

Aspects of Mabaan Tonology

TORBEN ANDERSEN

This article deals with the tonology of Mabaan, a little known Western Nilotic language. Although pitch is contrastive in Mabaan, contextually determined pitch variations make the tonal system somewhat non-conspicuous. However, the article demonstrates that Mabaan has two underlying tones, High and Low, and it gives a partial description of the processes leading to the phonetic manifestations of these tones.

1. INTRODUCTION*

Mabaan is a little known Nilotic language of Sudan.¹ According to Tucker and Bryan (1956:101), it is spoken "on the border of Gezira and Upper Nile Provinces, between River Yabus and Tombak in the north and Khor Daga in the south" by a population estimated to be at 20,000. In Köhler's (1955) classification of the Nilotic languages, Mabaan belongs to the Burun branch of the Western Nilotic subfamily of Nilotic. This genetic determination of Mabaan was based on a list of 84 words in Evans-Pritchard (1932:28ff). In fact, Evans-Pritchard's word list is the only previously published descriptive treatment of Mabaan.

As might be expected, Mabaan is a tone language, and the purpose of the present article is to provide some basic information about its tonal system and tonal processes. The tonal analysis of Mabaan is complicated by the existence of various types of contextually determined pitch variations, but I shall demonstrate that the pitch contrasts obtaining in this language can be analyzed in terms of two underlying tones, High and Low.

The article is organized as follows. As a background for the discussion of tone, section 2 gives a brief introduction to the segmental and morphological structures of words. Section 3 introduces a system of relative pitch level values as a device for describing pitch itself, which is, of course, a

* The present article is based on field work carried out during a number of trips to Khartoum between 1988 and 1991. I wish to thank the Scandinavian Institute of African Studies and the Danish Research Council for the Humanities for financial support and my principal informant, Zechariah John Shira, for his assistance. I also wish to thank the Editor and an anonymous referee for valuable comments on an earlier version of the article.

1. *Mabaan* is itself a Mabaan noun phrase, /má`bâanà/, whose literal meaning is 'people of home' (people:AG home).

prerequisite for referring to pitch differences at all. Section 4 classifies words into tonal classes on the basis of their pitch patterns in various contexts, and it proposes an analysis of their tonal structure. Sections 5 and 6 deal with external tonal sandhi. Section 7 argues that word-final floating tones have to be assumed for certain word forms. Finally, section 8 points out a way in which tone is dependent on vowel length.

2. SEGMENTAL AND MORPHOLOGICAL STRUCTURES OF WORDS

In Mabaan, the segmental structure of a word is to some extent dependent on whether the word occurs in prepausal position or in non-prepausal position. Therefore, it is relevant to note that there are four distributional classes of words in terms of this positional dichotomy: (i) words that can occur both prepausally and non-prepausally without any variation in their phonological form; (ii) words that can occur in both positions, but with one phonological form prepausally and another phonological form non-prepausally; (iii) words that cannot occur phrase-finally, and hence not prepausally, because of their grammatical properties, e.g. prepositions, which have to be followed by a noun phrase, or nouns in the antigenitive case, which have to be followed by a possessor noun phrase;² and (iv) words that can only occur prepausally, viz. certain function words, e.g. function words that can only occur sentence-finally.

Most word forms that can occur in prepausal position consist of two syllables, as in (1a), or three syllables, as in (1b).³

2. The form of the possessed, which I propose to call *antigenitive*, has variously been referred to as "genitive", "appertentive", "determinative", or, following the tradition of Semitic linguistics, "status constructus" or "construct state" by other authors working on Western Nilotic languages.

3. The following abbreviations are used in direct translations:

1	= first person	AP	= antipassive
1PLEX	= first person plural exclusive	BEN	= benefactive
1SG	= first person singular	CF	= centrifugal
2	= second person	FUT	= future tense
2PL	= second person plural	LOC	= locative
2SG	= second person singular	M	= multiplicative
3	= third person	PAST	= past tense
3PL	= third person plural	PL	= plural
3SG	= third person singular	POSTP	= postposition
AG	= antigenitive	PREP	= preposition

In direct translations of transitive verb forms, person markers for subject and object are mentioned in that order. Although not an ergative language, Mabaan has the possibility of detransitivizing a transitive verbal root into an *antipassive* stem, thereby demoting an object to an optional constituent. Unlike a true object, which precedes the verb and is cross-referenced

- (1) a. wáŋá 'eye'
 dírgá 'birds'
 bfiellà 'cane'
 túalŋgà 'elbows'
 jôgdé 'he will kick him' (kick:FUT:3SG:3)
 ɲàakcán 'louse'
 káltán 'they will steal it' (steal:FUT:3PL:3)
 b. ʔàŋkàndá 'always'
 mɔ̀nnéntò 'you beat us' (beat:PAST:2PL:1PLEX)
 jòŋgátò 'you kicked me' (kick:PAST:2PL:1SG)

The segmental structure of such words is summarized in (2), where parentheses enclose optional segments, and where \underline{V} is the last component of a diphthong, which does not contribute to the length of the diphthong.

- (2) CV(V)(\underline{V})C(C)(C)V(C)(CV)

Thus, according to (2), a word consists of, from left to right, (i) an initial consonant, (ii) a short or long vowel, which is either a monophthong or a diphthong, (iii) one, two or three consonants, (iv) a short monophthong, (v) an optional consonant, and finally, (vi) an optional syllable consisting of a consonant and a short monophthong.

Some nouns, which will not be further dealt with (except in section 8), deviate from the schema in (2) by having a long vowel in the second syllable, as in (3a), or by consisting of more than three syllables, as in (3b).

