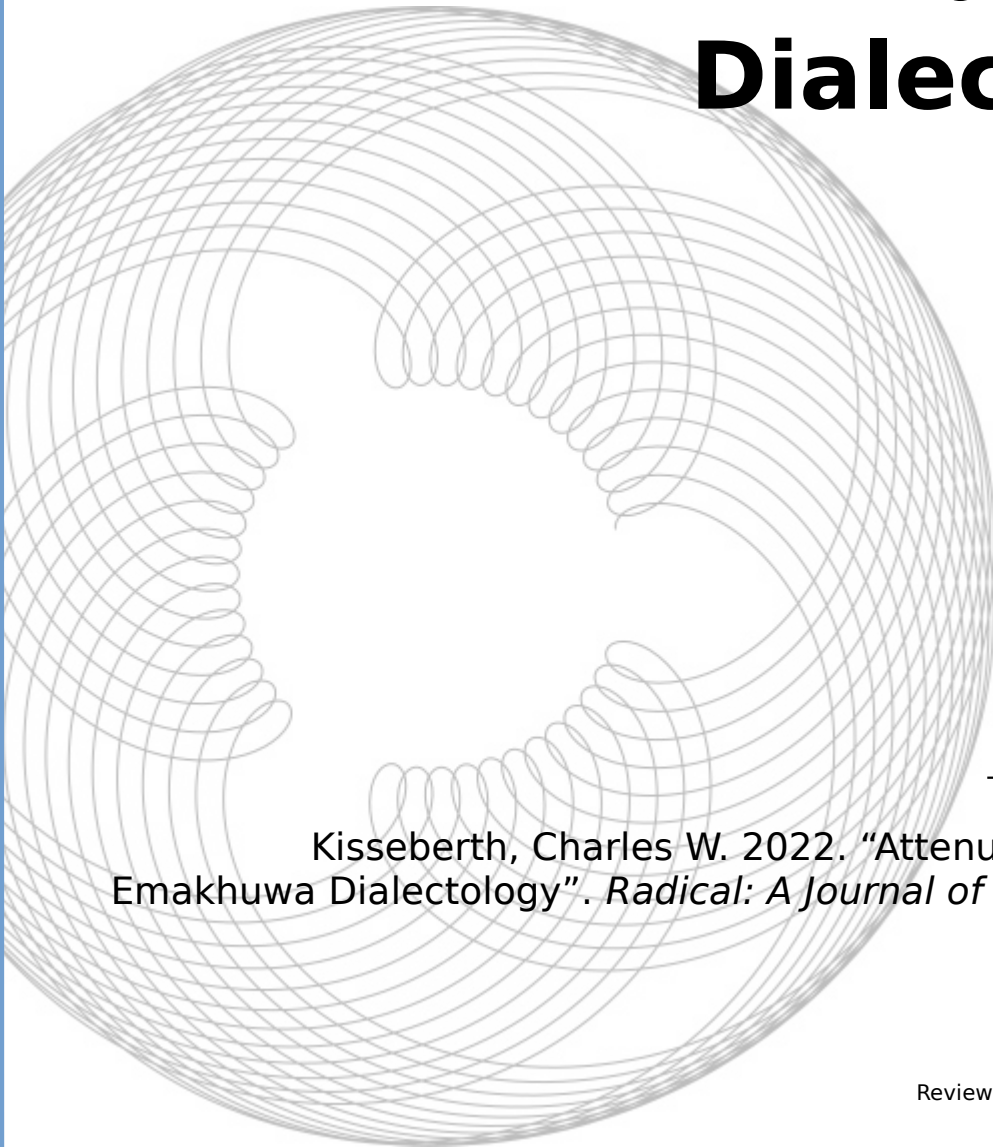


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ATTENUATED HIGH TONES IN EMAKHUWA DIALECTOLOGY

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Some Emakhuwa (Bantu, P30) dialects exhibit a phenomenon of High Tone Doubling, where underlying (or “primary”) H tones double onto the immediately following mora. Some of these dialects attenuate or weaken the primary H tone, once it has doubled, under certain conditions. This attenuation may be partial or complete. The present paper describes in detail the conditions under which attenuation occurs in these dialects. Since the attenuation phenomenon shows characteristics that are often associated with rules of phonetic implementation (e.g. it is exceptionless, in the case of partial attenuation it is a matter of degree of pitch height, it is not restricted to the lexicon), the paper examines the issue of whether attenuation could be located in the phonetic component of these dialects rather than the phonology. The conclusion is that attenuation is phonological in nature and not phonetic.

Bantu, Emakhuwa, Phonology, Phonetics, Tone

INTRODUCTION

This paper focuses on a tonal problem in Emakhuwa (P30 in Guthrie’s 1948 geographically-based classification of the Bantu languages). There is of course a large literature on Bantu tone (for recent surveys see Kisseberth & Odden 2003, Marlo 2013, Marlo & Odden 2019) and a much smaller literature on Emakhuwa tone (Cheng & Kisseberth 1979, 1980, 1981; Katupha 1983; Cassimjee & Kisseberth 1999a,b, 2003; Kisseberth 2003; van der Wal 2006, 2009, Kisseberth & Guérois 2014) that provides important context for the discussion. At the same time, the phenomenon examined has not been much documented/discussed in the general Bantu literature (as far as we are aware), but is of considerable significance for any theoretical or descriptive account of Emakhuwa.

The problem is this. All varieties of Emakhuwa exhibit a simple contrast between H-toned moras and toneless moras, with variation in the pitch height of the H-toned moras being primarily a consequence of what we can refer to as “downdrift intonation”, the widely observed phenomenon whereby a H tone separated from a preceding H tone by one or more toneless moras is realized at a somewhat lower pitch height. Furthermore, all Emakhuwa varieties assign H tones to words primarily on the basis of morphological considerations rather than lexical contrasts in the verb or noun stem. Call these H tones “primary” H tones. In addition, some dialects have a phonological rule of “High Tone Doubling” (=HTD), whereby a primary H tone doubles onto the immediately following mora. The problem that we examine in this paper is that in a subset of these “doubling dialects”, when a primary H tone has doubled onto the next mora, the primary H itself “attenuates” its pitch height, i.e. its pitch height does not rise to the level expected for a H tone (in the position in the utterance where the H tone is located). There seem to be two subcases: in one instance the attenuation is “complete” in that the primary H tone does not have a pitch height that distinguishes it from a toneless mora; in the other instance the attenuation is “partial” in that while lowered, the primary H tone is raised

sufficiently to make it distinct from a toneless mora. Whether one is dealing with complete or partial attenuation may be somewhat uncertain at times, but the existence of attenuation itself is quite clear. The core of the problem is figuring out what determines when attenuation occurs and when it does not.

After providing an account of attenuation in Emakhuwa dialects, we discuss the broader implications of the phenomenon for phonological theory. It is a commonplace of phonological theory to distinguish between *phonetic* phenomena and *phonological* phenomena, assigning each to its own module of the grammar. A popular view is that phonetics deal with degrees of a feature while phonology deals with +/- feature values. In this account, attenuation would seem to be a phonetic phenomenon (at least in terms of the partially attenuating dialects). A second, claimed generalization about phonetic rules is that they are exceptionless. Attenuation (and even the High Tone Doubling with which it is tied) are essentially exceptionless rules, in the sense that there are no cases where there is any need to state that a particular morpheme fails to obey the rule in question. Given that High Tone Doubling and Attenuation exhibit the main characteristics of phonetic rules, we take a closer look at the implications of any attempt to regard them as phonetic rules and not phonological rules.

Before turning to our examination of the attenuation phenomenon, a few preliminary remarks are in order. We cite a variety of Emakhuwa forms and in each case identify the mora bearing a primary H tone by underlining it. We do not attempt to justify the claim that a particular mora bears a primary H tone. The literature discusses in detail the patterns of H tone assignment in verbs in Emakhuwa, and while they are complex, they are for the most part not controversial. They largely involve the assignment of H tones to one or more mora in the verb stem (often referred to as “melodic H tones”). These principles often refer to the position of a mora in the so-called macrostem, which consists of an object marker (if one is present) and the verb root plus all subsequent affixes and the final vowel that obligatorily occurs at the end of the verb.

Our tone marking involves marking a mora with a fully H tone with an acute mark over the mora. A partially attenuated primary H tone is indicated by an umlaut symbol above the vowel (the vowel is of course also underlined since it is a primary H tone). A completely attenuated primary H has no mark above the mora, thus its underlining is the sole indication that the mora is the location of a primary H tone. A falling tone on a single mora is represented by a circumflex symbol over the vowel. Only a final or a penult monomoraic vowel (in the utterance) bears a falling tone. Utterance-final H tones commonly have a falling quality in many dialects. Utterance penult falling tones are restricted to doubled H tones and occur only in a subset of doubling dialects.

1 LANGUAGE AND LANGUAGE BACKGROUND

The Emakhuwa language is spoken primarily in northern Mozambique, but the movement of people has carried the language into southern Tanzania and southern Malawi. Some dialects of Emakhuwa have been traditionally referred to as Elomwe. These dialects are spoken in Zambezia Province in Mozambique and in Malawi. There is little that unites Malawian Elomwe linguistically with Mozambican Elomwe, and little to distinguish either from Emakhuwa more generally. There are at best a few lexical items that are common to all so-called Elomwe varieties.

Non-doubling dialects are concentrated in the interior of Mozambique and in Malawi. Doubling is characteristic of coastal varieties in Mozambique stretching from Pemba in the north to Moma in the south. We have identified four attenuating dialects to date: (a) Imitthupi, spoken in Masasi district in Tanzania, but whose oral tradition claims an origin in the region of the Ilha de Moçambique; (b) two dialects to the north of Ilha: Emwaaja, spoken in Mazua in the Memba district of Nampula, and Eratti, spoken in the Erati district of Nampula; (c) one dialect spoken on the southern Nampula coast, Enlai, in Angoche district. This paper focuses on the dialects for which we have

the most data: Imitthupi, Eeratti, and Enlai, but with some inclusion of examples from our more restricted Emwaaja data.

Our research on Imitthupi was far and away the most extended and most intensive. We gathered data from John Wembah-Rashid during the first half of the 1980s. This research took place in the United States while Wembah completed a Ph.D. in cultural anthropology at the University of Illinois. Our research on Enlai took place over several years in the 1990s, when we were assisted by Francisco Ussene Mucanheia in Maputo and in the course of joint research in Nampula. This research benefitted immensely from Chico's linguistic abilities, but was restricted to a number of fairly short research periods. Our research on Eeratti occurred by happenstance during a month-long visit to Montepuez in northern Mozambique, where a native speaker of Eeratti, Weliha, was working for John Isemenger of the Summer Institute of Linguistics. Because we were able to work together each day during that visit, substantial material on Eeratti was collected. Our work on Emwaaja with Jorge Junior was restricted to a few hours.

