

ARTICLE

Grammatical tone mapping in Ekegusii

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Abstract

A major issue in Bantu morphophonology is how to get the right tones in the right ‘cells’ in the verb paradigm. In many Bantu languages, grammatical tones are assigned to different positions in the verb stem depending on inflectional features of tense, aspect, mood (TAM), polarity and clause type: The same TAM may assign different tones (and different segmental allomorphs) in the affirmative *vs.* negative and in main *vs.* relative clauses. Although such ‘melodic tones’ (Odden & Bickmore 2014) are typically restricted to the verb stem (root + suffixes), often also the domain of vowel harmony and other segmental phonology, both the presence and mapping of grammatical tones within the stem cannot be determined without reference to the prefixal inflectional marking of subject, negation, TAM and object which precede the stem. In this article, we discuss three cases in Ekegusii, a Bantu language of Kenya, that require the stem-assigned grammatical tones to look ‘outward’ to morphological and phonological properties of such prefixes: (1) differential mapping according to whether the pre-stem tone-bearing unit is toneless, a derived H(igh) (from H-tone spreading), or underlyingly /H/ (Bickmore 1997, 1999); (2) presence of an object prefix in imperative and subjunctive forms and (3) initial/final tone agreement between the subject prefix and the final vowel of the verb (cf. Rolle & Bickmore (2022). We will show that Ekegusii provides extensive evidence that both the presence of grammatical Hs and their specific mapping, while targeting the stem (root + suffixes), must be ‘globally’ calculated on the basis of the entire morphosyntactic structure of the verb (including features expounded by prefixes).

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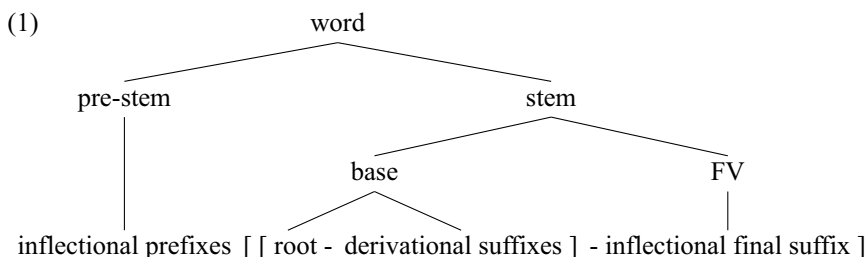
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1. Introduction

Most Bantu languages have a binary underlying tonal contrast, analysed as either H(igh) *vs.* L(ow) or H *vs.* \emptyset , both of which have also been proposed for Proto-Bantu (Greenberg 1948; Meeussen 1967, [1969] 1980; Coupez 1983 *vs.* Stevick 1969). The simplicity of the underlying contrast is, however, quite deceptive. As is well known, /H/ (and occasionally /L/) tones are subject to complex tonal alternations at the word and phrase levels. Nowhere is this more evident than in the verb tonology, where the individual morphs and morphosyntactic features interact to produce a tonal output at the word level which may then be subject to further (often opaque) modification depending on clause type, prosodic domain and/or intonation (see Marlo 2013 for a comprehensive overview). Such is the case in Ekegusii [ISO: guz], a language of Kenya designated as JE42 in the Guthrie referential classification of Bantu languages (Maho 2009). Based on the traditional structure of the Bantu verb in (1) (Meeussen 1967), many Bantu languages exclude prefixes from stem-level vowel height harmony, nasal consonant harmony and prosodic morphology.



As a result, there have been analyses of the sort in Mutaka (1994), where Bantu stem morphology and phonology precede word-level morphology and phonology in a stratum 1–stratum 2 procedure in the framework of Lexical Phonology and Morphology (Kiparsky 1982). It has also been attractive to view the verb root plus suffixes as a prosodic stem (Downing 1999), with prefixes being added outside (later) to form the prosodic word. The key issue is whether stem-assigned grammatical tones can be treated the same way – or whether they are different from vowel height harmony, etc. In this article, we have two goals. First, we will demonstrate that tone *is* different: Although grammatical H(igh) tones are assigned to the stem in Ekegusii, the exact realisation of these Hs crucially depends on access to the phonology and morphology of the full word. Second, we will expand the coverage of tonal patterns beyond previous studies. The article is organised as follows: After presenting verb forms without a grammatical H in §2, in §§3–5, we further document Bickmore’s (1997, 1999) three tone patterns (TP I–III) in which different H tone mappings depend on the tone of the immediate pre-stem prefix. In §6, we add three other tone patterns

(TP IV–VI) and show that the imperative verb stem also needs to look outward to see if there is an object prefix (= TP V) or not (= TP VI). The third example of ‘outward-looking’ tone assignments in §7 concerns initial/final tone agreement: In certain relative clause forms, the tone of the final vowel of the stem must agree with the tone of the subject prefix. We conclude in §8 with further evidence that the exact realisation of stem tone depends ‘globally’ on all of the morphosyntactic properties of the verb, including those exclusively realised on the pre-stem.¹

2. Verb stems lacking a grammatical H

As in many Bantu languages, Ekegusii verb roots can either have a lexical /H/ on their first mora or be toneless. While our attention will be on the mapping of grammatical Hs on the verb stem, not all tenses, aspects, moods (TAMs) assign a grammatical H. To illustrate, we start with the prehodiernal narrative past tense marked by the toneless prefix /ka-/ (which dissimilates to *ga-* before a voiceless consonant) in (2).²

- | | | | |
|-----|----|---------------------|-------------------------------|
| (2) | a. | to-ka-rɔr-a | ‘we saw’ |
| | | to-ka-rut-a | ‘we threw’ |
| | | to-ga-sibor-a | ‘we untied’ |
| | | to-ga-sibor-er-an-a | ‘we untied for each other’ |
| | | to-ga-sɔɔm-a | ‘we read’ |
| | | to-ga-sɔɔm-ɛr-an-a | ‘we read to/for each other’ |
| | b. | to-ka-rí-á | ‘we ate’ |
| | | to-ka-rúg-á | ‘we cooked’ |
| | | to-ka-róm-á | ‘we bit’ |
| | | to-ga-súgúm-a | ‘we pushed’ |
| | | to-ga-súgúm-er-an-a | ‘we pushed to/for each other’ |

¹The material presented in this study is based on the speech of the second author (henceforth HK), who was born in Ititi (a village East of Marani), where she lived until 21 years old. Hildah served as the linguistic consultant in an undergraduate field methods course at UC Berkeley in Spring 2021, which we have followed up with at least 50 hours of investigation into the Ekegusii verb paradigm, which included a comprehensive investigation of 24 TAMs of Ø and /H/ verb bases of different lengths occurring in the affirmative and negative of main and relative clauses, occurring in 80 filled cells in the Ekegusii verb paradigm (see the [Appendix](#)). We would like to thank the stimulating Linguistics 140 class participants, who were also thrilled to work with the second author on their own projects. Finally, we are grateful to two anonymous reviewers and especially to Nik Rolle for extensive comments and suggestions on the original submission. Previous work on Ekegusii tone and verb structure that has been consulted includes Whiteley (1960), Kingston (1983), Bickmore (1997, 1999), Cammenga (2002), Nash (2011) and Bosire & Machogu (2013), the last of which was, at the time of writing, also available online with most of the lexical entries recorded.

²In (2) and subsequent sets of data, we provide morpheme-by-morpheme glossing only for the last example, which will be applicable to other forms. We first present the tone patterns on forms with a toneless root, then those on forms with a /H/ root, both arranged by shorter to longer verb bases. The abbreviations SP (subject prefix) and OP (object prefix) are followed by a numeral indicating noun class, e.g. 2 for human plural class 2 *ba-* ‘they/them’ or 7 for singular inanimate class 7 *ke-* (~ *kɛ-*, *ge-*, *gɛ-*) ‘it’. Other abbreviations include TAM (tense-aspect-mood), NEG (negative), APPL (applicative), REC (reciprocal), FV (inflectional final vowel), AUG (augment), FOC (focus), INF (infinitive) and HAB (habitual).

to-ka-bwáat-a	‘we caught’
to-ka-bwáat-er-an-a	‘we caught for each other’
IPL-TAM-catch-APPL-REC-FV	

As seen, Ekegusii is analysed with a privative /H/ vs. \emptyset tonal contrast, where H is marked with an acute accent and L is unmarked.³ In (2a), the verb roots are toneless, as is the subject prefix (SP) *to-* ‘we’ (IPL) and the inflectional final vowel (FV) *-a*. Hence, all of the tone-bearing units receive a default L pitch. In (2b), the roots have a /H/ on their first vowel which triggers bounded H-tone spreading (HTS) onto the following vowel to produce two H moras in succession. The one exception is *to-ka-bwáat-a* ‘we caught’, which instead shows a HL falling pitch pattern on its long vowel (cf. *to-ga-kóor-a* ‘we finished’). The reason for this is that there is a constraint against a word-final long CVVCV sequence in the language (*-*bwáat-a*, *-*kóor-a*). A level H tone is realised prepenultimately on the longer form *to-ka-bwáat-er-an-a* ‘we caught for each other’ which contains a sequence of applicative (APPL) *-er-* plus reciprocal (REC) *-an-*.⁴

Another environment where there is no suffixal H is the infinitive marked by toneless *ko-* (~ *kɔ-*), realised as *go-* (~ *gɔ-*) before a voiceless consonant:

