicit statements on how to collect tonal data from professors, lecturers, and students of linguistics at universities in Kenya. Thus, those who are new to the study of Bantu tonal systems are the target audience of this paper, but the more experienced may also benefit from data presented here from unfamiliar languages and from the identification of paradigmatic contexts that might be easily overlooked, even by the most seasoned Bantu tonologists.

The guiding principle for questionnaire-development and data collection in (3) is quite simple and, if the word “tonal” were removed, would be broadly applicable to almost any linguistic phenomenon.

- (3) If some factor causes tonal alternations, it should be systematically varied in the course of the data collection.

A three-part approach is proposed in (4), in which one first collects and organizes a database of verbs and then determines which factors cause tonal alternations in the language under investigation.

- (4) A three-phase approach for constructing tonal paradigms and questionnaires
 - (i) Collect and organize vocabulary items.
 - (ii) Survey various grammatical properties to determine which ones trigger tonal alternations.
 - (iii) Systematically vary the properties that cause alternations in the construction of paradigms.

On the basis of the results of a survey of those properties, one then constructs a full-scale questionnaire in which the alternation-triggering factors are appropriately permuted.

2. Collecting vocabulary and analyzing phonological influences on tone

The first step in the study of a new verbal tonal system is to collect and organize vocabulary items. It is recommended that a relatively large set of verbs, i.e. at least 200-300 verbs, be collected initially such that a variety of types of verbs are included in the corpus. The database should contain verbs of many different phonological shapes as well as verbs that can be plausibly combined with different types of subjects, objects, verbal affixes, verb tenses, etc.

It is important that the researcher be able to carefully control the phonological shape of the verb stem: the number of syllables in the stem, whether each stem syllable has a short or a long vowel, and whether the stem-initial segment is a consonant or a vowel. As described further

in §3, verbal forms in Bantu languages can contain tones from a variety of sources. In addition, a wide variety of rules can apply to these tones. Kisseberth & Odden (2003: 59) remark that “[d]ivergences in surface pitch [among Bantu languages] can be understood in terms of the distribution of ‘primary’ High tones (generally, though not always ‘underlying’ Hs), and their surface modifications.” Kisseberth and Odden (2003) describe several common tonal processes in Bantu, including the spreading and/or shifting of H tones, ‘nonfinality’ processes where H tones avoid surfacing in final position, ‘OCP’ phenomena where adjacent H tones are avoided, the avoidance of contour tones, tonal rules that apply or fail to apply in penultimate position, and ‘plateau’ effects where HLH or HØH sequences are avoided. (See also Carter 1973, Downing 2011, Hyman 2001, 2007, Odden 1989, 1995a, and van Spaandonck 1971, among others, for discussion of these and other common tonal processes in Bantu.) Several of these phenomena significantly obscure the basic location of Hs, and the researcher must have access to many different stem shapes in order to identify the underlying sources and surface positions of tones as well as the rules acting upon those tones.

The best context for initially eliciting verbs and helping the researcher to sort out general tonotactic principles of the language is the Infinitive. The Infinitive is typically formed by a prefix such as *ku-* plus the verb stem. As discussed in §4 below, grammatical (“melodic”) tones are a significant complication to the description of the tonal systems of many languages. A key feature of the Infinitive is that verb stems are not inflected with a grammatical tone in many languages, e.g. Jita (Downing 1996), eastern varieties of Luyia (Marlo & Odden 2001, Odden 2009, Paster & Kim 2011), Nyaturu (Olson 1964, Schadeberg 1979, Yukawa 1989), and Shona (Fivaz 1970, Odden 1981). In addition, the Infinitive tends to have the most basic and most common tonal pattern in languages in which all verbal forms have a grammatical tone, e.g. Kimatuumbi (Odden 1996a) and central and southwestern varieties of Luyia (Ebarb & Marlo 2010a, Ebarb et al. in prep, Marlo 2007, 2008b, 2009, Mutonyi 2000, Poletto 1998a). By inspecting the Infinitive first, the researcher is often able to sort out the basics of the tone system before moving on to more complex matters.

The data in (5) – (8) show some of the basics of tone in Tiriki with Infinitival examples organized into two cross-cutting categories: (i) toneless (/Ø/) verbs vs. /H/-toned verbs and (ii) consonant-initial vs. vowel-initial verbs.¹ In both C-initial and V-initial contexts in (5) and (6), the toneless verbs surface entirely toneless.

¹ The verb stem is marked with square brackets, and, where relevant, the verb macrostem is indicated with braces. Where it can be determined, the underlying position of lexical H tones is indicated with single underlining (see §3), and the surface position of grammatical H tones is indicated with double underlining (see §4). Luyia examples are given in an adapted orthography, in which <kh> = [x], <ch> = [ʃ], <j> = [dʒ], <sh> = [ʃ], <rh> = [r], <ng'> = [ŋ], = [b] after <m> and [β] elsewhere, <n> = [ŋ] before <g> and [n] before <j>, and long vowels are represented as a sequence of identical vowels. Other examples are given in the transcriptions of their source materials. Examples whose source is not cited are from the author’s fieldnotes.

- (5) /Ø/ C-initial verbs in the Infinitive in Tiriki
- | | | | |
|---------------------|-------------------|---------------------|----------------------|
| khu[tsy-a] | ‘to go’ | khu[lak-a] | ‘to promise’ |
| khu[rheev-a] | ‘to ask’ | khu[valits-a] | ‘to count’ |
| khu[lekhuul-a] | ‘to release’ | khu[saambul-a] | ‘to de-roof’ |
| khu[khaanzuukh-a] | ‘to speak loudly’ | khu[khuuluur-a] | ‘to drag forcefully’ |
| khu[kalukhan-a] | ‘to turn around’ | khu[laang-ir-its-a] | ‘to shout’ |
| khu[simugukh-its-a] | ‘to revive (tr)’ | | |

The V-initial verbs in (6) differ from the C-initial stems only in that the vowel of the Infinitive prefix *khu-* becomes a glide before the stem-initial vowel, which is lengthened, preserving the input mora of the Infinitival prefix.²

- (6) /Ø/ V-initial verbs in the Infinitive in Tiriki
- | | | | |
|--------------|-----------|----------------|------------------|
| khw[eeny-a] | ‘to want’ | khw[aambukh-a] | ‘to cross water’ |
| khw[iinam-a] | ‘to bend’ | khw[iivirir-a] | ‘to forget’ |

The /H/-toned C-initial verbs in (7) surface with a H on the stem-initial vowel. These forms present two tonal complications: (i) the H surfaces on the infinitival prefix *khu-* with a monosyllabic stem, as in *khú[ly-a]* ‘to eat’, and (ii) there is a difference among stems whose stem-initial syllable has a long vowel, as *khu[léerh-a]* ‘to bring’ has a falling tone while *khu[fúúngul-a]* ‘to open’ has a level H.

- (7) /H/ C-initial verbs in the Infinitive in Tiriki
- | | | | |
|----------------------|----------------|------------------|------------|
| khú[ly-a] | ‘to eat’ | khu[vék-a] | ‘to shave’ |
| khu[léerh-a] | ‘to bring’ | khu[vúkul-a] | ‘to take’ |
| khu[sámeeh-a] | ‘to forgive’ | khu[fúúngul-a] | ‘to open’ |
| khu[háándiik-a] | ‘to write’ | khu[vóholol-a] | ‘to untie’ |
| khu[vóyoong’an-a] | ‘to go around’ | khu[váánzakal-a] | ‘to belch’ |
| khu[kóloongom-iny-a] | ‘to roll (tr)’ | | |

These two complications are the result of general tonotactic principles in the language. In the first case, H tones are generally not tolerated in phrase-final position, so the root H shifts to the penult in *khú[ly-a]* ‘to eat’. The second case is the result of an allotonic pattern in which falling tones are generally restricted to long vowels in penultimate position and other potential falling tones on long vowels are realized as level H.³ The researcher must control the phonological

² In examples that undergo rules of hiatus resolution, the stem boundary is indicated immediately after the last surface consonant of the prefix and before the lengthened vowel of the root. This convention slightly obscures the fact that the lengthened vowel contains one mora from the prefix, which is outside the stem. The verb ‘to want’ could alternatively be written as *khwe[eny-a]* to more accurately reflect the position of the stem with respect to the surface moraic structure, but in the author’s view this makes the morphological parsing of examples less transparent.

³ These general tonotactics are overridden by principles regulating the realization of grammatical tones in some constructions in Tiriki.

shape of the stem to determine the contexts in which these rules apply; once the rules are discovered, their effects can be factored out, and the researcher can focus on other issues.⁴

The trisyllabic and longer V-initial /H/-toned stems in (8) show the expected tonal output of input /V+V̇/: the H-toned stem-initial mora remains H on the surface, predictably realized as a ØH rising tone. The surface falling tone found on the VCV stems is the result of the allophonic processes described above that produce falling tones in penultimate position.

- (8) /H/ V-initial verbs in Tiriki
- | | | | |
|----------------|------------|---------------|-----------|
| khw[íiv-a] | ‘to steal’ | khw[íimb-a] | ‘to sing’ |
| khw[íinjir-a] | ‘to enter’ | khw[aákaan-a] | ‘to meet’ |
| khw[íimirir-a] | ‘to lead’ | | |

The stem shapes in the Tiriki data in (5) – (8) are representative of those needed to compose a phonologically complete paradigm in Luyia varieties. These shapes, which include all possible stems with one, two, and three syllables, are schematized and summarized in (9). In most cases in Luyia, it is not necessary to get all logically possible shapes of four-syllable and larger stems, though one might occasionally need a CVCVCVVCV stem or a five-syllable stem to eliminate possible alternative analyses of a given tonal pattern.

- (9) Stem shapes for tonal paradigms in Luyia varieties
- | | |
|-------------------|------------------|
| <i>C-initial</i> | <i>V-initial</i> |
| CV | |
| CVCV | VCV |
| CVVCV | |
| CVCVCV | VCVCV |
| CVCVVCV | VCVVCV |
| CVVCVCV | |
| CVVCVVCV | |
| CV(V)CV(V)CV(V)CV | VCV(V)CV(V)CV |

The importance of stem shape for tone realization is illustrated further by the Buguembe Kuria examples in (10). These forms have a melodic H that is assigned by rule to the the fourth mora of the verbal macrostem (see §3.3 below for more on the macrostem; in the present data, the macrostem, marked with braces, and the stem are identical). As shown by the (a) examples, which have four or more moras in the macrostem, the melodic H begins on the fourth mora of the macrostem and spreads rightward from there to the penult. When there are fewer moras in the macrostem, the melodic H is realized differently. When there are only three moras in the macrostem, a LH rising tone is realized on the macrostem-final mora.⁵ If there are fewer than three mo-

⁴ A further factor that needs to be controlled in the present data, discussed further in §5, is the position of the verb in the phrase, since the tonotactic alternations shown here are sensitive to this position.

⁵ Some speakers delink (or fail to link) the L of the final rise, producing a final (phonetically mid) downstepped H.

ras in the macrostem (c), the macrostem is realized all L, and the melodic H remains floating.⁶ As these different tonal realizations are conditioned only by the size of the macrostem show, it is essential that the prosody of the verb macrostem be carefully controlled in any study of Kuria tone.

(10) The role of stem shape in the Inceptive in Kuria (Marlo & Mwita 2009, Mwita 2008)

- | | | |
|----|---|----------------------------|
| a. | to-ra { [hoo <u>to</u> o <u>tér</u> -a] } | ‘we are about to reassure’ |
| | to-ra { [ta <u>ŋ</u> ga <u>ás</u> -a] } | ‘we are about to announce’ |
| | to-ra { [turu <u>ŋ</u> á <u>n</u> -a] } | ‘we are about to welcome’ |
| | to-ra { [koondok <u>ó</u> r-a] } | ‘we are about to uncover’ |
| | to-ra { [kirigi <u>t</u> -a] } | ‘we are about to scrub’ |
| | to-ra { [terem <u>ek</u> - <u>á</u>] } | ‘we are about to be calm’ |
| | to-ra { [heetok- <u>á</u>] } | ‘we are about to remember’ |
| | to-ra { [kara <u>ŋ</u> g- <u>á</u>] } | ‘we are about to fry’ |
| b. | to-ra { [sukur- <u>ǎ</u>] } | ‘we are about to rub’ |
| | to-ra { [saamb- <u>ǎ</u>] } | ‘we are about to burn’ |
| c. | to-ra { [rom-a] } ^H | ‘we are about to bite’ |
| | to-ra { [ry-a] } ^H | ‘we are about to eat’ |

The tonal patterns of some other Bantu languages require not only the prosody but also the segmental properties of the verb (macro)stem to be controlled. Depressor consonants affect surface tonal patterns in the Mijikenda languages in Eastern Bantu and throughout Southern Bantu (Cassimjee & Kisseberth 1992, Downing 2011, and references therein). As discussed in §3.1, glides (derived from vowels) also have tonal effects in some languages.

