

TONE IN THE MAKONDE DIALECTS: CHIMAHUTA*

David Odden
The Ohio State University

This paper expands the descriptive study of tone in the Makonde dialects, started in Odden [1990], by studying the Chimahuta dialect. Like the Chimaraba dialect and a number of closely related Bantu languages of Southern Tanzania, Chimahuta verbs lack lexical tone properties, and all tones appearing on the surface in verbs arise as a consequence of rules of tone insertion, docking, spreading, and deletion.

1. Introduction

The first paper in this series [Odden 1990] presents an account of tone in the Chimaraba dialect of Makonde. The present paper continues the analysis of Makonde by sketching the tonal grammar of the Chimahuta dialect. We will discover that the Chimahuta dialect uses the same fundamental tonal rules and representations as the Chimaraba dialect, with some interesting areas of divergence. There are various lexical, segmental and morphological differences between the dialects, and not surprisingly, tonal differences. §2 lays out the tonology of the verb, and §3 discusses sentence-level tonology in this dialect.

We begin with a summary of the earlier analysis of Chimaraba given in Odden [1990], focusing on the features in common between the dialects, which will form the foundation for the present analysis of Chimahuta. First, it was shown that the final syllable of every word is extraprosodic, and with the exception of a single tense, rules never assign tone to, or even see, the final syllable at the word-level. Stress and noncontrastive (but linguistically significant) vowel length are

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automatically assigned to the penultimate syllable of all words. The following rule assigns a second mora to stressed syllables.

(1) **Stress Lengthening**

$$\begin{array}{c} [+stress] \\ \sigma \\ | \\ | \\ \emptyset \rightarrow \mu \end{array}$$

Only the stress of the last word in an utterance is phonetically realized in connected speech, so we assume that medial stresses are either severely reduced or eliminated altogether.

Verbs have no lexical tone contrasts, and any tones appearing at the surface are assigned by rule. Every verb stem is assigned a single floating H tone by a rule which occurs in both of the dialects surveyed as well as in a number of related Bantu languages (Kimatuumbi, Yao, Kikuria).

(2) **Stem H Insertion**

$$\emptyset \rightarrow H / [STEM_]$$

The stem H is then mapped to the penultimate syllable by one of three rules. Two of these rules, Stem Mapping and Future Negative Mapping, are morphologically conditioned and only apply in specified tenses. These two rules apply prior to the addition of the second mora to the stressed penult, so that the H mapped to the penultimate syllable by these rules will surface as a falling tone. An example in Chimaraba is *vakateleéka* 'if they cook'. The third tone docking rule, Default Docking, assigns any remaining free H's to the penultimate, but that rule applies after stress-induced lengthening, hence we find a rising tone on the surface, viz. *tunateleéka* 'we will cook'.

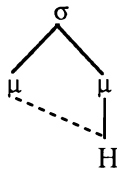
A second H tone, which originates from within the verbal prefixes, may appear at the left edge of the verb stem. Certain prefixes, such as the far past prefix *ní*, have a H tone, which shifts under the right conditions to the left edge of the verb stem by the rule Shift to Stem. By this shift, *nní* [*chiteleéka* becomes *nnichíteleéka* 'I cooked it'. The shifted stem-initial H tone may then undergo Tone Doubling, so intermediate *nniváfukuziíla* (from *nní vafukuziíla* by Shift to Stem) surfaces as *nniváfúkuziíla* 'I chased them'. Whenever two adjacent syllables bear H tones, the second loses its H tone by Meeussen's Rule, so underlying *análiíma* becomes *análiima* 'he will cultivate'. Finally, subject to morphological restrictions, a H spreads maximally rightward by the rule Rightward

Spreading, providing there is a following H, whereby underlying *kutélekelaána* becomes *kutélékéláána* ‘to cook for each other’.

At the sentence level, we find that certain verb tenses assign a H tone to the leftmost syllable of the following noun, providing there is a H tone after the verb. This H then spreads by Rightward Shift, so *niyumite ´ chikalaángo* becomes *niyumite chíkálaángo* ‘I bought a vegetable pot’. Certain nominal constructions (possessives and WH-modifiers) cause deletion of H tones in nouns, and others add H tones to toneless nouns: all of these tone insertion and deletion rules interact transparently with the rule assigning H to nouns after verbs. Nouns which become toneless due to their nominal construction reject the verbal H tone, just as lexically H toned nouns do. Similarly, nouns which are lexically toneless but which get a H due to their construction act just like nouns with an underlying H tone, taking a H from the verb.

Much of this analysis given to the Chimaraba dialect also holds for the Chimahuta dialect, but there are significant differences between the dialects. The first surface difference between the dialects is that the Chimahuta dialect has no contrast between rising tone and level H. Phonetically, the only opposition is between fall and H. This is due to a late rule, (3), spreading H leftward within the syllable.

(3) Leftward Spreading



In the course of the analysis, we will find ample motivation for assuming that a level penultimate tone derives from a more abstract rise.

2. Verb Tense

2.1. Stem tone assignment. The first tenses we will consider are those motivating Default Docking (6). If we look at examples of the future tense with 1 and 2 person subjects, we find that the patterns are identical in the two dialects, with the exception that where Chimaraba has a rising tone, Chimahuta has a phonetic level H.

(4) Chimahuta

nnaa [lɪya

‘I will eat’

<i>nna</i> [<i>shóóna</i>	‘I will sew’
<i>una</i> [<i>telééka</i>	‘you will cook’
<i>nna</i> [<i>pindikúúla</i>	‘I will change’
<i>tuna</i> [<i>kalangiláána</i>	‘we will fry for e.o.’
<i>tuna</i> [<i>va + lóóla</i>	‘we will watch them’
<i>nna</i> [<i>ku + limííla</i>	‘I will dig for you’
<i>tuna</i> [<i>ku + telekééla</i>	‘we will cook for you’

Chimaraba

<i>nnaa</i> [<i>lya</i>	‘I will eat’
<i>nna</i> [<i>shoóna</i>	‘I will sew’
<i>una</i> [<i>teleéka</i>	‘you will cook’
<i>una</i> [<i>chi + teleéka</i>	‘we will cook it’

Another context where Default Docking applies in Chimahuta is in the formation of instrument nominalizations.

(5) <i>chisuguliílo</i>	‘thing for washing clothes with’
<i>chitelekeélo</i>	‘thing for cooking with’
<i>chicheketeélo</i>	‘thing for cutting with’

A different tone pattern is found for the instrument nominalization in Chimaraba: there is a single H stretching from the stem-initial syllable to the penult, terminating in a falling tone, as in *chitélékéelo*. There are two differences between the dialects in the tone pattern of this nominalization. In Chimahuta, there is only one H tone, but in Chimaraba, there is also a floating pre-stem H. Additionally, the instrument nominalization is one of the categories triggering Stem Mapping in Chimaraba (hence the falling tone), whereas in Chimahuta the instrument nominalization is not a category triggering Stem Mapping. However, the Default Docking rule applies to any H not docked by an earlier rule. The form of Default Docking is thus identical in the two dialects, even though the class of forms to which the rule applies may differ between the dialects.

As noted earlier, Default Docking applies after Stress Lengthening, so that we do not derive a falling tone. The surface level H tone of *nnashóóna* (rather than a rising tone) is the result of Leftward Spreading (3).

(6) Default Docking

H´
|
|
μ]

The underlying form is *nnashoona*, with no tones. A stem H is inserted by Stem H Insertion (2), and the final syllable is rendered extratonal. The syllable *sho* is lengthened, since it is stressed, yielding intermediate *nnashoo(na)´*. This form then undergoes Default Docking, followed by Leftward Spreading (3), resulting in the surface form *nnashóóná*.

In the (positive) conditional seen in (7), there is a single falling tone on the penultimate syllable. Again, this is the same pattern as was encountered in Chimaraba, and it arises by application of Stem Mapping (9).

(7) Chimahuta

<i>káma vakáa</i> [<i>lya</i>	‘if he eats’
<i>káma aka</i> [<i>shóona</i>	‘if he sews’
<i>káma aka</i> [<i>la + líima</i>	‘if he cultivates them’
<i>káma vaka</i> [<i>panyáana</i>	‘if they beat e.o.’
<i>káma vaka</i> [<i>ngu + limíila</i>	‘if they cultivate for me’
<i>káma tuka</i> [<i>telekeláana</i>	‘if we cook for e.o.’