All data in the paper are drawn from our own research, which began in 1977 and has continued into the present. The labels used to identify examples from the dialects referenced are given below:

Eeratti (Erati district, Nampula Province, Mozambique): ^{Er}

Emwaaja (Memba district, Nampula Province, Mozambique): ^{Mwa}

Enlai (Angoche, Nampula Province, Mozambique): ^{En}

Esaaka (Cabo Delgado Province, Mozambique): ^{Es}

Ikorovere (Tunduru district, Tanzania): ^K

Imitthupi (Masasi District, Tanzania): ^{Mi}

Mugeba (Zambezia Province, Mozambique): ^{Mug}

2 HIGH TONE DOUBLING

While not all Emakhuwa dialects exhibit High Tone Doubling, those that do share one fundamental fact: only a primary H tone doubles. A doubled H tone does not itself double. A second shared principle is that if there is a situation that demands the deletion of a primary H tone, then this deletion entails that any potential double will also not occur in the surface form. We should note that there are two characteristic features about primary H tones in doubling dialects: (1) adjacent primary H tones essentially do not occur in underlying representations and (2) primary H tones do not generally occur on the last mora of a word, the principal caveat being that the verb in certain tenses (referred to as conjoint tenses in the linguistic literature, cf. van der Wal and Hyman 2017) may end in a final primary H tone. Final primary H tones do occur in many non-doubling dialects, but adjacent primary H tones are also largely disallowed in such dialects.

Most doubling dialects restrict doubling to some extent. If a dialect restricts HTD, then one of its restrictions is that an H tone may not double onto the final mora of the utterance. We refer to this as the Non-finality restriction. A second widely observed restriction is that a primary H on the first mora of a bimoraic syllable may not double when that syllable is penult in the utterance. We call this the Long Fall restriction. A third common restriction is in fact a generalization of the Long Fall restriction: it bars an antepenult mora in the utterance from doubling onto the penult mora. We call this the Antepenult restriction. The Antepenult restriction exists only in dialects that also have the Long Fall restriction, while dialects with the Long Fall restriction do not necessarily have the Antepenult restriction. Significantly, we have observed a few dialects where Nonfinality is not obeyed, and in every case neither Long Fall nor Antepenult are obeyed.

We will illustrate these three restrictions by citing some infinitive verbs and nouns in non-attenuating dialects. In (1) we illustrate examples where there is a primary H on the

penult mora of the word and HTD fails, and then cite a morphophonemically related word where the H tone is no longer on the phrase-penult mora and is able to double. The examples come from Ikorovere.

- (1) [u-thúma]^K ‘to buy’ (with no doubling), but [u-túmiha]^K ‘to sell’ (where the primary H is in antepenult position and it is the penult mora that is the target of HTD)
- [u-váha]^K ‘to give’ (with no doubling), but [u-váháca]^K ‘to give (plural)’
- [u-móra]^K ‘to fall’ (with no doubling), but [u-móréla]^K ‘to fall in, to’
- [naáhe]^K ‘gazelle’ (with no doubling), but [naáhy’ óoyo]^K ‘that gazelle’
(from: /naáhe uyo/)
- [kapwítthi]^K ‘gun’ (with no doubling), but [kapwítthy=áaka]^K ‘my gun’ (from: /kapwítthi=aka/)
- [m-oóno]^K ‘arm’ (with no doubling), but [m-oón’ óoyo]^K ‘the arm’
(from: /m-oóno uyo/)

The Long Fall restriction accounts for the data in (2), again drawn from Ikorovere.

- (2) [u-máala]^K ‘to be quiet’, [u-mááliha]^K ‘to make quiet’
- [u-khúra]^K ‘to chew’, [u-khúréla]^K ‘to chew with’
- [u-hóola]^K ‘to go in front’, [u-hóóléla]^K ‘to go in front of someone’
- [u-cúulu]^K ‘grandchild(ren)’, [u-cúúlw=aaka]^K ‘my grandchil(ren)’
- [ni-godóoro]^K ‘mattress’, [ni-godóoro nno]^K ‘the mattress’
- [n-káanda]^K ‘belt’, [n-káánd’ ooyo]^K ‘the belt’

The third restriction, Antepenult, is – to our knowledge – found in more northerly dialects like Esaaka and Enahara, and Imetto. Ikorovere, also a northern dialect, does

not have this restriction, however, nor do any attenuating dialects that we have encountered. (3) illustrates the non-application of HTD in Esaaka when the primary H is in antepenult position in the utterance, versus the application of HTD when further forward in the utterance.

- (3) **[o-rúkula]**^{Es} ‘to pick, pluck’, but **[o-rúkúl’ e-páphaya]**^{Es} ‘to pick a papaya’
[o-lóvola]^{Es} ‘to carry, but **[o-lóvóla m-íri]**^{Es} ‘to carry trees’
[o-thókola]^{Es} ‘to sharpen’, but **[o-thókóla n-thále]**^{Es} ‘to sharpen bamboo’

If HTD is not constrained by any of the above factors in a given dialect, then we will refer to that dialect as having unrestricted doubling. We have not identified many unrestricted doubling dialects, but the Mugeba variety of Elomwe spoken in Zambezia Province in Mozambique illustrates. Our thanks to Rozenn Guérois for collecting the Mugeba data for us in the course of pursuing her Ph.D. research on Ecuwabo. Note that utterance-final and utterance-penult doubled H tones are both falling. The rule predicting the fall on the penult mora, which we call simply Fall, is discussed at some length below since three of the four attenuating dialects exhibit this rule.

- (4) no Nonfinality restriction
[o-límâ]^{Mug} ‘to cultivate’, **[o-mánâ]**^{Mug} ‘to beat’, **[o-kúlâ]**^{Mug} ‘to buy’ **[o-rúpâ]**^{Mug} ‘to sleep’, **[o-váhâ]**^{Mug} ‘to give’
 no Long Fall restriction
[o-rúúla]^{Mug} ‘to put in water’, **[o-máála]**^{Mug} ‘to be quiet’, **[o-hóóla]**^{Mug} ‘to go ahead’,
[o-váánya]^{Mug} ‘to contradict’, **[o-khúúra]**^{Mug} ‘to chew’, **[o-thóóla]**^{Mug} ‘to sip’,
[o-róńtha]^{Mug} ‘to poke, provoke’

no Antepenult restriction

[**mu-lópwâna**]^{Mug} ‘man’

[**o-rúkûla**]^{Mug} ‘to pick, pluck’, [**o-lóvôla**]^{Mug} ‘to carry’, [**o-kúlíha**]^{Mug} ‘to sell’,

[**o-tútûsa**]^{Mug} ‘to frighten’, [**o-thókôla**]^{Mug} ‘to sharpen’

In the next section we begin our examination of the attenuation phenomenon.

3 ATTENUATION

Attenuation, the partial to complete lowering of a primary H tone, can only be observed in instances where a mora bearing a primary H tone (underlined in our transcriptions) doubles. A primary H tone that appears as a singleton cannot be attenuated. Thus attenuation is *possible* for any primary H tone that is not in a restricted environment in a given dialect. We shall show however that there are situations in which even though the Attenuation rule could apply, it nevertheless fails to do so. We refer to the environments blocking the Attenuation rule as “protecting” environments.

3.1 THE NON-FINALITY RESTRICTION IN ATTENUATING DIALECTS

A primary H tone on a penult mora is restricted in Mi, Mwa, Er, but unrestricted in En. Thus we have data like those in (5).

- (5) [**o-thúma**]^{Er}, [**u-thúma**]^{Mi}, but [**o-thumá**]^{En} ‘to buy’
 [**o-líma**]^{Er, Mwa}, [**u-líma**]^{Mi}, but [**o-limá**]^{En} ‘to cultivate’
 [**o-mána**]^{Er, Mwa}, [**u-mána**]^{Mi}, but [**o-maná**]^{En} ‘to beat’
 [**n-lúku**]^{Er}, but [**n-lukú**]^{En} ‘stone’

- [n-hóko]^{Mwa}, but [n-hokó]^{En} ‘sp. snake’
 [e-máttá]^{Er}, [i-máttá]^{Mi}, but [e-mattá]^{En} ‘field, garden’
 [e-théki]^{Er,Mw} ‘sp. rodent’
 [e-víli]^{Er,Mwa}, but [e-vilí]^{En} ‘puff adder’ (while in Mi there are a significant number of nouns where the primary H tone is retracted to the left and in the case of [i-víli] this allows the primary H tone to double *and* attenuate)
 [nacóro]^{Mi,Mwa} ‘a kind of gazelle’, but [nadhóró]^{En}
 [k-aa-hí-khwa]^{Mwa}, but [k-aa-hi-khwá]^{En} ‘I died’
 [k-aa-hí-lya]^{Er,Mwa}, but [k-aa-hi-cá]^{En} ‘I ate’

3.2 THE LONG FALL RESTRICTION

A primary H tone on the first mora of an utterance-penult bimoraic syllable fails to double in Mi, Mwa, and Er, but does double in En. This Long Fall restriction explains the absence of doubling versus its presence in examples like the following.

- (6) [o-rúula]^{Mwa}, [u-rúula]^{Mi}, but [o-rúúla]^{En} ‘to take out of water’
 [o-máala]^{Er,Mwa}, [u-máala]^{Mi}, but [o-máála]^{En} ‘to be quiet’
 [o-rúula]^{Mwa}, [u-rúula]^{Mi}, but [o-rúúla]^{En} ‘to take out of water’
 [o-wíiha]^{Er} ‘to bring’, but [o-wíhíya]^{Er} ‘to be brought’
 [u-téesa]^{Mi} ‘to lift’, but [u-téésíya]^{Mi} ‘to be lifted’
 [n-tténku]^{Mi} ‘bedpost’, but [ñná ñ-tténku ñna]^{Mi} ‘this bedpost’
 [ma-kufúuri]^{Mi} ‘padlocks’ but [ma-kufúúry’ ála]^{Mi} ‘these padlocks’
 [i-túuphu]^{Mi} ‘bracelet’, but [i-túúphw’ íla]^{Mi} ‘this bracelet’

It should be noted that when the bimoraic vowel is no longer an utterance-penult syllable, doubling is free to occur, but the primary H tone is not attenuated by virtue of

the protection afforded by the fact that the doubled H tone is in the same syllable as the primary H tone. This protecting environment is discussed in 4.1.

3.3 THE ANTEPENULT RESTRICTION

The third restriction on HTD, Antepenult, has not been found in any attenuating dialect. Thus in these dialects, we find that an antepenult primary H tone (in a monomoraic syllable) doubles and then attenuates. In the three dialects where HTD is restricted, the penult double has a falling quality. We attribute this to the Fall rule mentioned earlier. In Enlai, where HTD is unrestricted, the penult doubled H is level in tone. We do not believe that the absence of the Fall rule in Enlai is connected to HTD being unrestricted in this dialect. They appear to be independent facts.

Examples of the contrast between dialects that are affected by Fall and those that are not are given in (7).

- (7) [o-lovôla]^{Er}, [u-lôwôla]^{Mi}, [o-lôvôla]^{Mwa} but [o-lovôla]^{En} ‘to carry’,
 [o-rukûla]^{Er}, [u-rûkûla]^{Mi}, [o-rûkûla]^{Mwa} but [o-rukûla]^{En} ‘to pluck’
 [w-eemêla]^{Er}, [w-eëmêla]^{Mi} but [w-eemêla]^{En} ‘to stand (up)’
 [e-karîkho]^{Er}, [i-kârîkho]^{Mi}, but [e-karîkho]^{En} ‘cooking pot’
 [e-pâlâkha]^{Mwa}, but [ni-palâka]^{En} ‘sp. grasshopper’
 [nanrûwa]^{Er}, [nañrûwa]^{Mi} but [nanrûwa]^{En} ‘sp. bean’

3.4 ENVIRONMENTS WHERE NONE OF THE RESTRICTIONS ON HTD ARE APPLICABLE

There is a varied assortment of contexts where the three restrictions discussed are not at work. For example, an utterance-initial primary H tone in a monomoraic syllable cannot be protected and thus will always be attenuated.