- (3) a. còndûuk 'box' (cf. Sudanese Arabic sʔanduug 'box')
 kàwaaɣà 'white man' (cf. Sudanese Arabic ɣawaaɣa
 'foreigner')
 b. kèkàlilà (species of bird)

Some of the deviant words, such as those cited in (3a), are recent borrowings from Sudanese Arabic.

in the verb, a demoted object follows the verb and is not cross-referenced in the verb. Verb forms that are unmarked for tense (i.e. containing neither PAST nor FUT as a morpheme) denote, roughly speaking, a habitual situation if they are transitive, a present or habitual situation if they are intransitive (including antipassive) and non-stative, and a present or past situation if they are stative. Note also that most pronominal morphemes in Mabaan do not have the same denotation as their translational equivalents in English. Thus, for instance, 3SG is less specific than each of 'he', 'she' and 'it', and 2SG and 2PL are more specific than 'you'. In this article, 3SG and 3 will usually be translated 'he' (or 'it'), while the exact meaning of a pronominal morpheme will always be indicated in the direct translation.

A few of the word forms that can occur in prepausal position are monosyllabic, and they have the segmental structure summarized in (4).

(4) CV(V)(V)(C)

Thus they consist of (i) an initial consonant, (ii) a short or long vowel, and optionally, (iii) a final consonant. Apart from a few names, as in (5a), all true prepausally monosyllabic words are function words, i.e., they belong to closed distributional classes of words, as in (5b).

- (5) a. **càan** (male name)
 kàaŋ (male name)
 b. **ʔɔɔn** 'we' (1PLEX)
 tùuaŋ 'when?'
 bêɛ 'not'
 wán 'that, those'
 ʔi 'you' (2SG)
 té (POSTP)

Others are not true monosyllabics but free variants of disyllabic words, for instance those in (6).

- (6) **díiɛŋ** ~ **díiɛŋá** 'cow'
 ʔúuan ~ **ʔúuanà** 'man'

In non-prepausal position, monosyllabic word forms are far more common. Here they can have the segmental shapes summarized in (7).

(7) CV(V)(V)(C)(C)(C)

That is, they consist of (i) an initial consonant, (ii) a short or long vowel, and finally, (iii) zero, one, two or three consonants. Apart from names and function words like those in (5), non-prepausal monosyllabic words are either variants of prepausally disyllabic words that end in a vowel, as in (8a), or words that cannot occur prepausally because of their grammatical properties, as in (8b).

- (8) a. **wánŋ** 'eye' (cf. prepausal **wánŋá**)
 díirg 'birds' (cf. prepausal **díirgá**)
 túalŋg' 'elbows' (cf. prepausal **túalŋgà**)
 b. **ʔán'** 'tree of' (tree:AG)
 ʔâarg' 'houses of' (house:PL:AG)

Mabaan has 23 consonantal segments, whose phonetic properties are indicated in table 1 using IPA symbols. The number of consonantal phonemes is 17. They are indicated by symbols for allophones not enclosed in square brackets in the table.

Table 1. *Consonants*

	bilabial	inter- dental	alveolar	post- alveolar	palatal	velar	labio- velar	glottal
voiceless stop	p	t̪	t		c	k		[ʔ]
voiced stop	b	d̪	d		ɟ	g		
nasal	m	[ɱ]	n		ɲ	ŋ		
voiceless affricate				[tʃ]				
voiced affricate				[dʒ]				
voiceless fricative				[ʃ]				
lateral			l					
trill			[r]					
glide					j		w	

[ɱ] is an allophone of /n/, [tʃ] and [ʃ] are allophones of /c/, and [dʒ] is an allophone of /ɟ/. It may also be argued that [ʔ] is non-phonemic and that [r] is an allophone of /d/. However, although the transcription used in this article is basically phonemic, it treats ʔ, r and d as separate segments.

Mabaan has 11 contrastive vowel qualities, including 7 monophthongs and 4 diphthongs, which are shown in (9).

- (9)
- Monophthongs

i

u

e

ie

ε

Λ

ɔ

a
- Diphthongs

ie

iε

uΛ

ua

The vowel symbols in (9) have IPA values, with the following exceptions: /e/ is considerably higher than cardinal [e] (in fact as high as Danish /e/), /a/ is a low unrounded central vowel, and /ʌ/ is a lower-mid unrounded central vowel.

Vowel length is contrastive, and all eleven vowel qualities are either short, as in (9), or long, as in (10).

(10)	Monophthongs			Diphthongs	
	ii			uu	
	ee			ie	
	εε	ΛΛ	ɔɔ	iiε	uuΛ
	aa			uuu	

In long diphthongs the length is usually manifested in the first component, as indicated by the double vowel symbol for this component. Thus, the long diphthongs are clearly diphthongs rather than sequences consisting of a glide and a monophthong.

A Mabaan word may consist of several morphemes, as illustrated by the words in (11).

- (11) a. mÂΛnnén 'I beat for you repeatedly'
(beat:M:BEN:PAST:1SG:2SG)
- b. bôggé 'his arms'
(arm:PL:3SG)

The verb in (11a) contains six morphemes: The root 'beat', the derivational morphemes 'multiplicative' and 'benefactive', and the inflectional morphemes 'past tense', 'first person singular subject' and 'second person singular object'. And the noun in (11b) contains three morphemes: The root 'arm' and the inflectional morphemes 'plural' and 'third person singular possessor'. The means of derivation and inflection are suffixation, vowel alternation in the root, and tone alternation. Mabaan has no prefixes, so the first part of a word is a manifestation of its root. Suffixes are often not readily segmentable, at least not in the surface representation, so the right hand boundaries of roots and stems are often not immediately clear. In most words, however, the root is manifested by the first CV(V)(Y)C part of the word, and hence a root normally consists of an initial consonant, a vowel (which is short or long, and monophthongal or diphthongal), and a final consonant. The vowel of the root and the tone carried by that vowel may at the same time also be exponents of derivational or inflectional morphemes, and they will therefore be referred to as the stem vowel and the stem tone. Other vowels and tones will be referred to as suffix vowels and suffix tones.