Chimaraba

<i>nikáa</i> [<i>lya</i>	‘if I eat’
<i>aka</i> [<i>líima</i>	‘if he cultivates’
<i>nika</i> [<i>va + limíila</i>	‘if I cultivate for them’

The remote past perfective relative clause verb tense also undergoes this mapping rule.

(8) <i>inyáma inna</i> [<i>líile</i>	‘the meat which I ate’
<i>wélu unna</i> [<i>kw + ing’íile</i>	‘the field which I gave you’
<i>wélu unna</i> [<i>va + limidiile</i>	‘the field which I cultivated for them’
<i>inyáma ituna</i> [<i>telekéene</i>	‘the meat which we cooked’

A number of other tenses undergo Stem Mapping, but also select a secondary stem-initial H tone which obscures the tone pattern. These tenses will be discussed below. We will account for the falling tone pattern with the following rule:

- (9) **Stem Mapping** (applies in: conditional
subordinate tenses
subjunctive+OP)
- H´
|
|
μ]

Stem Mapping applies to *káma vakapanya(na)´* to give *káma vakapanyána*, which later undergoes Stress Lengthening, creating the contrast between fall and level H on the penultimate syllable. Chimahuta has no analog to the future negative tense of Chimaraba, so the Future Negative Mapping rule required for Chimaraba will not be required in this dialect.

2.2. Doubling, Meeussen's Rule, and Shift to Stem. We now return to the future tense, selecting a 3 person subject prefix. This is a tense where Default Docking applies to the stem H, giving a level H tone. The subject prefix also has a H tone, which shifts by an early rule to the tense prefix *na*, and then shifts to the stem initial syllable in the correct circumstances.¹ The parallelism between dialects is maintained when we look at the relatively long verb roots in (10), which have no object prefix. There is a H on the root initial syllable, which doubles to the following syllable, and there is a level H on the penultimate assigned by Default Docking.

(10) **Chimahuta**

- | | |
|---|----------------------------------|
| <i>ana</i> [<i>píndíkulapindikúúla</i> | ‘he will turn repeatedly’ |
| <i>vana</i> [<i>súkúmiláána</i> | ‘they will push for each other’ |
| (Chimaraba: <i>vana</i> [<i>télékelaána</i> | ‘they will cook for each other’) |

The form *vanasúkúmiláána* derives from *vanasúkumiláána* (ultimately from *vánasukumiláána*). We rarely encounter a single H tone not followed by another H, except in the last two syllables of the word where the final syllable is extraprosodic, so we need a Doubling rule in Chimahuta, as we did in Chimaraba. We also notice in (11) that when there is an object prefix on the verb, the object prefix (which is in stem initial position) has the first H as expected, but there is no tone doubling between the object prefix and the root.

¹Details of Shift to Stem will be considered in this section. We will see that the dialects do differ in this rule.

(11) **Chimahuta**

<i>ana</i> [<i>tú + valangíila</i>	‘he will count for us’
<i>vana</i> [<i>ngú + telekééla</i>	‘they will cook for me’
(Chimaraba: <i>vana</i> [<i>ní + kálangíila</i>	‘they will fry for me’)

In Chimahuta, we must constrain Doubling so that it does not apply between the object prefix and the root syllable. This can be accomplished by restricting the leftmost syllable in the relevant syllable pair morphologically. The determinant cannot be [+OP] (see (16)).

We found that in Chimaraba, Doubling is blocked if the syllable which follows the potential recipient happens to have a H. Hence, Doubling cannot create adjacent H toned syllables. This constraint is lacking in Chimahuta, so Doubling does apply to the four-syllable roots of (12), bringing together the root initial H and the penultimate H. Meeussen's Rule deletes the second of two syllabically adjacent H tones (whether or not the moras which bear the H's are adjacent), so the penultimate H is deleted.

(12) <i>vana</i> [<i>píndíkuula</i>	‘they will change’
<i>vana</i> [<i>límilaana</i>	‘they will cultivate for each other’
<i>vana</i> [<i>píndikuúla</i>	output of initial mapping rules
<i>vana</i> [<i>píndíkuúla</i>	Doubling
<i>vana</i> [<i>píndíkuula</i>	Meeussen's Rule

These forms contrast with the Chimaraba form *vana* [*límilaána*, where Doubling was blocked by the presence of a following H.

There being no further complications to consider in the form of Meeussen's Rule, we will state that rule formally at this point.

(13) **Meeussen's Rule**

H → Ø/H__

However, more must be said about Doubling.

Since Doubling can bring H's together to make Meeussen's Rule applicable, Doubling obviously precedes Meeussen's Rule. This raises a question about how we get the right tone in trisyllabic stems, that is, no penultimate H at all.

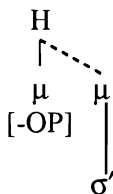
- (14) *ana* [*téleeka* 'he will cook'
vana [*tú + oona* 'they will see us'
ana [*shóneela* 'he will sew for'

Consider the incorrect derivation for *anatéleeka* in (15), where we apply the rules in the correct order and derive a penultimate falling tone (**anatéléeka*).

- (15) H H
 | |
 anateleeka **Shift to Stem**
- H H
 ↘ |
 anateleeka **Doubling**
- H
 ↘
 anateleeka* **Meeussen's Rule

In this derivation, Doubling spreads the first H to the leftmost mora of the penult, and Meeussen's Rule then deletes the following H (within the syllable). This would derive a falling tone on the penultimate syllable, whereas we actually have no H on the penultimate syllable. The solution to this problem is to impose the correct constraint on Doubling: in Chimahuta, Doubling is constrained by H tones—H cannot spread to a syllable that already has H. The final version of Doubling for this dialect is (16).²

- (16) Tone Doubling



²As noted in Odden [1990], the expression σ' is a formal anomaly. On the assumption that tones link to the mora, all syllables are literally "toneless", that is, not linked to a tone. This expression must therefore be taken to mean "a syllable which does not dominate any mora which is linked to a tone".

The requirement that the focal mora must be in a toneless syllable also explains why Doubling does not apply strictly within the syllable, for example, in *káma akashóona* ‘if he sews’, to derive **káma akashóona*.

To find further examples of the blockage of Doubling to H toned syllables and of the application of Meussen's Rule to the output of Doubling, we consider the recent past tense in (17). The data, hence the analysis, for both dialects are the same (excluding the low-level rise versus level H difference) in relatively long verb stems, where blockage of Doubling by H is not relevant.

(17) **Chimahuta**

<i>ání</i> [<i>tu + pilikanííla</i>	‘he listened to us’
<i>ání</i> [<i>li + sukúúma</i>	‘he pushed it’
<i>túní</i> [<i>va + hééka</i>	‘we laughed at them’
<i>túní</i> [<i>telééka</i>	‘we cooked’
<i>túní</i> [<i>pindikúúla</i>	‘we changed’
(Chimaraba: <i>vání</i> [<i>ni + telekeéla</i>	‘they cooked for me’)

The dialects diverge in the treatment of disyllabic stems. In the Chimaraba dialect, Doubling was blocked by the penultimate H. In Chimahuta, there is no such blockage, so Doubling does apply and results in a structure which undergoes Meeussen's Rule.

(18) **Chimahuta**

<i>ání</i> [<i>chii + lya</i>	‘he ate it’
<i>túní</i> [<i>liima</i>	‘we cultivated’
<i>ánii</i> [<i>lya</i>	‘he ate’

Chimaraba

<i>ánichíílya</i>	‘he ate it’
<i>túniliíma</i>	‘we cultivated’

The form *ániílya* illustrates the fact that Doubling does not apply *to*, i.e. strictly within, a H toned syllable, though it applies *before* a H toned syllable. This form also undergoes Meeussen's Rule.

(19) H H
| |*a nii lya***Output of docking rules**

NA

Doubling

H

|

a nii Iya

Meeussen's Rule

Chimahuta possesses a past progressive tense not found in Chimaraba, constructed with the prefix *na-*, which has the same tone pattern as the recent past tense. The subject prefix has a H tone which doubles to the following syllable, providing that it is toneless (hence Doubling is blocked in *vánaaIya*, which derives from *vánaáIya* by Meeussen's Rule). The penultimate syllable has a level H deriving from Default Docking, and that H will be deleted by Meeussen's Rule if it is preceded by a H, as in *ánáheeka*.