(3) a.	<i>kɔ-rɔr-a</i>	‘to see’
	<i>ko-rut-a</i>	‘to throw’
	<i>go-sibor-a</i>	‘to untie’
	<i>go-sibor-er-an-a</i>	‘to untie for each other’
	<i>gɔ-sɔɔm-a</i>	‘to read’
	<i>gɔ-sɔɔm-er-an-a</i>	‘to read for each other’
b.	<i>ko-rí-á</i>	‘to eat’
	<i>ko-rúg-á</i>	‘to cook’
	<i>ko-róm-á</i>	‘to bite’
	<i>go-súgúm-a</i>	‘to push’
	<i>go-súgúm-er-an-a</i>	‘to push to/for each other’
	<i>ko-bwáat-a</i>	‘to catch’
	<i>ko-bwáat-er-an-a</i>	‘to catch for each other’
	INF-catch-APPL-REC-FV	

The above isolated forms are important, since several TAMs are built on the infinitive. In some of these, the infinitive prefix /*ko-*/ is preceded by a /H/ which

³The few monosyllabic stems with /CV-/ roots are all realised H, including ‘grind’ and ‘fall’, which reconstruct as non-H (cf. Bickmore 1997: 267, fn. 3): *go-sí-á* ‘to grind’, *ko-gw-á* ‘to fall’. Although there is variation, when further suffixed, these two verbs can appear with either the /H/ or \emptyset tone pattern, e.g. *ko-gw-er-an-a* ~ *ko-gw-eer-an-a* ‘to fall on each other’ (with the indicated vowel length difference). There also is a downstepped \downarrow H which occasionally arises in surface outputs, particularly between the initial ‘augment’ vowel and a H that follows, e.g. *ó- \downarrow mw-áaná* ‘child’, from /*ó-mo-ána*/. In emphasised speech, HK pronounces the augment with a short falling tone [ómwá:ná].

⁴When the penultimate long vowel is followed by another word, unless there is a pause, the falling tone becomes a H tone, e.g. *to-ka-bwáat-a rí-ito* ‘we caught a leaf’, showing that the constraint against final *H:-L is phrase-based. See also Nash (2011: 94), who proposes a rule of Long Penultimate High Delinking.

triggers HTS. An example is the subject relative affirmative habitual, where the initial /á-/ is the Bantu augment (AUG) required when the relative form occurs without a head noun, and /bá-/ is the human plural class 2 subject prefix (SP). The prefix length is from the following underspecified habitual prefix /-V̄-/ whose /H/ spreads onto the *ko*-infinitive prefix (cf. *é-bí-í-kó-rɔr-a* ‘the ones (class 8) which see’ from /é-bí-V̄-/):

- | | | | |
|-----|----|-------------------------|---------------------------------------|
| (4) | a. | á-bá-á-kó-rɔr-a | ‘the ones who see’ |
| | | á-bá-á-kó-rut-a | ‘the ones who throw’ |
| | | á-bá-á-gó-sibor-a | ‘the ones who untie’ |
| | | á-bá-á-gó-sibor-er-an-a | ‘the ones who untie for each other’ |
| | | á-bá-á-gó-sɔɔm-a | ‘the ones who read’ |
| | | á-bá-á-gó-sɔɔm-er-an-a | ‘the ones who read for each other’ |
| | b. | á-bá-á-kó-ri-a | ‘the ones who eat’ |
| | | á-bá-á-kó-rug-á | ‘the ones who cook’ |
| | | á-bá-á-kó-rom-á | ‘the ones who bite’ |
| | | á-bá-á-gó-súgúm-a | ‘the ones who push’ |
| | | á-bá-á-gó-súgúm-er-an-a | ‘the ones who push to/for each other’ |
| | | á-bá-á-kó-bwáat-a | ‘the ones who catch’ |
| | | á-bá-á-kó-bwáat-er-an-a | ‘the ones who catch for each other’ |
- AUG-SP2-HAB-INF-catch-APPL-REC-FV

There is no complication in (4a), where the verb stem is toneless. In the first three examples of (4b), however, we see that the first syllable of the stem is unexpectedly L. In Bickmore’s (1997: 285) analysis, the word-final input H of /rúg-a/ and /rúm-a/ first undergoes HTS to derive *-rúg-á* and *-rúm-á*, which then become *-rug-á* and *-rum-á* by delinking of the H from the root vowel. We will see a second process of root-initial H delinking in (11b).⁵

Before moving on to consider Bickmore’s three grammatical H tone patterns, note first the infinitive tone patterns occurring with the OPs *-ke-/ge-* (~ *-kɛ-/gɛ-*) ‘it (class 7)’ and *-to-* (~ *-tɔ-*) ‘us’ (IPL) in (5).

- | | | | |
|-----|----|----------------------|------------------------|
| (5) | a. | gɔ-kɛ-rɔr-a | ‘to see it’ |
| | | gɔ-ke-rut-a | ‘to throw it’ |
| | | kɔ-ge-sibor-a | ‘to untie it’ |
| | | gɔ-to-ge-sibor-er- a | ‘to untie it for us’ |
| | | kɔ-gɛ-sɔɔm-a | ‘to read it’ |
| | | gɔ-tɔ-gɛ-sɔɔm-er-a | ‘to read it to/for us’ |

⁵An alternative to HTS plus delinking would be tonal displacement of the root H of a CVC-V verb stem onto the FV (Bickmore 1999: 148). Since initial stem H delinking elsewhere occurs on longer verb forms (see (11b)), we will assume Bickmore’s 1997 interpretation. However, in the case of monosyllabic stems, it should be noted that the delinked H is not available to relink onto a following word. Thus, compare *á-báá-kó-rug-á bó-túkó* ‘the ones who cook at night’, where the H spreads from the FV /-á/ onto *bo-túkó* ‘at night’, triggering delinking of the initial H of *-túkó*, with *á-báá-gó-si-a botúkó* ‘the ones who grind at night’, where *bo-túkó* is realised without modification. The H of /sí-a/ is thus presumably deleted at the word level.

b. go-ke-rí-á	‘to eat it’
go-ke-rúg-á	‘to cook it’
go-ke-róm-á	‘to bite it’
ko-ge-súgúm-a	‘to push it’
go-to-ge-súgúm-er-a	‘to push it to/for us’
go-ke-bwáat-a	‘to catch it’
go-to-ke-bwáat-er-a	‘to catch it for us’
INF-IPL-OP7-catch-APPL-FV	

The only difference from (4) concerns the non-application of stem-initial H delinking in the first three examples in (5a), since a preceding H is required. The same is seen in the subject relative affirmative habitual: /∅/ roots are again unaffected by an OP in (6a), while the presence of a toneless OP removes the need for stem-initial H delinking in the first three examples of (6b).

(6) a. á-bá-á-gó-ke-rɔr-a	‘the ones who see it’
á-bá-á-gó-ke-rut-a	‘the ones who throw it’
á-bá-á-kó-ge-sibor-a	‘the ones who untie it’
á-bá-á-gó-to-ge-sibor-er-a	‘the ones who untie it for us’
á-bá-á-kó-ge-sɔɔm-a	‘the ones who read it’
á-bá-á-gó-tɔ-ge-sɔɔm-er-a	‘the ones who read it for us’
b. á-bá-á-gó-ke-rí-á	‘the ones who eat it’
á-bá-á-gó-ke-rúg-á	‘the ones who cook it’
á-bá-á-gó-ke-róm-á	‘the ones who bite it’
á-bá-á-kó-ge-súgúm-a	‘the ones who push it’
á-bá-á-gó-to-ge-súgúm-er-a	‘the ones who push it to/for us’
á-bá-á-gó-ke-bwáat-a	‘the ones who catch it’
á-bá-á-gó-to-ke-bwáat-er-a	‘the ones who catch it for us’
AUG-SP2-TAM-INF-IPL-OP7-catch-APPL-REC-FV	

The above examples firmly establish that OPs are underlyingly toneless in Ekegusii. While this barely affects verb stems lacking a grammatical H or the tone pattern in the next section, the presence of an OP has important consequences in the tone patterns in §4 and §5.

3. Bickmore’s Tone Pattern I

As mentioned, Bickmore identifies three different suffixal H tone patterns which he predicts from the tone of the pre-stem prefix. These will be exemplified here and in the following two sections. As seen in the following main clause affirmative habitual forms, TP I maps the suffixal H from the second mora (M2) to the FV of the verb stem, a pattern which will be referred to as M2F.⁶

⁶This is the pattern that Meeussen (1961) reconstructs with an FV /-á/, whose H spreads leftwards to the second stem mora. Such H tone assignment patterns are known as ‘melodic tones’ in Bantu (Odden & Bickmore 2014).

(7)	a.	<i>tɔ-rɔr-á</i>	‘we see’
		<i>to-rut-á</i>	‘we throw’
		<i>to-sibór-á</i>	‘we untie’
		<i>to-sibór-ér-án-á</i>	‘we untie for each other’
		<i>tɔ-sóóm-á</i>	‘we read’
		<i>tɔ-sóóm-ér-án-á</i>	‘we read for each other’
	b.	<i>to-sí-á</i>	‘we grind’
		<i>to-rúg-á</i>	‘we cook’
		<i>to-róm-á</i>	‘we bite’
		<i>to-súgúm-á</i>	‘we push’
		<i>to-súgúm-ér-án-á</i>	‘we push to/for each other’
		<i>to-bwáát-á</i>	‘we catch’
		<i>to-bwáát-ér-án-á</i>	‘we catch for each other’
		IPL-catch-APPL-REC-FV	

In TP I, the analytic problems are relatively minor and concern only the toneless root pattern. First, one has to decide how to keep the suffixal H from mapping onto the initial root mora. To solve this, Bickmore (1997: 279, 1999: 127) proposes a diacritic accent on the second stem mora (M2) of TAMs that receive a suffixal H.⁷ Assuming that the suffixal H of TP I wants to link to all available stem moras, the function of the accent is both to attract and stop the suffixal H from going any further. Thus, the first mora (M1) remains \emptyset in (7a).