3. RELATIVE PITCH LEVEL VALUES

The phonologically relevant properties of pitch in Mabaan can be described abstractly by means of a system of five relative pitch level values: [1], [2], [3], [4] and [E]. In this system, [1] is a high pitch level, and [2], [3] and [4] are successively lower pitch levels, while [E] is an extra low pitch level near the bottom of the speaker's pitch range. A pitch, which is carried by a vowel, is either a level pitch, which is indicated by a single pitch level value symbol, or a falling or rising contour pitch, which is indicated by a sequence of two pitch level value symbols referring to the starting point and the end point of the contour. A hyphen indicates the boundary between two pitches of a single word. Thus, for instance, [14-4] tells of a disyllabic word that the pitch of its first vowel is a contour pitch falling from level [1] to level [4], and that the pitch of its second vowel is a level pitch at level [4].

I am not claiming that the pitch level values [1], [2], [3] and [4] are perceptually equidistant. Unlike the set of pitch level values used in a recent description of Pāri, another Western Nilotic language, see Andersen (1988b), these are approximate and basically arbitrary.

Mabaan exhibits a certain amount of downdrift, but since I have not examined this process systematically, it is ignored in the notational system of relative pitch level values used here. That is, the transcription does not imply that the absolute pitch height, F_0 , of a given relative pitch level value is constant throughout an utterance consisting of more than one word. Thus, two instances of a given relative pitch level value within an utterance do not necessarily have the same absolute pitch height, unless they occur within a single word.

4. TONES OF WORDS WITH AN UNRESTRICTED DISTRIBUTION

The pitch pattern of a given word form depends in part on whether that word form has prepausal or non-prepausal position in the utterance in which it is being used. But as mentioned in section 2 above, not all word forms have a phonologically unrestricted distribution, some occurring only prepausally and some only non-prepausally, and this situation complicates the analysis. Moreover, while the phonetic facts themselves are reasonably clear in non-prepausal position, they are somewhat uncertain in prepausal position. Although, in general, this local uncertainty does not prevent a valid tonal analysis, it has so far prevented me from identifying the tones of a few monosyllabic function words that can only occur prepausally.

As a starting point for the tonal analysis, we shall now consider word forms that have a phonologically unrestricted distribution, i.e. words that can occur both prepausally and non-prepausally and which have the same phonological

form in both positions. The three other distributional classes of words (cf. section 2 above) will be touched on in sections 6 through 8, but only some of the tonal problems pertaining to these classes will be dealt with.

Word forms with a phonologically unrestricted distribution fall into a number of tonal classes in terms of their pitch patterns. Thus there are four classes of monosyllabic words and nine classes of disyllabic words.⁴ These tonal classes are shown in table 2, which indicates the pitch patterns of each class as well as the tonal analysis that I adopt. Some of the tonal word classes have two different pitch patterns in non-prepausal position, and therefore the table distinguishes three positions. The first of the two non-prepausal positions, position A, includes the position before classes (b), (d), (f), (i) and (l), while the second position, position B, includes the position before the other classes of the table, viz. classes (a), (c), (e), (g), (h), (j), (k) and (m).

Table 2. Tonal classes of word forms with an unrestricted distribution

Tonal word class	Tone pattern	Contextually determined pitch pattern			
		non-prepausal		prepausal	
		A (= __L)	B (= __H)	ending in a light syllable	ending in a heavy syllable
(a)	H	[1]	[3]	[E]	[3E]
(b)	L	[34]	[34]	[E]	[3E]
(c)	HL	[14]	[14]	-	[1E]
(d)	LH	[31]	[3]	-	[3E]
(e)	H-H	[1-1]	[1-1]	[3-E]	[3-3E]
(f)	L-H	[3-1]	[3-3]	[3-E]	[3-3E]
(g)	HL-H	[12-2]	[12-2]	[34-E]	[34-4E]
(h)	H-L	[1-4]	[1-4]	[1-E]	[1-E]
(i)	L-L	[34-4]	[34-4]	[34-E]	[34-4E]
(j)	HL-L	[14-4]	[14-4]	[14-E]	[14-E]
(k)	H-HL	[1-1]	[1-1]	-	[1-1E]
(l)	L-HL	[3-1]	[3-1]	-	[3-1E]
(m)	HL-HL	[12-2]	[12-2]	-	[12-2E]

The tonal analysis of the system of pitch patterns in table 2, as well as of additional pitch patterns to be dealt with later on, is intended to be as simple as possible. More specifically, the analysis is guided by the following five, potentially conflicting, principles of simplicity: (i) the number of tonal

4. The tonology of trisyllabic words is not dealt with in the present article.

elements should be as small as possible, (ii) the relation between tone and relative pitch level value should be as invariable as possible, (iii) tones should be as freely combinable as possible, i.e., there should be as few restrictions as possible on tone combinations within a word, (iv) contextual tone rules (tone sandhi rules) should be as general as possible, and (v) the tonal analysis should allow the simplest possible morphological description.

The tonal analysis proposed in table 2 uses two tonal elements, H (= High tone) and L (= Low tone), i.e. the logically smallest possible number of contrasting tone levels. On this analysis, a vowel carries either a single tonal element, H or L, or a sequence of two tonal elements, HL or LH.

The distribution of tones among the tonal classes of words contained in table 2 implies a very simple tonotactics. A monosyllabic word has either a simple tone, H = /˥/ or L = /˩/, or a complex tone HL = /˥˩/ or LH = /˩˥/, as exemplified in (12).⁵

- | | | | | | |
|------|-----|----|------|------|--------------------|
| (12) | (a) | H | té | [1] | (POSTP) |
| | (b) | L | càan | [34] | 'Caan' (male name) |
| | (c) | HL | ?ôon | [14] | 'like that' |
| | (d) | LH | ?ôon | [31] | 'we' (1PLEX) |

A disyllabic word cannot have the complex tone LH, but the other three tonal configurations, H, L and HL, can combine freely in such words. The only restriction is that the tone of the second syllable cannot be HL unless that syllable ends in a consonant. Thus there are six possible tone patterns for disyllabic words ending in a vowel. The contrasts among these are shown by the minimal set in (13), which contains six morphologically distinct verb forms, which all share the same root.