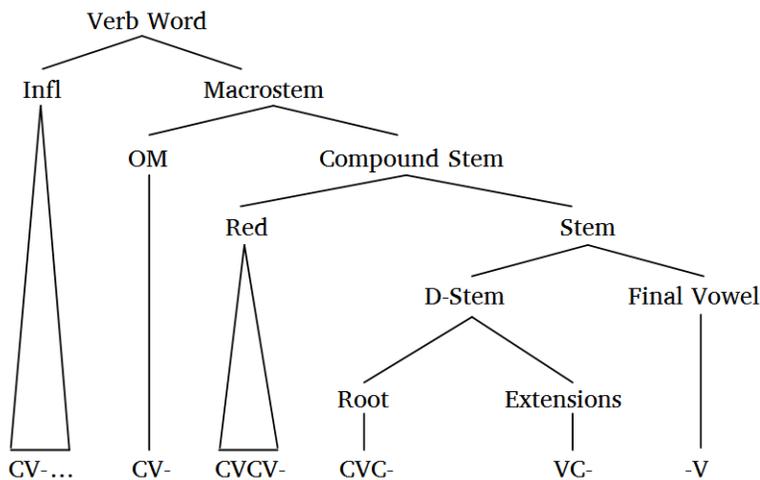
In addition, the Infinitive may not always be the best context for determining the fundamentals of tone in a Bantu language. For example, although there are some tenses in Bakweri that lack a melodic tone, not only does the Infinitive have a tonal melody but its properties are unlike any other melody in the language (Marlo & Odden 2007). Similarly, the tonal melody of the Infinitive in Kuria, which has two discrete Hs assigned to different positions of the macrostem, is more complex than the melodies found in most other verb tenses, which have only one H (Cammenga 2004, Mwita 2008, Odden 1987). Despite these complications in some languages, the Infinitive is still a reasonable context to study first in a new language, minimally for the collection of vocabulary items, even if other contexts have to be studied to determine the tonal basics. Another verb form that one might consider for the initial collection of vocabulary is the Imperative, which generally is formed with the bare verb stem (and no prefixes). This context is not recommended, however, since Imperatives are commonly inflected with a unique tonal melody.

⁶ The evidence the melodic H remains floating is that these forms fail to undergo a rule that lowers utterance-final L to Superlow after L, since the floating melodic H keeps the macrostem-final L from being final within the utterance.

3. Lexical factors affecting tone

In addition to the collection of vocabulary and working out the tonotactics of the language, another fundamental issue that must be dealt with in a tonal study is determining which morphemes contribute which tones. To address this issue, one needs to know which morphemes are in the verb. The literature on Bantu verbal morphology and morpho-phonology provides a guide on what to expect: a widely adopted morphological representation of the Bantu verb is provided for reference in (11).

- (11) Hierarchical morphological representation of the Bantu verb (adapted from Downing 2003, Hyman 2008: 325, Hyman et al. 2008)



There is variation across Bantu in the tonal properties of each of the morphemes in this structure, but some common tendencies and variants can be identified.

3.1 The stem

The verb stem is comprised of the root, a series of derivational suffixes, and an inflectional final suffix, commonly called the “final vowel”. Of the morphemes in the stem, typically only the root has lexically contrastive tonal properties. As is reconstructed for Proto-Bantu (Greenberg 1948, Meeussen 1967, Kähler-Meyer 1968), many modern day Bantu languages have two tonal classes of verb roots: /H/ verbs and /L/ verbs, though since Stevick (1969), the /H/ vs. /L/ difference has often been analyzed as a privative contrast between /H/ and /Ø/ (“toneless”). (See Hyman 2001, 2011, Odden 1995a, and references therein for further discussion of tonal representations.) The site of the lexical tonal contrast is the stem-initial mora or syllable; in autosegmental terms, the stem-initial tone-bearing unit (“TBU”) is linked to a H in /H/ verbs and is tonally unspecified in toneless verbs. Subsequent TBUs within the stem are generally not underlyingly tonally contrastive and are usually treated as underlyingly toneless.

Examples of the typical kind of /H/ vs. /Ø/ tonal system are found in the tonally ‘conservative’ (or ‘etymological’) dialects of eastern Luyia (Leung 1986, Odden 2009, Paster & Kim

2011).⁷ The lexical tonal contrast in verbs can be seen most clearly in these languages in tenses that are not inflected with any grammatical tones. This includes the Infinitive, as in (5) – (8) above, as well as finite tenses like the Near Future. The Tiriki data in (12) from the Near Future show that /Ø/ verbs roots surface entirely toneless, and /H/ roots surface with a H on the stem-initial vowel. As in the Infinitival data above, the phrase-final H shifts to the penult in the monosyllabic /H/-toned stem *a-lá*[ly-a] ‘he will eat’, and stem-initial long vowels are realized as a fall in penultimate position and as a level H elsewhere.

(12) Two lexical tonal classes of verbs in the Near Future in Tiriki

<i>/Ø/ (toneless) roots</i>		<i>/H/ roots</i>	
a-la[tsy-a]	‘he will go’	a-lá[ly-a]	‘he will eat’
a-la[lim-a]	‘he will dig’	a-la[vék-a]	‘he will shave’
a-la[cheend-a]	‘he will go’	a-la[téekh-a]	‘he will cook’
a-la[pulukh-a]	‘he will fly’	a-la[vúkul-a]	‘he will take’
a-la[val-its-a]	‘he will count’	a-la[kálaang-a]	‘he will fry’
a-la[kalukhan-a]	‘he will turn around’	a-la[khóomool-a]	‘he will make faces’
a-la[tsiiririr-a]	‘he will continue’	a-la[vóyoong’an-a]	‘he will go around’
a-la[vaanzakal-a]	‘he will belch’	a-la[kúúnamul-a]	‘he will invert’

Some Bantu languages have diverged from the typical ‘conservative’ pattern of contrasting /H/ vs. /Ø/ roots, and nearly the full range of these micro-typological divergences can be found within Luyia. The southwestern Luyia dialects have eliminated the lexical tonal contrast in verb roots (Ebarb & Marlo 2010a, Ebarb et al. in prep, Marlo 2007, 2008b, 2009, Onyango 2006, Poletto 1998a). As shown by the data in (13), verbs from the two different tonal classes in Tiriki are realized with the same tonal pattern in Tura, which has only one lexical tonal class of verbs.

(13) One lexical tonal class in Tura (Marlo 2008b)

	<i>Tura</i>		<i>Tiriki</i>	
*Ø verb	a-lá[<u>purúk</u> h-á]	‘he will fly’	a-la[pulukh-a]	‘he will fly’
*H verb	a-lá[<u>bukú</u> l-á]	‘he will take’	a-la[vúkul-a]	‘he will take’

Besides lacking a lexical tonal contrast in verb roots, another typical feature of these ‘predictable’ tonal systems (Odden 1989) is that all verbal forms are inflected with a grammatical tone, which is also seen in the Tura examples: the H appearing on the verb stem after the initial syllable is a melodic H (see §4), whereas the same tense in Tiriki lacks a melodic H. (The H of the tense prefix *-lá-* is a lexical tone; see §3.4.) Outside of southwestern Luyia and Kuria (Mwita 2008, Odden 1987), spoken near Lake Victoria, other Bantu languages that have predictable verbal tone systems are P zone languages of southeastern Tanzania like Makonde (Kisseberth 2003), Matuumbi (Odden 1996a), Rufiji (Odden 2003), and Yao (Hyman & Ngunga 1994, Odden

⁷ It is an analytical question to be addressed for each language what the underlying tonal contrast is, i.e. /H/ vs. /Ø/, /H/ vs. /L/, /H/ vs. /L/ vs. /Ø/, etc. To simplify the present discussion, the conservative tonal systems of eastern Luyia are discussed as having a /H/ vs. /Ø/ contrast, though this analysis is not necessarily endorsed for all languages.

1998), languages spoken near Lake Nyasa in southwestern Tanzania such as Bena, Hehe, Kinga, and Safwa (Odden 1989), and some languages of Democratic Republic of Congo such as Ruwund (Nash 1992, 1992-1994) and Tembo (Kaji 1996).

In the central Luyia region, ‘reversive’ dialects have preserved the contrast between two tonal classes of verb roots, but the class of historically /H/-toned roots have been reanalyzed as synchronically /L/-toned, with historically toneless roots remaining toneless (Marlo 2007, 2008a, Mutonyi 2000).⁸ Hyman (2001) identifies several languages of southern-central and eastern Democratic Republic of Congo that have “reversed the tones of Proto-Bantu”—Kanyok, Southern Kete, Luba, Ruwund, Shi, and Tembo—but this generalization seems to apply only to nouns in at least some of these languages, as Ruwund (Nash 1992, 1992-1994) and Tembo (Kaji 1996) lack a lexical tonal contrast in verb. Of the languages cited by Hyman (2001), Luba (Yukawa 1992) and Shi (Polak-Bynon 1975) appear most likely to have a /L/ vs. /Ø/ contrast in verb roots, though no autosegmental analyses of the language’s verbal tone systems exist.⁹ One additional feature that characterizes the known reversive tonal systems of Luyia, and possibly also Luba and Shi, is the presence of a melodic tone in all verb forms. In this way, reversive tone systems are like the predictable tone systems and may reflect an intermediate step on the way from conservative to predictable verbal tone systems.

The methodological implication of these cross-Bantu differences in lexical tone contrasts in verb roots is that languages with two tone classes require twice the data as ‘predictable’ languages with only one tone class. The particular nature of the tonal contrast, i.e. /H/ vs. /Ø/, /H/ vs. /L/, /L/ vs. /Ø/, etc., certainly has an impact on the tonal outputs, but what is methodologically important is that representative data be collected from each major tonal class.

Some other Bantu languages such as those of the Nguni group (Kisseberth & Odden 2003: 61), Nyaturu, Shambaa (Kisseberth & Odden 2003: 61, Meeussen 1955), Zezuru Shona (Bennett 1976), and Qhalaxari (Dickens 1984) have a third tonal type of root. The following examples from Nyaturu show roots of three types: toneless roots in (14), /H/-toned roots in (15) that undergo a regular process of tone shift to the second stem syllable, and /H/-toned roots in (16) that fail to undergo shift. (Note that the effect of tone shift is obscured in disyllabic roots by a rule that deletes/lowers an utterance-final H.)

(14) Toneless verbs in Nyaturu

<i>final</i>		<i>medial</i>	
o[kenk-a]	‘to carry’	o[kenk-a] ruvi	‘... right away’
o[hany-a]	‘to say’	o[hany-a] ruvi	‘... right away’
o[juɣurh-a]	‘to throw’		
o[raɣer-a]	‘to show’		

⁸ The main evidence for /L/ is that the stem-initial syllable of the toned class of verb (virtually) always surfaces L. The melodic H is blocked from reaching this position when it is assigned to the left edge of the stem and when it spreads leftward within the stem. If /H/ is assumed, tonal derivations are opaque, as /H/ blocks the leftward extent of the melodic H but is subsequently deleted or lowered. An analysis with /L/ results in more transparent derivations: /L/ prevents the melodic H from reaching the leftmost syllable in the stem, and simply surfaces L; a subsequent rule of deletion or lowering is not necessary.

⁹ Materials from Kanyok and Southern Kete have not yet been reviewed.

(15) /H/-toned verbs that undergo shift in Nyaturu

<i>final</i>		<i>medial</i>	
o[rh <u>o</u> m-a]	‘to send’	o[rh <u>o</u> m-á] ruvi	‘... right away’
o[rh <u>u</u> r-a]	‘to hit’	o[rh <u>u</u> r-á] ruvi	‘... right away’
o[k <u>u</u> májw-a]	‘to advertise’		
o[rh <u>a</u> kún-a]	‘to chew’		

(16) /H/-toned verbs that do not undergo shift in Nyaturu

<i>final</i>		<i>medial</i>	
o[k <u>o</u> r-a]	‘to pull out’	o[k <u>o</u> r-a] ruvi	‘... right away’
o[rh <u>a</u> n-a]	‘to call’	o[rh <u>a</u> n-a] ruvi	‘... right away’
o[kw <u>a</u> rher-a]	‘to hold in one’s hand’		
o[w <u>o</u> ker-a]	‘to boil’		

It seems to be a general characteristic of Bantu tonal systems with more than two lexical tonal classes that the third tonal class is a variant of the /H/-toned class that fails to undergo a general rule of shifting or spreading (due to the shortening of a historically long vowel, see Meeussen 1955). One would want to test to see if the failure of this class of roots to undergo shifting or spreading has other implications within the tonal system, but the third tonal class probably does not need to be represented in the corpus as comprehensively as the other two regular tonal classes of roots.

Following the verb root, derivational suffixes such as causative *-ic-, applicative *-id- and reciprocal *-an- are typically underlyingly toneless and have no tonal effect on the verb beyond extending it by a syllable. In some languages, however, causative *-i- and passive *-u- contribute a H, sometimes in restricted morpho-syntactic contexts (Ebarb & Marlo 2010b, Hyman & Katamba 1990, Meeussen 1967). As shown by the data in (17) – (18) from the Nyala-West dialect of Luyia (Ebarb et al. in prep, Marlo 2007), the verb stem normally surfaces toneless in Remote Past forms that lack an object marker, but the causative *-í-* and passive *-ú-* suffixes surface H.¹⁰ (In causative + passive combinations, as in ‘he was fed’ and ‘he was pleased’, different allomorphs of the suffixes surface, such that only one suffixal H, of passive *-ú-*, is present.)