Bickmore does not discuss roots with a long vowel, but as seen in the forms of ‘read’, there is an issue, since the initial stem syllable of *tɔ-sóóm-á* ‘we read’ is H, while it is \emptyset in *tɔ-sóóm-ér-án-á* ‘we read for each other’. The generalisation is that the M2H successfully links to the long vowel if it is in penultimate position (*-sóóm-á*); otherwise, the H begins on the third mora (*-sóóm-ér-án-á*). This difference is completely general: *to-ráám-á* ‘we insult’ vs. *to-raam-ér-án-á* ‘we insult for each other’. The solution we propose is that Bickmore’s second mora accent can be assigned to CVVC-V, producing intermediate *-sóóm-á* and *-raám-á*. However, since rising tones are not allowed in Ekegusii, what would be pronounced as LH-H with default L is instead realised H-H. The fact that we do not obtain an initial H on longer stems (**-sóóm-ér-án-á*, **-ráám-ér-án-á*) suggests that in these forms, the accent is instead assigned to the third mora (M3). In §5, we will see more evidence for the M3 accent on longer stems with an initial long vowel syllable.⁸

Since TP I is otherwise non-problematic, we need not dwell on it. Bickmore’s generalisation is that cells in which the stem is preceded by an output toneless mora will assign the suffixal H according to TP I. This is the first indication that grammatical

⁷Another approach is to treat the toneless stem-initial mora as extrametrical, as in Pulleyblank’s (1986: 172) analysis of Chitonga.

⁸The different behaviour of penultimate vs. pre-penultimate CVV suggests that the former represents a position of prominence. It should be noted that the contrast between M2 and M3 accent remains even when the verb is followed by another word: *to-ráám-á Kémunto* ‘we insult Kemunto’, *to-raam-ér-á Kémunto* ‘we insult for Kemunto’.

H cannot be mapped onto the stem without knowing what precedes it. A preceding OP, being toneless, will thus not affect the stem tone, as seen in (8).

- | | | |
|--------|---------------------------|--------------------------|
| (8) a. | tɔ-kɛ-rɔr-á | ‘we see it’ |
| | to-ke-rut-á | ‘we throw it’ |
| | to-ge-sibór-á | ‘we untie it’ |
| | to-ba-ge-sibór-ér-á | ‘we untie it for them’ |
| | tɔ-ge-sóóm-á | ‘we read it’ |
| | to-ba-ge-sóóm-ér-á | ‘we read it to/for them’ |
| b. | to-ge-sí-á | ‘we grind it’ |
| | to-ke-rúg-á | ‘we cook it’ |
| | to-ke-róm-á | ‘we bite it’ |
| | to-ge-súgúm-á | ‘we push it’ |
| | to-ba-ge-súgúm-ér-á | ‘we push it to/for them’ |
| | to-ke-bwáát-á | ‘we catch it’ |
| | to-ba-ke-bwáát-ér-á | ‘we catch it for them’ |
| | IPL-OP2-OP7-catch-APPL-FV | |

We will now see that the presence of an OP has consequences in the other two tone patterns.

4. Bickmore’s Tone Pattern II

The second tone pattern is what Goldsmith (1987) terms the ‘complex pattern’ found in a number of Lacustrine Bantu languages. Toneless roots still map the suffixal H from the M2 to the FV. /H/ roots, however, assign the suffixal H only to the FV. In Ekegusii, TP II is quite restricted as a basic pattern. In fact, among the more than 100 cells of the paradigms surveyed by Cammenga (2002: 442–495), we have found TP II in only two tenses,⁹ both of which have the prefix sequence /-á-ka-/, e.g. the general past tense used in non-focused clauses:¹⁰

- | | | |
|--------|--------------------|-------------|
| (9) a. | tw-áá-ká-rɔr-été | ‘we saw’ |
| | tw-áá-ká-rut-été | ‘we threw’ |
| | tw-áá-gá-sibór-été | ‘we untied’ |

⁹TP II does arise as an option in TP III when OPs are added. See §5.

¹⁰This tense has been identified variously as ‘recent past time reference, with some implication of emphasis’ (Whiteley 1960: 56), ‘recent present perfect’ (Cammenga 2002: 486) and ‘past completive’ (Kingston 1983: 43). As indicated, HK requires it to be in a dependent clause conflating the three most recent main clause affirmative past tense, ‘today’ (Past1), ‘yesterday’ (Past2) and ‘within a few days or so’ (Past3), but excluding the remote Past4, which is expressed with a different prefixal tone and TP I: *korwa tw-áa-ga-súgúm-été* ‘since we pushed’. Since Cammenga only illustrates the different TAMs with the -CVC- verb roots *-rut-* ‘throw’ and *-róm-* ‘bite’, we had to test all of the cells with longer verb stems, with particular attention to those where one could not distinguish TP II and TP III from the two short verb roots. While most of the cells were identified by HK, a few were not. However, HK’s semantic or grammatical characterisations of several recognised cells slightly differed from one or more of the above authors.

	tw-áá-gá-sibór-ér-án-été	‘we untied for each other’
	tw-áá-gá-soom-été	‘we read’
	tw-áá-gá-soom-ér-án-été	‘we read to/for each other’
b.	tw-áá-ká-rí-été	‘we ate’
	tw-áá-ká-rúg-été	‘we cooked’
	tw-áá-ká-róm-été	‘we bit’
	tw-áá-gá-súgum-été	‘we pushed’
	tw-áá-gá-súgum-er-an-été	‘we pushed to/for each other’
	tw-áá-ká-bwáát-été	‘we caught’
	tw-áá-ká-bwáát-er-an-été	‘we caught for each other’
c.	* tw-áá-ká-ri-été	‘we ate’
	tw-áá-ká-rug-été	‘we cooked’
	tw-áá-ká-rom-été	‘we bit’
	tw-áá-gá-sugúm-été	‘we pushed’
	tw-áá-gá-sugúm-ér-án-été	‘we pushed to/for each other’
	tw-áá-ká-bwaat-été	‘we caught’
	tw-áá-ká-bwaat-ér-án-été	‘we caught for each other’
	IPL-TAM-TAM-catch-APPL-REC-TAM	

As seen, toneless *-ka-* (~ *-ga-*) is realised as *-ká-* (~ *-gá-*) by HTS from the preceding prefix */-á-/*. In addition, the SP *tó-* glides before *-á-*, which undergoes compensatory lengthening to produce *tw-áá-*. Besides */-á-ka-*, which becomes *-á-ká-* by HTS, this TAM is marked by the final inflectional suffix sequence *-ete* (~ *-ete*) and a H suffixal tone whose M2F mapping in (9a) mirrors what we saw in TP I. Toneless roots thus show no distinction between TP I and TP II. However, H roots show two patterns. In the first, reported by Bickmore, the suffixal H is realised only on the FV, as in (9b). We will refer to this as the FV grammatical H pattern which, as we will see, can only occur if there also is a H on the first stem mora (M1). However, HK alternatively produces the alternate realisations in (9c), where the H roots in trisyllabic and longer stems delink their M1 H and show the same M2F pattern as toneless roots.¹¹ The questions faced by the data in (9b) are, first, how to restrict the suffixal H to the FV and, second, how to stop the H of the verb root from spreading onto the second mora. Concerning the FV pattern, Bickmore (1997: 281 ff.) surveys different approaches that have been explored to account for Goldsmith’s (1987) ‘complex’ tone pattern, to which others can be added. (For an OT analysis, see Bickmore 1999.) For our purpose, we are only interested in Bickmore’s generalisation that the different tone patterns are predictable from the tone of the pre-stem mora, in this case the derived H on *-ká-* (~ *-gá-*), and that morphological conditioning is not needed.

¹¹HK reports that she and others can use either realisation, which she confirmed with several other Ekegusii speakers in Kenya.

Although we will further discuss the FV H tone pattern in detail in the next section, let us consider the tonal effects of an OP. As seen in (10a) and (10b), stems with a \emptyset tone root do not change their M2F tone pattern, while the stems with a H root in (10c)–(10f) show the same two TP II possibilities as in (9b) and (9c):

- | | | |
|---------|-----------------------------|----------------------------|
| (10) a. | tw-áá-gá-ke-rɔr-été | ‘we saw it’ |
| | tw-áá-gá-ke-rut-été | ‘we threw it’ |
| | tw-áá-ká-ge-sibór-été | ‘we untied it’ |
| | tw-áá-ká-ge-sɔɔm-été | ‘we read it’ |
| b. | tw-áá-ká-ba-ge-sibór-ér-été | ‘we untied it for them’ |
| | tw-áá-ká-ba-ge-sɔɔm-ér-été | ‘we read to/for them’ |
| c. | tw-áá-gá-ké-rí-eté | ‘we ate it’ |
| | tw-áá-gá-ké-rúg-eté | ‘we cooked it’ |
| | tw-áá-gá-ké-róm-eté | ‘we bit it’ |
| | tw-áá-ká-gé-súgum-eté | ‘we pushed it’ |
| d. | tw-áá-gá-ké-bwáát-eté | ‘we caught it’ |
| | tw-áá-ká-bá-gé-súgum-er-eté | ‘we pushed it to/for them’ |
| | tw-áá-ká-bá-ké-bwáát-er-eté | ‘we caught it for them’ |
| e. * | tw-áá-gá-ke-ri-eté | ‘we ate it’ |
| | tw-áá-gá-ke-rug-été | ‘we cooked it’ |
| | tw-áá-gá-ke-rom-été | ‘we bit it’ |
| | tw-áá-ká-ge-sugúm-été | ‘we pushed it’ |
| | tw-áá-gá-ke-bwaat-été | ‘we caught it’ |
| f. | tw-áá-ká-ba-ge-sugúm-ér-été | ‘we pushed it to/for them’ |
| | tw-áá-ká-ba-ke-bwaat-ér-été | ‘we caught it for them’ |
- IPL-TAM-TAM-OP2-OP7-catch-APPL-TAM

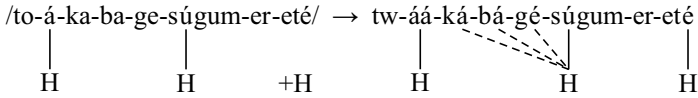
Besides the M2F pattern, the forms with toneless roots confirm that the OPs are underlyingly toneless, whether there is one (10a) or two (10b). In (10c) and (10d), the OPs are realised H in the FV pattern, whether there is only one (10c) or two (10d). (See (12) for three OPs.) In the M2F pattern in (10e) and (10f), the OPs are toneless.