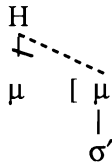
- | | |
|--------------------------------------|----------------------------------|
| (20) <i>vánaa</i> [<i>Iya</i> | 'they were eating' |
| <i>ńná</i> [<i>laa + Iya</i> | 'I was eating them' |
| <i>áná</i> [<i>heeka</i> | 'he was laughing' |
| <i>túná</i> [<i>i + chekééta</i> | 'we were cutting it' |
| <i>vána</i> [<i>telekeláána</i> | 'we were cooking for each other' |
| <i>vána</i> [<i>ngu + telekééla</i> | 'they were cooking for me' |

We discovered in the study of Chimaraba that the stem-initial H tone of the future and the remote past arrives in its stem-initial position by shifting from the prefixes *ni-* and *na-*. The Shift to Stem rule in Chimahuta is slightly different. The examples in (21) show that the H on the pre-stem prefix shifts to the stem initial vowel only if the stem-initial syllable is underlyingly toneless.

- | | |
|---------------------------------|----------------------|
| (21) <i>anáa</i> [<i>Iya</i> | 'he will eat' |
| <i>aná</i> [<i>shoona</i> | 'he will sew' |
| <i>aná</i> [<i>chii + Iya</i> | 'he will eat it' |
| <i>ana</i> [<i>tú + Ioola</i> | 'he will see us' |
| <i>ana</i> [<i>téleeka</i> | 'he will cook' |
| <i>anii</i> [<i>Iya</i> | 'he ate' |
| <i>vaná</i> [<i>liima</i> | 'they cultivated' |
| <i>nní</i> [<i>vii + Iya</i> | 'I ate them' |
| <i>tuni</i> [<i>vá + heeka</i> | 'we laughed at them' |
| <i>ani</i> [<i>téleeka</i> | 'he cooked' |

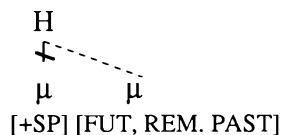
These examples are similar to what we encounter in Chimaraba, except when it comes to monosyllabic verbs with an object prefix. Where Chimahuta has *anáchiilya*, Chimaraba has *anachiilya*. The difference is quite simply that in the present dialect, the syllable which takes the shifted H tone must be toneless, regardless of whether that syllable is in an object prefix or a root. In Chimaraba, a H toned object prefix syllable could take the shifted H, where a H toned root syllable could not. The tone conditions in Chimahuta are thus uniform for both morphological conditions.

(22) **Shift to Stem**



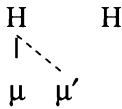
Finally, we account for the H tone which stands on the tense-aspect prefix in the future with 3 person subject by shifting that H from the subject prefix syllable to the tense prefix by the following rule. We will also apply this rule in the remote past (*aníchiilya*), where subject prefixes are uniformly H-toned. The sole difference between the remote past and the recent past (*áníchiilya*) is the application of Shift to Prefix in the remote past.

(23) **Shift to Prefix**



The form *anitéleeka* derives from *ániteleéka* as follows. First, Shift to Prefix gives *anitéleéka*. This undergoes Shift to Stem, resulting in *anitéleéka*. Doubling is blocked (since *leé* has a H tone), so Meeussen's Rule applies, giving the surface form.

2.3. Rightward Spreading and Meeussen's Rule. Rightward Spreading is the rule whereby a H at the left edge of a verb spreads maximally rightward to the penultimate H (which was assigned by Default Docking or Stem Mapping).

(24) **Rightward Spreading**

This rule will apply, *inter alia*, in the infinitive if there is no object prefix. An interesting difference between the dialects is that in Chimahuta, Meeussen's Rule applies to the output of Rightward Spreading (Meeussen's Rule is fed by Rightward Spreading), whereas in Chimaraba, Rightward Spreading counterfeeds Meeussen's Rule. We will consider one of the examples of this interaction here. The infinitive undergoes the rule Default Docking, and when an object prefix is present, Rightward Spreading is morphologically blocked, so the penultimate syllable has a level H tone, as seen in (25). If the object prefix immediately precedes the penult, Meeussen's Rule deletes the penultimate H.

- (25) *ku* [*lá + liima* 'to cultivate them'
 ku [*tú + limííla* 'to cultivate for us'
 ku [*tú + telekééla* 'to cook for us'

But looking at the plain infinitive, we find that Rightward Spreading applies within the stem, and the level penultimate H changes to a falling tone.

- (26) *ku* [*chíima* 'to close'
 ku [*púmúula* 'to breathe'
 ku [*télékéela* 'to cook for'

As the derivation in (27) shows, applying Meeussen's Rule after Rightward Spreading accounts for this change in the penultimate tone.

- (27) H H
 | |
 ku te le kee la output of Default Docking
- H H
 / |
 ku te le kee la Rightward Spreading

**Meeussen's Rule**

The alternation between penultimate level H when there is no Rightward Spreading and penultimate falling tone when there is spreading, can be seen in another tense. In the past progressive “when”-tense, a H tone is optionally assigned to the root initial syllable. When that H is assigned, Rightward Spreading applies, inducing a change in the tone of the penultimate syllable.

(28) a. **No initial H**

<i>paváchíí</i> [<i>lyá</i>	‘when they were eating’
<i>paníchi</i> [<i>súúma</i>	‘when I was buying’
<i>patúchi</i> [<i>telééka</i>	‘when we were cooking’
<i>patúchi</i> [<i>telekeláána</i>	‘when we were cooking for each other’

b. **Optional root initial H**

<i>paníchi</i> [<i>súuma</i>	‘when I was buying’
<i>paváchi</i> [<i>ímbiláana</i>	‘when they were singing for each other’
<i>paváchi</i> [<i>káláanga</i>	‘when they were frying’
<i>páchi</i> [<i>ngu + télékéela</i>	‘when he was cooking for me’
<i>paváchi</i> [<i>píndikúlíláana</i>	‘when they were changing for each other’

The second type of context where Meeussen's Rule applies to the output of Rightward Spreading is when the penult has an underlying falling tone, such as one finds in the conditional. This ultimately will bring us to a further interesting tonal feature of this dialect. The negative conditional is formed by adding a H to the prefix *-ka-* of the affirmative conditional, and spreading that H to the penult. As the data in (29) show, the penultimate syllable has no H. Segmentally, the positive and negative conditional forms are identical.³

(29) <i>káma aká</i> [<i>shoona</i>	‘if he doesn't sew’
<i>káma aká</i> [<i>lá + liima</i>	‘if he doesn't cultivate them’
<i>káma vaká</i> [<i>pányana</i>	‘if they don't beat each other’

³The positive and negative conditional of *lyá* are identical—*káma akáalya* ‘if he eats; if he doesn't eat’. In both forms, the stem H is assigned to the prefix *ka-*, and addition of a second H in the negative has no surface effect.

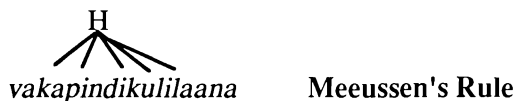
<i>káma vaká</i> [<i>ngú + límiila</i>	‘if they don't cultivate for me’
<i>káma vaká</i> [<i>píndíkúlílaana</i>	‘if they don't change for each other’

This pattern of a prefixal H spreading to the penultimate syllable with an underlying falling tone is encountered in a number of tenses, set out in (30), primarily the negative tenses and the relative clause tenses which in other Bantu languages have complex stem tone patterns.

(30) <i>aká</i> [<i>liima</i>	‘he won't plow’
<i>vaká</i> [<i>tú + heeka</i>	‘he won't laugh at us’
<i>niká</i> [<i>téleeka</i>	‘I won't cook’
<i>tuká</i> [<i>chí + píndíkuula</i>	‘we won't change it’
<i>tuká</i> [<i>píndíkúlílaana</i>	‘we won't change for e.o.’
<i>aká</i> [<i>ngú + télékétélékeela</i>	‘he won't freq. cook for me’
<i>ungúu</i> [<i>lya</i>	‘thing (Cl.14) that I am buying’
<i>chingú</i> [<i>sooma</i>	‘thing (Cl.7) that I am reading’
<i>itú</i> [<i>télékélaana</i>	‘thing (Cl.9) that we cook for e.o.’
<i>díní</i> [<i>kw + iing'a</i>	‘thing (Cl.5) that I give you’
<i>vaní</i> [<i>vá + loola</i>	‘people who I see’
<i>iní</i> [<i>kú + télékeela</i>	‘thing (Cl.9) that I cook for you’
<i>ingú</i> [<i>liile</i>	‘thing (Cl.9) that I ate’
<i>chingú</i> [<i>sómiile</i>	‘thing (Cl.7) that I read’
<i>ingú</i> [<i>súmísiije</i>	‘thing (Cl.4) that I sold’
<i>itú</i> [<i>télékéleene</i>	‘thing (Cl.4) that we cooked for e.o.’
<i>uní</i> [<i>vá + límídiile</i>	‘thing (Cl.3) that I cultivated for them’

The surface pattern found in this class of verb tenses is a H tone beginning with some relatively leftward position before the stem, extending to the antepenultimate syllable. This derives from assigning the stem H to the penult by Stem Mapping (which normally results in a falling tone) and spreading the leftmost H up to the penult by Rightward Spreading. Meeussen's Rule then applies to the output of Rightward Spreading, as the derivation in (31) shows.