(17) Remote Past in Nyala-West (speaker PO; Ebarb et al. in prep)

y-aá[chy-a]	‘he went’	y-aá[bal-a]	‘he counted’
y-aá[reeb-a]	‘he asked’	y-aá[burukh-a]	‘he flew’
y-aá[siindikh-a]	‘he pushed’	y-aá[karaang-a]	‘he fried’
y-aá[khoomool-a]	‘he made a face’	b-aá[bolol-an-a]	‘they untied e.o’
b-aá[paangulul-a]	‘they disarranged’	b-aá[rekhuul-an-a]	‘they released e.o’

¹⁰ It remains to be determined whether the proper transcription of these forms should be as shown, with a vowel that bears H, or with a non-tone-bearing glide and a falling tone on the following vowel: *-w-â*. The same ambiguity afflicts forms with the causative, i.e. whether outputs should be transcribed as *-i-a* or *-y-â*.

- (18) Causative *-í-* and passive *-ú-* contribute a /H/ in Nyala-West (speaker PO; Ebarb & Marlo 2010b, Ebarb et al. in prep)

<i>Causative</i>		<i>Passive</i>	
y-aá[kus-í-a]	‘he sold’	y-aá[bek-ú-a]	‘he was shaved’
y-aá[r-iis-í-a]	‘he fed’	y-aá[fwaal-ú-a]	‘he was dressed’
b-aá[rus-an-í-a]	‘they removed e.o’	y-aá[bukul-ú-a]	‘he was taken’
b-aá[saasaan-í-a]	‘they mixed up’	y-aá[rekhuul-ú-a]	‘he was released’
b-aá[nyoores-an-í-a]	‘they annoyed e.o’	y-aá[r-iis-ib-ú-a]	‘he was fed’
b-aá[fukirisan-í-a]	‘they agreed’	y-aá[ringaal-ú-a]	‘he was watched’
		y-aá[saangaas-ib-ú-a]	‘he was pleased’

Because tonal effects of the causative and passive are relatively uncommon (though probably under-reported in the literature), it is not recommended that the presence vs. absence of the causative and passive morphemes be varied as systematically from the beginning of the study. Rather, researchers are advised to test whether the presence of these morphemes has any tonal effect in various contexts and then proceed accordingly.

In addition to contributing a H, the causative **-i-* and passive **-u-* suffixes may also indirectly have an effect on tonal outputs as these suffixes typically surface as glides *-y-* and *-w-*. Glides are reported to trigger tonal anomalies in a number of Bantu languages of eastern Zambia, southern Tanzania, and northern Mozambique (Liphola & Odden 2000: 178), and in Kinande (Jones 2010, Mutaka 1994), particularly when the glides are in penultimate position, as they usually are with the causative and passive (Hyman 1994). As the data in (19) show, Infinitives in Hehe have a H on the Infinitival prefix *kú-*, and a melodic H tone on the penultimate vowel. (In the CVCV stem, the melodic H does not surface when the melodic H in penultimate position immediately follows the H of the prefix *kú-*.) In forms with causative *-y-* and passive *-w-*, the melodic H unexpectedly surfaces on the final vowel instead of the penult. As Odden (2005: 183-185) explains, this is because the causative and passive are underlyingly vowels that are in penultimate position at the time Melodic H Assignment applies. However, Glide Formation renders the causative and passive non-tone-bearing, and the H remains on the mora in the same syllable as the glide: Melodic H Assignment: *kú[kam-ú-a]* → Glide Formation: *kú[kam-ú-a]* → Tone Preservation: *kú[kam-w-á]*.

- (19) The tonal effects of glides in Hehe (Odden 2005)

‘milk’	‘hunt’	‘take bath’	‘fry’	
kú[kam-a]	kú[fwiím-a]	kú[kaláv-a]	kú[kalaáng-a]	<i>to V</i>
kú[kam-íl-a]	kú[fwiim-íl-a]	kú[kalav-íl-a]	kú[kalaang-íl-a]	<i>to V for</i>
kú[kam-il-án-a]	kú[fwiim-il-án-a]	kú[kalav-il-án-a]	kú[kalaang-il-án-a]	<i>to V for e.o</i>
kú-tu[kám-a]	kú-tu[fwiím-a]	—	kú-tu[kalaáng-a]	<i>to V us</i>
kú[kam-y-á]	kú[fwiim-y-á]	kú[kalav-y-á]	kú[kalaang-y-á]	<i>to make V</i>
kú[kam-w-á]	kú[fwiim-w-á]	kú[kala-w-á]	kú[kalaang-w-á]	<i>to be V'd</i>

Similar effects are reported in Lungu (Bickmore 2007a): a process of unbounded spreading, which normally terminates on the penult, surfaces on the final vowel when a glide is present in

penultimate position. As in Hehe, the H surfaces one vowel to the right of its expected position because the non-tone-bearing surface glide is derived from a vowel that bears tone at an intermediate level of representation. Namwanga has extended this process of Lungu one step further such that the H that becomes linked to the phrase-final vowel in the presence of a glide is subsequently deleted: Spreading: $\acute{u}kú[péél-ú-a]$ → Glide Formation: $\acute{u}kú[péél-w-a]$ → Tone Link Preservation: $\acute{u}kú[péél-w-á]$ → Lowering: $uku[peel-w-a]$ ‘to be shaved’, cf. $\acute{u}kú[péél-a]$ ‘to shave’. Viewed from the surface, it appears that the glide causes the deletion of the H in Namwanga (Bickmore 2000a). See also Liphola (2000) and Liphola & Odden (2000) for similar tonal complications posed by glides in Makonde.

The terminal suffix in the verb stem is the ‘final vowel’. Nurse & Philippson (2006) identify several common final vowels across Bantu, which are provided in (20).

(20) Common final vowel suffixes in Bantu (Nurse & Philippson 2006)

-a	‘indicative, neutral’	-é	‘subjunctive’
-ile	‘anterior, past’	-i	‘near past, anterior’
vowel copy suffix	‘near past, anterior’	-a(n)g-a	‘imperfective’

Although Nurse & Philippson (2006) connect the Subjunctive final vowel *-e* with a distinct tonal pattern and report that final *-i* is commonly H-toned, these suffixes are best analyzed as being synchronically toneless, with the tonal properties of the verb stem derived independently. As discussed further in §4 and §5 below, the final vowel is one of a constellation of morphemes, including tense prefixes and tonal melodies on the verb stem, that simultaneously mark tense-aspect-mood-polarity and clause type distinctions and is generally not a variable that can be independently manipulated in the verb structure. One possibly exceptional case is imperfective *-a(n)g-*, which sometimes combines more freely with other inflectional suffixes and is also rarely reported to have tonal effects, e.g. in Safwa (Hyman 1994, Odden 1989, Voorhoeve 1973).

3.2 The reduplicated stem (‘Compound Stem’)

The ‘Compound Stem’ is the structure implicated by the common process of verb stem reduplication (see Hyman 2009), which interacts with verbal tone patterns in diverse ways in Bantu languages. Downing (2003) identifies four main patterns that differ in how the tones of the stem are realized in the reduplicated verb. In Chewa, the two halves of the reduplicated verb are identical to each other and to the non-reduplicated verb.

(21) Chewa reduplication (Myers & Carleton 1996: 49)

ndí-ma[sangaláts-a]	‘I please (HAB)’
ndí-ma[sangaláts-a][sangaláts-a]	‘I please repeatedly (HAB)’

In Hehe, the tonal pattern of the non-reduplicated verb is found only on the second half of the reduplicated verb.

- (22) Hehe reduplication (Odden & Odden 1985, 1996)
 si-tu[dóongolees-a] ‘we won’t roll’
 si-tu[dongoles-a][dóongolees-a] ‘we won’t roll a bit’

In Shona total reduplication, the tonal pattern of the non-reduplicated verb is found only on the first half of the reduplicated verb.

- (23) Shona total reduplication (Odden 1981, 1984)
 handáka[tóréser-á] ‘I didn’t make take for’
 handáka[tóréser-á][toreser-a] ‘I didn’t make take for frequently’

Finally, in Kerewe the two halves of the reduplicated verb define a single tonal domain: when the H of the non-reduplicated verb is located at the left edge of the stem, it is located to the left edge of the entire reduplicated verb; when the H of the non-reduplicated verb is located at the right edge of the stem, it is located at the right edge of the entire reduplicated verb.

- (24) Kerewe reduplication (Odden 1996b)
 a. ku[káláang-a] ‘to fry’
 ku[káláang-a][kalaang-a] ‘to fry carelessly’
 b. m[baz-ílé] ‘I counted (yesterday)’
 m[baz-ile][baz-ílé] ‘I counted carelessly (yesterday)’

Given this considerable diversity in how tonal patterns play out in reduplication in Bantu as well as the further possibility of language-internal differences between total and partial reduplication, a comprehensive study of a language’s tonal system includes a discussion of the tonal properties of reduplicative structures.

3.3 The macrostem

In most Bantu languages, one or more object markers can precede the verb stem, and the unit composed of the object markers and the stem is called the ‘macrostem’. The object markers reconstructed for Proto-Bantu are given in (25) below. The Proto-Bantu object markers for 1sg, 2sg, and 3sg are reconstructed as /L/ (or toneless), while all others are reconstructed as /H/. Modern day Bantu languages sometimes maintain two tonal types of object markers, as in Bakweri (see (29) below), Luba (Yukawa 1992), and Nyaturu.

- (25) Object markers of Proto-Bantu (Meeussen 1967: 98, Polak 1986: 373-374)
- | | | | |
|-------|-------------------|-------|-------------------|
| refl. | *í- | | |
| 1sg | *ñ- | 1pl | *t ^ó - |
| 2sg | *k ^ò - | 2pl | *m ^ó - |
| 3sg | *m ^ò - | 3pl | *b ^á - |
| cl. 3 | *g ^ó - | cl. 4 | *g ^í - |
| cl. 5 | *d ^í - | cl. 6 | *g ^á - |

cl. 7	*kí-	cl. 8	*bí-
cl. 9	*jí-	cl. 10	*jí-
cl. 11	*dó-	cl. 12	*ká-
cl. 13	*tó-	cl. 14	*bó-
cl. 15	*kó-	cl. 16	*pá-
cl. 17	*kó-	cl. 18	*mó-
cl. 19	*pí-		

In a number of other languages, there is just a single tonal class of object markers. In some of these languages, such as most of the known Luyia varieties, all the object markers are /H/. In other languages, such as Kuria (Mwita 2008, Odden 1987), all object markers are /Ø/. Although the object markers are themselves toneless in Kuria, the presence of an object marker nevertheless affects the position of tones on the verb stem since many tonal generalizations in Kuria refer to the ‘macrostem’. For example, in the Subjunctive, a melodic H is assigned by rule to the third mora of the macrostem (and spreads rightward from there to the penult). When there is no object prefix, the stem and the macrostem are identical, and H is on the third mora of the stem: *o*{[*berekér-ε*]} ‘you should call’. When there is an object marker, the object marker is counted in the domain of tone assignment, so the H appears on the second mora of the stem (the third mora of the macrostem): *o*{*ga*[*berékér-ε*]} ‘you should call it₆’. It is fairly common within Bantu for the macrostem to be a domain for tonal and other phonological rules (Archangeli & Pulleyblank 2002, Bickmore 2000b, Boyd 2008, Clements & Goldsmith 1984, Hyman et al. 2008, Hyman & Ngunga 1994, Kisseberth 1984, Kisseberth & Odden 2003, Mous 2003: 113, Mutaka 1994, Myers 1990, 1998, Odden 1987, 1989, Sibanda 2004).

A further example of a special relationship between object markers and the stem, the Hs of object markers sometimes interact with root Hs in ways that the Hs of other prefixes do not. For example, in Shambaa, the phonological output differs depending on whether two adjacent input Hs are both within the macrostem or not. As shown by the data in (26), when two H tones are separated by the macrostem boundary, the two Hs are separated by a downstep: as in *a-té'*{[*kóm-á*]}, where the /H/ tense prefix precedes the root H, and in *ni-té'*{[*wá*[*dík-íy-a*]}}, where the /H/ tense prefix precedes the H of an object marker.¹¹ When two input Hs are adjacent within the macrostem, i.e., when a /H/ object prefix precedes a /H/ root, there is no downstep: *ku*{*chí*[*kóm-á*]}. When there are three consecutive input Hs, i.e. a /H/ tense prefix, a /H/ object marker, and a /H/ root, the first two inputs Hs are separated by a downstep, but there is no downstep between the second and third input Hs: *ni-té'*{[*í*[*kááng-íy-a*]}}, *a-ngé'*{*chí*[*kóm-á*]}. Odden (1982) analyzes the lack of downstep as the result of a rule of Tone Absorption (aka “Fusion”), which applies within the macrostem.

