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Rhythm, Quantity, and Tone in the Kinyarwanda Verb

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1 Introduction

In this paper, we discuss some aspects of the tonology of the verbal inflectional system in Kinyarwanda. There is a considerable amount of literature on tone in Kinyarwanda and in Kirundi (for example, [?], [?], [?]), two languages which are so similar that the two can be considered dialects of a single language. We have benefited from previous analyses of both languages, and especially from work done in collaboration with Firmard Sabimana (see [?]) and with Jeanine Ntahirageza, both linguists and native speakers of Kirundi. Nonetheless, the focus in the present paper is Kinyarwanda, which is the native language of one of the present authors (FM). We wish to emphasize that even restricting ourselves to the material discussed below, there are some differences between Kirundi and Kinyarwanda, and while the differences are small, they are significant. Despite the considerable work that exists already on the tone of the verbal system, a number of important questions—even basic ones—remain relatively obscure, and we hope that the present study will contribute to a better understanding of them. We plan to present a more comprehensive account of the tonology of the verbal system in the future.¹

Our goal has been to develop a formal account of tone which is as similar as possible to the analysis of tone in the other Bantu languages that are reasonably closely related. But the fact is that despite our bias in this regard, the analysis that we present here is quite different from what we expected, and from those proposed for nearby Bantu languages. In keeping with some earlier analyses, our account leans heavily on postulating metrical structure established from left to right, needed in order to account for the shifting and spreading of high tone. But the most surprising aspect of this analysis is that there is no general tonology of the verbal High tone as such: each High tone has a behavior that is directly tied to its morphological status or origin, and the shift of High tone occurs both towards a metrically Weak and a metrically Strong position, depending on the morphological status of the High tone in question, a fact that we did not expect, and that we were, in retrospect, biased against.

We will begin by sketching the overall analysis in general terms, and we describe the conclusions which we have reached. The motivation and justification will be presented over the course of the paper, and indeed, our reasons for formulating the generalizations as we do may not be entirely clear until the data is seen in detail.

1. The general structure of the Kinyarwanda verb is similar to that found in a range of familiar, and relatively closely related, Bantu tone languages; see Figure 1, where we present an schema of the Bantu verb—one that is incomplete, but sufficiently detailed for our present purposes.
2. Some morphemes have underlying tones and others do not.

¹We use the following abbreviations:

SM	Subject marker
TM	Tense marker
FOC	Focus marker
OM	Object marker
FV	Final vowel
inf	Infinitive marker
B	Basic (underlying) tone

3. There is a High/Low tonal contrast among the verb roots, although there is no evidence that what we might call Low toned verb roots bear a Low tone as such; they are best analyzed as bearing no tone. Speaking of a High/Low tonal contrast is a matter of convenience.
4. There is no lexical tonal contrast among the subject markers. In most environments, the Subject Marker (*SM*) appears on a low tone, the result of no tone associating with it. In a few environments, a High tone is associated with the Subject Marker.
5. There is a suffixal high tone, a suffixal morpheme which we indicate as H_{post} , that appears in certain morphological environments. When there are no Object Markers in the verb, the suffix H_{post} appears on the second syllable of the stem, but when there are OM prefixes, it appears further to the left.²
6. There is a leftward shift of High tone in some cases that appears to be rhythmically motivated. If we group moras into groups of two from left to right, then it is natural to label one as strong and one as weak, even if the choice is a bit arbitrary. We label these feet as trochees (Strong-Weak). H_{root} shifts leftward to a Strong position; H_{post} shifts leftward to a Weak position: this is the conclusion that we mentioned just above that was surprising, and it will become clearer when we consider some specific examples.
7. Kinyarwanda is relatively conservative among the Bantu languages in maintaining a vowel length contrast, and it appears to us to be impossible to avoid speaking of moras in the analysis of the prosodic system. However, not all moras show the same behavior, and in some cases, the second mora of a long vowel acts differently than the mora of a short syllable in a weak position. That much is perhaps not surprising: the first and the second mora in a bimoraic syllable may not have all the same privileges. But there are cases where a High tone that we might expect (based simply on counting moras, and distinguishing odd from even positions) to appear on the second mora of a long vowel will instead associate with the immediately *following* mora, which is to say, in the following syllable. We interpret this as an expression of quantity-sensitivity in the accentual system: in particular, if the left-to-right assignment of metrical positions should encounter (so to speak) a long (i.e., two-mora) vowel in a Strong position, it treats the long vowel as comprising the strong position of the trochee, with the weak position falling in the subsequent syllable.

One of the aspects of the verbal tone pattern that makes its analysis so difficult is the fact that there are few generalizations that hold for High tones *in general*. Instead, we find that in order to make sense of the data, we must talk about several *different* High tones—these tones are *different* in the sense that what makes the tones different is their grammatical function, rather than their phonetic description. In brief,

1. One of the High tones is the High tone that is part of a verb radical's underlying form;
2. Another High tone is a formal marker (some would say, a formal morpheme, if we allow ourselves to speak of morphemes that do not have a specifiable sense or unique grammatical function) that appears typically to the *right* of the verb radical;
3. A third High tone is part of the negative prefix *nti-* (although in the surface representation, that High tone is typically associated with a different syllable).