- (8) [ñ-lúku]^{Mi} ‘stone’
[mĩ-rááko]^{Mi} ‘traps’
[mĩ-khôva]^{Mi} ‘beads’
[a-námattíya]^{En} ‘(pl.) sp. bitter potatoes’
[a-náhúwo]^{Er}, [a-náhuwó]^{En}, [ã-náhúwo]^{Mi} ‘moles’
[ó-lye]^{Er} ‘you should eat’ (with no HTD and thus no attenuation),
but [o-ly’ é-khiráci]^{Er} ‘you should eat a yam’ (from: /o-lye e-khiráci/, where
there is HTD and also Attenuation)
[ú-lye]^{Mi} ‘you should eat!’, [ü-ly’ é-sím’ êyo]^{Mi} ‘you should eat the stiff
porridge!’
[o-cé]^{En} ‘you should eat!’, but [o-cé ma-tháápa]^{En} ‘you should eat vegetable
relish’
[khu-lím’ e-mattá]^{En} ‘and he cultivated the garden’

Antepenult or earlier primary High tones (in the word or in the phrase), if not protected, will attenuate as well.

- (9) [o-wéhe]^{Er} ‘you should look at’ (with no HTD and thus no attenuation), but
 [o-wehén-ttésa]^{Er} ‘you should look at the groundnuts’ (where medial position
 allows HTD and Attenuation to apply)
- [kh-a-n̄-lya]^{Er} ‘he is not eating’, but [kh-a-n-ly’ é-khiráci]^{Er} ‘he is not eating a
 yam’ (from: /kh-a-mu-lya e-khiráci/)
- [y-aa-hi-ly’ é-khiráci]^{Er} ‘[cl.2] ate the yam’ (from: /y-aa-hi-lya e-khiráci/)
- [a-nö-ly’ é-sima]^{Mi} ‘he is eating millet’
- [n-oomöläke]^{Mi} ‘we should chase’
- [a-hi-nä-k-úpusa]^{Mi} ‘before [cl.2] reminded me’
- [kh-a-no-rüpâca]^{Mi} ‘they are not sleeping’
- [k-a-h-á-n̄-ciyé karakáta]^{En} ‘they are not eating *karakata* porridge’
- [k-aalá m-eele]^{En} ‘I was planting millet’
- [ki-n-ooná mwaatiya]^{En} ‘I see a row boat’
- [k-aa-hi-máala]^{Mwa} ‘I was quiet’
- [k-oo-lövôla]^{Mwa} ‘I have transported’
- [namärókolo]^{Mwa} ‘hare’

4 ENVIRONMENTS THAT « PROTECT » A PRIMARY H TONE FROM ATTENUATION

In the preceding section we discussed in detail environments where attenuation is not possible and environments where it is possible. It is not the case, however, that in every situation Attenuation actually applies in an environment where it is possible. In particular, there are environments which protect a primary H from Attenuation. Protecting environments are discussed in this section. There are three subcases where a primary H is not attenuated after doubling. We examine these environments one by one.

4.1 PROTECTION PROVIDED BY VIRTUE OF A FOLLOWING H TONE IN THE SAME SYLLABLE

In the first case, the primary H tone is on the first mora of a bimoraic syllable; it is always retained (i.e. not attenuated) when it doubles onto the second mora. In Imithupi, Emwaaja, and Eeratti, this sort of bimoraic syllable is not located in an utterance-penult position since in that position no doubling can occur. But any such syllable is realized as a level H tone when earlier than the phrase-penult. In Enlai, on the other hand, H tone doubling is unrestricted and as a result even utterance-penult bimoraic syllables are protected from Attenuation.

- (10) [oo-n-áápeéla]^{Er} ‘[cl.1] has cooked for us’ (from: /oo-n_i-apeela/)
 [o-nóo-lya]^{Er} ‘he ate’ (with no HTD due to Long Fall restriction), but
 [o-nóó-ly’ e-khiráci]^{Er} ‘he ate a yam’ (with HTD, but no attenuation)
 [ki-náá-líma]^{Mwa} ‘I am cultivating’ (cf. *[ki-nää-líma])
 [u-h-áápeela]^{Mi} ‘to not cook for [cl.2]’ (from: /u-h_i-a-peela/)
 [kh-a-n-k-óómóla]^{Mi} ‘[cl.1] is not chasing me’ (from: /kh-a-no-ki-omola/)
 [kha-k-áá-lílye]^{Mi} ‘I did not eat’
 [n-ki-rukúñle]^{En} ‘I haven’t plucked’ (from: /n-ki-ruk_unle/)
 [ki-n_i-n-rukula]^{En} ‘I am not plucking [cl.1]’ (from: /ki-n_i-mu-rukula/)

It will be useful to contrast cases where a primary H tone is protected by a following H tone in the same syllable versus the case where the H tone is in a separate syllable. Consider the verb tense which we will refer to as the conjoint perfect. This tense, in its non-relative use, requires that a complement follow the verb. The only primary H tone in this tense is located on the final vowel of the verb. If the complement following the verb has an initial *CV* syllable, then the final vowel of the verb is in a separate syllable from the complement. If the noun has an initial moraic consonant, then the final vowel

of the verb is part of a bimoraic syllable with the moraic consonant. If the complement is vowel-initial, then the final vowel of the verb contracts with the following vowel as a bimoraic vowel. The details of this contraction are not relevant to the present discussion.

Now let us turn to the matter of tone. This tense, like other so-called “conjunct” tenses, triggers the deletion of the first primary H in the following complement. This phenomenon is referred to by van der Wal (2006, 2009) as “Predicate Lowering”. As a consequence of Predicate Lowering, the complement does not have H-toned moras located in its initial syllables. The primary H tone at the end of the verb doubles onto the following mora (whether that mora is in the next syllable or in the same syllable as the final vowel of the verb). The examples below illustrate that there is attenuation in the former case but not the latter.

- (11) [a-thumil̥ ní-guruduumu]^{Mi} ‘it’s a wheel that he has bought’
 [a-thumil̥ m-úuttuka]^{Mi} ‘it is a car that he has bought’
 [a-thumil̥ má-taapíta]^{Mi} ‘it’s a mat that [cl.1] has bought’
 [ki-thumil̥ ní-xaatti]^{Mi} ‘it’s a shirt that I have bought’
 [a-hemil’ éé-ngwaasara]^{Mi} ‘it is a stick for making music that he has carved’
 [a-lily’ éé-cikowo]^{Mi} ‘it’s pineapples that he has eaten’
 [a-khwily’ áá-hukúla]^{Mi} ‘it’s rabbits that have died’
 [a-hanil’ éé-hipa]^{Mi} ‘it’s a hoe that he has forged’

4.2 PROTECTION PROVIDED BY VIRTUE OF A PRECEDING H TONE IN THE SAME SYLLABLE

The second protecting environment is when the primary H tone is located on the second mora of a bimoraic syllable, but there is a doubled H tone on the first mora.

- (12) [k-oo-khōmááíha]^{Mwa} ‘I have strengthened’
 [a-n-n-áá-hóoléla]^{Er} ‘[cl.2] goes ahead of [cl.2]’
 [nañttóoro]^{Mi,Mwa}; ‘a male herbivore (e.g. warthog)’, plural:
 [ä-náñttóoro]^{Mi,Mwa}
 [mmörókólo]^{Er}, [mmörókólo]^{Mi,Mwa} ‘blackcapped bulbul, pl: [á-
 mmorokólo]^{Er}, [á-mmörókólo]^{Mi,Mwa} (Er has a dialect-specific rule that deletes
 the medial primary H tone in the [cl.2a] form. Being deleted, it cannot double.)
 [mwíikhómya]^{En}, [mwíkkhomya]^{Er}, [mwíikhomya]^{Mwa} ‘sp. snake’; pl: [a-
 mwíikhómya]^{En}, [a-mwíkkhomya]^{Er}, [ä-mwíikhomya]^{Mwa} (The Eeratti form is
 a bit different because instead of a bimoraic vowel the first syllable has a short
 vowel followed by a moraic geminate consonant. The tonal pattern is the same,
 however.)
 [nañkúttu]^{Mi} ‘a hen with small chicks’, but [ä-náñkúttu]^{Mi}
 [nanlóolo]^{Er} ‘tadpole’, but [a-náñlóolo]^{Er}
 [nannyóokóle]^{Er} ‘sp. river fish’, but [a-náñnyóokóle]^{Er}
 [nanlúme]^{Mi} ‘male (leader) elephant’, but [ä-náñlúme]^{Mi}

It is not necessarily the case that the primary High mora is *underlyingly* part of a bimoraic structure. The bimoraic structure may be derived. For instance, in Imitthupi a moraic nasal prefix in a noun may bear a primary High tone. This moraic nasal, if preceded by a vowel-final word, will form the coda that has this vowel as its nucleus. If the vowel bears a H tone, then the moraic nasal will not be attenuated.

- (13) [ñ-khâcu]^{Mi} ‘cashew nut tree’, [ülá ñ-khác’ úla]^{Mi} ‘this cashew nut tree’
 [ñ-ttónntto]^{Mi} ‘walking stick’, [ülá ñ-ttónntt’ ôla]^{Mi} ‘this walking stick’
 [ñ-khôpa]^{Mi} ‘sp. fish’, [ülá ñ-khóp’ óla]^{Mi} ‘this sp. fish’

A phonological process that plays a significant role with respect to Attenuation is one that we refer to as Contraction. Internal to a word, a sequence of two vocalic moras regularly leads to a bimoraic vowel. However, across words, a sequence of two vocalic moras typically leads to a monomoraic vowel. The precise adjustments that are involved are not pertinent here. The Contraction rule may be responsible for putting a primary H tone in a syllable where the preceding vowel bears a doubled H.

- (14) [Thanl' ó-n-líméla]^{Er} 'Thanla has cultivated for [cl.1]' (from: /Thanla oo-mu-liméla/).

This represents an interesting case where the *mu* object marker reduces to a moraic *n* in front of a consonant-initial verb stem. Since Emakhuwa bans trimoraic syllables, the underlying *a#oo* sequence reduces to a single vowel mora. We refer to this loss of moras as Mora Reduction and say that it is a response to the No Trimoraic Syllable constraint.

[Thanl' óó-k-éépéca]^{Er} 'Thanla calmed me' (cf. [oo-k-éépéca]^{Er} '[cl.1] calmed me')

[Thanl' óó-k-ííhána]^{Er} 'Thanla has called me' (cf. [oo-k-ííhána]^{Er} '[cl.1] called me')

4.3 PROTECTION PROVIDED BY A PRECEDING HIGH TONE IN A DIFFERENT SYLLABLE

The third protecting environment is when a primary H tone located on a mora in one syllable is preceded by a doubled H on the immediately preceding mora. The following examples are provided by [cl.1a/2a] nouns. The stem of these nouns bears a H tone on the second mora. The [cl.1a] prefix is null, but the [cl.2a] prefix is an H-toned *a*.