¹¹ Hs spread rightward to the penult, as in *ku*{*chí*[*dík-a*]}, where the H of the OM spreads, and in *ni-té'*{[*dík-a*]} and *ni-ngé'*{*kú*[*ghóshó-e*]}, where the H of the tense prefix spreads. Spreading can target the final vowel just in case H is located on the penultimate vowel, as in *ku*{[*kóm-á*]}. The available data do not contain the combination of /H/ prefix and a toneless monosyllabic root, so it is not known if spreading applies in this context, as the present statement of Spreading predicts.

(26) Downstep vs. Fusion in Shambaa (Odden 1982)

/Ø/ roots

ku {[dik-a]}	‘to cook’	ku {[ghosho-a]}	‘to do’
ku {chí[dík-a]}	‘to cook it ₇ ’	ku {ku[ghosho-e-a]}	‘to do for you’
ni-té ¹ {[dík-a]}	‘I cooked’		
ni-té ¹ {wá[dík-íy-a]}	‘I cooked for them’		
a-ngé ¹ {wá[dík-íy-a]}	‘he should have cooked for them’	u-ngé ¹ {[ghóshó-a]}	‘you should have done’
		ni-ngé ¹ {kú[ghóshó-e]}	‘I should have done for you’

/H/ roots

ku {[kóm-á]}	‘to kill’	ku {[kááng-a]}	‘to fry’
ku {chí[kóm-á]}	‘to kill it ₇ ’		
ku {wá[kóm-á]}	‘to kill them ₂ ’		
a-té ¹ {[kóm-á]}	‘he killed’	ni-té ¹ {í[kááng-íy-a]}	‘I fried with it ₉ ’
a-ngé ¹ {chí[kóm-á]}	‘he should have killed it ₇ ’		

Like the object markers, the reflexive usually immediately precedes the verb stem in Bantu languages (Meeussen 1967: 110, Polak 1983: 297) and is sometimes considered to be one of the object markers (Harjula 2004: 127, Mchombo 1993, Meeussen 1967), though not always (Buell 2005, Muriungi 2008). One possible reason to consider the reflexive to be different is that it sometimes has different tonal properties (Marlo 2011). Most object prefixes can generally be analyzed as having an underlying tone, /H/, /L/, or /Ø/, which may have local tonal effects. The reflexive, however, sometimes acts more like a grammatical tone that marks tense-aspect-mood-polarity and clause-type distinctions, as described in §4 and §5 below. As shown by the data in (27) from the Nyala-West dialect of Luyia, all of the non-reflexive object markers contribute a H that surfaces immediately before the stem in the Near Future tense, e.g. *a-rií[níng-áál-á]*¹² ‘he will watch me’ (Ebarb et al. in prep, Marlo 2007), but reflexive *é-* does not surface H, e.g. *a-ry-ee[ríngáál-á]* ‘he will watch himself’.

(27) Object prefixes in the Indefinite Future in Nyala-West (speaker PO; Ebarb et al. in prep)

a. a-ri[ríng-áál-á]	‘he will watch’		
b. a-rií[níng-áál-á]	‘he will watch me’	a-ri-rú[ríngáál-á]	‘he will watch us’
a-ri-khú[ríngáál-á]	‘he will watch you _{sg} ’	a-ri-mú[ríngáál-á]	‘he will watch you _{pl} ’
a-ri-mú[ríngáál-á]	‘he will watch him’	a-ri-bá[ríngáál-á]	‘he will watch them’
a-ri-kú[ríngáál-á]	‘he will watch it ₃ ’	a-ri-kí[ríngáál-á]	‘he will watch them ₄ ’
a-ri-rí[ríngáál-á]	‘he will watch it ₅ ’	a-ri-ká[ríngáál-á]	‘he will watch them ₆ ’
a-ri-sí[ríngáál-á]	‘he will watch it ₇ ’	a-ri-bí[ríngáál-á]	‘he will watch them ₈ ’

¹² Meinhof’s Law applies when 1sg *N-* combines with the root in (27): /n+rVN(C)/ becomes [nVN(C)], and the vowel preceding 1sg *N-* lengthens, but tonally 1sg *N-* has the same properties as other object markers in Nyala-West.

- | | | | |
|-----------------------|-------------------------------------|---------------------|-------------------------------------|
| a-ri-í[ringáál-á] | ‘he will watch it ₉ ’ | a-ri-chí[ringáál-á] | ‘he will watch them ₁₀ ’ |
| a-ri-rú[ringáál-á] | ‘he will watch it ₁₁ ’ | a-ri-khá[ringáál-á] | ‘he will watch it ₁₂ ’ |
| a-ri-rú[ringáál-á] | ‘he will watch them ₁₃ ’ | a-ri-bú[ringáál-á] | ‘he will watch it ₁₄ ’ |
| a-ri-kú[ringáál-á] | ‘he will watch it ₂₀ ’ | | |
| c. a-ry-ee[ringáál-á] | ‘he will watch himself’ | | |

In some other tenses of Nyala-West, it is clear that the reflexive contributes a /H/, though this H acts differently from the Hs of other object markers. As shown in (28), the Subjunctive normally has a melodic H tone on the first mora of the second syllable of the stem, and non-reflexive object markers, such as 3sg *mú-*, surface H, with the melodic H in the expected position on the stem. However, the reflexive introduces a H that surfaces on the stem-initial mora, not in situ, and the melodic H does not surface.¹³ Unlike the other object markers, the H of the reflexive is underlyingly floating and is assigned by rule to the stem-initial mora (under specific conditions) in Nyala-West. Similar effects are reported for Chewa (Kanerva 1990: 25-26), the Marachi (Marlo 2007, in prep) and Tura (Marlo 2008b) dialects of Luyia, Matuumbi (Kisseberth & Odden 1980, Odden 1984, 1989, 1996a), Nkore (Poletto 1998b), and Shona (Odden 1981, 1984).

- (28) Reflexive *e-* vs. other object markers in the Subjunctive in Nyala-West (speaker JW; Ebarb et al. in prep)
- | | |
|-----------------------|---------------------------|
| a. khu[riingáal-an-e] | ‘let’s look at e.o.’ |
| b. khu-mú[riingáal-e] | ‘let’s look at him’ |
| c. khw-ee[ríingaal-e] | ‘let’s look at ourselves’ |

An even more dramatic case of morpho-phonological differences triggered by the reflexive is found in Bakweri. As shown in (29), non-reflexive object prefixes in Bakweri are either L (*mò-*) or H (*vá-*), participate only in local tonal alternations, and generally have no other morphological effect on the verb stem. However, the Bakweri reflexive not only triggers a H-toned prefix *á-* but also changes the final vowel to *-é* and imposes a LH tonal melody on the final vowel of the stem—a melody found elsewhere only in relative clauses and wh questions (see §5).

- (29) Tonal properties of the reflexive in Bakweri (Marlo & Odden 2007)
- | | | |
|------------------|------------------------|---------------------|
| a. nà[zùŋg-à] | ‘I will rescue’ | <i>No OM</i> |
| b. nà-mò[zùŋg-à] | ‘I will rescue him’ | <i>/L/-toned OM</i> |
| c. nà-vá[zùŋg-à] | ‘I will rescue them’ | <i>/H/-toned OM</i> |
| d. nà-á[zùŋg-é] | ‘I will rescue myself’ | <i>Reflexive</i> |

The tonal effects of the reflexive are therefore entangled with the marking of tense-aspect differences in Nyala-West, Bakweri, and a number of other Bantu languages. The methodological implication of this is that one may be able to determine the tonal properties of the reflexive

¹³ Speaker PO has an additional optional pronunciation in this context in which the grammatical H is realized on the stem-final mora, i.e. *khw-ee[ríingaal-é]*. PO has an initial short vowel for the root meaning ‘watch’ (*-ringaal-a*), and JW has a long vowel (*-riingaal-a*).

only by collecting reflexive data in a wide variety of contexts. In studies on Luyia tone, for example, forms with the reflexive must be collected in virtually every tense.

A similar kind of effect is found throughout Bantu in Imperative constructions: the presence of an object marker triggers a morphological change on the verb that is not derivable from the combination of an OM and the Imperative. In particular, an object marker typically causes a change of the final vowel to *-e*, as in the following forms from Marachi: [*lekhuul-á*] ‘release!’, *mu*[*lékhuul-é*] ‘release him!’.¹⁴ Unlike other OMs, the 1sg object marker *N-* often conditions the final vowel *-a*: [*ndékhuul-á*] ‘release me!’. This pattern of final vowel allomorphy, in which the verb ends in *-e* with a non-1sg object marker and *-a* with no object marker and with the 1sg object marker, is reconstructed to Proto-Bantu (Meeussen 1962: 74, 1967: 112), and many modern day languages retain it (Marlo 2011). Imperatives and Subjunctives also have special tonal patterns in combination with an object marker in a number of languages, including Bena (Odden 1989), Hehe (Odden 1989), Kinga (Schadeberg 1973, Odden 1989), Logoori (Leung 1986), Safwa (Voorhoeve 1973, Odden 1989), Shambaa (Odden 1982: 202-206), Shona (Odden 1989: 234), and Yaka (Kidima 1991: 119-121). Imperative and Subjunctive forms, with and without object markers (including 1sg), should be included as part of the study of any Bantu language’s tonal system.

There are a number of contexts in Bantu languages where the reflexive and 1sg object markers act like they are part of the verb stem, while other object markers are outside the stem (Marlo 2011). Yao is a case where reflexive *i-* and 1sg *N-* act tonally like they are part of the stem and the macrostem, while other OMs are part of the macrostem but not the stem (Hyman & Ngunga 1994). It may be that the unique phonological shapes of the 1sg and reflexive markers within the set of object markers across Bantu (*-N-* vs. *-i-* vs. *-CV-*) are responsible for their unique tonal behavior. It is therefore recommended that all of the object markers be identified in any language in question, not only to provide a comprehensive description of the language’s morpho-tonology but also to determine whether any segmentally irregular object markers also have tonal irregularities.

Once the full set of object markers is identified, the OMs can be tested for internal tonal differences, and the set of OMs required for more complete paradigms can be identified. As with verb roots, only one or two general tonal classes of object markers are expected, with the further possibilities that the 1sg and/or the reflexive (or, more generally, the *-N-* and/or *-V-* object markers) constitute additional tonal classes. Barring syllable shape-related complications, only one /H/ object marker and one /Ø/ object marker should be necessary in fuller paradigms.

A further complication posed by object markers in some Bantu languages, e.g. Logoori (Marlo & Odden 2011) and Ruri (Massamba 1982, 1984), is that combinations of /H/ object

¹⁴ The final vowel *-e* is characteristic of the Subjunctive, and the Imperative + OM construction with final *-e* is often identified as a formal Subjunctive. Meeussen (1962: 74) lists several languages where Imperative forms with an object prefix are identical to Subjunctive forms with an object prefix: Bemba, Bembe, Gusii, Holoholo, Konzo, Lega, and Sotho, and Engelbrecht (1957: 106) says that Imperative forms with *-e* are tonally identical to Subjunctives in Zulu and may be treated as “a Subjunctive without a subjectival concord”. Nevertheless, in some languages, such as the Marachi and Nyala-West dialects of Luyia (Marlo 2007), Imperative forms with an object prefix take the final vowel *-e*, as in the Subjunctive, but the tonal patterns of Imperative forms with *-e* are those of the Imperative and not the Subjunctive, so it is inaccurate to call the forms Subjunctives.

markers sometimes trigger tonal alternations that are not seen in other contexts. It is therefore important to test for the possibility of multiple object markers, and, if multiple object markers are possible, to determine the tonal patterns of representative examples of these forms. The 1sg and reflexive object markers commonly license an additional object marker, even when other object markers cannot combine with one another (Marlo 2011, Polak 1986). Thus, combinations of OMs involving the 1sg and the reflexive are important to test, even in languages that might otherwise be reported to allow only a single object marker.

3.4 Pre-macrostem prefixes

The morphemes preceding the macrostem, labeled as a single category “Infl” in (11) above, consist of inflectional prefixes, including subject agreement, negation, and tense-aspect markers.

The subject markers of Proto-Bantu, in (30), are reconstructed as having a tonal contrast between the 1st- and 2nd-person object markers, which are reconstructed as /L/, and all other subject markers, which are reconstructed as /H/ (Meeussen 1967: 98).

(30) Subject markers of Proto-Bantu

1sg	* <u>n</u> -	1pl	*tò-
2sg	*ò-	2pl	*mò-
3sg	* <u>ú</u> -, * <u>á</u> -	3pl	*bá-
cl. 3	*g <u>ú</u> -	cl. 4	*g <u>í</u> -
cl. 5	*d <u>í</u> -	cl. 6	*g <u>á</u> -
cl. 7	*k <u>í</u> -	cl. 8	*b <u>í</u> -
cl. 9	*j <u>í</u> -	cl. 10	*j <u>í</u> -
cl. 11	*d <u>ú</u> -	cl. 12	*k <u>á</u> -
cl. 13	*t <u>ú</u> -	cl. 14	*b <u>ú</u> -
cl. 15	*k <u>ú</u> -	cl. 16	*p <u>á</u> -
cl. 17	*k <u>ú</u> -	cl. 18	*m <u>ú</u> -
cl. 19	*p <u>í</u> -		

The subject markers contrast two tonal values in many modern day Bantu languages, with a common tonal difference between 1st and 2nd persons vs. 3rd person. As pointed out by Kisseberth & Odden (2003: 68), there are also other variant patterns. One variant is where 1sg, 2sg, and 3sg are toneless, and the others are /H/. Another variant is where all of the subject markers have the same tonal value. The examples in (31) show a paradigm from a set of examples used to determine that there are no tonal differences among the subject markers in Nyala-West, which are all toneless.