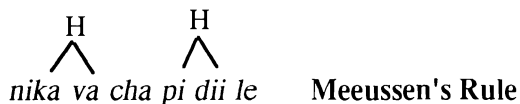
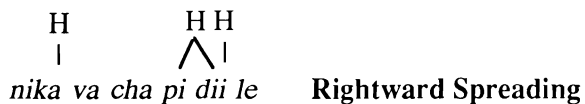
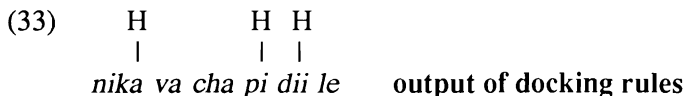
(31)	H	H	
	<i>vakapindikulilaana</i>		initial tone assignment



The last context within verb tenses to consider with respect to Meeussen's Rule is the negative perfective. Here we find, limiting ourselves to longer verbs, that the penultimate syllable has a falling tone. The antepenultimate syllable, but not preceding syllables, has a H. Finally, the prefix *ka* has a H tone, which doubles to the stem-initial syllable.

- (32) *niká* [*vá* + *chapídĩile* 'I didn't cook for them'
niká [*vá* + *telekédĩile* 'I didn't cook for them'
tuká [*pĩndikuliléene* 'we didn't change for each other'
niká [*vá*+ *pĩndikulídĩile* 'I didn't change for them'

This can be explained by postulating a H tone mapped to the penult by Default Docking, and a second H mapped to the antepenultimate. Rightward Spreading then applies, and Meeussen's Rule subsequently deletes the H from the second mora of the penult.



What confirms this analysis is the behavior of shorter verb stems. If the stem contains fewer than five syllables, we find a different pattern. The relevant data are given in (34).

- (34) *niká* [*liile*] 'I didn't eat'
niká [*ukííle*] 'I didn't leave'
niká [*chi + lííle*] 'I didn't eat it'
niká [*lá + telééke*] 'I didn't cook them'

The tone of the penultimate syllable changes from falling to level H or no tone, and the stem-initial syllable appears to resist Doubling, all under what would seem to be rather mysterious circumstances. In fact, these forms follow automatically from the analysis already specified.

Consider first the form *nikálatelééke* in (35), with a penultimate level H and no antepenultimate H. After the initial mapping rules, a H appears on the prefix *ka* (lexically), on *te* (the antepenult) and on *lee* (Default Docking). Doubling then applies to the stem initial syllable (Doubling in this dialect is not subject to the constraint that the following syllable must be toneless), but the rule does not apply to the penultimate syllable, since the syllable receiving the H tone must itself be toneless. Then Meeussen's Rule applies to the second stem syllable from the left, deleting the H of *te*. Since Meeussen's Rule iterates from left to right, the rule bleeds itself, preventing the penultimate syllable from undergoing the rule at the hands of the antepenultimate H.

- (35)
- | | |
|---|-------------------------|
| $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{nika la te lee ke} \end{array}$ | output of mapping rules |
| $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \wedge \quad \quad \\ \text{nika la te lee ke} \end{array}$ | Doubling |
| $\begin{array}{c} \text{H} \quad \quad \text{H} \\ \wedge \quad \quad \\ \text{nika la te lee ke} \end{array}$ | Meeussen's Rule |
| $\begin{array}{c} \text{H} \quad \quad \text{H} \\ \wedge \quad \quad \wedge \\ \text{nika la te le e ke} \end{array}$ | Leftward Spread |

The form *nikáúkííle* involves assigning H tones to each of the syllables *ka*, *u*, and *kii*—the mapping rules give us intermediate *nikáúkííle*. Doubling cannot apply, and Meeussen's Rule deletes the middle H tone in the sequence, giving *nikáúkííle*. Leftward Spread applies to the penultimate syllable, giving the surface level H. Finally, in the form *nikáliile*, there is no stem antepenultimate syllable, so the antepenultimate H cannot dock and is simply lost (by Stray Erasure). The penult receives its H by Default Docking, giving *nikáliile*, but that H is deleted by Meeussen's Rule, since the preceding syllable is H toned.

2.4. Other stem tone patterns. In the preceding section, it was noted that the infinitive is a context where Rightward Spreading applies (except if an object prefix is present). We have thus given an account of why there is a H tone sequence in the stem, but we still need to have an account of how the first H tone gets to the stem. We assume that the infinitive prefix itself has the H tone, and that a rule shifts that H to the stem in the right circumstance. Relevant examples are given below.

- | | |
|-------------------------------|---------------------|
| (36) <i>kúu</i> [<i>lya</i> | 'to eat' |
| <i>kú</i> [<i>chii + lya</i> | 'to eat it' |
| <i>ku</i> [<i>líima</i> | 'to cultivate' |
| <i>ku</i> [<i>lá + líima</i> | 'to cultivate them' |

The contrast to note in particular is between *kú* [*chii + lya* with an object prefix and *kulíima* with no object prefix.⁴ The pattern of shifting to stem is simply that H shifts off of the prefix to any toneless syllable, and it also shifts to a H toned root syllable, but not to a H toned object prefix syllable. Perhaps this tone shifting is to be accounted for by a separate rule. However, one might also impose the appropriate morphological and tonal constraints on the Shift to Stem rule (22). There is no evidence available which tells us whether there should be a single, more complex shifting rule, or two shifting rules.

There is a periphrastic tense meaning "X has not yet V'd", which is based on the unanalyzeable stem *-nambi* followed by what seems to be a variant of the infinitive. The infinitive form of the verb always requires the prefix *-ku-*, yet this prefix is not allowed in this tense, except in one form.

- | | |
|-------------------------------|------------------------------------|
| (37) <i>nikánambi téléeka</i> | 'I haven't yet cooked' |
| <i>vakánambi úuka</i> | 'they haven't yet left' |
| <i>vakánambi pányána</i> | 'they haven't yet beat each other' |

⁴The form *kúulya* poses no problem—the final syllable is extraprosodic, so there is nowhere for the prefixal H to shift to.

<i>akánambi ngútelekeéla</i>	‘he hasn't yet cooked for me’
<i>nikánambi váoona</i>	‘I haven't yet seen them’
* <i>nikánambi kuváoona</i>	
<i>nikánambi kúulya</i>	‘I haven't yet eaten’
* <i>nikánambi Iya</i>	
<i>nikánambi chiilya</i>	‘I haven't yet eaten it’

The tone pattern of the stem is basically that of the infinitive: H is assigned to the penult by Default Docking, and a second H appears at the beginning of the stem, which spreads rightward by Rightward Spreading, causing deletion of the penultimate H by Meeussen's Rule. The monosyllabic root *Iya* constitutes a particularly interesting case. When the monosyllabic root is not preceded by an object prefix, i.e. when the super-stem is monosyllabic, then the infinitive prefix must be retained. Secondly, and here the parallelism with the infinitive is particularly strong, when the stem is composed of an object prefix plus a monosyllabic verb (*nikánambi chiilya*), we find no H tone on the object prefix. This is to be compared with the infinitive *kúchiilya* ‘to eat it’, where, too, no H appears in the stem. The explanation given for this form in the infinitive is that the infinitive prefix has a H tone, which would usually shift to the stem initial syllable, but here shift is blocked by the underlying H tone on the object prefix syllable. Meeussen's Rule later deletes the stem H. The same explanation holds for this periphrastic tense, except that the infinitive prefix, along with the H tone which sets off Meeussen's Rule, is later deleted.

The sentence-level tone sandhi behavior of this verb form is also parallel to that of the infinitive. Utterance-medially, the stem retains its H tone only if there is no object prefix (this loss of H is peculiar to the infinitive); the object takes an initial H tone.