- | | | | | | |
|------|-----|------|-------|--------|---|
| (13) | (e) | H-H | jógdḗ | [1-1] | 'you will kick him repeatedly'
(kick:M:FUT:2PL:3) |
| | (f) | L-H | jògdḗ | [3-1] | 'he will kick him repeatedly'
(kick:M:FUT:3SG:3) |
| | (g) | HL-H | jôgdḗ | [12-2] | 'he will kick him'
(kick:FUT:3SG:3) |
| | (h) | H-L | jógdè | [1-4] | 'you will kick him'
(kick:FUT:2PL:3) |
| | (i) | L-L | jògdè | [34-4] | 'he will kick you repeatedly'
(kick:M:FUT:3SG:2PL) |
| | (j) | HL-L | jôgdè | [14-4] | 'he will kick you'
(kick:FUT:3SG:2PL) |

5. The pitch patterns in (12)–(15) are those of position A.

Another minimal set, which exploits four of the six possible tone patterns, is given in (14), which contains morphologically distinct noun forms, again sharing one root:

- | | | | | | | |
|------|-----|------|-------|--------|----------------|---------------|
| (14) | (f) | L-H | kàwwó | [3-1] | 'my sister' | (sister:1) |
| | (g) | HL-H | kâwwó | [12-2] | 'my sisters' | (sister:PL:1) |
| | (i) | L-L | kàwwò | [34-4] | 'your sister' | (sister:2) |
| | (j) | HL-L | kâwwò | [14-4] | 'your sisters' | (sister:PL:2) |

The nine possible tone patterns of disyllabic words ending in a consonant are illustrated in (15).

- | | | | | | |
|------|-----|-------|---------|--------|----------------------------|
| (15) | (e) | H-H | kéégén | [1-1] | 'children' |
| | (f) | L-H | bèèŋján | [3-1] | 'root' |
| | (g) | HL-H | béénán | [12-2] | 'skin' |
| | (h) | H-L | tópàn | [1-4] | 'knives' |
| | (i) | L-L | kàrtàn | [34-4] | 'pumpkins' |
| | (j) | HL-L | kûalgòn | [14-4] | 'fat' |
| | (k) | H-HL | kúuadân | [1-1] | 'he is jumping' (jump:M:3) |
| | (l) | L-HL | dùuŋkân | [3-1] | 'grasshoppers' |
| | (m) | HL-HL | kâatân | [12-2] | 'they will bite him' |
| | | | | | (bite:FUT:3PL:3) |

In position A of table 2, there are eight distinct pitches. As indicated in (16), each of these pitches unambiguously manifests one particular tonal value, if for the time being, we disregard the final L in the tone patterns of classes (k), (l) and (m).

- | | | |
|------|--|------------------|
| (16) | pitch | manifesting tone |
| | [1], a high level pitch, | H |
| | [2], a higher-mid level pitch, | H |
| | [3], a lower-mid level pitch, | L |
| | [4], a low level pitch, | L |
| | [12], a high, slightly falling pitch, | HL |
| | [14], a pitch falling from high to low, | HL |
| | [34], a low, slightly falling pitch, | L |
| | [31], a pitch rising from lower-mid to high, | LH |

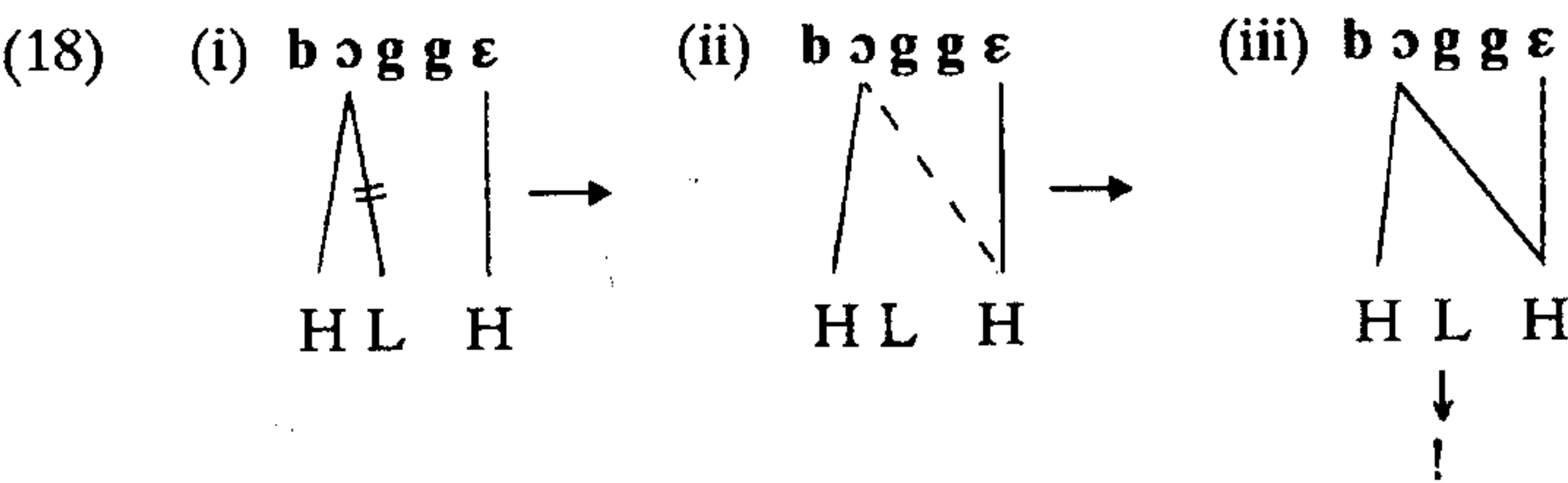
This analysis allows a very simple characterization of the two non-prepausal positions, A and B: In position A, a word is followed by a word beginning with L; and in position B, it is followed by a word beginning with H.