- (15) **[namārókolo]**^{Mi,Mwa} ‘hare’; **[ǎ-námārókolo]**^{Mi,Mwa}
[namāthâpa]^{Mi} ‘green mamba’, but **[ǎ-námāthâpa]**^{Mi}
[nambâyâya]^{Mi} ‘a kind of spider’, but **[ǎ-námbâyâya]**^{Mi} (note that “mb” is a
pre-nasalized consonant and not a case of a moraic nasal)
[nakhwála]^{Mi} ‘drum’, **[ǎ-nákhwála]**^{Mi} ‘drums’
[maráphi]^{Mi} ‘sp. frog’, **[ǎ-máráphi]**^{Mi} ‘sp. frogs’

In these examples, we see that the doubled H from the [cl.2a] prefix serves to protect the primary H tone on the second mora of the noun stem.

The protecting H tone may be in a preceding word, as shown in (16).

- (16) **[mä-lûku]**^{Mi} ‘stones’, but **[ǎlá má-lúkw’ ála]**^{Mi} ‘these stones’
[mä-vâka]^{Mi} ‘spears’, **[ǎlá má-vák’ ála]**^{Mi} ‘these spears’
[mä-kûra]^{Mi} ‘oil’, **[ǎlá má-kúr’ ála]**^{Mi} ‘this oil’

Verb forms provide countless examples. Consider the conjoint present tense in Imitthupi. In this tense in Imitthupi, there is a primary H on the first mora of the macrostem and also a penult H tone in longer verb stems. Since this is a conjoint tense, in non-relative clauses it must have a complement (and it triggers Predicate Lowering). Thus the penult H tone in the verb is not prevented from doubling. In the examples in (17), we see that the penult primary H tone attenuates if it is not preceded by a H tone in the antepenult syllable, but fails to attenuate when a H precedes.

- (17) **[a-no-k-óópélá ni-penga]**^{Mi} ‘he is blowing a horn for me’
[a-no-k-óósérá kharaka]^{Mi} ‘he is roasting a potato for me’
[a-no-k-áápeĕl’ á-kharáka]^{Mi} ‘he is cooking potatoes for me’
[a-no-k-ítthucih’ é-swaahiri]^{Mi} ‘he is teaching me Swahili’

In the past continuous tense in Imitthupi, there is again both a primary H tone on the first mora of the macrostem as well as a penult primary H tone in the case of longer verb stems. This is not a conjoint tense, so the verb may be phrase final. In such cases, the restrictions on HTD may come into play for both the primary H tone on the first mora and also for the primary H tone on the penult mora. The crucial point about this tense is that in environments where the first H tone does double, it can never be attenuated due to the fact that the macrostem is preceded by the complex tense-aspect-mood structure – *aa-no-*. The H tone on the first mora of the macrostem is always protected from attenuation by the doubled H tone on the *no* element. This point is illustrated by the following examples, which also show that the attenuation of the penult H is dependent on the preceding syllable.

- (18) [k-aä-nó-ttúpûla]^{Mi} ‘I was cutting’
 [k-aä-nó-ttúpûla mw-íri]^{Mi} ‘I would have cut a tree’
 (verb is too short for a penult H)
 [k-aä-nó-thúma]^{Mi} ‘I would have bought’
 [k-aä-nó-thúm’ é-kittháabu]^{Mi} ‘I would have bought a book’
 [aä-nó-tátákúlá tatakú tatakú]^{Mi} ‘he was rummaging about’
 [aä-nó-kí-lówolël’ é-híce]^{Mi} ‘[cl.1/2] was carrying chairs for me’

The contraction of vowels across words also provides evidence for the protection against Attenuation provided by a H tone in the preceding syllable.

- (19) [i-tth^up^ula]^{Mi} ‘belch’
[w-oöp’ é-tth^up^ula]^{Mi} ‘to belch’ (from: /u-opa i-tthupula/ ‘(lit.) to beat a belch’)
[i-mátt’ êyo]^{Mi} ‘that plot of land’
[ki-nóó-lím’ é-mátt=êyo]^{Mi} ‘I will cultivate that plot of land’ (from: /ki-no-
lⁱma i-mattaiyo/)

5 RESTRICTING PROTECTION IN ENLAI

The most significant complication to the protection afforded to primary H tones is observed in Enlai. Protection fails for a *word-penult* primary H tone. Since we have not encountered word-final bimoraic syllables, a penult primary H tone is always in a separate syllable from the final vowel. This means that the protection offered by the doubled mora being in the same same syllable is inapplicable. However, the protection afforded by a preceding H tone either in the same syllable or a preceding syllable fails to occur in Enlai. The examples are myriad.

Some examples from [cl.1a/2a] nominals are given in (20). In the singular [cl.1a] form, the primary H tone on the second mora of the noun stem is preceded by a toneless mora and thus unprotected. In the plural [cl.2a] form, the primary H tone on the prefix doubles onto the following mora and thus in other dialects would provide protection for the primary H tone on the second mora of the noun stem. But no protection is observed. In the first group of examples, the would be protecting mora is in a different syllable, while in the second group of examples it is in the same syllable.

- (20) [nadhoró]^{En} ‘a kind of gazelle’, pl: [a-nádhoró]^{En}
 [naherá]^{En} ‘sp. fish’, but [a-náherá]^{En}
 [nahuwó]^{En} ‘mole’, but [a-náhuwó]^{En}
 [koperá]^{En} ‘an instrument for catching fish’, but also [a-kóperá]^{En}
 [rooró]^{En} ‘a type of dance’, pl. [a-róoró]^{En}
 [raavá]^{En} ‘a kind of wild fruit’, pl. [a-ráavá]^{En}
 [ruuní]^{En} ‘a kind of relish’, pl. [a-rúuní]^{En}

Another example is provided by possessive roots which have the structure *VCV* and are encliticized to nouns. The initial vowel may be preceded by a consonantal agreement element, or in the absence of an agreement element it contracts into a bimoraic vowel with the final vowel of the noun. If the penult primary H tone is located in an unprotected environment, it will of course be attenuated. However, if located in what would be a protected environment in the other dialects, it fails to be protected.

- (21) [n-hakú]^{En} ‘money’, [n-hakhw=áaká]^{En} ‘my money’
 [mi-hakú]^{En} ‘money (pl.)’, [mi-hakhú=dh-aká]^{En} ‘my money (pl.)’
 [koperá]^{En} ‘fishing instrument’, [koper=áaká]^{En} ‘my fishing instrument’
 [napacé]^{En} ‘sp. of beans’, [napac=áaká]^{En} ‘my sp. beans’
 [e-lawá]^{En} ‘sp. tree’, [e-law=áaká]^{En} ‘my sp. tree’
 [i-lawá]^{En} ‘sp. trees’, [i-lawá=dh-aká]^{En} ‘my sp. tree’

We see from these examples that the penult primary H-tone fails to be protected even though there is a preceding H tone, whether that H tone be in the same syllable or a different syllable.

Protection is observed in the expected environments if the primary H tone is not in penult position. Nominals belonging to [cl.2a], in comparison to [cl.1a], provide numerous examples of protection in pre-penult position.

- (22) [naamílepe]^{En} ‘sp. grass’, but [a-náámílepe]^{En}
 [nammóoponí]^{En} ‘a kind of grasshopper’, but [a-námómóoponí]^{En}
 [naamítathi]^{En} ‘a sp. mushroom’, but [a-náámítathi]^{En}
 [nanlúkunikomá]^{En} ‘sp. tree’, but: [a-nánlúkunikomá]^{En}
 [nantóothoró]^{En} ‘a kind of fruit’, but [a-nántóothoró]^{En}
 [namakódhi]^{En} ‘a kind of snake’, but [a-námakódhi]^{En}
 [naamáriye]^{En} ‘a sp. grass’, but [a-náámáriye]^{En}
 [namarókolo]^{En} ‘hare’, but [a-námárókolo]^{En}
 [nannyápa]^{En} ‘sp. snake’, but [a-nánnyápa]^{En}
 [khammúro]^{En} ‘a sp. of grasshopper’, [a-khámúro]^{En}
 [nantát=aaká]^{En} ‘my sp. tree’, [a-nántát=aaká]^{En} ‘my sp. trees’

The contrast between lack of protection of a penult primary H tone and the implementation of protection in antepenult position can be observed in infinitives in Enlai.

- (23) penult
- | | |
|---|---|
| [o-rukúnsá] ^{En} ‘to turn s.t. over’ | [o-tutúrusá] ^{En} ‘to frighten’ |
| [o-phikírísá] ^{En} ‘to roll s.t.’ | [o-velávelá] ^{En} ‘to be troubled’ |
| [o-veléelá] ^{En} ‘to see off, send’ | [o-máálihá] ^{En} ‘to make silent’ |

antepenult

[o-khmáálíha]^{En} ‘to strengthen’

[o-rukúnééla]^{En} ‘to play with’

[o-leméélíha]^{En} ‘to make get used to and take for granted’

All of the data cited in this section have focused on a word in utterance-final position. In sentence-medial position, word-penult moras are protected from Attenuation in Enlai just as in the other attenuating dialects. The following contrast in utterance-final and utterance-medial infinitive verbs illustrate this point.

(24) [o-veleelá]^{En} ‘to see off’, [e-sepele]^{En} ‘a woman with children’

[o-veleél’ é-sepele]^{En} ‘to see a woman with children off’

[o-máálíhá]^{En} ‘to silence’, [e-yáno]^{En} ‘mouth’ (double underlining = uncertain analysis)

[o-máálíh’ é-yáno]^{En} ‘to stop talking’

[o-leméelá]^{En} ‘to be habituated to’, [e-mómpe]^{En} ‘cow’

[o-leméél’ é-mómpe]^{En} ‘to be habituated to the cow’

It appears that the failure of protection against Attenuation is limited to utterance-penult primary H tones. However, we do not have sufficient data concerning sentence phonology to rule out the possibility that there might be smaller phrasal units in which the penult primary H tone fails to be protected.

6 PHONETICS OR PHONOLOGY

Modern linguistic theory has struggled with the question whether there is a difference between “phonetic” phenomena and “phonological” phenomena, and if there is a difference, can their account be relegated to entirely distinct components of the

grammar of a language such that the one component in no way impinges on the other. We have no doubt that this thorny issue will remain a thorny issue far into the future, but it strikes us that at the very least Emakhuwa attenuation is relevant to these questions.

The literature would suggest that characteristic features of phonetic rules include their exceptionless nature, their post-lexical scope of application, and the possibility that they specify degrees of a feature rather than a simple binary opposition. The environment of a phonetic rule is claimed to be independent of morphological information. Inherent in the discussion of phonetic rules seems to be the idea that they “implement” the phonological representation that the phonological component specifies. But there are at least two critical issues at play here. First, do the phonetic rules interact with one another (i.e. are ordered/ranked)? Second, is the output of the phonological component required to have some direct relationship to the actual phonetic output, or can it be only abstractly related to the phonetic implementation? For example, to take an extreme example from Bantu tonology, can a phonetic rule “implement” an H tone in the phonological representation on a vowel in the next word? We will assume here that interaction of phonetic rules/constraints is a reasonable possibility, but that abstract outputs of the phonological component are not.

Since the assignment of primary H tones in Emakhuwa is a largely a matter of morphology and tonal specifications on grammatical morphemes, it is obvious that the distribution of primary H tones is not accomplished by phonetic rules. However, the other rules we have discussed (High Tone Doubling, Fall, Attenuation) are all potential candidates for phonetic rules since (a) there are generally no (unpredictable) exceptions, (b) they are post-lexical to some extent, and (c) at least in the case of Attenuation, they involve in some dialects degrees of pitch height.