Recalling *á-bá-á-kó-rug-á* ‘the ones who cook’ (/rúg-/ ‘cook’) and *á-bá-á-kó-rom-á* ‘the ones who bite’ (/róm-/ ‘bite’) in (4b), the examples in (9c), (10e) and (10f) provide the second case where a stem-initial H needs to be delinked. At the same time, the H on the OPs in (10c) and (10d) is unexpected: If /-ka-/ is underlyingly toneless, with its H resulting from bounded HTS from the preceding *-á-*, the following OP should remain toneless. Now consider the two variants in (10d) and (10f), where two OPs *-ba-* ‘them’ (class 2) and *-ke-* (~ *-ge-*) ‘it’ (class 7) occur in succession. The first option in (10d) shows both OPs with H tones and the stem with FV tone. In the second option in (10f), the OPs are \emptyset and the /H/ verb occurs with a \emptyset M1 tone and

the M2F tone suffix pattern. We formalise these options as in (11), where the suffixal H is shown as +H in the inputs:

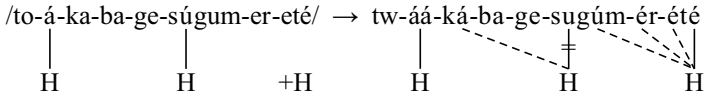
(11) a. *Option 1: H tone plateauing*

Toneless OPs become H between a H TAM prefix and a H verb root.



b. *Option 2: H tone anticipatory shift*

The M1 H of a verb root is delinked and relinks to the leftmost toneless prefix when the latter is preceded by a H TAM prefix.



In (11a), H tone plateauing affects /-ka-/ and toneless OPs wedged between the H tense prefix -á- and an M1 root H. The second option relinks the M1 H of the verb root to the leftmost toneless prefix, in this case /-ka-/, thereby producing the same M2F pattern obtained with underlyingly toneless roots.¹² Both processes affect /-ka-/ and all OPs, of which up to three can occur, as in (12).¹³

- (12) a. bá-á-gá-tó-bá-gé-súgum-er-été ‘they pushed it to them for us’
 b. bá-á-gá-to-ba-ge-sugúm-ér-été
 SP2.TAM-TAM-IPL-OP2-OP7-push-APPL-TAM

What is crucial is that anticipatory H tone shift does not occur in tenses which lack a grammatical H. Thus, recalling the examples in (6b), where the parallel TAM prefix sequence consists of a featureless H tone mora, which lengthens the preceding vowel, plus toneless /-ko-/, á-bá-á-gó-to-ge-súgum-er-a ‘the ones who push it to/for us’ cannot be pronounced *á-bá-á-gó-to-ge-sugúm-er-a with delinking of the M1 H. We interpret this to mean that the OCP(H) constraint that Bickmore posits to be operative in TP II (and TP III, but not TP I) blocks the possibility of the following two lower-ranked constraints both being satisfied: (i) the lexical root /H/ should be realised on the M1 and (ii) the grammatical H should link to the accented M2 (and subsequent moras). In Option 1, (ii) is satisfied by the grammatical H linking only to the FV and a separate rule of H tone plateauing applies to the OPs.¹⁴ In Option 2, (i) is

¹²An alternative to (11b) is that the H of /H/ roots is deleted when preceded by a H tone and an OP or -ka-, thereby merging with ∅ roots. In this case, the H of -ká- would derive from HTS from the preceding TAM prefix /-á-/. The prediction is that the same options would be found with other toneless prefixes preceded by a H. However, among the grammatical H assigning TAMs, /-ka-/ is the only toneless CV prefix we have found which is preceded by /H/.

¹³Because of the unnaturalness of three OPs in sequence, HK initially wondered whether the first OP in (12b) should not have H tone, finally deciding confidently (and on repeated occasions) that all OPs are ∅. This is an area where it would be good to investigate all TAMs with more speakers.

¹⁴In fact, we might be able to dispense with Bickmore’s ‘derived H’ environment, since the ∅ of a H+∅ prefix sequence will undergo H tone plateauing if the root is /H/. Thus, from (9b), /to-á-ka-rúg-ete +H/ ‘we cooked’ becomes to-á-ká-rúg-ete +H not by HTS, but rather by H tone plateauing. Since the latter does not

satisfied by delinking the root H from the M1 and relinking it to the leftmost toneless prefix. Although the delinking of the M1 H in Option 2 is not reported by Bickmore, his analysis does predict that the tone pattern will be M2F when the pre-stem mora is toneless. We will next see that the same options are available in Bickmore's TP III.

5. Bickmore's Tone Pattern III

TP III doesn't introduce any new tone patterns, but instead distributes the patterns of TP I and TP II differently. As seen in the following examples from the (focused) main clause affirmative hodiernal past tense (Past1), both /H/ and \emptyset roots take the same FV pattern as H tone verbs in TP II.

- (13) a. *n-tw-áá-rór-á* 'we saw'
n-tw-áá-rút-á 'we threw'
n-tw-áá-síbor-á 'we untied'
n-tw-áá-síbor-er-an-á 'we untied for each other'
n-tw-áá-sóom-á 'we read'
n-tw-áá-sóom-ér-án-á 'we read to/for each other'
- b. *n-tw-áá-rí-á* 'we ate'
n-tw-áá-rúg-á 'we cooked'
n-tw-áá-róm-á 'we bit'
n-tw-áá-súgum-á 'we pushed'
n-tw-áá-súgum-er-an-á 'we pushed to/for each other'
n-tw-áá-bwáat-á 'we caught'
n-tw-áá-bwáat-er-an-á 'we caught for each other'
- FOC-IPL-TAM-catch-APPL-REC-FV

This TAM is marked by the initial focus prefix *n-*, the prefix *-á-* and a H tone FV *-á*. As seen in (13a), as a result of HTS from the preceding *-á-*, the M1 is H even when the root is underlyingly toneless. However, note that the \emptyset root forms in (13a) are identical to the /H/ root forms in (13b) except for CVVC- roots in prepenultimate position: *n-tw-áá-sóom-ér-án-á* 'we read for each other' shows a HL contour on the verb root followed by H tones, while the verb root in *n-tw-áá-bwáat-er-an-á* 'we caught for each other' has a level H tone with a second H only on the FV. The HL contour on *-sóom-ér-án-á* is clearly due to HTS from the preceding TAM prefix *-á-* onto the toneless root *-sóom-*, while the level H of *-bwáat-er-an-á* is the result of stem-level contour simplification in prepenultimate position.¹⁵ The question then is what allows the suffixal H to map from the third mora (M3) of *-sóom-ér-án-á*, but

apply when the verb root is toneless, /to-á-ka-rut-ete +H/ 'we threw' will become *to-á-ká-rut-ete* +H instead by HTS. There thus are two different sources of the H on *-ká-* in the ultimate outputs *tw-áá-ká-rúg-eté* and *tw-áá-ká-rut-été*.

¹⁵That contour simplification is a stem-level process is seen from the fact that HL contours are allowed to surface in the prefixal domain, e.g. in the general past (Past3), which takes TP I: *n-tw-áa-rór-á* 'we saw', *n-tw-áa-rúg-á* 'we cooked'.

not onto the M3 of *-sibor-er-an-á* (**-sibor-ér-án-á*). The crucial difference is the long vowel of /-sóm-/. Recall from TP I in §3 that we proposed that Bickmore's M2 accent should instead be assigned to the third mora (M3) of toneless verb bases with an initial long vowel occurring in prepenultimate position. Underlining the accented mora, the contrast would be between *-sóm-er-an-a* and *-sibor-er-an-a*. Assuming that TP III differs from TP I in not allowing an OCP(H) violation (see also below), if the accent is on M2, the suffixal H will not be able to link to it; but if it is on M3, as in *-sóm-er-an-a*, it will. What this means is that the accent must be on M2 in *-bwáat-er-an-á* to make sure that **-bwáat-ér-án-á* is not derived.

As in the case of TP II /H/ roots, two additional problems need to be addressed. First, it is surprising that the M1 H of /H/ roots does not spread onto the M2. Bickmore considers, but rejects, the possibility of restricting HTS from applying when the FV is H. Instead, he proposes that HTS is restricted from targeting accented M2. Since TAMs which lack a suffixal H also lack an accent, the root H does in such cases spread onto the following accentless M2, as was seen in (3b) and (4b).

The second problem is how to restrict the suffixal H to the FV. Bickmore's insight is that it has to do with the fact that both /H/ and \emptyset verb roots have an M1 H tone, the latter receiving its H from HTS. While TP I does not care if the root /H/ plus M2F pattern violates the OCP, TP II and TP III do. Thus, in TP II and TP III, suffixal H will reach the M2 (and all successive moras) only if the M1 is toneless. This is supported by the two OP patterns we saw in TP II, analysed as in (11). In (14), we see that the same options are available in TP III.