We will try to show that the principles that account for the appearance of each of these tones is different. We thus are not led to a set of rules which must be applied sequentially, as has often been the case in the analysis of other related Bantu languages. The analysis does not draw us towards an optimality theoretic analysis, either, because the complexities of the analysis involve morphological specifications that appear to be inconsistent with a view that makes strong claims about the universality of phonological constraints.

²For specialists in historical or comparative Bantu tone, this tone is especially interesting. Its behavior is quite different from the verbal suffix High tone, or tones, that we observe in closely related Bantu languages. In particular, it is common to find a High tone that appears on the mora that follows the first mora of the verb radical, and in those languages in which there is a tonal contrast among the verb radicals, this High tone typically appears when the verb radical is Low (or toneless). This tone, however, never appears shifted to a position earlier in the word, as far as we are aware. In addition, there is a distinct High tone that is associated with the Final Vowel in a number of verbal patterns, such as the subjunctive. This difference does not naturally carry through to the Kinyarwanda system, as far as we can see at the present time.

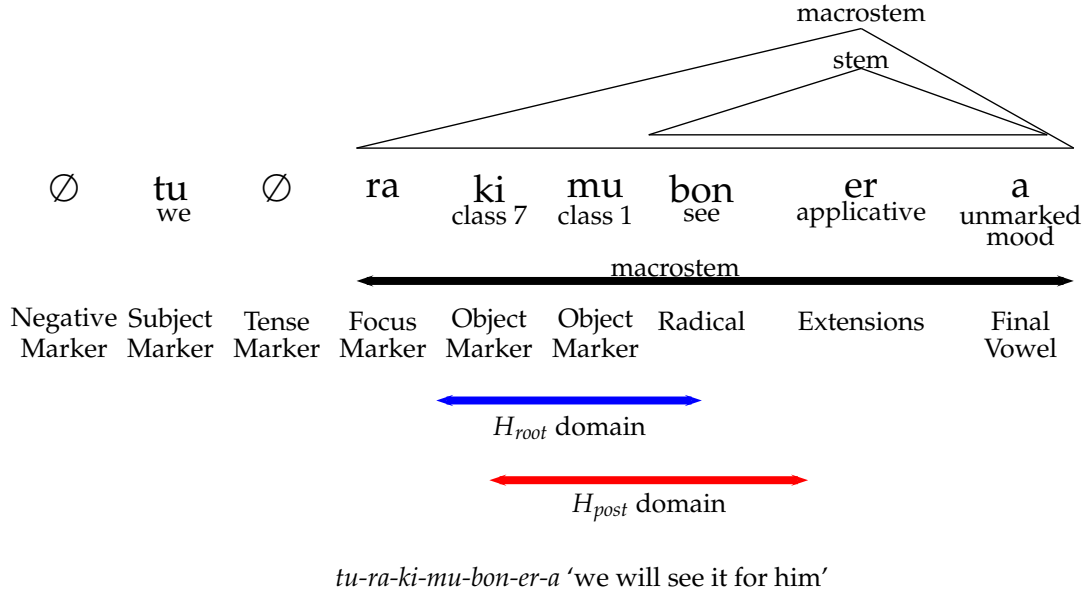


Figure 1: Verbal structure tone windows

We list below the four distinct High tones, according to this analysis. One of the reasons for distinguishing these classes is that not only (as we have just said) the *left to right position* of each tone in the word is determined by different principles, but in addition, there is a sort of competition among the tones, in the sense that when the post-radical High H_{post} is present, the radical's High tone does not appear (it is deleted, in generative terminology); and when the *nti*'s High tone appears, neither the radical's tone *nor* the post-radical High tone appears. However, there are pairs of High tones that can co-exist: the Tense Marker *raa*'s High tone, for example, can occur along with the radical High tone.

TYPES OF HIGH TONE			
	NAME	TYPE	"NORMAL" POSITION
(1)	H_{neg}	<i>nti</i> (negation)	Syllable after <i>nti</i>
	H_{post}	post-radical grammatical tone	syllable after radical
	H_{root}	radical lexical tone	first syllable of radical
	H_{TM}	tense marker <i>raa</i> , <i>záa</i>	on TM

In Figure 1, we have given a schematic of the most important positions for morphemes in the Kin-yarwanda verb. We have indicated towards the bottom the range of positions in which the H_{root} tone can (or does) associate, and the range of positions for the H_{post} . We are not quite certain as to whether these domains have a real status in the system, or whether the range of positions that we have indicated there is simply the logical consequence of the other rules and constraints posited in the grammar. There is one case below which suggests the former interpretation is correct, in connection with the tonal behavior of the inceptive (*raa*) tense: viewing this tonal domain as having some linguistic reality would perhaps provide the best account for the placement of the radical High tone there.