Still concentrating on position A, we can say that basically, the tonal element H is realized as [1] and the tonal element L as [3], [4] or [34]

depending on its position and tonal context within the word (in ways that will not be spelt out here). Diverging from this are classes (g) and (m), whose pitch pattern [12-2] is analyzed as a realization of HL-H, as in the following class (g) words:

- (17) **bôggé** [12-2] ‘his arms’ (arm:PL:3SG)
 jûlɲán [12-2] ‘kidney’

Here the stem vowel has a contour pitch falling from [1] to [2], and the suffix vowel has a level pitch at the same level as the end point of the preceding pitch. By conceiving of [2] as a downstepped H, the pitch pattern [12-2] can be analyzed as H!H-H, which can itself be analyzed as derived from HL-H in the following way: (i) L is set afloat between Hs, (ii) the suffixal H is spread to the stem, and (iii) the floating L is manifested as a downstep. These steps are exemplified with the word **bôggé** [12-2] ‘his (3SG) arms’ in (18), using notational devices of Autosegmental Phonology (cf. Goldsmith 1990).



By allocating H the register change value 1 and by allocating the second key span the key change value 1 (cf. Stewart 1983:61), the pitch pattern [12-2] of the word in (18) can be conceived of as coming about in the way shown by the derivation in (19).

(19)	b ô g g é
Underlying tones	HL H
L-dissociation	HL _o H
H-spreading	HL _o H H
Floating L as downstep	H!H H
Register change values	1 1 1
Key change values	0 1 1
Aggregate change values	1 2 2

5. PREPAUSAL PITCH LOWERING AND NON-PREPAUSAL HL-SIMPLIFICATION

In prepausal position, as can be seen in table 2 above, all words undergo one or two types of pitch lowering relative to their realization in non-prepausal positions. Firstly, any word ends at an extra low pitch level, whether the word ends in L, as in (20a), or in H, as in (20b). With some tonal word classes the final pitch is a level pitch if its syllable is light (i.e. CV), but a falling contour pitch if its syllable is heavy (i.e. CVC, CVV or CVVC).

(20)			Before L	Prepausally	
a.	L-L	lèŋŋò	[34-4]	[34-E]	'my (1SG) tooth'
		kàrtàn	[34-4]	[34-4E]	'pumpkins'
b.	L-H	lèŋŋó	[3-1]	[3-E]	'your (2SG) tooth'
		bèŋŋán	[3-1]	[3-3E]	'root'

Secondly, the pitch of any H is lowered, unless the word ends in L. Thus the initial H has its pitch lowered in (21a), but not in (21b).

(21)			Before L	Prepausally	
a.	H-H	kéégén	[1-1]	[3-3E]	'children'
	HL-H	bêénán	[12-2]	[34-4E]	'skin'
b.	H-L	tópàn	[1-4]	[1-E]	'knives'
	HL-L	kûalgòn	[14-4]	[14-E]	'fat'

The combined effects of these two types of pitch lowering could be that the following tonal classes of words merge prepausally: H, L and LH; H-H and L-H; and HL-H and L-L. I should make it clear, however, that I consider my perception of the relative pitch level values less reliable in prepausal words than in non-prepausal words. Therefore, the alleged mergers may be an illusion.

Before L, classes (k), (l) and (m) of table 2 are indistinguishable from classes (e), (f) and (g), respectively, but prepausally they are not, as shown by the examples in (22), repeated from (15).

(22)			Before L	Prepausally	
(e)	H-H	kéégén	[1-1]	[3-3E]	'children'
(f)	L-H	bèŋŋán	[3-1]	[3-3E]	'root'
(g)	HL-H	bêénán	[12-2]	[34-4E]	'skin'
(k)	H-HL	kúuadân	[1-1]	[1-1E]	'he is jumping' (jump:M:3)
(l)	L-HL	dùuankân	[3-1]	[3-1E]	'grasshoppers'
(m)	HL-HL	kâatân	[12-2]	[12-2E]	'they will bite him' (bite:FUT:3PL:3)

Before L, the suffix pitch of all six classes is either [1] or [2], both of which manifest H. Prepausally, however, the suffix pitch of classes (k), (l) and (m) is either [1E] or [2E], whereas the suffix pitch of classes (e), (f) and (g) is either [3E] or [4E]. The former pitches fall from a higher level than the latter pitches and thus exhibit a perceptually more salient fall than those. The more salient fall of the suffix pitch in classes (k), (l) and (m) can be analyzed as HL as opposed to the suffixal H of classes (e), (f) and (g). This analysis is in accordance with the generalization stated above, that the pitch of any H in a prepausal word is lowered unless the word ends in L: The suffix tone of classes (k), (l) and (m) ends in L, and hence the Hs of these classes do not have their pitch lowered. Independent evidence that these classes end in L comes from their behaviour before a word beginning with H, as shown in section 7 below. The merger of classes (k), (l) and (m) with classes (e), (f) and (g) before L can then be described as the result of a rule of HL-simplification (23), which simplifies suffixal HL to H before another word.

(23) HL-simplification

$L \rightarrow \emptyset / [T-H_] [$

where square brackets are word boundaries, and where T is any (simple or complex) tone.

6. H-LOWERING

Before a word beginning with H, as in position B of table 2, some Hs are realized phonetically as [3], a realization that will be referred to as H-lowering. Although the pitch that results from H-lowering is identical with that of L in, for instance, L-H words before L, it cannot be analyzed as the realization of a L substituted for H, as will become clear below. In order to distinguish a lowered H from a non-lowered H and from L, I use a distinct diacritic /-/, which I refer to as "M(id)". This move, however, is not intended to imply that Mabaan has three rather than two surface tones. It is merely a way of naming a problem that has to be cleared up by further research.

Observe first that H-lowering applies to L-H words, i.e. to disyllabic words with L in the stem vowel and H in the suffix vowel. Compare for instance (24a) and (24b).

- (24) a. ʔijà pìieccá [3-1] kàrtàn
 1SG SOW:AP:CF:FUT:1SG pumpkins
 'I will start sowing pumpkins'
- b. ʔijà pìieccā [3-3] ʔágàn
 1SG SOW:AP:CF:FUT:1SG beans
 'I will start sowing beans'

In (24a) the verb *piiecca* occurs before a word with initial L, and its pitch pattern is [3-1]. In (24b), by contrast, the same morphological form of the verb occurs before a word with initial H, and here its pitch pattern is [3-3]. Thus, in (24b), the suffix tone has the same pitch as the Low stem tone preceding it. However, if the suffix tone were L, this verb form would be homonymous with the morphologically different verb form in (25), but it is not, since the pitch pattern of the latter is [34-4], whether before L, as in (25a), or before H, as in (25b).