- (14) a. n-tw-áá-ké-rór-á 'we saw it'
 n-tw-áá-ké-rut-á 'we threw it'
 n-tw-áá-gé-sibór-á 'we untied it'
 n-tw-áá-gé-sóm-á 'we read it'
- b. n-tw-áá-bá-ge-sibór-ér-á 'we untied it for them'
 n-tw-áá-bá-ge-sóm-ér-á 'we read it to/for them'
- c. n-tw-áá-ké-rí-á 'we ate it'
 n-tw-áá-ké-rúg-á 'we cooked it'
 n-tw-áá-ké-róm-á 'we bit it'
 n-tw-áá-gé-súgum-á 'we pushed it'
 n-tw-áá-ké-bwáat-á 'we caught it'
- d. n-tw-áá-bá-ge-súgum-er-á 'we pushed to/for them'
 n-tw-áá-bá-ké-bwáat-er-á 'we caught it for them'
- e. n-tw-áá-ké-rug-á 'we cooked it'
 n-tw-áá-ké-rom-á 'we bit it'
 n-tw-áá-gé-sugúm-á 'we pushed it'
 n-tw-áá-ké-bwaat-á 'we caught it'

- f. n-tw-áá-bá-ge-sugúm-ér-á 'we pushed it to/for them'
 n-tw-áá-bá-ke-bwaat-ér-á 'we caught it for them'
 FOC-IPL-TAM-OP2-OP7-catch-APPL-FV

In stems with \emptyset verb roots in (14a) and (14b), the tone pattern is M2F. The first (or only) OP is H as a result of HTS from the preceding -á- TAM prefix. The second OP in (14b) is \emptyset , as expected. Turning to stems with a /H/ root, the FV tone pattern is seen with H on the one or two OPs in (14c) and (14d) vs. the M2F pattern with H only on the first (or only) OP in (14e) and (14f). Again, this is identical to what was seen for /H/ roots in TP II. Hence, the alternates in (14) can be accounted for by the same rule options in (11).

This completes our discussion of Bickmore's three tone patterns. As demonstrated, mapping of the grammatical H to the stem requires a word-level phonological interaction with the preceding prefixes. In the following section, we present further evidence from some additional minor patterns which diverge from TP I–III.

6. Other tone patterns

In the preceding sections, we have seen that different Ekegusii TAMs are expounded by one of four suffixal stem tone patterns, which we number TP 0–III in Table 1. As also seen, we have added three more tone patterns, TP IV, TP V and TP VI (P = penult), which will be discussed in this section.

Setting aside TP VI for the moment (where the suffixal H maps from the M2 to the penult), the cells in Table 1 all contain one of the three tonal possibilities we have seen in preceding discussion: \emptyset , M2F and FV. Not indicated in the table is the M1 root /H/ in all of the TPs (which spreads to M2 in the \emptyset cells) or the M1 H on \emptyset tone roots which results from HTS from a preceding /H/ prefix. Thus, in TP I, the H span begins from the M1 if the root is /H/, otherwise from M2, and similarly for TP VI. Perhaps the most basic distinction is between the \emptyset cells, which are not assigned a grammatical H, and the others, which are. This clearly is a morphological issue. The second is whether the differences seen in cells with a suffixal H can be predicted from the tone of the immediate pre-stem prefix, as Bickmore proposed, or whether morphological information is also needed. In other words, is the choice

Table 1. *Stem tone patterns in Ekegusii.*

	H root	\emptyset root	context (Bickmore)
TP 0	\emptyset	\emptyset	
TP I	M2F	M2F	after \emptyset
TP II	FV	M2F	after derived H
TP III	FV	FV	after underlying H
TP IV	M2F	FV	
TP V	\emptyset	M2F	
TP VI	M2P	M2P	

between M2F and FV mapping based purely on the word-level phonological context, or must reference be made to the morphology and syntax (TAM, polarity, clause type), as in most other Bantu languages? As seen in the context column in Table 1, Bickmore suggests that TP I–III can be predicted from the tone of the preceding prefix. While this works in the majority of cases, we will now briefly present the exceptional TPs IV–VI, which also support the main point of this article, that the stem tone patterns require ‘outer’ access to properties of the full word.

6.1 Tone Pattern IV

TP IV has been found only in the main and relative clause affirmative forms of two related TAMs. The first is identified by Cammenga (2002: 480) as a generic expressing an ‘untimed truth or fact’:

- | | | | |
|------|----|------------------------|-----------------------------|
| (15) | a. | tó-rór-été | ‘we see’ |
| | | tó-rút-été | ‘we throw’ |
| | | tó-síbor-été | ‘we untie’ |
| | | tó-síbor-er-an-été | ‘we untie for each other’ |
| | | tó-sóom-été | ‘we read’ |
| | | tó-sóom-ér-án-été | ‘we read to/for each other’ |
| | b. | tó-rí-été | ‘we eat’ |
| | | tó-rúg-été | ‘we cook’ |
| | | tó-róm-été | ‘we bite’ |
| | | tó-súgúm-été | ‘we push’ |
| | | tó-súgúm-ér-án-été | ‘we push to/for each other’ |
| | | tó-bwáát-été | ‘we catch’ |
| | | tó-bwáát-ér-án-été | ‘we catch for each other’ |
| | | IPL-catch-APPL-REC-TAM | |

As seen in (15), the tone patterns are the reverse of TP II: \emptyset root verb stems have FV tone in (15a), while /H/ root verb stems have M2F in (15b). Since the preceding (and only) prefix *tó-* ‘IPL subject’ has an underlying /H/ tone, (15a) is as expected. However, (15b) curiously has the M2F pattern of TP I which Bickmore predicts to occur only when the preceding prefix is output toneless, not H.

Cammenga (2002: 471) identifies the other TP IV TAM as ‘resultative present perfect’, although we prefer ‘inverse present perfect’, to indicate that the subject is not the actor, rather occurs as the object in the resulting state. The form is identical to the untimed truth TAM except that it ends in *-ire* (although we have added an applicative suffix in three examples, realised *-é-* and *-é-*):

- | | | | |
|------|----|---------------|----------------------------|
| (16) | a. | tó-rór-iré | ‘we have been seen now’ |
| | | tó-rút-iré | ‘we have been thrown now’ |
| | | tó-síboir-é | ‘we have been untied now’ |
| | | tó-sóom-é-iré | ‘we have been read to now’ |

- b. tó-róm-íré 'we have been bitten now'
 - tó-súgúm-íré 'we have been pushed now'
 - tó-súgúm-é-íré 'we have been pushed to now'
 - tó-bwáát-íré 'we have been caught now'
 - tó-bwáát-é-íré 'we have been caught for now'
- IPL-catch-APPL-REC-TAM

As seen, the ∅ root verbs take the FV H tone pattern in (16a), while /H/ root verb stems are all H in (16b). No other TAMs have been found which take TP IV, although the same TP IV is found in the corresponding relative clauses: á-↓bá-rút-eté 'the ones who throw', á-↓bá-rúg-été 'the ones who cook', á-↓bá-rút-íré 'the ones who have been thrown' and á-↓bá-róm-íré 'the ones who have been bitten' (where ↓ indicates the lowering or 'downstepping' of the following H tones).

The question is whether one can provide a phonological account for the unexpected reversal of the FV and M2F patterns in TP IV or whether morphological marking is required. To apply Bickmore's context generalisation and assign the M2F pattern in (15b) and (16b), we need the H tone subject prefix to be interpreted as ∅, but only when the root is /H/. The most direct way would be for the SP to have a polar tone: ∅ before /H/ verb roots, H before ∅ roots. This, however, would have to be followed by an *ad hoc* rule attracting the root /H/ onto the toneless SP only in these TAMs.¹⁶ Another possibility is that the SP is ∅, but is preceded by a floating H tone, as in (17), where +H represents the grammatical H:

- (17) a. /'to-rut-ete/ → tó-rut-ete → tó-rút-ete → tó-rút-été 'we throw'
-
- b. /'to-rúg-ete/ → to-rúg-ete → to-rúg-été → tó-rúg-été 'we cook'
-

As seen, the inputs maintain a general ∅ SM /to-/ preceded, however, by a floating H tone. In (17a), the floating H links to the SP and then triggers HTS onto the toneless root. Since the M1 is now H, the suffixal H then links only to the FV. In (17b), the floating H initially stays floating, since to link would place it adjacent to the M1 H of the root. Since to- is still toneless, the M2F pattern is next assigned. The last step is for the floating H to link to the SM.

While one might propose other exceptional marking of the SP or an exceptional rule, the above shows one way that the reverse unexpected mapping of the grammatical H can be made to follow from Bickmore's contextual phonological conditioning as in TP I–III. Since TP IV has been found only in these two TAMs, it could equally well be implemented by direct reference to the appropriate morphosyntactic features.

¹⁶Note also the curious fact that these two TAMs are the only main clause forms that have an initial underlyingly /H/ SP, i.e. not preceded by a focus or negative prefix. Most SPs are /H/ in relative clauses (§7) and in the subjunctive.