(31) Subject prefixes in the Indefinite Future in Nyala-West (Ebarb et al. in prep)

ndi[ringáá <u>l</u> - <u>ú</u> -a]	‘I will be watched’	khu-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘we will be watched’
o-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘you _{sg} will be watched’	mu-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘you _{pl} will be watched’
a-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘s/he will be watched’	ba-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘they will be watched’
ku-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘it ₃ will be watched’	ki-ri[ringáá <u>l</u> - <u>ú</u> -a]	‘they ₄ will be watched’

ri-ri[ringáál-ú-a]	‘it ₅ will be watched’	ka-ri[ringáál-ú-a]	‘they ₆ will be watched’
si-ri[ringáál-ú-a]	‘it ₇ will be watched’	bi-ri[ringáál-ú-a]	‘they ₈ will be watched’
i-ri[ringáál-ú-a]	‘it ₉ will be watched’	chi-ri[ringáál-ú-a]	‘they ₁₀ will be watched’
ru-ri[ringáál-ú-a]	‘it ₁₁ will be watched’	kha-ri[ringáál-ú-a]	‘it ₁₂ will be watched’
ru-ri[ringáál-ú-a]	‘they ₁₃ will be watched’	bu-ri[ringáál-ú-a]	‘it ₁₄ will be watched’
ku-ri[ringáál-ú-a]	‘it ₂₀ will be watched’		

In another Luyia variety, Logoori, there is a rule that lowers Hs in utterance-initial position (David Odden, p.c.), which obscures the fact that all subject prefixes are /H/. Thus, in order to determine the correct underlying tonal value of the subject prefix in Logoori, forms parallel to those in (31) must be collected with an overt subject before the verb.

The tonal properties of the subject markers are sometimes determined by morpho-syntactic factors. For example, in Bakweri (see (35) and (41) below), the lexical contrast of the subject markers is neutralized to /H/ in object relative clauses, object wh questions, and some verb tenses. In Shona, the subject markers are predictably all H in some morpho-syntactic constructions and all L in others, but in the remaining main clause tenses, 1st and 2nd person subject markers are L, while 3rd person subject markers are H (Kisseberth & Odden 2003: 68). Similar effects are found in Bondei (Kisseberth & Odden 2003: 68) and Mushunguli (David Odden, p.c.).

The phonological shape of the subject markers also sometimes interacts with tonal patterns. As shown in (32), subject prefixes in Kerewe introduce a H, which surfaces on the subject prefix and spreads to the following syllable when the subject prefix has an onset (a). When the subject prefix does not have an onset (b), the H of the subject prefix associates to the following syllable and spreads from there one further syllable to the right (Downing 1998, Odden 1995c).

- (32) Effects of an onset consonant on the tonal patterns of subject markers in Kerewe
- | | | | | |
|----|------------------|------------------------------|------------------|----------------|
| a. | bá-ká[luundum-a] | ‘if they growl’ | tú-ká[luundum-a] | ‘if we growl’ |
| | bí-ká[luundum-a] | ‘if they ₈ growl’ | | |
| b. | o-ká[lúúndum-a] | ‘if you growl’ | a-ká[lúúndum-a] | ‘if he growls’ |

Given the extent of the tonal variation among subject markers across Bantu, it is recommended that the SMs markers be tested not only in default contexts, such as the Near Future in Tiriki, but also in other contexts, such as in different tenses and clause types (see §4 and §5), varying features like person (1, 2 vs. 3), number (sg vs. pl), and the phonological shape of the prefixes (CV- vs. V- vs. N-). While there are several parameters to control here, it is not the case that literally all subject markers should be collected in all paradigms. The non-human subject markers can typically be ignored, and among the human subject markers, it would be unexpected if, for example, the 2pl context could not be skipped over in most contexts. When fuller paradigms are constructed, it is generally necessary only to have one representative /H/ SM and one representative /L/ SM (plus phonological shape variants, if necessary).

In addition to the subject markers, the other verbal prefixes are negation and tense-aspect markers. In any Bantu language, the possibility exists for some of these markers to contribute a tone, and therefore as part of the morpho-phonological analysis, one would want to determine

what the tense-aspect and negation prefixes of the language are and what their tonal properties are. Some common tense-aspect prefixes are listed in (33).

- (33) Common tense-aspect prefixes in Bantu (Nurse & Philippson 2006)
- | | | | |
|----------|--|-------------|---------------------------|
| -a-, -á- | ‘past(s)’ | -Ø- | ‘present’ |
| -ka- | ‘itive, narrative, (far) future, (far) past’ | -kí- | ‘persistive, participial’ |
| -laa- | ‘future’ | -la- | ‘disjunctive’ |
| -la- | ‘present’ | -la- / -rá- | ‘past?’ |

Like the final vowel and the inflectional tonal marking on the stem, discussed in §4, it is not easy to systematically vary the tense-aspect prefixes. One must elicit a range of possible tense-aspect forms to determine what the different tense constructions of the language are and what the prefixes, suffixes, and tonal patterns of those tenses are. The question of how to determine what the tenses of a language are for the purposes of a study of the verbal tone system is addressed in §4.

3.5 Summary of tonal properties of verbal morphemes

To conclude this section, the tonal properties of the verbal morphemes of the Nyala-West dialect of Luyia are summarized in the schematic display in (34).

- (34) Tonal properties of morphemes in the Nyala-West verb (Ebarb & Marlo 2010a, Ebarb et al. in prep., Marlo 2007)
- | | | | | | | | | | | |
|------------------|-------|-------|--------------------|--------------------|--------------------|---|------|---------|-------------|------------------------|
| Ø | Ø | H/Ø | Ø | H | H | Ø | Ø | H | Ø | |
| | | | | | | | | | | |
| NEG ₁ | – SBJ | – TNS | – NEG ₂ | – OBJ ₁ | – OBJ ₂ | [| ROOT | – DERIV | – CAUS/PASS | – FV] _{stem} |

In this language, the negation and subject prefixes are always toneless. Tense prefixes are either /H/ or toneless. Object prefixes are always /H/; two object prefixes are possible just in case one is the 1sg *N-* or reflexive *e-*. (As noted above, the reflexive is /H/ like the other object markers, but it has different tonal effects.) Within the stem, verb roots, most of the derivational suffixes, and the final vowel are underlyingly toneless, while the causative and passive suffixes are /H/.

Methodologically speaking, there is little that can be done or that needs to be done with the morphemes that are consistently toneless in constructing tonal paradigms for Nyala-West. Different verb roots are selected from a variety of phonological shapes but are otherwise not varied. Derivational suffixes other than the passive and causative can be added to a root to increase the phonological length of the stem but otherwise trigger no tonal alternations and do not need to be varied. The final vowel is obligatorily present and cannot be independently manipulated. Subject agreement markers are obligatorily present in all verbal forms but the Imperative and obligatorily absent in the Imperative, and all are toneless and do not cause alternations. Likewise, the negation prefixes are obligatory in negative verbal forms (the choice between the two negative prefixes depends on the tense and clause type), but the two prefixes are toneless and do not trigger alternations.

In the case of the morphemes that are predictably /H/ but optionally present in any verbal form (object markers and the causative/passive suffixes), the presence vs. absence of these morphemes must be systematically varied. As for the tense prefixes, which have a lexical difference between /H/ and toneless, these prefixes can only be studied in conjunction with one missing piece in our summary of the tonal properties of verbs: melodic tones on the verb stem contributed by tense-aspect-polarity distinctions. This is the topic of the next section.

4. Morphological factors affecting tone

A prominent influence on tonal outputs in Bantu is the tonal marking of tense-aspect-mood-polarity distinctions—the assignment of melodic H tones to the TBUs toward one of the edges of the verb (macro)stem. The melodic Hs commonly interact with other tones in the verb, and tone rules sometimes apply only to specific tonal melodies. These tonal melodies are central to comprehensively understanding a language’s tone system, and the different melodies of a language must be studied systematically.

A summary of the Bakweri tone-melodic system is given in (35). The various tense-aspect distinctions of the language can be described in terms of different tense prefixes (-Ø-, -zì-, -zá̀-, -ma-, -`má̀-) combined with different final vowels (-a, -e, -ε, -i) and different tonal melodies (Ø, L, H, HL, LH) that are realized on the final vowel.¹⁵ In addition, all subject markers become H-toned in the the Perfective2 tense, which explains why the 1sg SM is *ná-* in this tense but *na-* in the others.

(35) Bakweri melodies (Gensler 1980, Marlo & Odden 2007)

		<i>Tense</i>	<i>FV</i>	<i>Melody</i>
na-Ø[zoz-á]	‘I will wash’	Future	-a	L
na-zì[zoz-è]	‘I did not wash’	Past Negative	-e	L
na-zá[zoz-á]	‘I will not wash’	Future Negative	-a	H
na-ma[zoz-á]	‘I washed’	Past	-a	H
na-zì ¹ [zóz-ì]	‘I have not washed yet’	Incompletive	-i	H
na-Ø[zoz-î]	‘I have washed’	Perfective1	-i	HL
ná ¹ -má[zoz-a]	‘I have washed’	Perfective2	-a	Ø

A summary of the Nyala-West tone-melodic system is provided in (36). As with Bakweri, the different tenses of Nyala-West are characterized by a combination of tense prefixes (-ri-, -ná-, -Ø-, -a-khá-, -aá-), final vowels (-a, -ire, -e), and tonal melodies on the verb stem. The main difference between the tonal melodies of Nyala-West and Bakweri is that those in Nyala-West are found on a variety of different positions on the verb stem—from the second syllable (“σ2”) to the final vowel, just on the first mora of the second syllable (“μ1 of σ2”), just on the final vowel, one H on the first mora of the stem and one H on the final vowel, etc.—whereas

¹⁵ The difference between the Ø and L melodies is found in phrase-medial position; forms with the Ø melody acquire a H melody in phrase-medial position, while forms with the L melody remain L phrase-medially. The LH melody is not found in main clause forms; it is found only in other clause types.

those of Bakweri are found only on the final vowel. See Kisseberth & Odden (2003: 61-62) for a summary of the positions targeted by the melodic H in some other Bantu languages.

(36) Tonal melodies in Nyala-West (Ebarb & Marlo 2010a, Ebarb et al. in prep, Marlo 2007)

<i>Melody 1</i>	<i>H from $\sigma 2$ to final</i>	
Indefinite Future	khu-ri[paang <u>ú</u> l <u>ú</u> l- <u>á</u>]	‘we will disarrange’
<i>Melody 2</i>	<i>H on $\mu 1$ of $\sigma 2$</i>	
Present Negative	si-i[mbaang <u>ú</u> lul-a]	‘I am not disarranging’
<i>Melody 3</i>	<i>H on final</i>	
Imperative _{sg}	[paangulul- <u>á</u>]	‘disarrange!’
<i>Melody 4</i>	<i>H targeting $\mu 1$¹⁶</i>	
Remote Past	b-a <u>á</u> [paangulul-a] (PO)	‘they disarranged’
<i>Melody 5</i>	<i>H on $\mu 1$ and on final</i>	
Hodiernal Perfective	khu[s <u>á</u> ambuul- <u>é</u>]	‘we de-roofed’
<i>Melody 6</i>	<i>all toneless</i>	
Conditional Past	khu[paanguluul-e]	‘if we could disarrange’

These examples illustrate the fact that the marking of tense-aspect distinctions in Bantu involves multiple morphemes in the verb, including tense prefixes, the final vowel, a tonal melody, and possibly also the subject marker. With the exception of the subject marker, these morphemes cannot be independently varied; rather, the entire constellation of properties must be studied for each tense, which requires the various ‘tenses’ of the language under investigation to be identified. As in figuring out the lexical tonal properties of different morphemes, identifying the main tenses and tonal melodies of a language can be accomplished in an initial survey. Once this has been accomplished, the tenses can be studied more systematically, varying other key paradigmatic parameters: with /H/ and /Ø/ roots, with and without an object marker, with two /H/ object markers, with the passive/causative, etc.

In the task of identifying the tenses of a language, it is generally recommended that the researcher consult the literature on the language in question and/or on closely related languages to prepare a list of forms and meanings to test. In Kerewe (Odden 2010), 24 tenses have been identified, with distinct affirmative and negative forms in main clauses and relative clauses and another 22 ‘when’ inflections with positive and negative forms. Main clause forms and ‘when’ tenses are given in (37) and (38), respectively.