- (25) a. ?ì piieccà [34-4] kàrtàn
 2SG sow:AP:CF:FUT:2SG pumpkins
 'you will start sowing pumpkins'
 b. ?ì piieccà [34-4] ʒágàn
 2SG sow:AP:CF:FUT:2SG beans
 'you will start sowing beans'

On the basis of these facts, we can formulate the following rule of H-lowering:

- (26) H-lowering
 $H \rightarrow M / [L_] [H]$

According to (26), H is lowered to M if two conditions are met: (i) H is word-final and immediately preceded by a word-initial L (the internal condition), and (ii) the word is immediately followed by a word beginning with H (the external condition).

Monosyllabic LH words exhibit a variation which is similar to that of disyllabic L-H words. Compare for instance (27a) and (27b).

- (27) a. ?ǝǝn [31] ?ì lálkè
 1PLEX 2SG teach:1PLEX:2SG
 'we teach you'
 b. ?ǝǝn [3] ?ékè lálón
 1PLEX 3SG teach:1PLEX:3
 'we teach him'

In (27a), before L, the LH word ?ǝǝn has pitch [31], but in (27b), before H, it has pitch [3]. The latter pitch cannot simply be analyzed as L, since monosyllabic L words have pitch [34], whether before L, as in (28a), or before H, as in (28b).

- (28) a. càan [34] nàŋŋé ?ì
 Caan kill:PAST:2SG:3 2SG
 ‘you killed Caan’
 b. càan [34] náŋé ?ìjà
 Caan kill:PAST:1SG:3 1SG
 ‘I killed Caan’

On the other hand, however, the pitch [3] variant of ?ɔɔn in (27b) must be analyzed as having an initial L, since a L-H word does not undergo H-lowering before it, as in (29).

- (29) ?èkké [3-1] ?òɔn [3] jûuarŋéntò
 2PL 1PLEX see:PAST:2PL:1PLEX
 ‘you saw us’

These facts are predicted if ?ɔɔn [3] is analyzed as having undergone the independently motivated rule of H-lowering (26). By this rule, LH of ?ɔɔn becomes LM, and both elements of the latter sequence are realized as [3]; but since the two elements are carried by one vowel, they are realized as one level pitch [3].

The phenomenon of H-lowering is not restricted to L-H words and LH words, but is also found in H words (whether true monosyllabics or non-prepausal monosyllabic variants of prepausal disyllabics, cf. section 2 above) and in some H-H words. The variation in H words is illustrated in (30) and (31).

- (30) a. díiel [1] nàŋŋé ?ì
 goat kill:PAST:2SG:3 2SG
 ‘you killed the goat’
 b. díiel [3] náŋé ?ìjà
 goat kill:PAST:1SG:3 1SG
 ‘I killed the goat’
- (31) a. ?ékè bálá c̣áŋṭé ɟé [1] ṭè ṭɛnò
 3SG be:3 mud POSTP PREP yesterday
 ‘it has been in the mud since yesterday’
 b. ?ékè bálá c̣áŋṭé ɟē [3] ṭɛnò
 3SG be:3 mud POSTP yesterday
 ‘it was in the mud yesterday’

In (30a), before L, díiel has pitch [1], but in (30b), before H, it has pitch [3]. Similarly, ɟe has pitch [1] before L in (31a), but pitch [3] before H in (31b). The pitch of a H-lowered H word, [3], is different from the pitch of a L word, [34], but identical with the pitch of a H-lowered LH word, [3]. Unlike a H-lowered LH word (and a L word), however, a H-lowered H word does not prevent a preceding word from undergoing H-lowering. Thus

- To accommodate the fact that H words are H-lowerable, the rule of H-lowering (26) must be revised as in (33).

- According to (33), a word-final H is lowered if it is immediately preceded by a word-initial L or if it is the only tonal element of the word, and if it is followed by a word beginning with H.

The H-H words referred to in table 2 cannot undergo H-lowering. For instance, the H-H word *bálá* has pitches [1-1] whether it is followed by L, as in (34a), or by H, as in (34b).

- However, there are other words with H-H before L that are, in fact, H-lowered before H. In this case, both syllables get pitch [3], as can be observed in (35).

- (35) a. **káamé** [1-1] **?àmmé** [3-1] **?ì**
 lady-finger eat:PAST:2SG:3 2SG
 'you ate lady-finger'
- b. **kāamē** [3-3] **?ámé** [1-1] **?ijà**
 lady-finger eat:PAST:1SG:3 1SG
 'I ate lady-finger'

The word **kaame** has pitches [1-1] before L, as in (35a), but [3-3] before H, as in (35b). The latter pitch pattern, [3-3], is identical with the pitch pattern of H-lowered L-H words. That there is an underlying difference, however, is shown by the fact that a word can be H-lowered before a H-lowered H-H word, as in (36b), but not before a H-lowered L-H word, as in (36a).

- (36) a. ?ì káamé [1-1] ?àmmē [3-3] wénne
 2SG lady-finger eat:PAST:2SG:3 here
 'you ate lady-finger here'
 b. ?ijà kāmē [3-3] ?āmē [3-3] wénne
 1SG lady-finger eat:PAST:1SG:3 here
 'I ate lady-finger here'

When lowerable H-H words occur before L rather than before H, the first H is optionally lowered. Thus, while **tiēgdē** is M-M before H, as in (37a), it is either H-H, as in (37b), or M-H, as in (37c), before L.

- (37) a. ?ijà lān' tiēgdē [3-3] wénne
 1SG animal spear:FUT:1SG:3 here
 'I will spear the animal here'
 b. ?ijà lān' tiēgdé [1-1] tē túaŋá
 1SG animal spear:FUT:1SG:3 PREP spear
 'I will spear the animal with a spear'
 c. ?ijà lān' tiēgdé [3-1] tē túaŋá

The pitch pattern of M-H, [3-1], is identical with the pitch pattern of L-H. Unlike L-H, however, M-H can be preceded by a H-lowered word. Thus, **ɲàtē** is H-lowered before M-H in (38a), but not before L-H in (38b).