6.1 CAN PARTIAL ATTENUATION BE A PHONETIC PRINCIPLE

Let us begin with the partially attenuating dialects. Attenuation is manifested as a lowering *in degree* of primary H tones. A popular view in classical generative phonology was that phonological rules are concerned only with *binary* feature values (+/-), while rules that involve degrees of a feature are phonetic in nature. Adopting that perspective would mean that Attenuation (at least of the partial type) is a matter of phonetics.

As a phonetic rule, Attenuation could not identify the mora that undergoes it as bearing a primary H tone since that would be a reference to the morphophonemic representation. An initial formulation might be that given a sequence of two H tones, the first attenuates. However, given that protection is provided by a preceding H tone, one could get closer to an adequate formulation by limiting Attenuation to the first H tone in a HH sequence that is preceded by a toneless mora or no mora. One additional limitation would be required: if the HH sequence is in a single bimoraic syllable, then Attenuation also does not apply. This caveat is required since in an example like [**u-hóóléla**]^{Mi} ‘to go in front of someone’, the first mora of a bimoraic syllable does not attenuate even though it is preceded by a toneless mora. The second mora also does not undergo Attenuation since while it precedes a H, it also follows a H. The third mora does not undergo Attenuation since it is not followed by a H. This formulation of Attenuation will account for the great mass of data without making reference to the fact that only primary H tones undergo Attenuation.

There are, however, some problematic cases that cast doubt on whether (partial) Attenuation can be accounted for entirely in terms of the surface tone pattern. Consider the following example from Imithupi: [**ǎ-hó-lókóth’ ě-púúru**]^{Mi} ‘he picked up a nest’. The underlying representation of this sentence is: /ǎ-ho-lokottha i-puuru/. An *a#i* sequence across words surfaces as *e* due to Contraction. Furthermore, the contracted vowel is always H-toned if one of the moras is H-toned. What we can readily see in this

example is that the initial primary H tone on the verb is attenuated since it is not preceded by a H tone, being word-initial; the second primary H is not attenuated, since it is protected by the preceding doubled H on *ho*. However, the third primary H tone (realized on the contracted mora) *is* attenuated, even though it is preceded by a H tone. The application of Attenuation here is troubling for a purely phonetic account, since the conditions for attenuation simply do not exist on the surface. If one is not restricted to phonetic representation, on the other hand, an explanation is obvious: prior to Contraction, the primary H tone on the noun class prefix is *not* protected since the final vowel of the verb is toneless. It is Contraction that eliminates the toneless mora that blocks attentuation from appearing in the phonetic representation.

The correctness of the analysis of the preceding example is supported by an example like [**ǎ-h-óón' é-púúru**]:Mi 'he saw a nest', which has the underlying representation /ǎ-ho-ona i-puuru/. Notice that in this example the third primary H tone does not undergo attenuation. Once again, it is preceded by a H tone, but in this case the overt preceding H tone is a primary H tone and one that would be expected to double onto the final vowel of the verb. Thus in this example, the contracted vowel has its source in a doubled H on the final vowel of the verb and a primary H tone on the prefix of the noun. The primary H on the prefix was in fact protected by the H tone on the immediately preceding mora, even though that mora is not preserved on the phonetic surface.

An entirely parallel example is [**k-ǎ-h-óón' ǎ-khárámu**]^{Mi} 'I saw some lions' (from the more remote structure: /k-ǎ-ho-ǎ-ona ǎ-kharamu/; notice that elided toneless final vowel of the verb seems to prevent "protection" of the H tone on the noun class prefix due to an apparently preceding H tone). A somewhat different type of example involves a noun-adjective sequence. Compare the contrast between [**m-mĩráwo ń-ttâyi**]^{Mi} 'a tall boy' and [**a-mĩráw' ǎ-ttâyi**]^{Mi} 'tall boys'. The adjective 'tall' in Imitthupi shows a retracted primary H tone on the agreement prefix on the adjective stem. In the first

example, the [cl.1] agreement prefix is *mu*, which reduces to a moraic nasal. There is no contraction of the final vowel of the noun with the adjective. In the second example, a [cl.2] agreement prefix *a* appears on the adjective and bears the retracted H tone. In this case, there is contraction between the noun and the adjective. In [m-mĩráwo ń-ttâyi]^{Mi}, the toneless uncontracted final vowel on the noun guarantees that the primary H tone on the adjectival prefix will be attenuated. But in [a-mĩrâw' ä-ttâyi]^{Mi}, where Contraction converts *wo#a* to *w#a*, the prefix H is preceded by a H tone but still is attenuated. Once again the missing toneless mora is responsible for this application of Attenuation, even though the overt preceding mora is H-toned and should protect a following primary H tone.

We should point out that there is a case where a missing toneless mora does not induce the failure of protection.

- (25) [ä-létto] ‘visitors’, [áyo] ‘those’
 [ä-léttw' áyó kh-a-no-khüm' ó-mbwaa=ni] ‘the visitors [cl.2] do not come from the coast’

We suspect that even though Contraction does apply between a noun and a following demonstrative, this sequence is more “word-like” than say a verb and a noun, or a noun and an adjective. But this is a matter needing further research.

It is significant that these cases of the impact of missing toneless moras on protection seem to be limited to the contraction of moras across word-boundaries. Internal to words, the constraint No Trimoraic Syllable leads to Mora Reduction (sometimes affecting as many as three moras). But the data do not reveal a hidden impact of a toneless mora on Attenuation when Mora Reduction is at work rather than Contraction.

(26) presents one situation of this sort. The negative past tense verb has the structure *Negative-Subject Marker-aa-(object marker)-verb stem-perfect-e*. We are concerned

here only with the interaction between **aa** and a following object marker. The critical fact here is that in this tense there is a primary H tone on the second mora of the macrostem. As a consequence, the object marker is toneless while the first mora of the verb stem proper bears a primary H tone.

- (26) [kh-**áá**-ki-rússîle]^{Mi} ‘he did not annoy me’ (/kh-**aa**-ki-rusile/)
 [kh-**áá**-ki-lilye]^{Mi} ‘he didn’t eat me’ (/kh-**aa**-ki-lilye/)
 [kh-**áá**-ki-váhîre]^{Mi} ‘he didn’t give me s.t.’ (/kh-**aa**-ki-vahire/)
 [kh-**á**-n-rússîle]^{Mi} ‘he didn’t annoy [cl.1]’ (/kh-**aa**-mu-rusile/)
 [kh-**á**-n-lilye]^{Mi} ‘he didn’t eat [cl.1]’ (/kh-**aa**-mu-lilye/)
 [kh-**á**-m-máhîre]^{Mi} ‘he didn’t give it to [cl.1]’ (/kh-**aa**-mu-vahire/)
 [kh-**óó**-rússîle]^{Mi} ‘he did not annoy you’ (/kh-**aa**-u-rusile/)
 [kh-**óó**-lilye] ‘he didn’t eat you’ (/kh-**aa**-u-lilye/)
 [kh-**óó**-váhîre]^{Mi} ‘he didn’t give it to you’ (/kh-**aa**-u-vahire/)
 [kh-**áá**-rússîle] ‘he didn’t annoy [cl.2]’ (/kh-**aa**-a-rusile/)
 [kh-**áá**-lilye]^{Mi} ‘he didn’t eat [cl.2]’ (/kh-**aa**-a-lilye/)
 [kh-**áá**-váhîre]^{Mi} ‘he didn’t give it to [cl.2]’ (/kh-**aa**-a-vahire/)

The data in (26) illustrate four object markers: **ki** (first person singular), **mu** ([cl.1]), **u** (second person), and **a** [cl.2]). When **ki** is present, there is no threat to the No Trimoraic Syllable constraint. Thus **aa** simply surfaces as [**áá**] by virtue of HTD, and the toneless **ki** serves to trigger attenuation of the primary H tone at the beginning of the verb when it is followed by its double.

The object marker **mu** is different, since it elides its vowel in front of a consonant and the nasal assimilates the following consonant. Crucially, the nasal is moraic. Thus the sequence **aan** is in violation of the No Trimoraic Syllable constraint. Violation of this constraint is avoided by deleting a mora from the bimoraic vowel. Notice that in

this structure, the primary H tone on *aa* doubles onto the moraic nasal. The object marker is toneless, but on the surface this tonelessness does not induce attenuation of a following primary H tone in examples like [kh-á-ń-rú síle]^{Mi} and [kh-á-m-máhîre]^{Mi} (no attenuation in any case is possible in [kh-á-ń-lílye]^{Mi} since the primary H does not double; but cf. [kha-k-á-ń-lílyé kharáka]^{Mi} ‘I didn’t eat potatoes’, where doubling does occur and still the primary H tone on the verb stem is not attenuated).

In the case of the object marker *u*, it is lowered to *o* by virtue of the preceding non-high vowel *aa*, and then *aa* itself assimilates to *o*. However, the resulting trimoraic structure *oo-o-* must lose a mora because it is in violation of the No Trimoraic Syllable constraint. In the output, the primary H on the initial mora of this sequence doubles onto the next mora, thus juxtaposing [óó] with the primary H tone on the verb stem. This primary H is not attenuated, meaning that the missing toneless mora of the object marker does not serve to trigger the failure of protection.

The object marker *a* is entirely parallel to *u* except that the sequence *aa-a-* requires no vowel quality adjustments, just the loss of a mora. But once again this missing toneless object marker mora does not trigger attenuation of the primary H tone on the verb stem.

The contrast between the contraction of vowels across words and the reduction of moras in word-internal position suggests that moras lost in the sentence phonology are distinct from moras lost in the lexical phonology. This perhaps can be attributed to the fact that the uncontracted words do sometimes appear in their uncontracted form, while verbs exhibiting mora loss do not have alternative pronunciations where the mora loss does not occur (at best there is only morphophonemic evidence for the underlying vowel structure).

While this explanation for the difference between word-internal and cross-word behavior seems reasonable to us, it nevertheless is a problem if Attenuation is supposed to be a phonetic rule. One possible solution to the problem would be to order

Contraction after Attenuation, but this is questionable since Contraction would then be in the phonetic component and phonetic rules presumably are not sensitive to grammatical structure. Yet Contraction affects only successive moras across *words*. And it is a rule that seems to affect a second vowel only if it is a prefix. For example, note the failure of Contraction to affect the successive vowels in an example like **[ńk-á-áhúlanihaca ahúláníhaci ahúláníhaci]**^{Mi} ‘and [cl.2] tore it into pieces’, where a repeated ideophone *ahulanihaci* follows its cognate verb. Contraction does not affect the verb and the first occurrence of the ideophone nor does it affect the successive ideophones. Relegating Contraction to the phonetic component does not seem particularly viable.

6.2 IS FALL A PHONETIC RULE IN A PARTIALLY ATTENUATING DIALECT?

It is not just Attenuation that is problematic for an entirely phonetic account: another, even more problematic area is the falling tone that the doubled H exhibits when it occurs in utterance-penult position. Since the falling tone appears when the antepenult mora is H-toned, it would be natural to propose that there is a phonetic rule that a H tone falls when in penult position and the antepenult mora is H-toned. While this does predict correctly *all* the cases where there is a falling tone, it also predicts many penults to be falling when they are not.