We draw the reader's attention to the curious fact that while this analysis depends more heavily on tones' *morphological* status than is found in analyses of related Bantu tone languages, the analysis is not thereby more concrete. That is, it is often the case that diachronic development leads a language from a situation in which a phonological effect is governed by phonological considerations only, to one, a little later, where the conditioning factor is not the phonological environment, but rather the specific morphological identity of the neighboring morphemes—velar softening in English, for example. In such cases, the

triggering environment is present, visible, and directly observable. In the present case, however, the High tones that we observe do not wear their categorization on their sleeves, so to speak: it requires an analytic leap to decide that a given High tone in a given word is marked as H_{neg} or H_{post} .

The most complex aspect of the tone system is the shifting and reassociations of these tones. To understand this, we must distinguish between the placement of the radical High tone, and the post-radical High tone. Both of these tones shift to the left, and in their reassociation they remain within the *macrostem* (which is to say, they remain to the right of the Tense Marker). But they shift according to different principles. By *macrostem*, we mean the part of the verb that begins after the Tense Marker, consisting of all Object Markers and the verb stem as well. In addition, the macrostem includes the secondary prefixes which appear in much the same position as Object Markers do; this is depicted graphically in Figure 1.

The *radical High* H_{root} shifts to the *beginning* of the macrostem—that is, the first syllable of the macrostem. Actually, what we find on the surface suggests that it might be more appropriate to say that the radical High tone *spreads* to the first syllable of the macro-stem. Essentially what we find is this: the radical High tone appears on (i.e., is associated with) the first syllable of the macrostem, but in addition, we may find the tone spread further to the right, as far to the right as the radical itself—the only condition being that the entire span of Highs must be odd in number (which here means *one* or *three*). Such a condition seems to make more sense on the view that the radical High *spreads* to the left, and is then delinked in a right-to-left fashion to satisfy a “parity” condition, to which we will return below. This is illustrated in Figure 2.

The *post-radical High* H_{post} shifts leftward to a position within the macrostem which is an even-numbered position—but there are two slightly different principles that determine how we count. If the macrostem has 2 or more Object Markers,³ then counting begins with the beginning of the macrostem; otherwise, counting begins at the beginning of the word. The even-numbered positions are “strong” in the sense that they attract the post-radical High: H_{post} shifts to the leftmost even-numbered position in the macrostem.

It is difficult to avoid the sense that the H_{post} is a *syncopated* High tone—in music, the term *syncopation* refers to a prosodic impulse that is on an off-beat, or in present terms, a Weak metrical position. The shifting of association of this tone preserves this aspect of syncopation, and we suspect that this is an important fact.

1.1 Infinitive

We look first at the infinitive. Its negative is formed with the prefix *-ta-*, not *nti-*. In the tabular representation of the verbal tone pattern, we use “B” to indicate the *basic* or inherent tone of the verb radical.

³“secondary” prefixes are counted in this, as they behave like Object Markers quite generally

	AFFIRMATIVE INFINITIVE	Gloss
<i>Low tone</i>	ku rim a	to cultivate
	ku rer a	to raise (children)
	ku rog a	to poison
	ku rut a	to surpass
	ku geend a	to go
<i>High tone</i>	ku bón a	to see
	ku búr a	to lack
	ku bík a	to crow
	ku báag a	to butcher
	ku béer a	to suit

	NEGATIVE INFINITIVE	Gloss
(2)	<i>Low tone</i>	
	ku tá rim á	not to cultivate
	ku tá rer á	not to raise (children)
	ku tá rog á	not to poison
	ku tá rut á	not to surpass
	ku tá geend á	not to go
	ku tá geend án a	not to go with
<i>High tone</i>	ku tá bon á	not to see
	ku tá bur á	not to lack
	ku tá bik á	not to crow
	ku tá baag á	not to butcher
	ku tá beer á	not to suit
	ku dá teek á	not to cook
	ku dá teek ér a	not to cook for

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN

(3)	TM	H_{root}	H_{post}
	infinitive	B	

2 Present tense

2.1 Affirmative

In the simple case where there are no Object Markers (OMs), the basic or lexical tone marking of the verb radical appears on the radical itself. However, one of the central issues in Kinyarwanda morphotonology is how to account for what appears to be a shifting of a High tone's position, or association, from the radical when we compare the surface tone pattern of verbs with no Object Markers (OMs) and verbs with a single OM. As noted above, we propose that this leftward shift is best understood in terms of a rhythmic pattern which is established by creating binary feet from left to right from the beginning of the word: including the negative prefix *nti-* in the case of Kinyarwanda. We look first at the affirmative present tense form of the verb. It is clear that the High tone in these forms is the High tone of the verb radical, but it will be associated to a position to the left of the radical if there is such a position within the macrostem. Furthermore, this tone may appear associated with either one or three syllables: the maximum number possible if the tone's association is not to move outside of its domain, defined as the macrostem up to the radical. Consider first the behavior of verb radicals with a short vowel, given in (5), and next the behavior of verb radicals with a long vowel, given in (6). The long vowel stems do not behave differently in any important way in this tense. In Figure 2, we present the foot construction made on these verbs, and one can see that the H_{root} always associates to the first (i.e., leftmost) Strong position within the macrostem, which is indicated with a dotted-line box.