(37) Tenses in main clauses in Kerewe

	<i>Affirmative</i>	<i>Negative</i>
<i>Remote Past</i>	ba-ka[kálaang-a]	ti-bá-á[kálaang-ile]

¹⁶ The melodic H is deleted in this form, due to the preceding H of the tense prefix -á-. (A stem-initial melodic H is also deleted after a single H-toned prefix in the Hodiernal Perfective: *ba-mú*[*bek-eré*] ‘they shaved him’ vs. *a*[*bék-eré*] ‘he shaved’.) The melodic H surfaces in Remote Past forms with an object marker, e.g. *b-á-mu*[*káraang-ir-á*] ‘they fried for him’, which shows a complex alternation in which the H of the object marker shifts to the stem-initial position and the melodic H is realized on the stem-final position.

<i>Hesternal Past</i>	ba[kalaang-ílé]	ti-ba[kalaang-ílé]
<i>Hodiernal Perfective</i>	ba-a[kalááng-ile]	ti-bá-ká ¹ [kalááng-ile]
<i>Simple Past</i>	ba-a[kaláángá]	ti-bá-á[kálaang-a]
<i>Experiential past</i>	ba-lá[kálaang-ile]	ti-bá-ká ¹ [kalááng-a]ga
<i>Present Progressive</i>	ba-ku[kálaang-a]	ti-bá-kú ¹ [kaláang-a]
<i>Habitual</i>	ba[kalááng-á]	ti-ba[kalááng-a]
<i>Persistent Dynamic</i>	ba-chá-á[kálaang-a]	ti-bá-kí[kalaang-a]
<i>Persistent Stative</i>	ba-chá-á[lób-ile]	ti-bá-kí[lob-ile]
<i>Near Future</i>	ba-la-a[kalááng-a]	a-ba-la-a[kaláanga]
<i>Remote Future</i>	ba-li[kalááng-á]	ti-ba-lí[kálaanga]
<i>Counterfactual</i>	bá-á-ká[kalaang-ile]	ti-bá-á-ká[kalaangile]
<i>Conditional (general)</i>	bá-ká ¹ [kaláang-a]	
<i>Conditional (counterfactual)</i>	ba-ki[kalááng-á]	
<i>Potential Imperfect</i>	ba-a-ká-á[kaláang-a]	
<i>Potential Perfective</i>	ba-a-ká-á[kalááng-ile]	
<i>Hortative 1</i>	a-lá[kálaang-a]	
<i>Hortative 2</i>	ni-ba-ka[kalááng-e]	
<i>Subjunctive 1</i>	ni-ba[kalááng-é]	
<i>Subjunctive 2</i>	ba[kalááng-é]	
<i>Conjunctive</i>	ní-bá[kalááng-á]	
<i>Imperative</i>	[kalááng-a]	
<i>Negative Imperative</i>	o-ta[kalááng-a]	
<i>Negative Imperative Future</i>	o-ta-lí[kálaang-a]	

(38) ‘When’-tenses in Kerewe

	<i>Positive</i>	<i>Negative</i>
<i>Remote past</i>	ká-bá-á[kalaang-ílé]	ká-bá ¹ -tá-á[kálaang-ile]
<i>Hesternal past</i>	ká-bá[kalaang-ílé]	ká-bá-ta[kalaang-ílé]
<i>Hodiernal perfective</i>	ká-bá-á[kalááng-ile]	ká-bá ¹ -tá-ká ¹ [kalááng-ile]
<i>Simple Past</i>	ká-bá-á[kalááng-á]	ká-bá ¹ -tá-á[kálaang-a]
<i>Experiential</i>	ká-bá ¹ -lá[kálaang-ile]	ká-bá ¹ -tá-ká ¹ [kalááng-a]ga
<i>Habitual</i>	ká-bá[kalááng-á]	ká-bá ¹ -ta[kalááng-a]
<i>Persistent Dynamic</i>	ká-bá-kí[kalaang-a]	ká-bá ¹ -tá-kí[kalaang-a]
<i>Persistent Stative</i>	ká-bá-kí[lob-ile]	ká-bá ¹ -tá-kí[lob-ile]
<i>Remote Future</i>	ká-bá ¹ -lí[kálaang-a]	ká-bá ¹ -ta-lí[kálaang-a]
<i>Present</i>	ká-bá-kú ¹ [kalááng-a]	ká-bá ¹ -tá-kú ¹ [kalááng-a]
<i>Near Future</i>	ká-bá-laa[kalááng-a]	
<i>Past Habitual</i>	ká-bá-á[kalaang-á]ga	

Such thorough descriptions are important to the development of tone-melodic studies. For example, recent studies of Kuria (Mwita 2008) and Gusii (Nash 2011) were given head-starts by previous tonal studies (Bickmore 1997, Odden 1987) and rich descriptions of tense-aspect forms (Cammenga 2002, 2004), which built on even earlier in-depth works (Whiteley 1955, 1960).

Recent data collection on the tense forms of Tiriki by the author provides useful lessons. This work began by surveying tenses in the language, eliciting forms using analogous data in Marachi (Marlo 2007). The Marachi materials were chosen for comparison because the language is closely related to Tiriki (both are varieties of Luyia) and has a tonal system that is fairly well described (in unpublished work) and that has a large number of tonal melodies, which is important because the goal of such a survey is to discover the distinct tonal melodies of the language, not necessarily the distinct tenses. Additional forms were later elicited based on unpublished Tiriki materials from Larry Hyman, Yuni Kim, and Mary Paster (“HKP”), and a novel questionnaire was created and administered using some of the materials in Bouquiaux & Thomas (1992, “B&T”), along with other logical combinations of tense-aspect distinctions and their negative forms. Results from this three-part survey of the Tiriki tense-aspect system are provided in (39) and (40), which show the the distinct affirmative and negative tenses found in Tiriki.

(39) Affirmative tenses in Tiriki¹⁷

Conditional Future* (B&T)	va-maa-va[kālúúkhan-e]	‘they will turn around’
Consecutive I* (HK&P)	n-aá[kalúkhan-a]	‘and then he turned around’
Consecutive II* (HK&P)	á-la[kalukhan-a]	‘and then he turned around’
Crastinal Future	ni-va[kālúkhán-e]	‘they will turn around’
Experiential* (HK&P)	y-áá[kálúkhán-á]khú	‘he has turned around before’
Habitual* (B&T)	va-má-va[kálukhan-aang-a]	‘they usually turn around’
Hodiernal Perfective	a[kalúkhaan-e]	‘he turned around’
Immediate Imperative*	kha[kálukhan-é]	‘now turn around!’
Immediate Past I	y-á-kha[laangirits-a]	‘he just shouted’
Immediate Past II*	y-a-kha[kálúúkhán-a]	‘he turned around’
	(+ two other tonal variants)	
Imperative (sg)	[kalukhan-a]	‘turn around!’
Indefinite Future	a-li[kālúúkhan-a]	‘he will turn around’
Near Future	a-la[kalukhan-a]	‘he will turn around’
Past Conditional	a-la[kalukhan-a] ...	‘if he had turned around ...’
Past Habitual	y-á[kálúúkhan-aang-a]	‘he used to turn around’
Persistent	a-shi[kálúúkhan-aang-a]	‘he is still turning around’
Present	a[kalúkhan-aang-a]	‘he is turning around’
Recent Past	y-aa[kalúkhaan-e]	‘he turned around’
Remote Future* (HK&P)	a-li-kha[kalúkhan-e]	‘he will turn around’
Remote Past	y-a[kálukhan-a]	‘he turned around’
Subjunctive	khu[kalúkhan-e]	‘let’s turn around!’
Uncertain Future	y-a-kha[kálukhan-e]	‘he may turn around’

¹⁷ This study of Tiriki is still in progress. Not all tonal transcriptions or glosses have been completely verified, and the names of the different tenses may change with further study. One potentially important tense also seems to have fallen through the cracks: the Imperative Plural, which is known to have a distinct tonal melody in Marachi.

(40)	Negative tenses in Tiriki		
	Crastinal Future Negative	ni-va[kalúkhan-e] mba	‘they won’t turn around’
	Hodiernal Perfective Neg.	a[kalúkhaan-e] mba	‘he didn’t turn around’
	Imperative Negative	u-kha[kalúkhan-a] mba	‘don’t turn around’
	Incompletive	a[kálúkháán-é] mba	‘he hasn’t turned around’
	Indefinite Future Negative	a-li[kalúkhan-a] mba	‘he won’t turn around’
	Near Future Negative	a[kalúkhan-a] mba	‘he won’t turn around’
	Past Conditional Negative	a-la[kalukhan-a] mba ...	‘if he hadn’t turned around ...’
	Present Negative	a[kalúkhan-a-a] mba	‘he is not turning around’
	Remote Future Negative	a-li-kha[kálukhan-e] mba	‘he may not turn around’
	Remote Past Negative	y-a[kálukhan-a] mba	‘he didn’t turn around’
	Subjunctive Negative	khu-kha[kalúkhan-a] mba	‘let’s not turn around’
	Uncertain Future Negative	y-a-kha[kálukhan-e] mba	‘he may not turn around’

The initial comparison with Marachi identified most of these tenses, many of which were also listed in the HKP materials and also subsequently found in the B&T-based questionnaire. There were a few mismatches, though, including a semantic difference in the past and perfective categories in Marachi and Tiriki, and, relatedly, a lack of distinct negative hesternal and hodiernal perfective forms, which were found in Marachi but not in Tiriki. Aside from this, virtually all of the morphological forms of Marachi were found in Tiriki.

A fair number of other tenses not known from Marachi were discovered in Tiriki—these forms are indicated with an asterisk in (39) and (40) along with the source of the new form. (The status of analogous forms in Marachi is not yet known.) Some of these tenses were encountered accidentally in the course of normal elicitation, such as the distinct Immediate Imperative and Immediate Past tenses. Others were found as a result of the HKP and B&T materials. The B&T-based questionnaire identified two previously unknown tenses—the Conditional Future and the Habitual—and a large number of ‘complex’ tenses composed of multiple verbs not shown here. The HKP materials were responsible for the Experiential, the Remote Future, and two new Consecutive tenses (one that is the same as one in their materials and one that is different). Although it is not yet known whether the newly discovered tenses translate into any new tonal melodies, it is clear that the comparisons with other research on the language and closely related languages yielded positive results.

A number of the tenses that were identified in Tiriki were listed not in the HKP materials (which were not meant to be an exhaustive list of tenses in the language): the two tenses discovered through the B&T questionnaire (the Conditional Future and the Habitual), the Indefinite Future, the Uncertain Future, the Immediate Imperative, the two Immediate Past tenses, and the Past Conditional. Two tenses in HKP—a Consecutive tense and the Perfect—were not accepted by the Tiriki consultant interviewed as part of the present survey, suggesting internal differences within the Tiriki-speaking community.

Since comparison with Marachi and HKP had already been completed, the B&T-based survey turned out to be somewhat redundant, repeating many already known tenses and revealing relatively few new simple verb forms. However, it did provide some indication of the usage of the tenses that was not previously known (for example, which of the past tenses can combine

with the expressions meaning “today”, “yesterday”, “last week”, and “long ago”), and it provided information on complex tenses that will be useful for the general description of the language.

This experience with Tiriki suggests that if there is already good documentation of the tense system of the language under investigation or of closely related languages, it should be sufficient to use previous research (augmented to fill in any gaps) to elicit an initial set of tenses, rather than collecting comparative data and also composing an extensive novel tense-identification questionnaire from scratch. If comparative materials are lacking, various tense-aspect forms must be surveyed, minimally including affirmative and negative forms of the main past, present, and future distinctions, imperatives and subjunctives, and clause type differences discussed below.

In addition to basic tense-aspect differences, tenses that express contrasts of focus are sometimes found in Bantu languages. For example, Matuumbi has a morphological and tonal difference between a neutral perfective form *tu[kálaang-itɛ]* ‘we just fried’ and a ‘verb-focus’ form *tu-ti[kalaang-á]* ‘we just FRIED’ (Odden 1984: 280). (See Hyman (1999) for a discussion of other tone-focus interactions.) While it is not recommended that the initial overview of the tense-aspect system seek out such differences, researchers should be aware that such contrasts may be found.

For the purposes of surveying the tense-aspect system, full paradigms should not be collected. Rather, a handful of representative forms in key paradigmatic contexts (e.g. a four-syllable /Ø/ verb and a four syllable /H/ verb, with and without an object marker) should be used to give a first-pass organization of the tonal melodies and the tenses in the language. The precise details of how the melodies are realized can be sorted out later by more systematically eliciting other stem shapes and in combination with other factors that affect the tonal realization.