Let us first take some basic data.

(27) *no fall if the penult H-toned mora is not preceded by a H tone*

[u-thúma]^{Mi} ‘to buy’

[ki-ho-líma]^{Mi} ‘to cultivate’

[i-máttá]^{Mi} ‘field, garden’

[ki-kaa-höw-ítthána n-cána]^{Mi} ‘I would have called’

penult H falls if preceded by a H tone which in turn is preceded by a toneless mora

[u-tũmîha]^{Mi} ‘to sell’

[a-ho-sükûma]^{Mi} ‘[cl.2] has pushed’

[m-mĩrâwo]^{Mi} ‘youth’

penult H tone falls if preceded by a H which in turn is preceded by a H

[ki-kaa-hõw-ítthâna]^{Mi} ‘I would have called’

[k-ä-hó-hítá mĩ-thûpi]^{Mi} ‘I killed the roosters’

penult H does not fall even though preceded by a H which in turn is preceded by a H

[ki-ho-hóóléla]^{Mi} ‘I have arrived first’

[aä-nó-mw-ítthána]^{Mi} ‘[cl.1/2] was calling [cl.1]’

[aä-nó-mw-éépéttha]^{Mi} ‘[cl.1/2] was beating [cl.1]’

[ki-kaa-hõw-éérékéla mw-ĩri]^{Mi} ‘I would have cut the tree’

The first examples involve a final OH0 structure, where Fall never applies. This confirms that Fall minimally requires a penult H that is preceded by a H. The second set of examples show that Fall does apply in a OHH0 environment. The next two sets of examples show that when the HH0 sequence is preceded by a H, Fall applies in some cases but not others.

The only generalization that will distinguish between the cases above where the penult falls after a HH tone versus where it does not is this: a falling tone occurs on an utterance-penult mora when it is in an even-numbered position in a sequence of H-toned moras. To the extent that this formulation works, it is because only a doubled H tone

falls and H-toned sequences in Emakhuwa typically are sequences of a H and its double. Thus in sequence of H tones, a doubled H is located in even-numbered positions.

This formulation of the fall principle would require that the theory of phonetic rules allow counting even-numbered as opposed to odd-numbered moras. And of course it also assumes that the notion “mora” is somehow a notion that can be appealed to in phonetic rules. But if these assumptions are made, the falling tone is correctly predicted, as long as the surface form reflects the underlying sequencing of primary and doubled H tones. Unfortunately, there are a variety of ways in which the surface sequence of H tones is misaligned with an underlying sequencing of H tones and their doubles.

Let us examine a few cases where H tones in even-numbered positions in a sequence do not fall, and where H tones in odd-numbered position do fall.

(28) *even-odd count failures: three H-toned mora sequence but there is a fall*

[a-nǎ-ttúpunlé n̄-khâcu]^{Mi} ‘when [cl.1] had cut the cashew nut tree’

cf. the alternative form:

[a-nǎ-ttúpunle n̄-kâcu]^{Mi} ‘when [cl.1] had cut the cashew nut tree’

[n-k-éévê=ni]^{Mi} ‘you (resp.) should kill [cl.2]’ (from: /mu-ka-a-ive=ni/)

These two examples illustrate the case where a sequence of three H-toned moras ends with a fall on the third, in contradiction to the proposed generalization.

In the case of **[a-nǎ-ttúpunlé n̄-khâcu]^{Mi}**, this failure is due to the fact that in this tense, it is possible to have a primary H tone at the end of the verb that is immediately followed by a primary H tone on the prefix of the noun. The counting algorithm is based on the fact that H tone sequences typically consist of a sequence of a primary H tone and a doubled H tone. Any case where the surface sequence does not correspond to this situation is a potential problem. In this example, the problem is that there is no mora for the word-final H tone to (non-vacuously) double onto. The alternative (optional)

pronunciation of this example is one where the primary H tone has not been added to the end of the verb. As a consequence, the fall is in an even-numbered position.

The problem with [n-k-évê=ni]^{Mi} is essentially the same as the preceding case, but is different in detail. On the surface there is a three mora sequence of H tones, but the penult H does fall even though in an odd-numbered position. The reason for the failure of counting here derives from the fact that the three surface moras derive from four moras in the underlying representation. The tone pattern in the remote subjunctive form illustrated here involves a H tone on the tense-aspect-mood element *ka* and a H tone on the second mora of the macrostem (i.e. the first mora of the verb stem proper). This example has the underlying structure /mu-ka-a-ive=ni/, where *ka* is followed by the [cl.2] object marker *a* which in turn is followed by a vowel-initial verb root /iv/ ‘kill’. The final vowel of the subjunctive is *e* and the enclitic *ni* indicates that the second person subject is respected. The critical point is that the vowel sequence *a-a-i* violates the constraint No Trimoraic Syllable and must be reduced to two moras. In addition, of course, the high vowel in the verb stem is lowered to mid after a non-high vowel, and the preceding vowel assimilates its quality. The critical point here is that the toneless object marker *a* disappears without a trace, leaving a succession of primary H-toned moras. This results in the penult H being subject to Fall even though in an odd-numbered location in the sequence of H tones.

Next let us look at four mora sequences where the final mora does not fall as the proposed phonetic rule predicts. This example involves a verb tense where there is a tense-aspect-mood marker *hoo* and a macrostem that has a primary H tone on the first mora (in this example, the object marker) and on the penult mora.

(29) *four H-toned moras but no fall*

[aa-h_{ow}-éépéttha]^{Mi} ‘[cl.1] beat [cl.2]’ (from: /aa-h_{oo}-a-epettha/)

cf.

[aa-h_{oo}-k-éépéttha]^{Mi} ‘[cl.1] beat me’ (from: /aa-h_{oo}-ki-epettha/)

The problem in the first example is that a four mora sequence /oo-a-e/ first undergoes a process of glide formation plus compensatory lengthening, yielding /ow-aa-e/. The result of this process is that we have three moras in a row, a violation of No Trimoraic Syllable. Mora Reduction thus deletes one of these moras. Had all three moras managed to be pronounced, they would all have borne a H tone. But due to Mora Reduction, there are just two H-toned moras. Mora Reduction results in what in principle is a five mora sequence, but in fact is only a four mora sequence. The level H tone on the penult vowel is thus on the surface a violation of the proposed phonetic rule of Fall. In contrast, the second example has no application of Mora Reduction (due to the object marker beginning with a consonant) and thus there is a five mora H tone sequence and Fall fails to apply to the odd-numbered penult mora.

In (30), we give an example of a five mora H-toned sequence where there is an unexpected falling penult.

(30) *five H-toned moras in a sequence but there is a fall*

[ä́l' á-nákópw' ála]^{Mi} ‘these sp. trees’ (from /ála a-nakopo ala/),

cf. **[ǘlá naköp' ôla]^{Mi}** ‘this tree’ (from /ula nakopo ola/), where the fall correctly appears in an even numbered mora)

The problem here is that there are two missing moras; the first (at the end of the initial demonstrative) would have borne a doubled H, while the second (at the end of the noun) would also have borne a doubled H, but due to its absence allows the double to appear

on the post-nominal demonstrative. In other words, the initial vowel in the demonstrative would not have borne a double if the last vowel of the noun had been allowed to surface. It is this fact that leads to the wrong counting of even versus odd moras in the sequence of H tones. In the uncontracted form, {allá á-nákópó ala}, there is a sequence of six H-toned moras, but the sequence does not include the penult mora until Contraction takes place. After Contraction, the sequence of H-toned moras is reduced to five.

We move on to an even longer sequence of H tones:

(31) *six H-toned moras in a sequence but no fall on penult*

[ál' á-nácírórw' ála]^{Mi} 'these male Grant's gazelles'

In this example, there are two moras missing due to the Contraction of vowels across words. But the first of these missing moras (the second mora of the pre-nominal demonstrative), if it had surfaced, would have borne a doubled H tone. The second missing mora (the final vowel of the noun stem), would have been toneless if it had surfaced. It is this missing mora at the end of the noun that throws off the even/odd counting. In an uncontracted version of the example, {állá á-nácíróro ála}, the penult H tone is not part of a sequence larger than one, an odd number and thus predictably not subject to Fall.

An even longer sequence is given in (32):

(32) *seven H-toned moras in a sequence but a falling penult*

[k-ä-h-étthán' á-mírâwo] 'I called young men' (from /k-a-ho-a-itthana a-mjrawo/)

In this example there are two missing moras: one is the underlying toneless mora in *ho*, which would have borne a doubled H were it realized. The second missing mora is from the cross-word sequence *a#a*. The contracted mora bears the doubled H from the verb, but in effect a toneless mora is missing, and it is this toneless mora that throws off the counting. Specifically, if the missing mora were restored, the sequence of H tones at the end of the expression would be just two, an even number.

Finally, in (33) we give a sequence of eight H-toned moras that end in a penult mora that does not fall.

- (33) *eight H-toned mora sequence but no fall*
[k-ā-h-áá-límél' á-tááta] 'I cultivated for my uncle'

The problem in this example is the missing mora in the contracted *a#a* sequence at the juncture of the verb and noun. The penult H tone is in an odd-numbered position in the sequence of underlying vowels each of which would be H-toned if there were no Contraction. But the deleted mora throws the count off.

In conclusion, although Attenuation itself seems to be contradicted, as a phonetic rule, by virtue of Contraction, Fall is contradicted by a more complex array of cases within and across words. There is no viable way to avoid restricting Fall to a doubled H (i.e. a reference to morphophonemics) as opposed to a phonetic rule counting even/odd numbering in H-tone sequences).

6.3 CAN COMPLETE ATTENUATION BE CONSIDERED A PHONETIC RULE?

In a partially attenuating dialect one can conceive of Attenuation as a phonetic rule that operates on a representation where there is a sequence of H tones created by the rule of HTD. The HTD rule could be regarded either as a phonological rule or a phonetic rule.

But in a completely attenuating dialect, it is difficult to see how HTD could be considered a phonetic rule, since commonly it is not true that H tones appear in succession in the phonetic realization. But if we assume that HTD is a phonological rule, we might try to account for complete Attenuation by proposing that a mora lacks a H tone if followed by a H tone (and is not protected). This approach of course would require that the output of the phonology have many instances of successive H-toned vowels that are not actually pronounced. Thus for this approach to work, it would have to assume a theory of phonetic rules that apply to an “abstract” output of the phonological component. It seems doubtful that proponents of phonetic rules would countenance this idea. It would require a radical view of the nature of the representation that results from the phonology.

In any case, there would still be problems. In Eeratti, as in Imitthupi, there are cases where Attenuation occurs in an environment where phonetically we would expect Attenuation to be blocked. These involve again the situation where Contraction leads to a loss of a mora.

(34) [y-aa-h-áá-ly' a-kérékêsa]^{Er} ‘[cl.2] ate the flavoring/seasoning’ (from: /y-aa-hi-a-lya a-kerekesa/)

[o-no-mw-áá-wéh' a-khôle]^{Er} ‘[cl.1] saw baboons’ (from: /o-no-mu-a-weha a-khole/)

[o-no-mw-ááp' a-kápútthi]^{Er} ‘he fired guns’ (from: /o-no-mu-a-apa a-kaputthi/)

cf.