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN

	TM	H_{root}	H_{post}
(4) infinitive		B	
present tense affirmative (focus)		B	

PRESENT TENSE AFFIRMATIVE
SHORT VOWEL

Singular subject *Plural subject*
Root: **-rim-** (Low tone: to cultivate)

	<i>n</i> da rim a	<i>tu</i> ra rim a
No OM	<i>u</i> ra rim a	<i>mu</i> ra rim a
	<i>a</i> ra rim a	<i>ba</i> ra rim a
One OM	<i>n</i> da ki rim a	<i>tu</i> ra ki rim a
ki (cl 7)	<i>u</i> ra ki rim a	<i>mu</i> ra ki rim a
	<i>a</i> ra ki rim a	<i>ba</i> ra ki rim a
Two OMs	<i>n</i> da ki mu rim ir a	<i>tu</i> ra ki mu rim ir a
ki mu (cl 7, 1)	<i>u</i> ra ki mu rim ir a	<i>mu</i> ra ki mu rim ir a
	<i>a</i> ra ki mu rim ir a	<i>ba</i> ra ki mu rim ir a
Three OMs ki ha mu	<i>n</i> da ki ha mu rim ir a	<i>tu</i> ra ki ha mu rim ir a
mu (cl 7, 16, 1,)	<i>u</i> ra ki ha mu rim ir a	<i>mu</i> ra ki ha mu rim ir a
	<i>a</i> ra ki ha mu rim ir a	<i>ba</i> ra ki ha mu rim ir a

(5)

Root: **-bón-** (High tone: to see)

No object marker	<i>n</i> da bón a	<i>tu</i> ra bón a
	<i>u</i> ra bón a	<i>mu</i> ra bón a
	<i>a</i> ra bón a	<i>ba</i> ra bón a
One OM mu (him/her)	<i>n</i> da mú bon a	<i>tu</i> ra mú bon a
	<i>u</i> ra mú bon a	<i>mu</i> ra mú bon a
	<i>a</i> ra mú bon a	<i>ba</i> ra mú bon a
Two OMs mu (him/her)	<i>n</i> da kí 'mú bón er a	<i>tu</i> ra kí 'mú bón er a
	<i>u</i> ra kí 'mú bón er a	<i>mu</i> ra kí 'mú bón er a
	<i>a</i> ra kí 'mú bón er a	<i>ba</i> ra kí 'mú bón er a
Three OMs mu (him/her)	<i>n</i> da kí 'há mú bon er a	<i>tu</i> ra kí 'há mú bon er a
	<i>u</i> ra kí 'há mú bon er a	<i>mu</i> ra kí 'há mú bon er a
	<i>a</i> ra kí 'há mú bon er a	<i>ba</i> ra kí 'há mú bon er a

PRESENT TENSE AFFIRMATIVE		
LONG VOWEL		
	<i>Singular subject</i>	<i>Plural subject</i>
	Low tone: -geend- (to go)	
No OM	n da geend a	tu ra geend a
	u ra geend a	mu ra geend a
	a ra geend a	ba ra geend a
One OM	n da ha geend a	tu ra ha geend a
	u ra ha geend a	mu ra ha geend a
	a ra ha geend a	ba ra ha geend a
	High tone -téek- (High tone: to cook)	
(6) No OM	n da téek a	tu ra téek a
	u ra téek a	mu ra téek a
	a ra téek a	ba ra téek a
One OM	n da gí teek a	tu ra gí teek a
	u ra gí teek a	mu ra gí teek a
	a ra gí teek a	ba ra gí teek a
Two OMs <i>mu</i> (him/her)	n da kí 'mú téek er a	tu ra kí 'mú téek er a
	u ra kí 'mú téek er a	mu ra kí 'mú téek er a
	a ra kí 'mú téek er a	ba ra kí 'mú téek er a
Three OMs <i>mu</i> (him/her)	n da kí 'há mú teek er a	tu ra kí 'há mú teek er a
	u ra kí 'há mú teek er a	mu ra kí 'há mú teek er a
	a ra kí 'há mú teek er a	ba ra kí 'há mú teek er a