Once the tenses of the language have been identified, the research should comprehensively investigate at least one or two representative tenses for each melodic pattern in the language, with the full set of paradigmatic contexts covered in those tenses. A systematic survey of the number of tone melodies that Bantu languages typically have has not been carried out, but Bakweri, with five melodies, and Nyala-West, with six melodies, seem to represent the “upper-middle class” of Bantu in terms of the richness of their tone-melodic distinctions. Kuria also falls into this class with about five or six different melodies that can be characterized as melodic Hs that target the first, second, third, fourth, or first and fourth moras of the verb macrostem, and some other forms that lack a melodic H (Marlo & Mwita 2009, Mwita 2008, Odden 1987). Lũngu has four melodic distinctions: some tenses have no melody while others fall into one of three patterns that can be characterized as having a melodic H targeting (i) the final vowel only, (ii) the second mora of the stem to the final vowel, and (iii) the second mora of the stem to the penult (Bickmore 2007a, b). Although one might debate exactly what to count as a distinct melody, it is clear that Khayo (Marlo 2009) and Tura (Marlo 2008b) have at least one or two melodies more than Nyala-West, and Marachi (Marlo 2007, in prep) may have as many as 12 distinct melodies, which seems to mark the peak complexity in Bantu in terms of tone-melodic distinctions. In these elaborated melodic systems of Luyia, one typically finds that the vast majority of tenses have one of a few common melodies, and the other melodies are found in just one or two tenses each.

The list of tenses in (39) and (40) for Tiriki probably does not include every tense in the language. However, (with the possible exception of the Imperative Plural, see fn. 17) these tenses

should be more than sufficient to represent all the distinct tone melodies of the language. Given how Bantu languages typically work, it is unlikely that any new melodic patterns will be found in other citation forms. However, not all key contexts for Tiriki and Bantu tone have yet been identified. The main contexts remaining to be discussed are phrasal contexts and those where the verb is found in other clause types.

5. Syntactic and phrasal factors affecting tone

A number of phenomena require the syntax configuration and the position of the verb in the phrase to be manipulated in the construction of tonal paradigms. Going hand-in-hand with tense-aspect-mood-polarity distinctions are clause type distinctions, i.e. differences between verbs found in main clauses, subordinate clauses, subject and object relative clauses, subject and object wh questions, ‘when’ clauses, participials, etc. These differences can affect the same morphological features on the verb as ‘tense’ differences—the subject marker, the tense prefix, the final vowel, and the tonal melody on the stem—so these different syntactic contexts should be surveyed in much the same way that the tense differences are.

The multiple effects of clause type differences are shown by the Bakweri data in (41). In these forms, all from the Past, the quality of the final vowel, the tone of the final vowel, and the tone of the subject prefix differ in the main clause and the object wh question, and the tone of the tense prefix is different in the main clause and the subject wh question. See Hyman & Katamba (2011) on the tonology of different types of wh questions in Luganda and Odden (2010) for Kerewe forms parallel to those in (37) in affirmative and negative relatives.

(41) Past tense morphology in main clauses, object wh questions, and subject wh questions in Bakweri (Marlo & Odden 2007)

<i>Main</i>	na -ma [zoz -á] 1SG -PST [wash -FV] ‘I washed’	SP-ma-... -á
<i>Object WH</i>	njé [!] ná -ma [zoz -ê] who 1SG -PST [wash -FV] ‘Who did I wash?’	SP [!] -ma-... -ê
<i>Subject WH</i>	nj’ á [!] -má -mo [zoz -á] who 3SG -PST -him [wash -FV] ‘Who washed him?’	SP- [!] má`-... -á

The different clause types do not always require extensive paradigmatic study in Bantu. For example, in Luyia varieties such as Nyala-West (Ebarb et al. in prep), there is no tonal difference between main clauses and relatives in many tenses. A few other tenses with unique tonal melodies are not possible in relatives (e.g. the Imperative, the Conditional Past). In the few cases with tonal alternations, the alternates take one of the two most common tonal melodies. For example, the Hodiernal Perfective, the only tense with the ‘first and final’ melody, changes under

relativization to the common ‘first mora of second syllable’ pattern found in Subjunctives and a number of other tenses. For a system such as this, once these contexts are surveyed to confirm that the tonal patterns of the relatives fall into one of the existing melodic categories, no further tonal data are necessary.

Other kinds of tonal alternations are triggered by differences in the position of the verb within the phrase. For example, the rule that shifts a final H to the penult in Tiriki does not apply to the phrase-medial form (a) in (42); the H on a CVVCV stem in (b), which is realized as a fall in penultimate position, is realized as a level H phrase-medially; and the fall in penultimate position in the VCV form in (c) alternates with a rise in phrase-medial position.

(42) Phrase-medial and phrase-final alternations in Tiriki

	<i>phrase-medial</i>		<i>phrase-final</i> (see (7), (8), and (12))
a.	a-la[ly-á] vwaangu	‘he will eat quickly’	a-lá[ly-a] ‘he will eat’
b.	a-la[téék-h-a] vwaangu	‘he will cook quickly’	a-la[téék-h-a] ‘he will cook’
c.	a-l[iíiv-a] vwaangu	‘he will steal quickly’	a-l[iíiv-a] ‘he will steal’

Domain-final neutralizations are also found, as in Nyaturu, which has a lowering rule that applies to words in utterance-final position. Some rules apply in phrase-medial position, as in the examples in (43) from Tiriki, in which the H of a word following the verb spreads left onto the toneless moras of the preceding verb stem, triggering alternations between an entirely toneless verb in isolation and when followed by a toneless word vs. an entirely H-toned verb stem when followed by a H. On-going research suggests that the leftward spreading process seems to apply in some melodies but not others. Sorting out the details of exactly when spreading is found involves systematically crossing the phrase-medial vs. phrase-final context with other paradigmatic contexts in the language.

(43) Phrasal leftward spread in Tiriki

a-la-molom-a	‘he will talk’
a-la-molom-a vwaangu	‘he will talk quickly’
a-la-mólóm-á kálaha	‘he will talk slowly’

In some languages, the nature of the following word—and its syntactic position vis-à-vis the verb—may determine whether a tonal alternation occurs or not. For example, in Zinza, H is deleted from a verb that is followed by a complement, as in *aka[zína] geeta* ‘he sang in Geita’ vs. *aka[zína]* ‘he sang’, but not if the following word is not a complement: *aka[zína] Bulemo* ‘Bulemo sang’ (Kisseberth & Odden 2003: 69, Odden 2000). The researcher must carefully control the syntactic configuration to arrive at the correct analysis of such forms. (See the large and growing literature on phonology-syntax interactions in Bantu, e.g. Downing 2011, Odden 1995b, and references therein). In addition, tonal alternations may be found in yes/no questions and in other intonational contexts (Downing 1989, Hyman & Monaka 2011). These are probably not contexts that one would first survey when beginning the study of a new language, but it is useful to be aware of such phenomena as the scope of the study grows.

6. Conclusion

A number of parameters that affect the realization of tone in Bantu languages have been discussed in order to assist researchers in devising questionnaires that appropriately manipulate and control the relevant variables in the language under investigation. These factors are summarized in (44).

- (44) Parameters of tonal variation in Bantu languages
- a. *Phonological properties of the stem*
 - 1- vs. 2- vs. 3- vs. 4+-syllables
 - short vs. long vowels in each syllable
 - C-initial vs. V-initial
 - depressor consonants
 - glides (particularly in penultimate position)
 - b. *Lexical properties*
 - /H/ vs. /Ø/ roots
 - a second type of /H/ root
 - causative and passive suffixes
 - /H/ vs. /Ø/ object markers
 - CV- vs. -N- vs. -V- object markers
 - 1sg object marker
 - reflexive object marker
 - multiple object markers (including combinations with 1sg and reflexive)
 - /H/ vs. /Ø/ subject markers
 - CV- vs. -N- vs. -V- subject markers
 - c. *Tonal melodies in different tenses*
 - past vs. present vs. future
 - imperatives and subjunctives (with and without an object marker)
 - affirmatives vs. negatives
 - imperfective *-a(n)g-*
 - verb focus tenses
 - d. *Reduplication*
 - Unreduplicated vs. reduplicated verbs
 - Total reduplication vs. partial reduplication
 - e. *Clause type differences*
 - subject and object relative clauses
 - subject and object WH questions
 - participials
 - ‘when’ clauses
 - yes/no questions
 - f. *Position in the phrase*
 - Phrase-medial vs. phrase-final
 - Followed by a complement vs. followed by an adjunct

To give a concrete example of how the combinations of these parameters play out in the development of a questionnaire for a particular language, a relatively complete paradigm for the Near Future tense in Tiriki is provided in the Appendix. The data include verbs of a variety of stem shapes for toneless and /H/-toned verbs, with and without one object marker. C-initial stems are elicited separately from V-initial stems. Among the object markers, the reflexive is evaluated separately from the rest. There are two contexts where two object markers are allowed in Tiriki—with the 1sg object marker and with the reflexive—so these two contexts are also collected. All of the preceding contexts are crossed with the phrase-medial vs. phrase-final parameter. As noted above, verbs in phrase-medial position are subject to tonal alternations depending on the tone of the word following the verb. Thus, in the phrase-medial context, there are two sub-types of examples: for every verb, one example is collected with a following toneless word, and one example is collected with a following word that has a H. The full version of the questionnaire repeats these kinds of data for tenses representing the distinct tone melodies of the language.

There is always an infinite amount of data that could be collected on any language. The proposal developed here shows that a relatively large amount of data is required to carry out a thorough study of the verbal tonal system of a Bantu language. However, the amount of data is in fact finite, and knowledge of the known grammatical factors that can influence the realization of tone greatly helps the researcher know what kinds of data to test for, which ultimately helps limit and make manageable the scope of the data that must be collected.

7. References

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8. Appendix: example paradigms for the Near Future tense in Tiriki

- (45) /Ø/ verbs
- | | |
|-------------------|-----------------------|
| a-la[kw-a] | ‘he will fall’ |
| a-la[tsy-a] | ‘he will go’ |
| a-la[lak-a] | ‘he will promise’ |
| a-la[lim-a] | ‘he will dig’ |
| a-la[cheend-a] | ‘he will go’ |
| a-la[molom-a] | ‘he will talk’ |
| a-la[valits-a] | ‘he will count’ |
| a-la[kalukhan-a] | ‘he will turn around’ |
| a-la[suuvirits-a] | ‘he will assure’ |
- (46) /H/ verbs
- | | |
|-----------------------------|----------------------|
| a-lá[ly- <u>a</u>] | ‘he will eat’ |
| a-lá[ng’w- <u>a</u>] | ‘he will drink’ |
| a-la[vé <u>k</u> -a] | ‘he will shave’ |
| a-la[vír <u>h</u> -a] | ‘he will pass’ |
| a-la[té <u>ekh</u> -a] | ‘he will cook’ |
| a-la[lé <u>erh</u> -a] | ‘he will bring’ |
| a-la[khál <u>ak</u> -a] | ‘he will cut’ |
| a-la[vú <u>kul</u> -a] | ‘he will take’ |
| a-la[ká <u>laang</u> -a] | ‘he will fry’ |
| a-la[khó <u>omool</u> -a] | ‘he will make faces’ |
| a-la[vó <u>yoong</u> ’an-a] | ‘he will go around’ |
| a-la[kú <u>ún</u> amul-a] | ‘he will invert’ |
- (47) /Ø/ V-initial verbs
- | | |
|--------------------------|----------------------------------|
| a-l[<u>aal</u> -a] | ‘he will spread (e.g. beddings)’ |
| a-l[<u>iits</u> -a] | ‘he will come’ |
| a-l[<u>aambukh</u> -a] | ‘he will ford (cross water)’ |
| a-l[<u>iivirir</u> -a] | ‘he will forget’ |
| a-l[<u>iiririts</u> -a] | ‘he will fill a hole’ |
- (48) /H/ V-initial verbs
- | | |
|-------------------------|------------------|
| a-l[<u>íiv</u> -a] | ‘he will steal’ |
| a-l[<u>íimb</u> -a] | ‘he will sing’ |
| a-l[<u>íinjirh</u> -a] | ‘he will enter’ |
| a-l[<u>íirhim</u> -a] | ‘he will punch’ |
| va-l[<u>aákaan</u> -a] | ‘they will meet’ |
| a-l[<u>aásamul</u> -a] | ‘he will sneeze’ |
| a-l[<u>íimirir</u> -a] | ‘he will lead’ |