(38) <i>kutélékéláná máloombe</i>	‘to cook maize for each other’
<i>kuvátelekela máloombe</i>	‘to cook maize for them’
<i>nikánambi vásumisa límbeende</i>	‘I haven't yet sold him the skin’
<i>vakánambi télékéláná máloombe</i>	‘they haven't yet sold each other the maize’
<i>nikánambi váteleke ntandaasa</i>	‘I haven't yet cooked them the stiff cassava porridge’

This “not-yet” tense is not the only example of a periphrastic tense constructed from an auxiliary verb plus prefixless infinitive. The future relative tense is formed from the auxiliary verb *lembela*.⁵

- (39) *inyáma ingúlembe kúulya* ‘the meat which I will eat’
midi ingúlembe súuma ‘the ropes which I will buy’
malómbe langúlembe téléeka ‘the maize which I will cook’
malómbe langúlembe vátelekeéla ‘the maize which I will cook for them’

The tone pattern selected by subjunctive verbs is controlled by whether an object prefix or negative prefix is selected. If the subjunctive has no object or negative prefix, as in (40a), the penultimate has a level H (and, as in Chimaraba, if the stem is monosyllabic, the H is assigned to the word-final syllable). If there is an object prefix (40b) or a negative prefix (40c), an extra H is mapped to the root initial syllable. Rightward Spreading applies, giving a sequence of H's stretching from the stem-initial to antepenultimate syllables. Finally Meeussen's Rule deletes the stem H from the penultimate syllable, providing that the prefix H is docked to some vowel, rather than being deleted (as it is in *uníing'e*).

- (40) a. *uu* [*lyé* ‘you should eat’
u [*líime* ‘you should cultivate’
u [*telééke* ‘you should cook’
u [*pindikúúle* ‘you should change’
- b. *u* [*níi + ng'e* ‘you should give me’
u [*chi + súume* ‘you should buy it’
u [*chi + téleeke* ‘you should cook it’
u [*ngu + píndíkúliile* ‘you should change for me’
- c. *unáa* [*lye* ‘don't eat’
una [*liime* ‘don't cultivate’
una [*téleeke* ‘don't cook’
nna [*télékélaane* ‘don't cook for each other’

Hence, *uchitéleeke* derives via Meeussen's Rule from *uchitéléeeke*, the first H being the floating prefix H of the “complex subjunctive” and the second being the stem H, docked by Stem Docking.

⁵In utterance-medial position, the word-final syllable *la* usually deletes.

The tone of the present negative also depends on the presence or absence of an object prefix. Being a noun-focal tense, there is also no pre-pausal form of the verb. When there is no object prefix, there is a single H on the negative prefix *ka-* and no stem H. When there is an object prefix, there is a string of H's from the negative prefix up to the antepenultimate syllable.

- (41) *niká* [*lya malóombe* 'I don't eat maize'
tuká [*sumisa dinúútu* 'we don't sell fried maize'
vaká [*kalangilana dinúútu* 'they don't fry maize for each other'

tuká [*vá + ona vasúnguula* 'we don't see rabbits'
tuká [*n + yáníkila dihóomba* 'we don't dry fish for him'
vaká [*tú + télékela ntandaasa* 'they don't cook stiff cassava porridge for us'

The variant with an object prefix involves assigning the stem H tone to the penult by Stem Mapping; Rightward Spreading spreads the prefix H up to the antepenultimate syllable, and Meeussen's Rule deletes the penultimate H. Explaining the variant without an object prefix is more difficult: we have to explain both why there is no stem H and why Rightward Spreading fails to apply. Since Rightward Spreading requires a following H tone as part of its conditioning environment, we will simply assume that the stem H tone is deleted by a morphologically conditioned rule.

$$(42) \quad H \rightarrow \emptyset / \left[\begin{array}{c} \text{+present neg} \\ \text{-OP} \end{array} \right]$$

Deletion of the stem H is sufficient to block Rightward Spreading.

A difference in tonal behavior between verbs having 3 person (singular or plural) versus 1 or 2 person subjects is fairly common in Bantu languages and has been found in a number of tenses in Makonde. Chimahuta also makes a more surprising distinction: the form of the perfective used with [+WH] subjects varies according to the plurality of the subject.

- (43) *nnáni á* [*liile* 'who (sg.) ate?'
nnáni a [*límiile* 'who (sg.) cultivated?'
nnáni a [*téleeke* 'who (sg.) cooked?'
nnáni a [*pílíkeene* 'who (sg.) listened?'

<i>vanáni</i> va [<i>líile</i>	‘who (pl.) ate?’
<i>vanáni</i> va [<i>limíile</i>	‘who (pl.) cultivated?’
<i>vanáni</i> va [<i>telééke</i>	‘who (pl.) cooked?’
<i>vanáni</i> va [<i>pilikéene</i>	‘who (pl.) listened?’

Despite the otherwise peculiar conditioning factor, the tone patterns themselves are clear. The simplest pattern is that selected by plural subjects: the stem H is mapped to the penultimate syllable as a falling tone by Stem Mapping. With a singular subject, we find that the stem-initial syllable has H tone, or, if that syllable already has the stem H tone (*áliile*), then the subject prefix must bear the extra H. In fact, no extra mapping rules are required for this form. We merely must assign a H tone the 3 singular subject prefix *a-* in this context, and the rule Shift to Stem will assign it to the stem-initial syllable, providing that syllable is toneless.

- (44) a. $\begin{array}{c} H \ H \\ | \ | \\ a \ lii \ le \end{array}$ **output of mapping rules**
- NA **Shift to Stem**
- $\begin{array}{c} H \\ | \\ a \ lii \ le \end{array}$ **Meeussen's Rule**
- b. $\begin{array}{c} H \quad H \\ | \quad | \\ a \ pi \ li \ kee \ ne \end{array}$ **output of mapping rules**
- $\begin{array}{c} H \quad H \\ | \quad | \\ a \ pi \ li \ kee \ ne \end{array}$ **Shift to Stem**
- $\begin{array}{c} H \quad H \\ \wedge \quad | \\ a \ pi \ li \ kee \ ne \end{array}$ **Doubling**
- $\begin{array}{c} H \\ \wedge \\ a \ pi \ li \ kee \ ne \end{array}$ **Meeussen's Rule**

There seem to be no other contexts where 3 singular and 3 plural subject prefixes are distinguished tonally.

3. Object H Tone and Nominal Tonology

The first part of this section outlines the basic alternations encountered in nouns preceded by verb forms which assign a H tone to the object. The second part takes on tonal alternations triggered by various modifiers in the noun phrase, and the final part shows how assignment of H to objects may be affected by the application of the phrase-internal sandhi rules.

3.1. Meeussen's Rule at the sentence level. As was the case in Chimaraba, verbs in certain tenses assign a H tone to the first syllable of the following noun, and that H then spreads up to the first H in the noun by Rightward Spreading.⁶ This situation holds for Chimahuta as well. However, rather than merely assigning and spreading the H, we also find a categorial change in the surface tone of the penultimate syllable, whereby a level H toned syllable changes to falling tone, and a falling toned syllable loses its H altogether. The following examples illustrate the tone changes in nouns preceded by present tense verbs with 3 person subjects, which contrast with the isolation form and the form after a 1 person subject, which contributes no H to the noun.

(45) <i>mitéégo</i>	'traps'
<i>nguteya mitéégo</i>	'I'm setting traps'
<i>ateya mítéego</i>	'he's setting traps'
<i>chibáánda</i>	'hut'
<i>ngupyayi chibáánda</i>	'I'm sweeping the hut'
<i>apyayi chíbáanda</i>	'he is sweeping the hut'
<i>ungondóólo</i>	'kondoo'
<i>ning'aka ungondóólo</i>	'I'm hunting kondoo'
<i>ang'aka úngóndóolo</i>	'he's hunting kondoo'
<i>litíili</i>	'fruit (sp)'
<i>ngulya litíili</i>	'I'm eating litili'
<i>alya lítíili</i>	'he is eating litili'
<i>unéembo</i>	'elephant'
<i>ning'aka unéembo</i>	'I'm hunting an elephant'
<i>ang'aka úneembo</i>	'he's hunting an elephant'

⁶The conditions, phonological and morphological, on the rule assigning that H, Floating H Docking, are considered in §3.3.