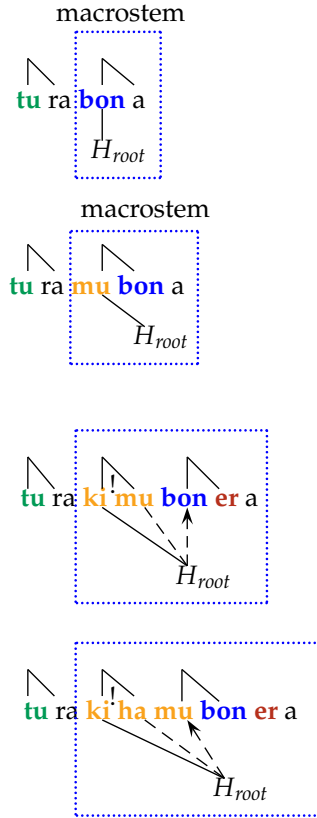


Figure 2: Foot marking for H_{root} association

2.2 Negative

When we turn to the negative form of the present tense, we see a different pattern of a shifting High tone. When there is no OM, the suffixal High tone appears on the second syllable of the stem (*-er-*, in the cases examined here). However, when there is a single OM, we see a complex set of data present when we look at long and short vowels in Kinyarwanda. In (8), we present these forms.

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN			
	TM	H_{root}	H_{post}
(7) infinitive		B	
present tense affirmative (focus)		B	
present tense negative		\emptyset	H

PRESENT TENSE NEGATIVE		
SHORT VOWEL		
<i>Tone neutralized</i>	<i>Singular subject</i>	<i>Plural subject</i>
		-bón- (to see)
No OM	sii m bon ér a	nti tu bon ér a
	ntu u bon ér a	nti mu bon ér a
	nta a bon ér a	nti ba bon ér a
One OM	sii n ki bón er a	nti tu ki bón er a
	ntu u ki bón er a	nti mu ki bón er a
	nta a ki bón er a	nti ba ki bón er a
(8)	Two OMs, 3rd person	nti ba ki mú bon er a
	Reflex OM, 3rd person	nti b ii bón er a
	Three OMs, 3rd person	nti ba ha kí mu bon er a
<i>Tone neutralized</i>	<i>Singular subject</i>	<i>Plural subject</i>
		-geend- (to go)
	(3rd person only)	
No OM	nta a teek ér a	nti ba teek ér a
One OM	nta a mu téek er a	nti ba mu téek er a
Two OMs	nta a ki mú teek er a	nti ba ki mú teek er a
Reflex	nti y ii téek er a	nti b ii téek er a

In Figure 3, we observe the behavior of a tone that appears to shift leftward, though that is simply a metaphor derived from comparing different forms from the same inflectional paradigm. The situation is more complex when the vowel in the verb radical is long. A generalization that merely counts odd- and even-numbered positions fails to generate the correct data, and the details of this are shown in Figure 4.

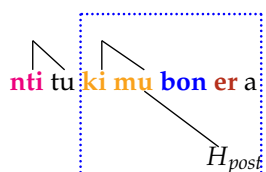
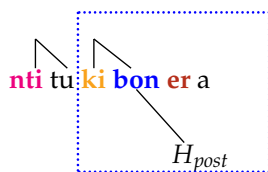
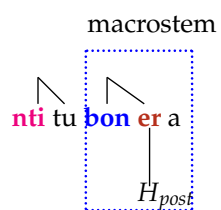
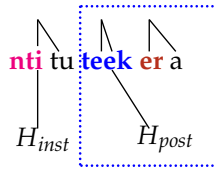


Figure 3: Rhythmic structure in negative present tense (short vowel)

Quantity-insensitive foot assignment
(incorrect)



Quantity-sensitive foot assignment
(correct)

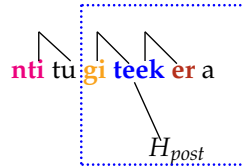
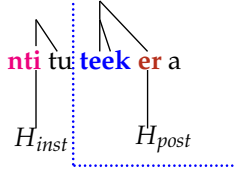


Figure 4: Rhythmic structure in negative present tense (long vowel **-teek-**)

3 Inceptive: -ráa-

3.1 Kinyarwanda

This tense only exists in the negative in Kinyarwanda. The verb radical keeps its lexical tone, High or Low, but in the presence of OM prefixes, the radical's lexical tone is pulled leftward: if there is one OM, the tone is maintained on the root, and if there are two OMs, the tone is placed on the second OM (counting, as ever, from left to right). If there are 3 OMs, the tone is placed on the second OM, just as it is in the two OM case, but we find spreading of the High tone from that second OM to the verb radical. We note that in all cases, the High tone moves to an even-numbered position, and furthermore, if the original position of the High tone was in an even-numbered position (here, mora 6 of the word), it remains in place, and we find spreading from the 4th to the 6th position. If the High tone had been on an odd numbered position, the tone moves, rather than spreads, leftward to the 4th mora.