6.2 Tone Pattern V

TP V is limited to the imperative affirmative, used both for singular and plural addressees. As seen in (18), stems with a \emptyset root acquire the M2F pattern, while those with a /H/ root have no suffixal H, hence a polar tone pattern:

- (18) a. rər-á ‘see!’
 rut-á ‘throw!’
 sibór-á ‘untie!’
 sibór-ér-á ‘untie for!’
 sóóm-á ‘read!’
 sóóm-ér-á ‘read to!’
- b. ka-rí-á ‘eat!’
 rug-á ‘cook!’
 rom-á ‘bite!’
 súgúm-a ‘push!’
 súgúm-er-a ‘push to!’
 bwáat-a ‘catch!’
 bwáat-er-a ‘catch for!’
 catch-APPL-FV

The \emptyset root verbs in (18a) follow the M2F pattern without any complication. The /H/ root verbs in (18b) clearly have no suffixal H, although CVCV stems delink the H of their first syllable. (Monosyllabic verb roots are all /H/ and take a *ka-* prefix in the imperative.) Interestingly, since there is no prefix, Bickmore’s generalisations do not apply. While it would seem that the absence of a prefix might be equated with a \emptyset tone prefix in order for \emptyset tone roots to acquire the M2F pattern and /H/ tone roots to delink their M1 H, this does not explain why /H/ roots do not receive a suffixal H. Although TP V directly reflects Meeussen’s (2014: 34) ‘contrastive’ imperative tone pattern (H after \emptyset , \emptyset after H), since no other TAM is marked in this way, we assume that a specific exceptional assignment is necessary (cf. Schadeberg 1989: 37–38).

6.3 Tone Pattern VI

TP VI is also very restricted, having been found in only two contexts. The first is when an OP is added to the imperative affirmative:

- (19) a. kε-rór-ε ‘see it!’
 kε-rút-e ‘throw it!’
 ge-sibór-e ‘untie it!’
 ge-sóóm-ε ‘read it!’
- b. ba-ge-sibór-ér-e ‘untie it for them!’
 ba-ge-sóóm-ér-ε ‘read it to/for them!’

c.	ge-sí-é	‘grind it!’
	ke-rí-é	‘eat it!’
	ke-rúg-e	‘cook it!’
	ke-róm-e	‘bite it!’
	ge-súgúm-e	‘push it!’
	ke-bwáát-ε	‘catch it!’
d.	ba-ge-súgúm-ér-e	‘push it to/for them!’
	ba-ke-bwáát-ér-e	‘catch it for them!’
	OP2-OP7-catch-APPL-FV	

First note that the OP conditions a change of the FV /-a/ of the bare imperative seen in TP V to /-ε/, another outward-looking effect.¹⁷ Tonally, TP VI appears to be related to the M2F of TP I except that the suffixal H maps only as far as the penultimate syllable. The toneless roots in (19a) thus show an M2P pattern with one OP, while the same pattern is observed in (19b) with two OPs. /H/ roots realise their M1 H followed by the same M2P suffix H mapping both with one OP in (19c) or two in (19d). The second environment concerns the relative forms of certain TAMs whose SP has ∅ tone. Since this provides an even more convincing case of ‘outward’ grammatical tone mapping, it will be treated separately in the following section.

7. Initial/final tone agreement

As seen in the preceding sections, six tone pairings have been found in verb stems. In this section, we address a phenomenon that affects 9 of the 80 filled cells outlined in black in Table A.1 in the Appendix. As reported in a number of other Bantu languages (Nsuka Nkutsi 1982: 189; Schadeberg 1989; Bickmore 2007: 246; Hyman 2012: 109, 2014: 48–50; Rolle & Bickmore 2022) and proposed as a reconstruction in Proto-Bantu (Meeussen 1967: 113–114), certain TAMs in Ekegusii subject relative clauses show a curious tonal agreement between the subject prefix at the left edge and the final vowel at the right edge.¹⁸ To begin, consider the TP III forms of the subject relative clause today past negative (Past1) with a H tone human plural class 2 SP *bá-*:¹⁹

¹⁷The FV /-ε/ harmonises to [e] after all vowels except /a/. The fact that OPs have special properties is not unique to Ekegusii, as numerous studies have shown the need for an OP+verb stem constituent known as the ‘macro-stem’, e.g. in Kinande (Mutaka 1994: 17–20). Another noteworthy fact is that forms like *ge-sóm-ε* ‘read it!’ and *ke-bwáát-ε* ‘catch it!’ provide the only H-L pattern on a CVVC-V stem that we have found. Recall from §2 that an M1 /H/ does not trigger HTS in a CVVC-V stem, e.g. *ko-bwáat-a* ‘to catch’, since **ko-bwáát-a* is otherwise avoided.

¹⁸While Meeussen (1967: 113) refers to the agreement as tonal harmony, the first author recalls from the 1972 Colloquium on African Languages and Linguistics (CALL, Leiden University) Meeussen and others discussing it as the Law of Initials and Finals. In their study of Cilungu, Rolle & Bickmore (2022) refer to it as ‘first–last tone harmony’.

¹⁹Relative forms are presented as they would appear after a head noun: *ábanto bá-tá-á-síbor-á* ‘(the) people who didn’t untie’, *ábanto bá-tá-á-súgum-á* ‘(the) people who didn’t push’, etc. In the absence of a head noun, an additional ‘augment’ must be used, e.g. class 2 /á-/ in *á-bá-tá-á-síbor-á* ‘they/the ones who didn’t untie’ and class 8 /é-/ in *é-bí-tá-á-súgum-á* ‘the ones which didn’t push’ (cf. (4) and (6) above). The presence or absence of a head noun or augment does not affect the tone pattern of the verb stem.

- (20) a. bá-tá-á-rór-á '...who didn't see'
 bá-tá-á-rút-á '...who didn't throw'
 bá-tá-á-síbor-á '...who didn't untie'
 bá-tá-á-síbor-er-an-á '...who didn't untie for each other'
 bá-tá-á-sóòm-á '...who didn't read'
 bá-tá-á-sóòm-ér-án-á '...who didn't read to/for each other'
- b. bá-tá-á-rí-á '...who didn't eat'
 bá-tá-á-rúg-á '...who didn't cook'
 bá-tá-á-róm-á '...who didn't bite'
 bá-tá-á-súgum-á '...who didn't push'
 bá-tá-á-súgum-er-an-á '...who didn't push to/for each other'
 bá-tá-á-bwáat-á '...who didn't catch'
 bá-tá-á-bwáat-er-an-á '...who didn't catch for each other'
- SP2-TAM-catch-APPL-REC-FV

The forms in (20) have the same TP III FV H patterns that were exemplified in §5: Both \emptyset and /H/ root verbs have a H on their M1 and their FV, with the exception of *bá-tá-á-sóòm-ér-án-á* '...who didn't read to/for each other', whose H on the third to last moras was addressed in §5. A H on the FV is found in every main clause TAM with TP III as well as relative clause TAMs whose SP is underlyingly /H/, as in the case of human plural class 2 /bá-/ and most other noun classes (cf. plural class 8 /bí-/: *bí-tá-á-síbor-á* '...which didn't untie', *bí-tá-á-súgum-á* '...which didn't push').

While most SPs in subject relative clauses have the shape CV- with /H/ tone, the three classes with an SP of shape V- are \emptyset tone: singular human class 1 *o-*, plural class 4 *e-* and singular class 9 *e-*. Now compare the corresponding singular forms with singular human class 1 *o-* in (21).²⁰

- (21) a. o-tá-á-rór-a '...who didn't see'
 o-tá-á-rut-a '...who didn't throw'
 o-tá-á-síbor-a '...who didn't untie'

²⁰Curiously, the H of the TAM prefix /-á-/ does not trigger HTS when the verb stem is toneless in (21a) vs. (20a). In the first three examples of (21b), the H of the M1 has undergone HTS and initial delinking, as originally seen in the examples in (4). All of this suggests a L effect between /-á-/ and the stem. In the absence of a head noun, class 1 requires the augment *oyo-*, derived from the class 1 proximal demonstrative *oyo* 'this'. Note that class 1 exhibits another widespread Bantu property of having a different SP form *o-* in subject relative clauses vs. *a-* in main and other clause types, e.g. *a-síbor-á* 's/he unties', *a-súgum-á* 's/he pushes'. The reason for citing the negative Past1 forms in (21) is that toneless *o-* fuses with the affirmative TAM prefix *-á-* as *ó-*, thereby obscuring the initial/final tonal agreement in the output: /o-á-síbor-a/ → *ó-síbor-a* '...who (sg.) untied' (cf. *bá-á-síbor-á* '...who (pl.) untied'). Note, however, that while all subject relatives spell out the class 1 SP as *o-*, not all show the initial/final agreement. Thus, corresponding negative relative of the generic TAM in (23) below shows no tonal difference in TP III *bá-tá-súgum-etí* '...who don't push', *o-tá-súgum-etí* '...who doesn't push'.

	o-tá-á-sibor-er-a	‘...who didn’t untie for’
	o-tá-á-soom-a	‘...who didn’t read’
	o-tá-á-soom-er-a	‘...who didn’t read to/for’
b.	o-tá-á-ri-a	‘...who didn’t eat’
	o-tá-á-rug-á	‘...who didn’t cook’
	o-tá-á-rom-á	‘...who didn’t bite’
	o-tá-á-súgúm-a	‘...who didn’t push’
	o-tá-á-súgúm-er-a	‘...who didn’t push to/for’
	o-tá-á-bwáat-a	‘...who didn’t catch’
	o-tá-á-bwáat-er-a	‘...who didn’t catch for’
	SPI-NEG-TAM-catch-APPL-FV	

As seen, the \emptyset root stems are completely toneless in (21a), while the /H/ root stems in (21b) have only the M1 H, which spreads onto M2 (except *o-bwáat-a* ‘...who caught’, as we saw in §2). What is clear is that the suffixal H is not present when the SP is toneless. This remains so when OPs are present:

(22)	a.	o-tá-á-kε-rɔr-a	‘...who didn’t see it’
		o-tá-á-ke-rut-a	‘...who didn’t throw it’
		o-tá-á-ge-sibor-a	‘...who didn’t untie it’
		o-tá-á-to-ge-sibor-er-a	‘...who didn’t untie it for us’
		o-tá-á-ge-soom-a	‘...who didn’t read it’
		o-tá-á-to-ge-soom-er-a	‘...who didn’t read it to/for us’
	b.	o-tá-á-ke-rí-á	‘...who didn’t eat it’
		o-tá-á-ke-rúg-á	‘...who didn’t cook it’
		o-tá-á-ke-róm-á	‘...who didn’t bite it’
		o-tá-á-ge-súgúm-a	‘...who didn’t push it’
		o-tá-á-to-ge-súgúm-er-a	‘...who didn’t push it to/for us’
		o-tá-á-ke-bwáat-a	‘...who didn’t catch it’
		o-tá-á-to-ke-bwáat-er-a	‘...who didn’t catch it for us’
		SPI-NEG-TAM-IPL-OP7-TAM-catch-APPL-FV	

The diachronic source of the SP/FV tonal agreement has been known for some time. As stated by Meeussen (1971: 10; emphasis in the original): ‘...instead of tonal harmony at a distance, there is a *repetition of the initial morpheme at the end of the word*, but in such a way that it is reduced to mere [high] tone – except if this repetition is propped up by a pronominal (-e) or anaphoric (-o) support, as in Swahili...’ (cf. Schadeberg 1989; Hyman 2022). While the facts differ, after considering different synchronic interpretations of initial/final tonal agreement occurring in a small set of TAMs in Cilungu, Rolle & Bickmore (2022) opt for an allomorphy solution, rather than a morphologically conditioned phonological rule that would delete the final H just when the SP is \emptyset in the affected relative TP III TAMs.