<i>lijamáanda</i>	‘box’
<i>ngusumisa lijamáanda</i>	‘I’m selling a box’
<i>asumisa Ijámaanda</i>	‘he’s selling a box’

We know from the preceding section that Meeussen’s Rule applies to the output of Rightward Spreading, so the tonal change observed on the penult is as expected. The derivations in (46) show how representative surface forms are generated.

- (46) a. H H
 | |
alya li tii li **output of Floating H Docking**
- NA **Rightward Spreading**
- H
 |
alya li tii li **Meeussen’s Rule**
- b. H H
 | |
ateya mi tee go **output of Floating H Docking**
- H H
 ^ |
ateya mi tee go **Rightward Spreading**
- H
 ^
ateya mi tee go **Meeussen’s Rule**

The examples in (45) show what happens to nouns which have at least one toneless syllable at the beginning of the word. In these nouns, penultimate level H changes to falling tone, and falling tone deletes entirely. When the noun is disyllabic and therefore has no syllable preceding the penult, we find a divergence in behavior between level H and fall: H changes to fall as above, but fall does not change.

- (47) a. *mááka* ‘cat’
ninumisa mááka ‘I’m selling a cat’
anumisa máaka ‘he’s selling a cat’

<i>nyááma</i>	‘meat’
<i>ngusuma nyááma</i>	‘I’m buying meat’
<i>asuma nyááma</i>	‘he’s buying meat’
b. <i>séela</i>	‘wax’
<i>ngusuma séela</i>	‘I’m buying wax’
<i>asuma séela</i>	‘he’s buying wax’
<i>ng’úuku</i>	‘chicken’
<i>ninsumisa ng’úuku</i>	‘I’m selling a chicken’
<i>ansumisa ng’úuku</i>	‘he’s selling a chicken’

As we can see from the further alternation *nivasumisa vang’úuku* ‘I’m selling chickens’ ~ *avasumisa vǎng’uuku* ‘he’s selling chickens’, the behavior of falling toned nouns is not a lexical irregularity of the stem, since when some syllable precedes the penult, their behavior is precisely as predicted, the fall being deleted.

The data in (47) can be handled with no further extensions of the analysis. In the case of level H nouns (48a), which have a rising tone at a more abstract level, the floating H contributed by the verb is assigned to the first mora of the noun’s penultimate syllable. The H of the second mora then deletes by Meeussen’s Rule. In the case of falling toned nouns (48b), the floating H docks with the first mora of the penult, but that mora already has a H tone. Therefore, the Twin Sister Convention deletes one of the two adjacent identical tones, effectively yielding no change.

(48) a.	H H	
	<i>asuma nyaa ma</i>	underlying
	HH	
	<i>asuma nyaa ma</i>	Floating H Docking
	H	
	<i>asuma nyaa ma</i>	Meeussen’s Rule
b.	H H	
	<i>asuma see la</i>	underlying
	H H	
	∨	
	<i>asuma see la</i>	Floating H Docking

H
|
asuma see la **Twin Sister Convention**

There are two important constraints to be imposed on the sentence level application of Meeussen's Rule. The first is that the rule will not apply to a stem H tone which is not exclusively linked to the penultimate syllable. Consider the following alternations.

- | | |
|---------------------------|--------------------------|
| (49) <i>dimálápéende</i> | 'cockroaches' |
| <i>aona dímalápéende</i> | 'he sees cockroaches' |
| <i>ding'ávaanga</i> | 'dogs' |
| <i>asuma díng'ávaanga</i> | 'he's buying dogs' |
| <i>disúnguula</i> | 'rabbits' |
| <i>asuma dísunguula</i> | 'he's buying rabbits' |
| <i>litíkiiti</i> | 'watermelon' |
| <i>alya lítikiiti</i> | 'he's eating watermelon' |

As we saw in §2.3, the negative perfective assigns a H tone to the antepenultimate syllable, and that H may be deleted by Meeussen's Rule. It is therefore impossible to constrain Meeussen's Rule across the board to the penultimate syllable. Such a constraint must be imposed on the sentence level application of the rule.

The second constraint is that Meeussen's Rule does not apply to disyllabic verb infinitive stems.

- | | |
|------------------------|-------------------------------|
| (50) <i>kushóna</i> | 'to sew' |
| <i>alinga kúshóna</i> | 'he's trying to sew' |
| <i>kulíima</i> | 'to cultivate' |
| <i>valinga kúlíima</i> | 'they're trying to cultivate' |

We would expect, based on the behavior of other nouns with a penultimate fall, to find **alinga kúshoona* (cf. *alinga lítili* 'he likes litili' from *alinga lítíli*). Although we have no explanation for the problem at the present, there is a significant difference between the infinitive and nouns like *unéembo* where Meeussen's Rule does apply. The infinitive underlyingly has two H tones, a stem-initial H and the H assigned to the penult by Default docking, hence *kushóna* derives from *kushóna*—cf. *kutélékéela* 'to cook for'.

Finally, there are a number of nouns with penultimate falling tone which simply are exceptions to Meeussen's Rule.

(51) <i>lulíimi</i>	‘tongue’
<i>aona lúlíimi</i>	‘he sees the tongue’
<i>dinóondwa</i>	‘stars’
<i>alo dínóondwa</i>	‘he’s looking at the stars’
<i>dimbóoko</i>	‘lice’
<i>awala dímbóoko</i>	‘he’s killing lice’
<i>liléende</i>	‘greens’
<i>alya líléende</i>	‘he’s eating greens’
<i>lukúuni</i>	‘firewood’
<i>asumisa lúkúuni</i>	‘he’s buying firewood’
<i>mawáangwa</i>	‘bones’
<i>apasu máwáangwa</i>	‘he’s breaking bones’
<i>midíidi</i>	‘ropes’
<i>asuma mídíidi</i>	‘he’s buying ropes’

For almost all the irregular nouns with known cognates in Chimaraba, the corresponding form in Chimaraba has a level H tone, which too is the tone pattern of the infinitive in that dialect. Thus compare these forms with Chimaraba *ndíidi* ‘rope’, *liwáangwa* ‘stone’, *lukúúni* ‘firewood’, *mbóoko* ‘louse’. Of the 16 recorded irregular nouns, eight have Chimaraba cognates with level H, and only one, *liléende* ‘greens’, has a falling tone (and none has rising tone). Historically, this exceptionality probably had the same source as the blockage of Meeussen’s Rule on the infinitive. Synchronically, these words are best treated as exceptions.

3.3. NP tonology. In Chimaraba we found that there were four morpho-tonemic alternations operating at the level of the noun phrase. By one rule, a H tone spreads to the end of the noun if it is followed by a demonstrative. By a second rule, any toneless noun followed by a modifier in its phrase receives a H on the penult. A third rule deletes H tones in nouns which are followed by [+WH] modifiers, and the final rule deletes all H tones in words which precede a c-commanding possessive pronoun, i.e. one in the same phrase as the pronoun. Versions of these rules can be found in Chimahuta as well.

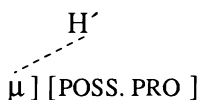
The first construction to investigate is the noun plus possessive pronoun construction. In Chimaraba, we found that all H tones of the noun were deleted in this construction, and a floating H was assigned to the final vowel of the word before the pronoun. The pattern in Chimahuta looks rather different. As the examples in (52a) show, if the noun has an underlying rising tone on the penult (surface level H), that H appears to shift to the final syllable. If the noun has no underlying tone, then one H is assigned to the final vowel. Finally, if the penult has a falling tone (52b), or if the H tone appears before the penultimate syllable (52c), then we find H tones from that point to the end of the word.

- (52) a. *lipááhu* 'lung'
lipahú lyaangu 'my lung'
chiláámbo 'world'
chilambó chaake 'his world'
chikalaángo 'frying pan'
chikalangó chaangu 'my frying pan'
- b. *ntandaasa* 'stiff cassava porridge'
ntandasá waangu 'my stiff cassava porridge'
likuungwa 'drum'
likungwá lyaake 'his drum'
nankakataambwe 'spider'
nankakatambwé waangu 'my spider'
- c. *nkwáanja* 'game'
nkwánjá weetu 'our game'
ntoliilo 'sweet potato leaves'
ntoliló waangu 'my sweet potato leaves'
língaavi 'fruit (sp.)'
lingávi lyaangu 'my fruit'
litikiiti 'watermelon'
litikítí lyaangu 'my watermelon'
dimálápéende 'cockroaches'
dimálápéndé jaangu 'my cockroaches'

Our account of this pattern is as follows: we will assume that the possessive pronoun comes with a floating H which docks to the final vowel of the noun preceding it.⁷

⁷In this dialect, the syntactic restrictions on placement of the possessive are more stringent than in Chimaraba. The possessive must immediately follow the head noun of the phrase, hence the possessive can never be preceded by anything but the noun. Consequently, we cannot tell how these rules would affect non-nouns.