In putting things this way, we have overlooked the fact that our description of quantity-sensitive rhythm-assignment does not correctly deal with the case with no OM, for both the short- and the long-vowel radicals, and we highlight this in Figure 5. Why do we find (b) in reality, and not (a)? This is clearly a radical High tone, not a H_{post} , so according to the analysis presented here, it should associate with a strong position. Why does the *ráa* TM not take the first mora of the radical as the weak position in its foot? If we follow the analysis presented here, the TM *ráa* does just that, as it should, when there is one or more OM. So *why* do we find the situation as we do in Figure 5?

The only answer we have is both partial and tentative: If the H_{root} must associate with a strong position within the macrostem—and that is the heart of our present proposal—then the only such position is the one indicated in (5), and it is to the right of the first mora of the verb stem. In no cases does a root’s High tone appear to the right of the first mora of the radical; that is what we indicated in Figure 1 above. If that generalization has some real status in the language, and the language uses that domain-based generalization to govern where the tone associates, then we have perhaps the basis of an account, or answer, to this question.

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN				
	NTI	TM	H_{root}	H_{post}
(9) infinitive			B	
present tense affirmative (focus)			B	
present tense negative	H		\emptyset	H
inceptive		H (ráa)	B	

-RÁA-		
<i>Low tone radical</i>		
	SHORT VOWEL	LONG VOWEL
No OM	nti ba ráa rim a	nti ba ráa geend a
1 OM	nti ba ráa ha rim a	nti ba ráa ha geend a
2 OM	nti ba ráa bi ha rim a	nti ba ráa bi ha geend an a
(10) 3OM	nti ba ráa bi ha mu rim er a	nti ba ráa bi ha mu geend er a

<i>High tone radical</i>		
	SHORT VOWEL	LONG VOWEL
No OM	nti ba ráa bón a	nti ba ráa téek a
1 OM	nti ba ráa ha bón a	nti ba ráa ha téek a
2 OM	nti ba ráa bi há bon a	nti ba ráa bi há teek a
3OM	nti ba ráa bi há mú bón er a	nti ba ráa bi há mú téek er a



Figure 5: *raa* with no OMs

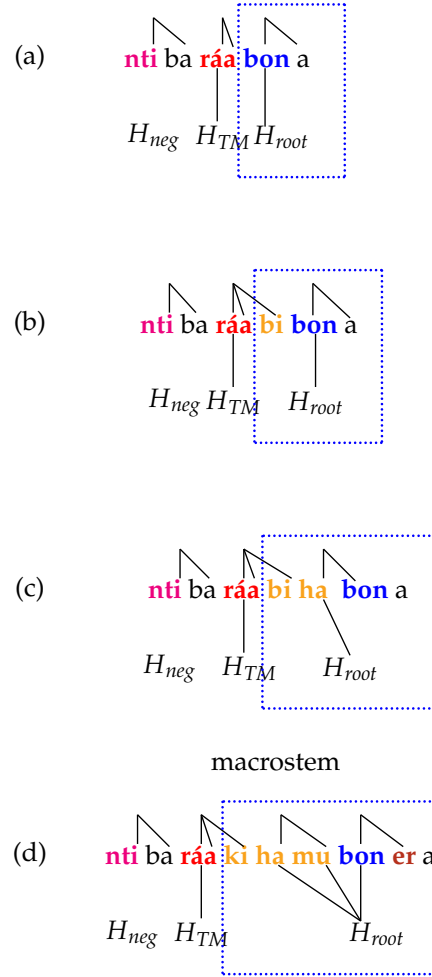


Figure 6: Rhythmic structure in negative inceptive with High-toned radical

4 Future

The future is marked by $-záa/zaa-$ in Kinyarwanda. The tone pattern behaves just like the parallel case of *ráa*.

4.1 Affirmative Indicative Future

In Kinyarwanda, nothing special happens in the case of 2 OMs, other than the shift to even-numbered positions.

Note that in the affirmative, all syllables are Low:

FUTURE AFFIRMATIVE -ZAA- OR -ZÁA-

Low tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba zaa rim a	ba zaa geend a
1 OM	ba zaa ha rim a	ba zaa ha geend a
2 OM	ba zaa bi ha rim a	ba zaa bi ha geend an a
(11) 3 OM	ba zaa bi ha mu rim ir a	ba zaa bi ha mu geend an ir a

	SHORT VOWEL	LONG VOWEL
No OM	ba zaa bon a	ba zaa teek a
1 OM	ba zaa ha bon a	ba zaa ha teek a
2 OM	ba zaa bi ha bon a	ba zaa bi ha teek a
3 OM	ba zaa bi ha mu bon er a	ba zaa bi ha mu teek er a

4.2 Negative

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN

	NTI	TM	H_{root}	H_{post}
infinitive			B	
present tense affirmative (focus)			B	
(12) present tense negative	H		Ø	H
inceptive negative	H	H (ráa)	B	
future affirmative			Ø	
future negative (non-focused)	H	H (záa)	B	