There is a complication, however. Absence of the final H in (21) and (22) is a pattern that occurs only in the TP III relative forms that show initial/final tone agreement (see the black-outlined orange cells in the Appendix). A different sensitivity to the tone of the SP is found in TP IV which, recall, inverts the FV and M2F tone patterns of TP II, and also in one TP I TAM, the dubitative perfect. Consider first the relative forms with the H human plural class 2 SP *bá-* in the TP IV generic TAM seen earlier in (15).

- (23) a. *bá-rór-été* '...who see'
bá-rút-été '...who throw'
bá-síbor-été '...who untie'
bá-síbor-er-an-été '...who untie for each other'
bá-sóom-été '...who read'
bá-sóom-ér-án-été '...who read to/for each other'
- b. *bá-rí-été* '...who eat'
bá-rúg-été '...who cook'
bá-róm-été '...who bite'
bá-súgúm-été '...who push'
bá-súgúm-ér-án-été '...who push to/for each other'
bá-bwáát-été '...who catch'
bá-bwáát-ér-án-été '...who catch for each other'
- AUG-SP2-catch-APPL-REC-TAM

The \emptyset root verbs have an FV stem tone pattern in (23a), while the /H/ root verbs have an M2F stem tone pattern in (23b), hence TP IV. Now compare with the corresponding singular human class 1 forms in (24).

- (24) a. *o-rór-éte* '...who sees'
o-rut-éte '...who throws'
o-sibór-éte '...who unties'
o-sibór-ér-éte '...who unties for'
o-sóom-éte '...who reads'
o-sóom-ér-éte '...who reads to/for'
- b. *o-rí-éte* '...who eats'
o-rúg-éte '...who cooks'
o-róm-éte '...who bites'
o-súgúm-éte '...who pushes'
o-súgúm-ér-éte '...who pushes to/for'
o-bwáát-éte '...who catches'
o-bwáát-ér-éte '...who catches for'
- SPI-catch-APPL-TAM

As seen, with the class 1 \emptyset tone SP *o-*, we now obtain TP VI, i.e. H from the M2 to the penult. In (24b), the only change from the M2F mapping in (23b) is that the final syllable is \emptyset . However, in (24a), instead of the FV H pattern in (23a), the H also maps from the M2 to the penult. The reason for this differ realisation is clear from what we have seen above: In this TAM, the SP occurs immediately before the verb stem. Thus, when a \emptyset tone SP is substituted for a /H/ SP, the M2F tone patterns is assigned, as per Bickmore's generalisation. This M2H pattern is then subjected to the delinking of the H of the FV to agree with the subject \emptyset tone. Support for this is seen from the dubitative perfect in (25), the only TP I TAM which shows initial/final tone agreement. As illustrated with the verbs *-sibor-* 'untie' and *-súgum-*, M2F is observed in (25a) vs. M2P in (25b).

- (25) a. bá-gá-sibór-été '...who (pl.) might have untied'
 bá-gá-súgúm-été '...who (pl.) might have pushed'
 b. o-ga-sibór-éte '...who (sg.) might have untied'
 o-ga-súgúm-éte '...who (sg.) might have pushed'
 SPI-TAM-push-TAM

While we must arbitrarily identify which cells will be affected, we can conclude, following Meeussen, that the tonal agreement is what is left of an earlier case of multiple exponence, where a final segmental relative enclitic was marked for noun class with the same noun class tone as the subject prefix (\emptyset in classes 1, 4 and 9 vs. H in the others).²¹ What we are left with is a case where the tonal pattern of the stem must know what the tone is of the SP, hence a quite dramatic case of the stem having to look outward to the full word – contrary to a cyclic or stratal phonology.

8. Discussion

In the preceding sections, we have established that there are six different mapping patterns of suffixal H. Three of these directly follow Bickmore's TP I–III phonological conditioning, of which TP I and TP III are quite general, while TP II and TP IV–VI are more restrictive. As mentioned, it is quite unusual for suffixal H mapping differences to be phonologically predictable. In other Bantu languages, the distributions are determined by specific TAMs, which may have different realisations in affirmative vs. negative and main vs. relative clause. In Bickmore's analysis, the presence vs. absence of a suffixal H is encoded by the M2 accent, which then plays a role in determining the mapping of the same input suffixal /H/. This is clearly an innovation which works for the core TAMs but not some of the outliers. In §7, we saw that the dubitative perfect

²¹In some languages such as Cilungu (Rolle & Bickmore 2022), the initial/final tone agreement may have spread from relative to main clauses (cf. Schadeberg 1989: 38–40). On the other hand, the M2P tone of imperative TP VI is not likely to represent a tonal agreement with the toneless OP, at least historically, since some of the OPs reconstruct with H tone (Meeussen 1967: 97). Unfortunately there is no H tone OP to test the relation in Ekegusii, as even the historically H tone reflexive prefix is realised \emptyset in the imperative: *e-sibór-ér-e* 'tie for yourself!', *e-súgúm-ér-e* 'push towards yourself!'. Its historical *H is seen only in TP 0, where it assigns a H to M1 of toneless stems, as in the present TAM: *tó-ó-gó-sibor-a* 'we untie', *tó-ó-gó-e-sibor-a* 'we untie ourselves'.

was the only TP I TAM whose relative forms showed initial/final tone agreement. This TAM in fact shows another irregularity in the main clause affirmative:

- (26) a. n-tó-ká-rər-été 'we might have seen'
 n-tó-ká-rut-été 'we might have thrown'
 n-tó-gá-sibór-été 'we might have untied'
 n-tó-gá-sibór-ér-án-été 'we might have untied for each other'
 n-tó-gá-sɔɔm-été 'we might have read'
 n-tó-gá-sɔɔm-ér-án-été 'we might have read to/for each other'
- b. n-tó-ká-rí-été 'we might have eaten'
 n-tó-ká-rúg-été 'we might have cooked'
 n-tó-ká-róm-été 'we might have bitten'
 n-tó-gá-súgúm-été 'we might have pushed'
 n-tó-gá-súgúm-ér-án-été 'we might have pushed to/for each other'
 n-tó-ká-bwáát-été 'we might have caught'
 n-tó-ká-bwáát-ér-án-été 'we might have caught for each other'
- c. *n-tó-ká-ri-été 'we might have eaten'
 n-tó-ká-rug-été 'we might have cooked'
 n-tó-ká-rom-été 'we might have bitten'
 n-tó-gá-sugúm-été 'we might have pushed'
 n-tó-gá-sugúm-ér-án-été 'we might have pushed to/for each other'
 n-tó-ká-bwaat-été 'we might have caught'
 n-tó-ká-bwaat-ér-án-été 'we might have caught for each other'
- IPL-TAM-TAM-catch-APPL-REC-TAM

As seen in (26a) and (26b), this TAM clearly takes TP I with the grammatical H assigned from the second mora to the final vowel. Note, however, that the stem is preceded by a derived H rather than a toneless prefix. The prefix /-ka-/ is underlyingly \emptyset but becomes H by HTS from the exceptionally H SP *tó-* in (26a). The two sets of examples in (26b) and (26c) show the same H tone plateauing and anticipatory H tone shift options from (11). Since the H of *-ká-* (~ *-gá-*) is derived, Bickmore would predict that we should get TP II here, as we saw with /-á-ka-/ in (9). In order to preserve Bickmore's account, we would have to say that HTS applies earlier to *-á-ka-* to produce a derived H that can impose TP II and applies later to *tó-ka-* so that the \emptyset of *-ka-* can condition TP I. Of course, we note that *-á-* is a tense marker, while *tó-* is a subject marker, but initial/final tone agreement tells us that the stem should have access to the SP as well as everything after it. We thus see that there is another case where assignment of the stem tone pattern has to be morphologically conditioned.

This TAM-specific finding and the need for 'whole-word' grammatical conditioning to produce TP IV–VI should not be surprising. As was shown in (1), the relevant morphological input is more fully expressed in the inflectional prefixes (SP-NEG-TAM-OP-) than in the suffixes. As seen in the [Appendix](#), the inflectional suffixes and tonal

melodies provide a limited number of contrasts which distinguish the meanings of the different cells only in conjunction with the prefixal exponents.²² Why then should we expect that the stem tonal melodies be mapped without reference to the rest of the verb? As mentioned in the introduction, within Bantu, there have been two reasons for viewing the prosodic stem as the relevant domain. First, as we have seen, the placement of H tones is calculated with respect to stem edges, thus M1, M2, FV. This is reinforced by the fact that Ekegusii, unlike certain other Bantu languages (cf. note 17), shows no need to include the OPs in calculating M2, for instance.