(53) Possessive H Docking



This rule directly accounts for the form *likungwá lyaake* in (52b).

The rule Rightward Spreading handles the examples in (52c). The final vowel receives a H tone, which then triggers Rightward Spreading. Thus underlying *língaavi ʼlyaangu* becomes *língaaví ʼlyaangu* by Possessive H Docking, and that form becomes *língááví ʼlyaangu* by Rightward Spreading (later, phrase-medial stresses and vowel length are eliminated). The word-final H is not deleted by Meeussen's Rule, since that rule only applies to H's linked exclusively to the penult, at the sentence level.

The apparently problematic forms are those in (52a), where nouns with underlying rising tones (surface level H) seem to shift their H to the final vowel. The challenge, then, is to explain the contrast between *nkwánjá weetu* and *chilambó chaake*. The crucial difference is the distance between the word-final H tone and the H tone in the penult. In the intermediate form *nkwáanjá*, which is the output of Possessive H Docking, the first and second H's are separated by a mora, whereas in *chiláambó*, the two H tones are on adjacent morae. Therefore, we simply require a rule deleting the first of two moraicly-adjacent H's before the possessive.

(54) Possessive H Deletion

$$H \rightarrow \emptyset / \text{---}H \omega] [\text{POSS. PRO.}]$$

This rule differs (in addition to the direction and the morphological conditions) from Meeussen's Rule in requiring the involved tones to be in adjacent morae, where Meeussen's Rule merely required the tones to be on adjacent syllables.⁸

Nouns followed by demonstratives undergo tonal alternations as well. If the noun has an underlying H tone, the rightmost H spreads to the end of the word before a demonstrative. If the noun has no underlying H, a H is assigned to the penultimate syllable, and that H then spreads to the right.

⁸These alternations also give us evidence that phrase-medial words are assigned stress and vowel length at a more abstract level, even though the stress and vowel length are phonetically realized only in utterance-final position, since the only way to sustain the crucial rise versus fall contrast in the possessive construction is for there to be vowel length on the penult.

(55) <i>ng'áambe</i>	'tortoise'
<i>ng'ámbé yuula</i>	'that tortoise'
<i>ng'ámbé yúuno</i>	'this tortoise'
<i>chikáápu</i>	'basket'
<i>chikápú chíino</i>	'this basket'
<i>chikápú chiila</i>	'that basket'
<i>chikápú cháneecho</i>	'that basket'
<i>chínduuli</i>	'cassava'
<i>chíndúlí chíino</i>	'this cassava'
<i>nankakataambwe</i>	'spider'
<i>nankakatámbwé yuula</i>	'that spider'
<i>likuungwa</i>	'drum'
<i>likúngwá líino</i>	'that drum'

It was possible to account for the added H found in toneless nouns in Chimaraba by a more general rule, since a toneless noun followed by any modifier receives a H on the penult in that dialect. However, in Chimahuta, the insertion of H only applies to toneless nouns followed by a demonstrative, as the following examples show.

(56) <i>makungwa mavíili</i>	'two drums'
<i>ntandasa wákunóowa</i>	'good stiff cassava porridge'
<i>ntandasa wohewóóhe</i>	'all the stiff cassava porridge'

We therefore require the following rules, the first rule to assign a H to the penult of toneless nouns, and the second rule to spread the last H of all nouns rightward.

(57) **Demonstrative H Insertion**

[_ω ∅ → H]	[+DEMONST.]
... μ μ]	

Demonstrative Spreading

H
|
|
μ ... ω] [+DEMONST.]

The final rule of NP-tonology is the equivalent of the Chimaraba rule WH-Modifier H deletion. In Chimahuta, this rule applies only before one morpheme, *ntaani*, and not before other [+WH] modifiers (as was the case in Chimaraba).

(58) <i>chikáápu</i>	‘basket’
<i>chikapu ntaani</i>	‘what type of basket?’
<i>chikápu chilíida</i>	‘which baskets?’
<i>vikápu vingáápi</i>	‘how many baskets?’
<i>umálápéende</i>	‘cockroach’
<i>umalapende ntaani</i>	‘what kind of cockroach?’
<i>lijamáanda</i>	‘box’
<i>lijamanda ntaani</i>	‘what kind of box?’

The corresponding rule is therefore governed lexically, not by a general morphological feature.

(59) WH-Deletion

[_ω ... H → ∅ ... ω] [*ntaani*]

3.4. Object H tones and NP tonology. In this section, we scrutinize the morphological and phonological conditions on Floating H Docking more closely and see how that rule interacts with the phrase-level tone rules of the previous section.

As in Chimaraba, the basic phonological condition on Floating H Docking is that the word to which the H docks must already have a H tone. If this condition is not satisfied, the floating H docks to the final vowel of the verb.

(60) <i>awené kaanya</i>	‘he saw the mouth’
<i>asumá linkungwa</i>	‘he’s buying a drum’
<i>avawalá vanankakatambwe vakúlúungwa</i>	‘he’s killing large spiders’
<i>valyá mitandaasa</i>	‘they are eating plates of stiff cassava porridge’

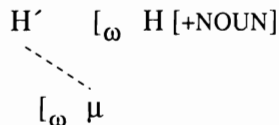
The morphological conditions on Floating H Docking in Chimahuta are similar to those found in Chimaraba. In Chimaraba, the postverbal word must be a noun. The constraints in Chimahuta correspond roughly to that constraint. We find that the floating H is not assigned to the postverbal element, but is instead assigned to the final vowel of the verb, in the following circumstances: first (61a), [+WH] words do not take the H tone, except that *cháani* ‘what’ does not cause the floating H to land on the verb; second (61b), most adverbs do not take the object H, although ‘badly’ and ‘now’, which seem to have the noun class prefix *vi*, do take the object H; third (61c), the locative morpheme *pa* takes the H tone, but the instrumental morpheme *na* does not; finally (61d), prenominal demonstratives will not take the object H tone.

- (61) a. *ateleká vingáápi* ‘how many is he cooking?’
ahená chikááni ‘when is he leaving?’
ateleké sangáápi ‘what time did he cook?’
alolá kwaachi ‘where is he looking?’
vavapanyá vanááni ‘who (pl.) are they beating?’
achekete cháani ‘what did he cut?’
(nchekete cháani ‘what did I cut?’)
- b. *aimbá saana* ‘he really sings’
aimbá chiihi ‘he's just singing’
aimbá weeka ‘he's singing alone’
aimbá chikadíiki ‘he's singing a little’
aimba víbaaya ‘he sings badly’
ateleka víino ‘he's cooking now’
- c. *alo páweelu* ‘he's looking at the field’
acheketé na chipúula ‘he's cutting with a knife’
alenjé na vakúliima ‘he's talking with the farmers’
- d. *avasumá aváno vang’ámbe* ‘he's buying these tortoises’
avawalá avalá vanankakataambwe ‘he's killing those spiders’

We can account for the difference between the instrument and the locative by according them different morphosyntactic status. If the instrumental morpheme is a word, then it does not satisfy the minimal phonological criterion that the recipient

word must have a H tone already. On the other hand, given the exceptional status of *cháani*, and the unclear morpho-syntactic status of adverbs, lexical conditioning may be required anyway. We will assume that a simple [+NOUN] condition will suffice, pending further investigation of this problem.

(62) Floating H Tone Docking



Three constructions may affect the presence of H tones in a noun, where application of Floating H Docking is of interest. The first is the combination of noun plus a possessive pronoun, before which a H tone will be added. In Chimaraba we found that the H added to toneless nouns in that construction subsequently triggers Floating H Docking. In Chimahuta, there is free variation in these constructions: either the postverbal H docks at the left edge of the noun and spreads rightward, or the H does not dock to the noun and instead appears on the verb.

(63) *avawala vánánkákátámbwé vaangu* ‘they are killing my spiders’

avawalá vanakakatambwé vaangu ”

ateleka mítándásá yaangu ‘he is cooking my plates of stiff cassava porridge’

ateleká mitandasá yaangu ”

vavalanga díkányá jaao ‘they are counting their mouths’

vavalangá dikanyá jaao ”

Similar variation exists for toneless nouns followed by a demonstrative: the H assigned by the demonstrative may trigger Floating H Docking, or it may not.