- (49) /Ø/ verbs + OP
a-la-ká[sy-a] ‘he will grind it₆’
a-la-mú[lekh-a] ‘he will release him’
a-la-mú[lol-a] ‘he will see him’
a-la-mú[nyool-a] ‘he will find him’
a-la-vá[valits-a] ‘he will count them’
a-la-mú[lekhul-a] ‘he will release him’
a-la-mú[lekhul-ir-a] ‘he will release for him’
a-la-mú[saambul-ir-a] ‘he will de-roof for him’
a-la-khú[valits-ir-a] ‘he will count for you/us’
a-la-mú[suuvirits-a] ‘he will assure him’
- (50) /H/ verbs + OP
a-la-vá[h-a] ‘he will give to them’
a-la-mú[rhy-a] ‘he will fear him’
a-la-mú[hir-a] ‘he will take him (somewhere)’
a-la-mú[vek-a] ‘he will shave him’
a-la-vá[haan-a] ‘he will give them’
a-la-mú[leerh-a] ‘he will bring him’
a-la-mú[khalak-a] ‘he will cut him’
a-la-mú[vukul-a] ‘he will take him’
a-la-mú[kalaang-a] ‘he will fry him’
a-la-mú[khuunikh-a] ‘he will cover him’
a-la-mú[vuchiirir-a] ‘he will accept him’
a-la-mú[voyoong’an-a] ‘he will rotate him’
- (51) /Ø/ V-initial verbs + OP
a-la-mw[éeny-a] ‘he will want him’
a-la-mw[éeny-er-a] ‘he will want for him’
a-la-mw[íits-ir-a] ‘he will come for him’
a-la-mw[ívirir-a] ‘he will forget him’
- (52) /H/ V-initial verbs + OP
a-la-ts[íimb-a] ‘he will sing them₁₀’
a-la-mw[íimb-ir-a] ‘he will sing for him’
a-la-mw[írhim-a] ‘he will punch him’
a-la-mw[áakaanir-a] ‘he will meet him’
- (53) /Ø/ verbs + OP_{RefI}
a-l-í[sy-a] ‘he will grind himself’
a-l-í[kos-a] ‘he will scare himself’
a-l-í[siing-a] ‘he will bathe himself’
a-l-í[valits-a] ‘he will count himself’

- a-l-ií[lekhuul-a] ‘he will release himself’
a-l-ií[khuuluurh-a] ‘he will drag himself’
a-l-ií[simukukhits-a] ‘he will revive himself’
- (54) /H/ verbs + OP_{Refl}
a-l-ií[rh-a] ‘he will bury himself’
a-l-ií[vék-a] ‘he will shave himself’
a-l-ií[véerh-a] ‘he will forgive himself’
a-l-ií[khálak-a] ‘he will cut himself’
a-l-ií[sameeh-a] ‘he will forgive himself’
a-l-ií[véerheerh-a] ‘he will forgive himself’
a-l-ií[peenduul-a] ‘he will turn himself upside down’
a-l-ií[kuunamul-a] ‘he will invert himself’
a-l-ií[voyoong’an(y)-iny-a] ‘he will make himself go around’
- (55) /Ø/ verbs + OP + OP_{1sg}
a-la-muú[ndeev-er-a] ‘he will ask him for me’
a-la-vaá[mbal-its-ir-a] ‘he will count them for me’
- (56) /H/ verbs + OP + OP_{1sg}
a-la-muú[mbek-er-a] ‘he will shave him for me’
a-la-muú[ndeerh-er-a] ‘he will bring him for me’
a-la-muú[ndumul-ir-a] ‘he will beat him for me’
- (57) /Ø/ verbs + OP + OP_{Refl}
a-la-v-íí[val-its-ir-a] ‘he will count himself for them’
a-la-mw-íí[lekhuul-ir-a] ‘he will release himself for him’
- (58) /H/ verbs + OP + OP_{Refl}
a-la-v-íí[vék-er-a] ‘he will shave himself for them’
a-la-mw-íí[voholol-er-a] ‘he will untie himself for him’
- (59) /Ø/ verbs + OP_{1sg} + OP_{Refl}
a-l-ií[mbal-its-ir-a] ‘he will count himself for me’
~ a-laá-nz-i[val-its-ir-a]
a-l-ií[ndekhuul-ir-a] ‘he will release himself for me’
~ a-laá-nz-i[lekhuul-ir-a]
- (60) /H/ verbs + OP_{1sg} + OP_{Refl}
a-l-ií[mbek-er-a] ‘he will shave himself for me’
~ a-laá[nz-i-vek-er-a]
a-l-ií[mbohoholol-er-a] ‘he will untie himself for me’
~ a-laá-nz-i[voholol-er-a]

- (61) /Ø/ verbs phrase-medial
a-la[tsy-a] vwaangu ‘he will go quickly’
a-la[tsy-á] kálaha ‘he will go slowly’
a-la[cheend-a] vwaangu ‘he will walk quickly’
a-la[chéénd-á] kálaha ‘he will walk slowly’
a-la[molom-a] vwaangu ‘he will talk quickly’
a-la[mólóm-á] kálaha ‘he will talk slowly’
va-la[valits-an-a] vwaangu ‘they will count each other quickly’
va-la[válíts-án-á] kálaha ‘they will count each other slowly’
- (62) /H/ verbs phrase-medial
a-la[ly-á] vwaangu ‘he will eat quickly’
a-la[ly-á] ¹ kálaha ‘he will eat slowly’
a-la[vék-a] vwaangu ‘he will shave quickly’
a-la[vé¹k-á] kálaha ‘he will shave slowly’
a-la[téekh-a] vwaangu ‘he will cook quickly’
a-la[téé¹kh-á] kálaha ‘he will cook slowly’
a-la[vóyoong’an-a] vwaangu ‘he will go around quickly’
a-la[vó¹yóóng’án-á] kálaha ‘he will go around slowly’
a-la[kúúnamul-a] vwaangu ‘he will invert quickly’
a-la[kúú¹námúl-á] kálaha ‘he will invert slowly’
- (63) /Ø/ V-initial verbs phrase-medial
a-l[iits-a] vwaangu ‘he will go quickly’
a-l[iíts-á] kálaha ‘he will come slowly’
a-l[aambukh-a] vwaangu ‘he will cross quickly’
a-l[aámbúk-á] kálaha ‘he will cross slowly’
- (64) /H/ V-initial verbs phrase-medial
a-l[iív-a] vwaangu ‘he will steal quickly’
a-l[ií¹v-á] kálaha ‘he will steal slowly’
va-l[aákaan-a] vwaangu ‘they will meet quickly’
va-l[aá¹káán-á] kálaha ‘they will meet slowly’
a-l[aásamul-a] vwaangu ‘he will sneeze quickly’
a-l[aá¹sámúl-á] kálaha ‘he will sneeze slowly’
- (65) /Ø/ verbs + OP phrase-medial
a-la-ká[sy-a] vwaangu ‘he will grind it₆ quickly’
a-la-ká¹[sy-á] kálaha ‘he will grind it₆ slowly’
a-la-mú[lol-a] vwaangu ‘he will see him quickly’
a-la-mú¹[lól-á] kálaha ‘he will see him slowly’
va-la-mú[khwees-a] vwaangu ‘they will pull him quickly’

- va-la-mú¹[khwéés-á] kálaha ‘they will pull him slowly’
va-la-mú[khuuluurh-a] vwaangu ‘they will drag him quickly’
va-la-mú¹[khuúlúúr-á] kálaha ‘they will drag him slowly’
va-la-mú[vakal-ír-a] vwaangu ‘they will set out to dry for him quickly’
va-la-mú¹[vákál-ír-á] kálaha ‘they will set out to dry for him slowly’
- (66) /H/ verbs + OP phrase-medial
a-la-mú[rh-a] vwaangu ‘he will bury him quickly’
a-la-mú[rh-a] kálaha ‘he will bury him slowly’
a-la-mú[vek-a] vwaangu ‘he will shave him quickly’
a-la-mú[vek-á] kálaha ‘he will shave him slowly’
a-la-mú[leerh-a] vwaangu ‘he will bring him quickly’
a-la-mú[leerh-á] kálaha ‘he will bring him slowly’
a-la-mú[voyoong’an-a] vwaangu ‘he will go around him quickly’
a-la-mú[voyóóng’án-á] kálaha ‘he will go around him slowly’
a-la-mú[kuunamul-a] vwaangu ‘he will invert him quickly’
a-la-mú[kuunámúl-á] kálaha ‘he will invert him slowly’
- (67) /Ø/ V-initial verbs + OP
a-la-mw[éény-a] vwaangu ‘he will want him quickly’
a-la-mw[éé¹ny-á] kálaha ‘he will want him slowly’
a-la-mw[ííts-ír-a] vwaangu ‘he will come for him quickly’
a-la-mw[í¹ts-ír-á] kálaha ‘he will come for him slowly’
- (68) /H/ V-initial verbs + OP phrase-medial
a-la-ts[íimb-a] vwaangu ‘he will sing them₁₀ quickly’
a-la-ts[í¹mb-á] kálaha ‘he will sing them₁₀ slowly’
a-la-mw[íimb-ír-a] vwaangu ‘he will sing for him quickly’
a-la-mw[í¹mb-ír-á] kálaha ‘he will sing for him slowly’
- (69) /Ø/ verbs + OP_{Ref} phrase-medial
a-l-í[sy-a] vwaangu ‘he will grind himself quickly’
a-l-í¹[sy-á] kálaha ‘he will grind himself slowly’
a-l-í[kos-a] vwaangu ‘he will scare himself quickly’
a-l-í¹[kós-á] kálaha ‘he will scare himself slowly’
a-l-í[siing-a] vwaangu ‘he will bathe himself quickly’
a-l-í¹[síing-á] kálaha ‘he will bathe himself slowly’
a-l-í[val-its-a] vwaangu ‘he will count himself quickly’
a-l-í¹[vál-íts-á] kálaha ‘he will count himself slowly’
a-l-í[kalukhany-iny-a] vwaangu ‘he will turn himself around quickly’
a-l-í¹[kálúkhány-íny-á] kálaha ‘he will turn himself around slowly’

- (70) /H/ verbs + OP_{Refl} phrase-medial
a-l-í[rh-a] vwaangu ‘he will bury himself quickly’
a-l-í[rh-a] kálaha ‘he will bury himself slowly’
a-l-í[vék-a] vwaangu ‘he will shave himself quickly’
a-l-í[vék-á] kálaha ‘he will shave himself slowly’
a-l-í[vēerh-a] vwaangu ‘he will forgive himself quickly’
a-l-í[vēerh-á] kálaha ‘he will forgive himself slowly’
a-l-í[teekh-er-a] vwaangu ‘he will cook for himself quickly’
a-l-í[teekh-ér-á] kálaha ‘he will cook for himself slowly’
a-l-í[voholol-a] vwaangu ‘he will untie himself quickly’
a-l-í[vohólól-á] kálaha ‘he will untie himself slowly’
- (71) /Ø/ verbs + OP + OP_{1sg} phrase-medial
a-la-muú[ndeev-er-a] vwaangu ‘he will ask him for me quickly’
a-la-muú[ndéév-ér-á] kálaha ‘he will ask him for me slowly’
a-la-muú[m̄balits-ir-a] vwaangu ‘he will count him for me quickly’
a-la-muú[m̄bálíts-ír-á] kálaha ‘he will count him for me slowly’
- (72) /H/ verbs + OP + OP_{1sg} phrase-medial
a-la-muú[m̄bek-er-a] vwaangu ‘he will shave him for me quickly’
a-la-muú[m̄bek-ér-á] kálaha ‘he will shave him for me slowly’
a-la-muú[ndeerh-er-a] vwaangu ‘he will bring him for me quickly’
a-la-muú[ndeerh-ér-á] kálaha ‘he will bring him for me slowly’
- (73) /Ø/ verbs + OP + OP_{Refl} phrase-medial
a-la-v-í[valits-ir-a] vwaangu ‘he will count himself for them quickly’
a-la-v-í[válíts-ír-á] kálaha ‘he will count himself for them slowly’
a-la-v-í[lekhuul-ir-a] vwaangu ‘he will release himself for them quickly’
a-la-v-í[lékhúúl-ír-á] kálaha ‘he will release himself for them slowly’
- (74) /H/ verbs + OP + OP_{Refl} phrase-medial
a-la-v-í[vék-er-a] vwaangu ‘he will shave himself for them quickly’
a-la-v-í[vék-ér-á] kálaha ‘he will shave himself for them slowly’
a-la-v-í[voholol-er-a] vwaangu ‘he will untie himself for them quickly’
a-la-v-í[vohólólér-á] kálaha ‘he will untie himself for them slowly’
- (75) /Ø/ verbs + OP_{1sg} + OP_{Refl} phrase-medial
a-l-í[m̄biimb-ir-a] vwaangu ‘he will cover himself for me quickly’
~ a-laá-nz-i[viimb-ir-a] vwaangu
a-l-í[m̄bíimb-ír-á] kálaha ‘he will cover himself for me slowly’
~ a-laá-nz-i[víimb-ír-á] kálaha
a-l-í[m̄balits-ir-a] vwaangu ‘he will count himself for me quickly’
~ a-laá-nz-i[valits-ir-a] vwaangu

a-l-íí[mbálíts-ír-á] kálaha ‘he will count himself for me slowly’
~ a-laá-nz-i[válíts-ír-á] kálaha

(76) /H/ verbs + OP_{1sg} + OP_{Refl} phrase-medial

a-l-íí[mbek-er-a] vwaangu ‘he will shave himself for me quickly’

~ a-laá-nz-i[vek-er-a] vwaangu

a-l-íí[mbek-ér-á] kálaha ‘he will shave himself for me slowly’

~ a-laá-nz-i[vek-ér-á] kálaha

a-l-íí[mboholol-er-a] vwaangu ‘he will untie himself for me quickly’

~ a-laá-nz-i[voholol-er-a] vwaangu

a-l-íí[mbohólól-ér-á] kálaha ‘he will untie himself for me slowly’

~ a-laá-nz-i[vohólól-ér-á] kálaha

marlom@missouri.edu