- (38) a. ?ékè ɲàtē [3-3] kɔmpé [3-1] tē píicà
 3SG see:AP:3 stick PREP hole
 'he is looking at a stick through the hole'
 b. ?ékè ɲàté [3-1] dùuŋá [3-1] tē píicà
 3SG see:AP:3 grasshopper PREP hole
 'he is looking at a grasshopper through the hole'

The fact that some H-H words are lowerable, while others are not, might seem to imply that H-lowering is not purely phonologically conditioned. However, the two classes of H-H words behave differently in another respect as well. While a non-lowerable H-H word has the same phonological form in prepausal and non-prepausal positions, a lowerable H-H word has different phonological forms prepausally and non-prepausally (but this

variation is not dealt with in the present article). Hence the lowerability of a H-H word is, in fact, predictable from other aspects of its phonological behaviour. It is not clear, though, how this information should be built into the (underlying) phonological representation of the non-prepausal forms themselves.

7. WORD-FINAL FLOATING TONES

There are three classes of apparent exceptions to the rule of H-lowering. One class of exceptions is exemplified in (39).

- (39) a. ?ékkèn ?ékè kàΛtán` [3-1] wénne
 3PL 3SG bite:M:FUT:3PL:3 here
 'they will bite him repeatedly here'
 b. ?ékkèn càan kàrkôn` [3-1] búrnén
 3PL Caan steal:BEN:3PL:3 clothes
 'they steal clothes for Caan'

The words kàΛtan in (39a) and kàrkôn in (39b) have the pitch pattern [3-1], which is a manifestation of L-H. Notice, however, that these words are followed by a word beginning with H, and this sequence is predicted to be impossible by the rule of H-lowering, which would change L-H to L-M before H. The exception is easily avoided, though. A crucial fact is that in prepausal position, the same words do not have L-H but L-HL, as shown in (40), where their pitch pattern is [3-1E].

- (40) a. ?ékkèn ?ékè kàΛtân [3-1E]
 3PL 3SG bite:M:FUT:3PL:3
 'they will bite him repeatedly'
 b. ?ékkèn càan kàrkôn [3-1E]
 3PL Caan steal:BEN:3PL:3
 'they steal for Caan'

Therefore, the L-H words in (39) are L-HL words underlyingly, as argued in section 5 above, where their L-H pattern was derived by a HL-simplification rule deleting the L component of HL in non-prepausal position. However, if we assume that L is merely set afloat rather than deleted, then we get a simple explanation why H-lowering does not apply in (39): The alleged L-H words do not end in H but in a floating L, and therefore, they do not meet the internal condition of H-lowering. Hence we have to revise the formulation of HL-simplification (23) as follows:

- (41) HL-simplification (revised)
 $L \rightarrow \underset{\circ}{L} / [T-H __] [$

If HL-simplification were taken to delete L rather than to set it afloat, there would be no way of explaining the non-application of H-lowering, and we would have to stipulate that H-lowering be extrinsically ordered before HL-simplification.

Another class of apparent exceptions to H-lowering consists of intransitive (including antipassive) first and second person singular present tense forms of some verbs, as in (42).

- (42) a. ʔijà déŋ` [1] lʌʌnà
 1SG shoot:AP:1SG animal
 'I am shooting an animal'
 b. ʔì déŋ` [1] lʌʌnà
 2SG shoot:AP:2SG animal
 'you are shooting an animal'

In (42) the verbs carry a High tone before a word beginning with a High tone. Given that what appears as a word-final H can be followed by a floating L, as demonstrated in the previous paragraph, an obvious way of accounting for the non-application of H-lowering in (42) would be to posit a floating L after the stem of the verbs. That this is, in fact, a correct analysis is evidenced by the prepausal forms of the verbs in question, which are shown in (43).

- (43) a. ʔijà déŋà
 1SG shoot:AP:1SG
 'I am shooting'
 b. ʔì déŋè
 2SG shoot:AP:2SG
 'you are shooting'

In prepausal position the verbs have a Low-toned vowel suffix, -à for first person singular, and -è for second person singular. The prepausal forms of these words are obviously more basic than their non-prepausal counterparts, since the latter are homonyms neutralizing the contrast maintained by the former. Hence the non-prepausal forms must be analyzed as derived from the prepausal forms. The change that takes place is that the suffix vowel is deleted, whereby the Low tone associated with this vowel is set afloat.

The third class of apparent exceptions to H-lowering consists of some monosyllabic antigenitive noun forms, as in (44).

- (44) **túan̩** [1] **cúnà**
 spear:AG Cuna
 'Cuna's spear'

The antigenitive form **túan̩** in (44) has pitch [1] although it is followed by a word beginning with H. As with the other classes of apparent exceptions to H-lowering, the presence of a floating L would explain why antigenitive forms do not undergo H-lowering. This time, however, we cannot use prepausal data as evidence for such a L, since antigenitive forms cannot occur prepausally at all. Independent evidence for a floating L comes from the morphology, though. All antigenitive forms that behave tonally like **túan̩** in (44) are forms of nouns whose absolutive form ends in the suffix vowel **ʌ** prepausally.⁶ Nouns with this suffix vowel in the absolutive have either no suffix vowel or a Low-toned suffix vowel **è** in the antigenitive, as shown in (45a) and (45b), respectively.

(45)	Prepausal absolutive	Antigenitive
a.	túan̩ʌ	túan̩ [1] 'spear'
	gól̩ʌ	gól̩ [34] 'stick'
	wól̩kà	wól̩k [14] 'gourds'
b.	gól̩kà	gól̩kè [1-4] 'dogs'
	kél̩ʌ	kél̩è [34-4] 'stone'
	túan̩gà	túan̩gè [14-4] 'spears'

The presence or absence of the suffix vowel **e** in the antigenitive is predictable from the number and nature of the consonants preceding **ʌ** in the absolutive (in ways that will not be described here). Hence the antigenitive forms without the **e** suffix can be analyzed as having the same underlying representation suffixally as those with the **e** suffix, although it is not clear whether the underlying representation has an **e**, which is deleted in (45a), or no vowel, **e** being inserted in (45b). Whether the **e** suffix is deleted or inserted, its tone is L, and if we assume that this L is present whether **e** is present or not, then we get an explanation why the antigenitive form in (44) does not undergo H-lowering.