The second reason is that segmental phonology and prosodic morphology are often restricted to the stem (Downing 1999), e.g. vowel harmony and verb stem reduplication. Interestingly, Ekegusii is one of a minority of Eastern Bantu languages where root-controlled vowel harmony not only affects suffixes, but also prefixes (Hyman 1999: 240), as has been seen in many of the above examples where the infinitive prefix /ko-/ and the class 7 OP /ke-/ are realised *kɔ-/gɔ-* and *ke-/ge-* before the root vowels /ɛ/ and /ɔ/ (cf. Whiteley 1960: 3–4; Omwansa Mariera 2018, among others). However, unlike tone mapping, the root of the inner stem triggers the vowel harmony of the outer prefixes, rather than the reverse. Concerning reduplication, while other Bantu languages can copy the full verb stem, the more than 300 examples in Bosire & Machogu (2013) glossed ‘repeatedly, now and again’ show that verb reduplication is limited to a copied CVC-a structure followed by the full stem. The infinitive forms in (27) confirmed by HK show truncation of a longer lexicalised verb base.²³

(27)	a.	ko-rangeri-a	‘to call’	ko-rang-a+rangeri-a
		ko-busur-a	‘to sow, scatter seeds’	ko-bus-a+busur-a
		ko-nacherer-a	‘to omit’	ko-nach-a+nacherer-a
		go-tengeech-a	‘to tremble, shake’	go-teng-a+tengeech-a
	b.	go-kórór-a	‘to cough’	go-kór-á+kɔrɔr-a
		go-chárók-a	‘jump’	go-chár-á+charok-a
		ko-mámáant-a	‘touch gently’	ko-mám-á+mamaant-a
		go-kúndék-a	‘knot together’	go-kúnd-á+kundek-a

Taken together, vowel harmony and reduplication show a striking disregard for the stem domain, which has less importance in Ekegusii than in other Bantu languages. This is perhaps most noteworthy in the case of initial/final tone agreement.²⁴ As

²²Ekegusii does have some rather nice subregularities, such as those seen in the past tenses, where the suffixal distinctions are secondary to the prefixes. Thus, Past1 and Past2 are first classed together with the H prefix *-á-* and Past3 and Past4 with the \emptyset prefix *-a-*, and each pair is then distinguished by a temporally nearer FV *-a* vs. more distant *-ete*. While *-ete* might thus be interpreted as having an ‘anterior’ meaning, it is also used in the generic TAM, which is translated as an unmarked present in (15), (23) and (24). *-a* is the default FV on verbs both in Ekegusii and in Bantu in general.

²³Limitation to the FV *-a* is seen in forms such as the subjunctive, whose FV *-e* cannot appear in the bisyllabic reduplicant: *tó-bá-róm-á+róm-é* ‘let’s bite them repeatedly’, *tó-bá-súg-á+súgúm-é* ‘let’s push them repeatedly’ (**tó-bá-róm-é+róm-é*, **tó-bá-súgú+súgúm-é*, **tó-bá-súg-é+súgúm-é*).

²⁴We should not, however, assume that all Bantu languages with initial/final tone agreement show as much disregard for the stem domain. A more canonical language with initial/final tone agreement is Cilungu,

mentioned, Rolle & Bickmore (2022) propose that in Cilungu the H vs. L tone on the FV represents an allomorphy that must look outward to the subject SP tone. Another possibility is that initial/final tone agreement remains a case of synchronic multiple exponence (recall the quote from Meeussen) and can thus be compared to past tenses which are marked with either an *-á-* or *-a-* prefix, an *-a* or *-ete* final suffix and a tone pattern. While it is hard to determine what the empirical differences might be between these two approaches, they clearly agree that a cyclic ('bottom-up') or stratal ('inside-out') analysis would be quite awkward to implement, at best. Since tone provides part of the spell-out of the morphology, tonal dependencies between the 'inner' stem and 'outer' word morphology should be as unsurprising as segmental allomorphs – all of which can show different forms in main vs. relative clauses.

To summarise, Bickmore's (1997, 1999) case for outward phonologically conditioning of stem tone mapping is a reasonable approach to the majority TAMs where this works. There are, however, additional tone patterns that require separate treatment. While we have framed the discussion in terms of traditional derivational phonology, whether one were to instead adopt a constraint-based analysis, as in Bickmore (1999), and delve deeper into the properties of phonological vs. morphological conditioning, one truth shines through the Ekegusii material, supporting Rolle & Bickmore (2022): Stem tone cannot be assigned from inside out, i.e. stem first, then word. As we have repeatedly seen, the suffixal tones must have access to the prefixes. While we have attempted to provide a more comprehensive treatment of the grammatical tone assignment properties of Ekegusii, what we have left out are two things: (i) a more formal account in terms of a phonology–morphology–syntax interface model and (ii) further discussion of the reconstruction and historical development of the tonal facts (cf. Hyman 2022). We hope that the documentation in this article, the Appendix, and the Supplementary Material will stimulate further development of both in Ekegusii, in Bantu, and more generally wherever such phenomena may reside.

Appendix

Table A.1 presents the segmental and tonal properties of the 24 TAMs listed in the first column, as they appear in affirmative and negative main and relative clauses. The different tone patterns are marked by hatching and (in the online version) colours, as follows: TP 0: ∅ (yellow dots); TP I: M2F (green diagonal hatching), TP II: M2F-FV (orange cross-hatching), TP III: FV (red vertical hatching), TP IV: FV-M2F (solid light grey), TP V: ∅-M2F (solid dark grey), TP VI: M2P (blue horizontal hatching). Outlined cells indicate forms that are subject to initial/final tone agreement. Cells which do not occur in relative clauses are left white. The following abbreviations appear in the table: SP (subject prefix); OP (object prefix); R (root).

which both restricts vowel harmony to the stem and has full verb stem reduplication (Bickmore 2007: 30–39, 316–325). Both prefixal vowel harmony and truncated verb stem reduplication are clearly innovative in Ekegusii.

Table A.1. Realisation of TAMs in different clause types.

	Main Clause Aff	Rel Clause Aff	Main Clause Neg	Rel Clause Neg
Habitual	SP-R-a	SP-á-ko-R-a	ti-SP-:-ko-R-a	SP-tá-ko-R-a
Present	SP-:-ko-R-a	SP-á-ko-R-a	ti-SP-rí-ko-R-a	SP-a-táá-ko-R-a
Progressive	n-ko-R-a SP-ré	SP-á-ko-R-a	ti-SP-rí-ko-R-a	SP-tá-rí-ko-R-a
Perfect	SP-a-R-ire	SP-a-R-ire	ti-SP-ráa-R-a	SP-tá-ráa-R-a
Past1	SP-á-R-a	SP-á-R-a	ti-SP-R-eti	SP-tá-á-R-a
Past2	SP-á-R-ete	SP-á-R-ete	ti-SP-á-R-ete	SP-tá-á-R-ete
Past3	n-SP-a-R-a	SP-a-R-a	ti-SP-a-R-ete	SP-tá-a-R-a
Past4	n-SP-a-R-ete	SP-a-R-ete	ti-SP-a-R-ete	SP-tá-a-R-ete
Generic	n-SP-R-ete	SP-R-ete	ti-SP-R-eti	SP-tá-R-eti
Perf 'since'	SP-á-ka-R-ete		SP-táa-ka-R-ete	
Perfect Inverse	SP-R-ire	SP-R-ire	ti-SP-R-iri	SP-tá-R-iri
Past12 Inverse	SP-á-R-ire	SP-á-R-ire	ti-SP-á-R-ire	SP-tá-á-R-ire
Past234 Inverse	SP-a-R-ire	SP-a-R-ire	ti-SP-a-R-ire	SP-tá-a-R-ire
Future1=Prog	n-ko-R-a SP-ré	SP-á-ko-R-a	ti-SP-rí-ko-R-a	SP-tá-rí-ko-R-a
Future234	n-SP-ché SP-R-é	SP-:-ko-cha ko-R	ti-SP-ko-cha ko-R	SP-tá-rí-ko-cha ko-R-a
Imperative	R-a		tó-o-R-a	
+Obj prefix	OP-R-ε		tó-o-OP-R-a	
Subjunctive	SP-R-ε		ti-SP-:-R-a	
+Obj prefix	SP-OP-R-ε		ti-SP-OP-R-ε	
Should	SP-á-R-a		ti-SP-:-R-a	
Past23 consec	SP-ka-R-a		ti-SP-R-eti	
Dubitative pres	n-SP-R-e	SP-ráa-R-e	n-SP-:-kó-R-a	SP-tá-a-R-e
Dubitative perf	n-SP-ka-R-ete	SP-ka-R-ete	n-SP-ka-R-eti	SP-tá-ka-R-eti
Infinitive	ko-R-a		ko-tá-R-a	

Note: We have left out variants, e.g. indicators of TAMs that can appear both with and without the focus marker *n-*, and main clause negatives whose prefix *ti-* can be replaced by a homorganic nasal when the SP is consonant-initial. There are also more possibilities than the above, with other post-SP auxiliary-like elements such as *-ráa-*, which often has an attenuating meaning ('sort of do X') and *-nyá-*, which often has a continuous meaning ('be doing X'), which can appear in various TAMs with different semantic effects.

Supplementary material. An audio recording in which the authors read all the numbered examples in this article is posted as an online supplement at <https://doi.org/10.1017/S0952675723000118>.

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