(64) *avawala vánánkákátámbwé váano* ‘he is killing these spiders’

avawalá vanankakatambwé váano ”

asuma líkúngwá liino ‘he is buying this drum’

asumá likúngwá liino ”

Since the two different H tones appear in different positions (penultimate versus final), it is hard to imagine a strictly structural account of this variation, one not invoking rule ordering. We may account for this variation by assuming that two orderings are possible between the relevant rules: if Demonstrative Deletion or Possessive Docking applies before Floating H Docking, then the later rule becomes applicable; if Floating H Docking precedes Demonstrative Deletion or Possessive Docking, then the floating H will not dock, since the noun will not yet have been assigned a H tone.

The final rule, WH-Deletion, does not appear to allow any variation. When a noun loses its H tone by that rule, Floating H Docking cannot apply.

- (65) *asumá vikapu nítaani* ‘what kind of baskets is he buying?’
 amwené ung’avanga nítwaaani ‘what kind of dog did he see?’
 asumisá lijamanda nítaani ‘what kind of box is he selling?’

This requires that a single order be imposed on Floating H Docking and WH-Deletion: WH-Deletion precedes Floating H Docking.

4. Conclusion

This completes our survey of tonal principles in two dialects of Makonde. Given the similarities and differences between these two dialects, we are encouraged to undertake more extensive comparison and reconstruction of the earlier tonal grammar of Makonde. Such a reconstruction would be of considerable value in unraveling the complex relations between the various P-zone Bantu languages. But a prerequisite to systematic comparative work on Makonde tone is the existence of descriptions of the relevant dialects, and three more dialects of Makonde remain undescribed. Such a comparison must therefore wait for another day.

APPENDIX 1

Paradigm-style examples of the verb tense are given here, including appropriate stem-length, subject prefix, and object prefix contrasts.

FUTURE POSITIVE

1 subject	3 subject	Gloss	OP
<i>naalya</i>	<i>anáalya</i>	'eat'	--
<i>nnachiilya</i>	<i>anáchiilya</i>	'eat'	it
<i>nnalíima</i>	<i>análiima</i>	'cultivate'	--
<i>nnachisúúma</i>	<i>anachísuuma</i>	'buy'	it
<i>nnatelééka</i>	<i>anatéleeka</i>	'cook'	--
<i>nnachitelééka</i>	<i>anachítelééka</i>	'cook'	it
<i>nnapilikáána</i>	<i>anapílikaana</i>	'hear'	--
<i>nnavavalangúíla</i>	<i>anavávalangúíla</i>	'count for'	them

FAR PAST

1 subject	3 subject	Gloss	OP
<i>nníilya</i>	<i>aníilya</i>	'eat'	--
<i>nníviilya</i>	<i>áníviilya</i>	'eat'	them
<i>nníliima</i>	<i>áníliima</i>	'cultivate'	--
<i>nniváheeka</i>	<i>aniváheeka</i>	'laugh'	them
<i>nnitelééka</i>	<i>anitéleeka</i>	'cook'	--
<i>nnichítelééka</i>	<i>anichítelééka</i>	'cook'	it
<i>nnipílikaana</i>	<i>anipílikaana</i>	'hear'	--
<i>nnivápindikúúla</i>	<i>anivápindikúúla</i>	'change'	them

NEAR PAST

1 subject	3 subject	Gloss	OP
<i>ñniilya</i>	<i>ániilya</i>	'eat'	--
<i>ñníviilya</i>	<i>áníviilya</i>	'eat'	them

<i>ńńíliima</i>	<i>áníliima</i>	‘cultivate’	--
<i>ńńívahééka</i>	<i>ánívahééka</i>	‘laugh’	them
<i>ńńítelééka</i>	<i>ánítelééka</i>	‘cook’	--
<i>ńńíchitelééka</i>	<i>áníchitelééka</i>	‘cook’	it
<i>ńńípilikáána</i>	<i>ánípilikáána</i>	‘hear’	--
<i>ńńívapindikúúla</i>	<i>ánívapindikúúla</i>	‘change’	them

POSITIVE CONDITIONAL

(*káma* +)

1 subject	3 subject	Gloss	OP
<i>nikáalya</i>	<i>akáalya</i>	‘eat’	--
<i>nikachiilya</i>	<i>akachiilya</i>	‘eat’	it
<i>nikáliima</i>	<i>akáliima</i>	‘cultivate’	--
<i>nikavahéeka</i>	<i>akavahéeka</i>	‘laugh’	them
<i>nikateléeka</i>	<i>akateléeka</i>	‘cook’	--
<i>nikavitelekéela</i>	<i>akavitelekéela</i>	‘cook’	it

NEGATIVE CONDITIONAL

(*káma* +)

1 subject	3 subject	Gloss	OP
<i>nikáalya</i>	<i>akáalya</i>	‘eat’	--
<i>nikáchiilya</i>	<i>akáchiilya</i>	‘eat’	it
<i>nikáliima</i>	<i>akáliima</i>	‘cultivate’	--
<i>nikáváheeka</i>	<i>akáváheeka</i>	‘laugh’	them
<i>nikátéleeka</i>	<i>akátéleeka</i>	‘cook’	--
<i>nikávítélékeela</i>	<i>akávítélékeela</i>	‘cook’	it

SUBJUNCTIVE

2 subject	Gloss	OP
<i>uulyé</i>	'eat'	--
<i>uvíilye</i>	'eat'	them
<i>ulíime</i>	'cultivate'	--
<i>uchilíime</i>	'cultivate'	it
<i>uteléléke</i>	'cook'	--
<i>uvatélékéele</i>	'cook for'	them

INFINITIVE

	Gloss	OP
<i>kúúlya</i>	'eat'	--
<i>kúchiilya</i>	'eat'	it
<i>kulíima</i>	'cultivate'	--
<i>kuchíshoona</i>	'sew'	it
<i>kutéléeka</i>	'cook'	--
<i>kuchítéléeka</i>	'cook'	it
<i>kupíndíkúula</i>	'change'	--
<i>kuvátelekééla</i>	'cook for'	them

APPENDIX 2

The rules cited above are recapitulated here, in their order of application.

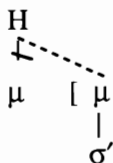
(2) Stem H Insertion

$$\emptyset \rightarrow H / [\text{STEM} ____]$$

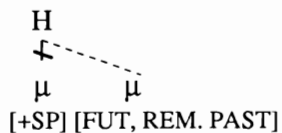
- (9) **Stem Mapping** (applies in: conditional subordinate tenses subjunctive+OP)



- (22) **Shift to Stem**

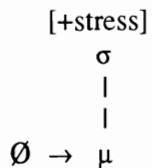


- (23) **Shift to Prefix**



- (42) $H \rightarrow \emptyset / \left[\begin{array}{l} \text{+present neg} \\ \text{-OP} \end{array} \right]$

- (1) **Stress Lengthening**



(6) **Default Docking**

$$\begin{array}{c} H' \\ | \\ | \\ \mu] \end{array}$$
(53) **Possessive H Docking**

$$\begin{array}{c} H' \\ \text{---} \\ \mu] \text{ [POSS. PRO]} \end{array}$$
(54) **Possessive H Deletion**

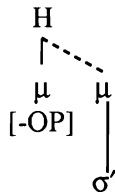
$$H \rightarrow \emptyset / \text{---} H \omega] \text{ [POSS. PRO.]}$$
(57) **Demonstrative H Insertion**

$$\begin{array}{c} [\omega \emptyset \rightarrow H \quad] \quad [+DEMONST.] \\ | \\ | \\ \mu \mu] \end{array}$$
Demonstrative Spreading

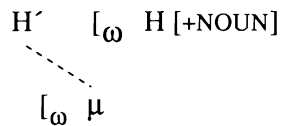
$$\begin{array}{c} H \\ | \\ | \\ \mu \dots \omega] \quad [+DEMONST.] \end{array}$$
(59) **WH-Deletion**

$$[\omega \dots H \rightarrow \emptyset \dots \omega] \text{ [ntaani]}$$

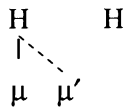
(16) Tone Doubling



(62) Floating H Tone Docking



(24) Rightward Spreading



(13) Meeussen's Rule

H → Ø / H__

REFERENCE

Odden, David. 1990. "Tone in the Makonde dialects: Chimaraba." *Studies in African Linguistics* 21:61-105.