FUTURE NEGATIVE NTI- + -ZÁA-

Low tone radical

	SHORT VOWEL	LONG VOWEL
No OM	nti ba záa rim a	nti ba záa geend a
1 OM	nti ba záa ha rim a	nti ba záa ha geend a
2 OM	nti ba záa bi ha rim a	nti ba záa bi ha geend an a
(13) 3 OM	nti ba záa bi ha mu rim ir a	nti ba záa bi ha mu geend an ir a

	SHORT VOWEL	LONG VOWEL
No OM	nti ba záa bón a	nti ba záa téek a
1 OM	nti ba záa ha bón a	nti ba záa ha téek a
2 OM	nti ba záa bi há bon a	nti ba záa bi há teek a
3 OM	nti ba záa bi há mú bón er a	nti ba záa bi há mútéek er a

5 Far Past

5.1 Far past affirmative

In the affirmative, there is neutralization between radicals of High and Low tone; both have a High tone (or in the non-focused forms, no tone, i.e. low tone).

FAR PAST (NON-FOCUSED) -Á-

Low tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba á rim aga	ba á geend aga
1 OM	ba á ha rim aga	ba á ha geend aga
2 OM	ba á bi ha rim aga	ba á bi ha geend an aga
(14) 3 OM	ba á bi ha mu rim ir aga	ba á bi ha mu geend an ir aga

High tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba á bon aga	ba á teek aga
1 OM	ba á ha bon aga	ba á ha teek aga
2 OM	ba á bi ha bon aga	ba á bi ha teek aga
3 OM	ba á bi ha mu bon er aga	ba á bi ha mu teek er aga

FAR PAST (FOCUSED) -ÁRA-

Low tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba ára rim aga	ba ára géend aga
1 OM	ba ára ha rimaga	ba ára ha géend aga
2 OM	ba ára bi há rim aga	ba ára bi há géend an aga
(15) 3 OM	ba ára bi há mu rim ir aga	ba ára bi há mu geend an ir aga

High tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba árá bón aga	ba árá téek aga
1 OM	ba árá ha bón aga	ba árá ha téek aga
2 OM	ba árá bi há bon aga	ba árá bi há teek aga
3 OM	ba árá bi há mu bon er aga	ba árá bi há mu teek er aga

5.2 Far past negative

This form is necessarily non-focused, and (we believe) this is why there is no High tone either on the radical (in the case of High toned verbs).

FAR PAST (NON-FOCUSED) -Á-

	SHORT VOWEL	LONG VOWEL
No OM	nti ba á rim aga	nti ba á geend aga
1 OM	nti ba á ha rim aga	nti ba á ha geend aga
2 OM	nti ba á bi ha rim aga	nti ba á bi ha geend an aga
(16) 3 OM	nti ba á bi ha mu rim ir aga	nti ba á bi ha mu geend an ir aga

High tone radical

	SHORT VOWEL	LONG VOWEL
No OM	nti ba á rim aga	nti ba á geend aga
1 OM	nti ba á ha bon aga	nti ba á ha teek aga
2 OM	nti ba á bi ha bon aga	nti ba á bi ha teek aga
3 OM	nti ba á bi ha mu bon er aga	nti ba á bi ha mu teek er aga

The negative Far Past does not have a focused form.

BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN

	NTI	TM	H_{root}	H_{post}
(17) infinitive			B	
present tense affirmative (focus)			B	
present tense negative	H		∅	H
inceptive negative	H	H (ráa)	B	
future affirmative			∅	
future negative (non-focus)	H	H (záa)	B	
far past affirmative (focus)		H (ára)	H	
far past negative		H (á)	∅	

6 Recent Past

6.1 Recent past affirmative

The only difference with the Far Past here is that the TM is on a low tone.

RECENT PAST (NON-FOCUSED) -A-

Low tone radical

	SHORT VOWEL	LONG VOWEL
(18) No OM	ba a rim aga	ba a geend aga
1 OM	ba a ha rim aga	ba a ha geend aga
2 OM	ba a bi ha rim aga	ba a bi ha geend an aga
3 OM	ba a bi ha mu rim ir aga	ba a bi ha mu geend an ir aga

High tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba a bon aga	ba a teek aga
1 OM	ba a ha bon aga	ba a ha teek aga
2 OM	ba a bi ha bon aga	ba a bi ha teek aga
3 OM	ba a bi ha mu bon er aga	ba a bi ha mu teek er aga

In the following forms, we note a sequence of three adjacent moras in each case, but on the surface this is not distinct from other two-mora vowels.