[o-no-mw-áá-ly' á-kérékêsa]^{Er} ‘he ate the flavoring/seasoning’ (from: /o-no-mu-a-lya a-kerekesa/)

Observe that the H-toned [cl.2a] prefix a is completely attenuated in the first three examples, even though it is preceded by a H tone and followed by its double. The failure of protection here, just as in the case of Imitthupi, is that the a noun class prefix is here a contraction of the toneless final vowel of the verb and the H-toned prefix. It is the toneless final vowel that interferes with protection from the preceding syllable. If the protection/attenuation phenomenon were a phonetic phenomena, there is no way that the missing mora can play a role in the account of the shape of a. In the fourth example, the missing final vowel of the verb would bear a doubled H tone due to the preceding H-toned object marker a. Thus the initial vowel of the noun represents a contraction of a doubled H and a primary H vowel.

A missing mora due to the contraction of a noun and a following vowel-initial verb provides further examples of surface-unexpected failure of protection. Consider verb forms like [a-h-áa-lyale]^{Er} ‘he had not eaten’, [a-h-áa-kusále]^{Er} ‘he had not carried’, etc. We illustrate first the case where the noun has a penult primary H and then the case where it has an antepenult primary H. In the former situation, the primary H would be expected to double onto the final vowel in medial position, while in the latter case the double would be expected to be onto the penult vowel of the noun and not the final vowel. In both cases, however, the final vowel contracts with the initial H-toned vowel on the verb.

- (35) **[thanlá]**^{Er}, **[mphwátta]**^{Er}, **[hayáka]**^{Er} - personal names
[thanl' á-h-áa-lyale]^{Er} 'if Thanla had not eaten' (/Thanla a-h-aa-lyale/)
[mphwatt' á-h-áa-lyale]^{Er} 'if Mphwatta had not eaten' (/Mphwatta a-h-aa-lyale/)
[hayak' á-h-áa-kusále]^{Er} 'if Hayaka had not carried' (/Hayaka a-h-aa-kusale/)
[loopîsi]^{Er}, **[nkhuwêla]**^{Er}, **[cookhôro]**^{Er} – personal names
[loopís' a-h-áa-lyale]^{Er} 'if Loopisi had not eaten' /Loopisi a-h-aa-lyale/)
[nkhuwél' a-h-áa-lyale]^{Er} 'if Nkhuwela had not eaten' (/Nkhuwela a-h-aa-lyale/)
[cookhór' a-h-áa-rukunúsale]^{Er} 'if Cookhoro had not turned it over'
(/Cookhoro a-h-aa-rukunúsale/)

In the first set of examples, the primary H tone on the verb is protected from Attenuation. On the surface it is not preceded by a H tone, but rather a completely attenuated H tone. This, of course, represents a problem for a phonetic account of the protection against Attenuation. It is, however, also the case that the missing mora at the juncture of the noun and the verb would have born a doubled H that could have counted as the protecting factor.

The second set of examples shows that the initial primary H tone on the verb *is* attenuated, which means that the preceding H tone in the noun is not sufficient to protect it. Protection fails because the missing mora is in fact a toneless mora, never having received a doubled H from the noun's antepenult primary H tone. If we are attempting to predict attenuation on the basis of the surface form, then this type of example also is a counterexample.

These counter-examples to Attenuation could be explained if Contraction were itself a phonetic rule ordered after Attenuation. We have already discussed the problems created by trying to make Contraction a phonetic rule.

In Eerati the No Trimoraic Syllable constraint apparently can lead to an unexpected failure of Attenuation. We did not observe this phenomenon in Imitthupi, despite having worked much more intensively on Imitthupi. But in our work on Eeratti we came across the following contrast:

- (36) [y-i-h-áa-k-oópíhale] ‘if [cl.2] had not beaten me’ (from: /y-i-h-aa-ki-opopihale/)
 versus:
 [y-i-h-áaópíhale] ‘if [cl.2] had not beaten [cl.2]’ (from: /y-i-h-aa-a-opopihale/)

The critical facts about this verb tense is that the initial element i bears a primary H tone as does the second mora of the macrostem (in these examples, this is the initial mora of the stem proper since there is a preceding object marker). The *aa* tense-aspect-mood marker in this tense precedes a structure /ki-opopihale/ and /a-opopihale/. The first example does not yield any mora loss. The second example, on the other hand, leads to a four mora sequence: *-aa-a-o*. This sequence of four moras cannot be realized as the nucleus of a syllable due to the No Trimoraic Syllable constraint. Two moras must be deleted. It is notable that in Eeratti, the vowel quality of the resulting bimoraic vowel is *aa* and not *oo* (the latter seems to us the more expected output cross-dialectally, but we have not studied the matter intensively). What is critical is that the last mora of the four mora sequence has a primary H tone, and we see in the output that it doubles onto the following mora. The problem is that even though it doubles, it is not itself realized with a H tone, despite apparently being protected by a preceding H tone. The problem here is

that in the input sequence *aa-a-g*, while the initial vowel would be expected to bear a doubled H tone, neither of the next two moras would be expected to be H-toned. When No Trimoraic Syllable forces the deletion of two moras, it is the toneless moras that are sacrificed and not the H-toned ones. Still, these toneless moras seem to be the explanation for the failure of protection against Attenuation.

There is no way in which the Mora Reduction phenomenon triggered by No Trimoraic Syllable can be a phonetic rule, since it would require an input with four moras in a row, which is totally impossible in the pronunciation of Emakhuwa.

We conclude that Attenuation is not viable as a phonetic rule in completely attenuating dialects.

6.4 CAN FALL BE A PHONETIC PRINCIPLE IN COMPLETELY ATTENUATING DIALECTS?

In a system with complete attenuation there is no surface shape that can identify when a falling tone on a penult monomoraic syllable will occur. An utterance-penult mora that follows a toneless antepenult may be either level or falling, as seen in (37).

- (37) [kharáka]^{Er} ‘potato’
 [nacíra]^{Er} ‘a kind of knife’
 [w-aáwa]^{Er} ‘to use witchcraft to steal crops, etc.’
 [a-phôtto]^{Er} ‘roof beams’
 [w-aakhûla]^{Er} ‘to answer’
 [n-rokôlo]^{Er} ‘sp. bird’

However, on the assumption that there can be interaction among phonetic rules, if the Fall rule is applied *before* Attenuation, then one could propose that Fall simply requires

an utterance-penult H tone to be realized as a fall when preceded by a H. Thus **[kharáka]**^{Er} does not have a H tone in front of the penult prior to Attenuation, whereas **[a-phôtto]**^{Er} does. This account of Fall, however, is dependent on Attenuation being a phonetic rule, which as we have seen is problematic.

Unfortunately, of course, a preceding H tone does not in fact guarantee that the penult mora should be falling.

- (38) **[o-máálíha]**^{Er} ‘to make quiet’
[w-ooopóíha]^{Er} ‘to frighten’
[w-uupúwéla]^{Er} ‘to remember’
[w-untákáca]^{Er} ‘to break’

What these examples show is that even with ordering Fall before Attenuation (and also assuming that HTD is a phonological rule and not a phonetic rule), we merely have put completely attenuating dialects into the same position as partially attenuating dialects. Fall affects a penult H if an even-numbered mora in a sequence of H tones.

While this form of the phonetic rule allows most examples of the Fall rule to be accounted for, it runs into trouble as we have seen (in the case of partial attenuation) when the contraction of moras occurs. Because of the more restricted nature of our research on Eeratti in comparison to Imitthupi, and because Eeratti morphophonemics avoids sequences of four moras that arise in Imitthupi, we are unsure of how extensive the problem of omitted moras is in Eeratti. We will cite just one example that illustrates the problem that Contraction across words creates.

- (39) [o-n_o-mw-á-ly' á-kérékêsa] 'he ate *akerekesa*' (from: /o-n_omu-alya a-kerekesa/)

The noun, in isolation, is not a problem. Given an input /a-kerekesa/, after HTD and before Attenuation there is a sequence of four H-toned moras. The penult H is in an even position in that sequence and consequently will correctly have a fall on the surface. The verb in isolation also is not a problem: [o-n_o-mw-á-ly_a] 'he ate', since the penult H tone is in an odd position in the sequence of pre-Attenuation H tones. However, when the verb and the noun occur in the same phrase, the final vowel of the verb and the initial vowel of the noun contract into a single mora. The final vowel of the verb *would have received a H tone by virtue of HTD*, but it is missing from the surface as a consequence of Contraction and the result is that the penult H is in fact in an odd-numbered position in the sequence of pre-Attenuation H tones. In order to achieve the correct count, it would be necessary that Contraction follow Fall. But we have already seen that making Contraction a phonetic rule is not viable if phonetic rules are not sensitive to grammar.

6.5 CAN HTD BE A PHONETIC PRINCIPLE?

HTD is generally transparently true in Emakhuwa: a H tone is followed immediately by another H tone (as long as it is in an unrestricted environment – i.e., depending on dialect, not penult in the utterance, not the initial mora in a utterance-penult bimoraic syllable, not in an utterance-antepenult mora). If HTD is regarded as a phonetic rule, then Attenuation and Fall must also be phonetic rules, since they are dependent on the fact of doubling.

If HTD is a phonetic rule, then the only H tones in the output of the phonological component are the primary H tones assigned mostly by morphological principles. HTD

will require that each of these H tones be followed by a H tone on the next mora if it is in an unrestricted environment. If it is the case that in the output of the phonological component there are two primary H tones on successive moras, then it is possible that HTD either fails or applies vacuously.

This phonetic rule of HTD is contradicted just in the event that there is a primary H tone that fails to double onto a following toneless mora even though it is not in a restricted position. We have failed to find such examples in the course of our research on non-attenuating and partially attenuating dialects. Thus at least in those dialects, there is little impediment to assuming a phonetic rule of HTD, as long as one is prepared to assume an ordering between it and a phonetic Fall rule and a phonetic Attenuation and a phonetic Contraction rule. This complex interplay of “phonetic” rules seems not to fit well with at least the popular understanding of phonetic rules as being fundamentally rules that spell out the realization of the “phonemic” sequences found in phonological representation. Although to be fair, as early as the 1970s David Stampe proposed a theory of “natural phonology” whereby fast speech was characterized in terms of a complex interplay of natural phonological processes that were phonetic in nature, and not dependent on morphophonemic structure (Stampe 1969, 1979). However, the input to these fast speech rules was a representation that conformed to the actual pronunciation of a careful production of the fast speech form. In the dialects we have discussed here, the output of the phonology (where HTD does not apply until the phonetic component) is not a possible pronunciation of the word or sentence.

Let us now turn to the question of whether HTD can be a phonetic rule in a completely attenuating dialect. The critical problem with this proposal is that the output of the phonology would very often contain a H tone on a mora that in fact is not H-toned (subsequent to the HTD and Attenuation rules in the phonetic component). This means that the phonetic component must implement a change whereby an H tone becomes a toneless. This would seem to allow abstract surface phonological represents

that can be phonemically restructured (e.g. a H0 sequence can become a 0H sequence). This raises the question of whether there is a principled condition on how far the surface phonological representation can differ from the phonetic representation. In addition, of course, these phonological representations do not in fact conform in any direct way with the actual pronunciation.

7 CONCLUSION

In this paper we have examined the tonal pattern displayed by partially and completely attenuating dialects in Emakhuwa, including the complexities introduced by the existence of protective environments that militate against attenuation. We have also examined the opacity that can be introduced by rules that require the loss of a mora (due to Contraction and No Trimoraic Syllable). We have also raised the issue of to what extent the rules discussed (HTD, Attenuation, Fall, Contraction, *Trimoraic Syllable) can be considered to be phonetic rather than phonological rules. Resolving this question, however, is dependent on a precise characterization of what it means to be a rule of phonetic implementation. It seems dubious to us that the complex interplay of these rules would allow them to be regarded as “phonetic implementation”, but that ultimately is a matter for theorists of phonetic implementation.

8 REFERENCES

Cassimjee, Farida & Charles W. Kisseberth. 1999. Tonal variation across Emakhuwa dialects. In Shigeki Kaji, ed., *Proceedings of the symposium, cross-linguistic studies of tonal phenomena, tonogenesis, typology, and related topics*, 261-287. Tokyo: Tokyo University of Foreign Studies.

- Cassimjee, Farida & Charles Kisseberth. 1999. A Conspiracy Argument for Optimality Theory: Emakhuwa Dialectology. *Proceedings of the 23rd Penn Linguistics Colloquium, University of Pennsylvania Working Papers in Linguistics* 6.1: 81-96.
- Cassimjee, Farida & Charles W. Kisseberth. 2003. Eeratti tone: towards a tonal dialectology of Emakhuwa. In Stefan Ploch (ed.), *Living on the Edge: 28 Papers in Honour of Jonathan Kaye*, pp. 203-222. Berlin: Mouton de Gruyter.
- Cheng, Chin-Chuan & Charles W. Kisseberth. 1979. Ikorovere Makua tonology (part 1). *Studies in the Linguistic Sciences* 9. 31-63.
- Cheng, Chin-Chuan & Charles W. Kisseberth. 1980. Ikorovere Makua tonology (part 2). *Studies in the Linguistic Sciences* 10. 15-44.
- Cheng, Chin-Chuan & Charles W. Kisseberth. 1981. Ikorovere Makua tonology (part 3). *Studies in the Linguistic Sciences* 11. 181-202.
- Guthrie, Malcolm. 1948. *The classification of the Bantu languages*. London: Oxford University Press.
- Katupha, Jose M.M. 1983. *A preliminary description of sentence structures in the E-Saaka dialect of Emakhuwa*. MPhil Thesis. London: SOAS, University of London.
- Kisseberth, Charles W. 2003. Makhuwa (P30). In *The Bantu languages*, ed. by Derek Nurse & Gérard Philippson, 546-565. London: Routledge.
- Kisseberth, Charles W., & David Odden. 2003. Tone. In *The Bantu languages*, Derek Nurse & Gérard Philippson, 59–70. London: Routledge.
- Kisseberth, Charles W., & Rozenn Guérois. 2014. Melodic H tones in Emakhuwa and Ecuwabo verbs. *Africana Linguistica* 20: 181-205.
- Marlo, Michael R. 2013. Verb tone in Bantu languages: micro-typological patterns and research methods. *Africana Linguistica* 19.137-234.

- Marlo, Michael R. & David Odden. 2019. Tone. In *The Bantu languages*, second edition, ed. by Mark Van de Velde & Koen Bostoen. London: Routledge.
- Odden, David. 1989. Predictable tone systems in Bantu. In Harry van der Hulst & Norval Smith (eds.), *Autosegmental studies on pitch accent*, 225-251. Dordrecht: Foris Publications.
- Stampe, David. 1969. The acquisition of phonetic representation. In Robert I. Binnick, Alice Davison, Georgia Green and Jerry L. Morgan (eds.), *Papers from the fifth regional meeting of the Chicago Linguistic Society*, pp. 443-454. Chicago: University of Chicago Department of Linguistics.
- Stampe, David. 1979. *A dissertation on Natural Phonology*. New York: Garland.
- Van der Wal, Jenneke. 2006. Predicative tone lowering in Makhuwa. In Jeroen van de Weijer & Bettelou Los (eds.), *Linguistics in the Netherlands* 23, 224-236. Amsterdam: John Benjamins.
- Van der Wal, Jenneke. 2009. *Word order and information structure in Makhuwa-Enahara*. Utrecht: LOT.
- Van der Wal, Jenneke and Larry Hyman (eds). 2017. *The conjoint/disjoint alternation in Bantu*. Trends in Linguistics series. Berlin: Mouton de Gruyter.

DISCUSSION WITH CÉDRIC PATIN

(UNIVERSITÉ DE LILLE, CNRS STL)

Patin, Cédric. 2022 Discussion in: Kisseberth, Charles (auth.) “Attenuated high tones in Emakhua dialectology”. *Radical: A journal of Phonology*, 4, 642-645.

COMMENTS

In addition to offering an impressive set of new data and analyses of Emakhua tonology in the first part of his article (Sections 1-5), Chuck Kisseberth proposes in a second part a thought-provoking discussion of the nature of the rules that are postulated, questioning their phonetic or phonological nature (Section 6). Discussing all the points raised in this second part – I have little to say on the first – would require a long development. To take just one small example, it is proposed that phonetic rules have no exceptions, but some have also used this characteristic to identify rules as phonological, rather than morphological (e.g. Green 2003). In this public reaction, I will focus on two aspects of Chuck's paper, the analyses of *Fall* and *Attenuation*.

Fall as it is discussed in Subsections 6.2 and 6.4. I must admit that I am not convinced by the analysis conducted on *Fall* (reminder = *Fall* is the fact that a tone emerge in a descending form on the penultimate syllable, e.g. [u-tūmîha]^{Mi} ‘to sell’ (27)). In Subsections 6.2 and 6.4, Chuck tries to account for the fact that *Fall* sometimes fail to apply (e.g. [u-thūma]^{Mi} ‘to buy’ (27), *[u-thūma]). In his demonstration, he indicates that the application or not of the rule can be linked to the number of (high-toned) moras that precede the high tone landing on the penult: "*a falling tone occurs on an utterance-penult mora when it is in an even-numbered position in a sequence of H-toned moras*". His conclusion, in the end of Subsection 6.2, is that "*there is no viable way to avoid restricting Fall to a doubled H (i.e. a reference to morphophonemics) as opposed to a phonetic rule counting even/odd numbering in H-tone sequences*".

Chuck's analysis is based on the idea that *Fall* is a rule that applies to the tone on the penultimate syllable of the utterance, but I see nothing in the data that compels us to make that assumption. When a high tone appears in a falling form when it is at the end of an utterance, my first and primary suspect is a boundary tone (or its equivalent in models other than the autosegmental-metrical theory). As far as I know, there is no detailed study of the intonation of Emakhuwa, or even researches that include F_0 curves, but van der Wal (2009:34) indicates that the language is characterized by a "*process of Final Lowering, which lowers the last syllable of a sentence, and possibly also of smaller phrases*". An alternative to Chuck's assumptions would therefore be that an L% boundary tone is able to extend onto the penultimate when it carries a doubled tone, but not when it carries a primary tone. This type of interaction between tones and intonation is not impossible, especially in Bantu languages: in Shingazidja, a language from Comoros Chuck knows well, "*the L% does not interact with a high tone on the penultimate syllable if the final syllable of the sentence is underlyingly high*" (Patin 2017:292-293), and no L% is observable in Tswana (South Africa) when the end of the utterance is composed of a H+L or L+H tone sequence, vs. sentences ending with H+H or L+L sequences (Zerbian 2017:406-407). One can imagine different ways to formalize such a potential interaction, but such analyses would require that an analysis of Emakhuwa's intonation be conducted first.

Attenuation. In contrast to the point I just made, I have no reservations about the analysis that is offered for this issue in the article. As with the previous point, however, I think it is interesting to question the necessity of the proposed rule, beyond the pleasure of discussion. I am rather convinced that Attenuation applied in a form or another during the *diachronic* evolution of Emakhuwa. However, it is not clear to me that it is necessary to assume the *synchronic* existence of such a rule in the different dialects of this language.

To account for a variety like Imitthupi, we must indeed assume that Attenuation applies in two distinct environments: i. when the primary tone is preceded by a low tone more, on the one hand, and ii. when the primary tone emerges in the initial syllable of the utterance, on the other. Obviously, we can consider that Attenuation comes into play when the mora that carries the primary tone is *not* preceded by a mora carrying a high tone, but such a 'negative' formulation is not without problems. It may then seem interesting to consider that the height of the attenuated tone is in fact the default pitch. Instead of an attenuation of the primary tone, we would then posit a rule that would raise the height of the doubled tone. This is far from being uncommon. In Saghala, a Bantu language of Kenya, for instance, every tone in a tone domain is raised in regard to the preceding one (e.g. *ilya njó 'vú 'mbwáa* 'that big elephant', where the tone shifts from the final syllable of the demonstrative to the first syllable of low-toned noun *njovu* 'elephant' – a case of 'complete attenuation' – and then spreads up to the first syllable of the adjective – my data). From this point of view, the high realization of the primary tone when it is preceded by a high tone would not constitute a case of non-application of Attenuation (a hypothesis which is in fact uneasy to motivate, especially since this non-application reduces the identification of the boundaries of tone domains), but rather a case of application of a 'natural' tone bridge rule.¹ It would then remain to account for the pitch of the (other) tones not associated with HTD, for which an interaction with stress seems to occur. To do this, it could be interesting to observe the shape of the curve of the F₀.

Green, A. 2003. The Independence of Phonology and Morphology: The Celtic Mutations. *ZAS Papers in Linguistics* 32: 47-86. **Patin**, C. 2016. Tone and Intonation in Shingazidja. In L. Downing & A. Rialland (eds.), *Intonation in African Tone Languages*. Phonology & Phonetics 24. Berlin/Boston, Mouton De Gruyter: 285–320. **van der Wal**, J. 2009. *Word order and information structure in Makhwa-Enahara*. Utrecht, LOT. **Zerbian**, S. 2017. Sentence

¹ Note that such an explanation would not change anything with regard to the one put forward by Chuck concerning situations where the tone doubles onto the second mora in the same syllable.

intonation in Tswana (Sotho-Tswana group). In L. Downing & A. Rialland (eds.), *Intonation in African tone languages*. Phonology & Phonetics 24. Berlin, Mouton De Gruyter: 393–434.

REPLY OF CHARLES W. KISSEBERTH

The proposal that the fall on a doubled H on the penult mora can be attributed to a boundary tone effect is not implausible, but it has no bearing on the issues addressed in the paper. The question we were addressing was this: if Fall is a phonetic rule (however it is implemented), how does it pick out a doubled H from a primary H, since only the doubled H tone falls. The difficulties with making this distinction are the same regardless of whether Fall is a manifestation of a boundary tone or not.

The suggested re-analysis of attenuation seems problematic to me. The proposal seems to be that the attenuated mora is the default pitch height and the doubled H is raised above it. But why then is a H tone that is not doubled at the default pitch height? For example, why in Imithupi is there no question that the first vowel in **[u-thúma]** is a fully H vowel and **[u-tümíha]** is not? And what about the fully attenuated dialects? Here the same analysis cannot be proposed, but there are very good reasons why you want to identify the fully attenuated vowel as being H-toned: they are assigned by very general morphologically based principles where some of the time the targetted mora will manifest the H tone overtly and at other times be attenuated. The generality of tone assignment will be impossible if the completely attenuated moras are not in fact H-toned.