RECENT PAST (FOCUSED) -AA-

Low tone radical

	SHORT VOWEL	LONG VOWEL
(19) No OM	ba aa rim aga	ba aa geend aga
1 OM	ba aa ha rim aga	ba aa ha geend aga
2 OM	ba aa bi ha rim aga	ba aa bi ha geend an aga
3 OM	ba aa bi ha mu rim ir aga	ba aa bi ha mu geend an ir aga

High tone radical

	SHORT VOWEL	LONG VOWEL
No OM	ba aa bón aga	ba aa téek aga
1 OM	ba aa ha bón aga	ba aa ha téek aga
2 OM	ba aa bi há bon aga	ba aa bi há teek aga
3 OM	ba aa bi há mu bon er aga	ba aa bi há mu teek er aga

6.2 Recent past negative

RECENT PAST (NON-FOCUSED) -A-				
<i>Low tone radical</i>				
	SHORT VOWEL	LONG VOWEL		
(20)	No OM	nti ba a rim aga	nti ba a geend aga	
	1 OM	nti ba a ha rim aga	nti ba a ha geend aga	
	2 OM	nti ba a bi ha rim aga	nti ba a bi ha geend an aga	
	3 OM	nti ba a bi ha mu rim iraga	nti ba a bi ha mu geend an ir aga	
<i>High tone radical</i>				
	SHORT VOWEL	LONG VOWEL		
(21)	No OM	nti ba a bon aga	nti ba a teek aga	
	1 OM	nti ba a ha bon aga	nti ba a ha teek aga	
	2 OM	nti ba a bi ha bon aga	nti ba a biha teek aga	
	3 OM	nti ba a bi ha mu bon eraga	nti ba a bi ha mu teek er aga	
BASIC TONE ASSIGNMENT FOR EACH MORPHOLOGICAL PATTERN				
	NTI	TM	H_{root}	H_{post}
(22)			B	
			B	
	H		∅	H
	H	H (ráa)	B	
			∅	
	H	H (záa)	B	
		H (ára)	H	
		H (á)	∅	
		H (áa)	B	
			∅	

7 Subjunctive

In the affirmative subjunctive, we see the interaction between two generalizations: first, the special placement of a High on the second of two (or more) OMs, and second, the placement of the suffixal tone on an even-numbered mora, counting from the beginning of the word (as long as there are at least 4 moras to the word).

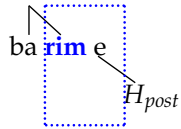
In the negative subjunctive, we see a situation in which the SM (subject marker) is associated with a High tone, which we analyze functionally as part of the negative **nti**- prefix.

SUBJUNCTIVE AFFIRMATIVE		
<i>Kinyarwanda</i>		
	SHORT VOWEL	LONG VOWEL
(23)	No OM	ba rim é
	1 OM	ba ha rim é
	2 OM	ba bi há rim e
	3 OM	ba bi há mu rim ir e
<i>Kirundi</i>		
	SHORT VOWEL	LONG VOWEL
	No OM	ba rim é
	1 OM	ba ha rim é
	2 OM	ba bi há rim e

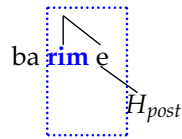
SUBJUNCTIVE NEGATIVE		
<i>Kinyarwanda</i>		
	SHORT VOWEL	LONG VOWEL
No OM	nti bá rim e	nti bá geend e
1 OM	nti bá ha rim e	nti bá ha geend e
2 OM	nti bá bi ha rim e	nti bá bi ha geendane
(24) 3 OM	nti bá bi ha mu rim ir e	nti bá bi ha mu geend an ir e

<i>Kirundi</i>		
	SHORT VOWEL	LONG VOWEL
No OM	nti bá rim e	nti bá geend e
1 OM	nti bá ha rim e	nti bá ha geend e
2 OM	nti bá bi ha rim e	nti bá bi ha geend an e

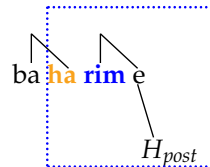
Predicted but wrong:



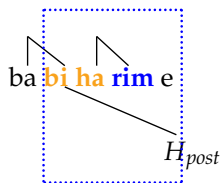
Correct:



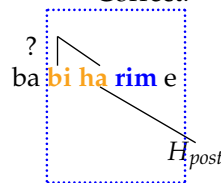
Predicted and correct:



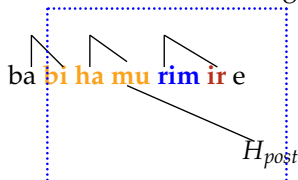
Predicted but wrong:



Correct:



Predicted but wrong:



Correct:

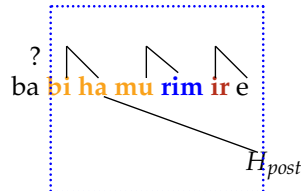


Figure 7: Rhythmic structure in affirmative subjunctive

8 Conclusions

We have only begun to deal with the complexities of tone assignment to the Kinyarwanda verb in this paper, but we hope that the material that we have presented is at the very least suggestive of how rhythmic structure may interact with tone association in Kinyarwanda, and by implication in Kirundi and perhaps in some other Lacustrine Bantu languages.