6. The term "absolutive" refers to the morphologically unmarked case form of a noun, which is used for instance as the citation form. It contrasts with the antigenitive case and the "modified" case. The case system of Mabaan differs from those of certain other Western Nilotic languages such as Pàri and Dinka. Thus, unlike Pàri (see Andersen 1988a), Mabaan has no ergative case, and unlike Dinka (see Andersen 1991), it has no special case shared by possessors and postverbal subjects.

8. LH-SIMPLIFICATION

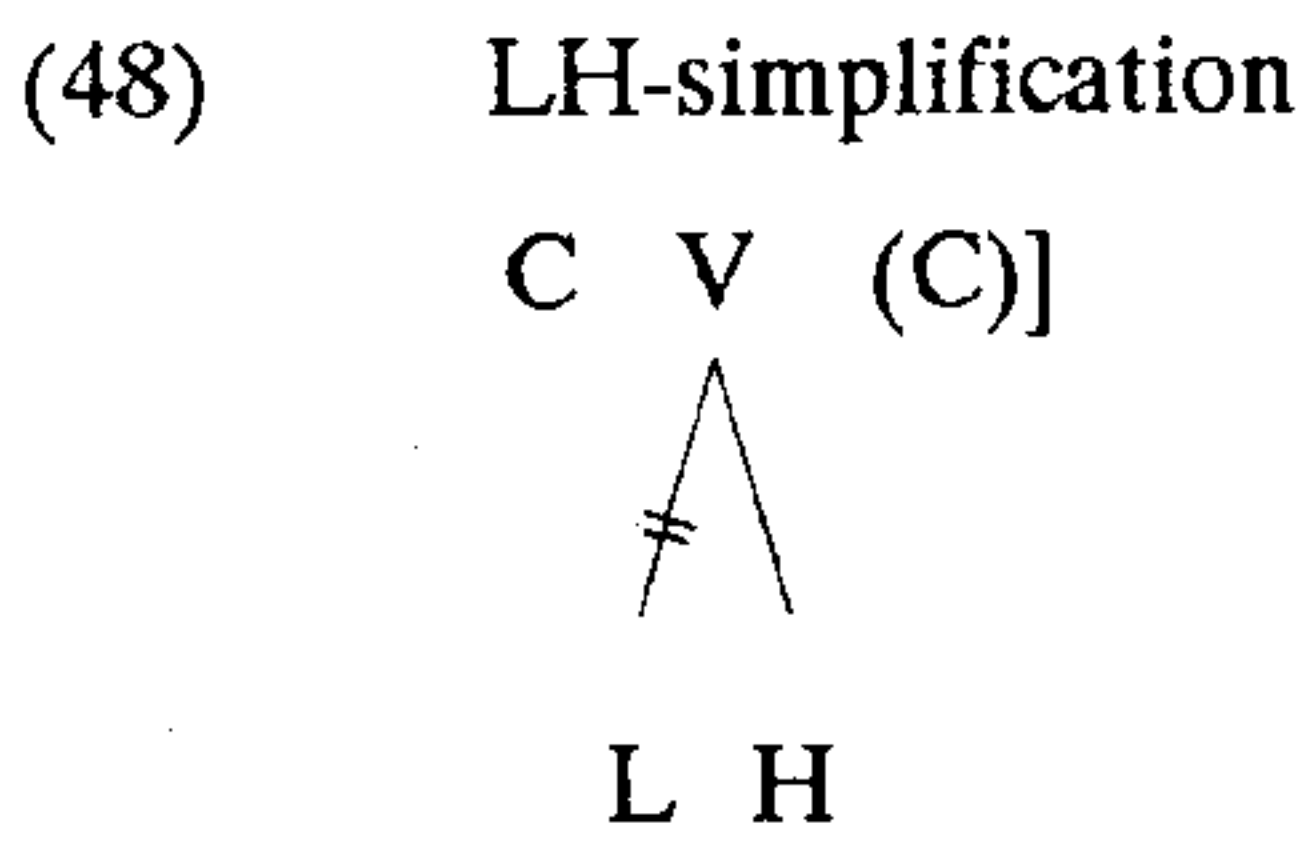
The rising tone LH is rare, and it has only been attested in long vowels. In fact, the only morphologically simple word in which it is known to occur is the pronoun ʔǎn ‘we’ (1PLEX). However, it occurs regularly in the final syllable of nouns that are modified by a demonstrative, by a stative verb in its attributive form, or by a relative clause (but not by a possessor, before which the modified noun has the antigenitive case, which is another form). Examples are given in (46), which also shows the corresponding absolutive forms.

(46)	Absolutive	Modified	
	a. kàaŋ	kǎaŋ tǐdán	‘red Kaang’
	b. cǎndǔuk	cǎndǔuk cǐgán	‘heavy box’

While modified nouns with a final rising tone end in a syllable with a long vowel, modified nouns that end in a syllable with a short vowel have a High tone rather than a rising tone in that syllable, as in (47).

(47)	Absolutive	Modified	
	a. tǎorón	tǎorón bòwán	‘white donkey’
	b. bàdǐdà	bàdǐdà cǐgán	‘heavy porridge’

This difference is evidence that the absence of LH from short vowels is no coincidence but is due to a constraint against this combination. Hence it is well-motivated to posit a rule of LH-simplification (48) that dissociates the L of LH from a short vowel.



Given this rule, the modified forms in (47) can be analyzed as having an underlying LH in their final syllable, an analysis which simplifies the morphological description.

Whether LH-simplification applies or not, modified forms meet the internal condition of H-lowering. Hence, if followed by a word beginning with H, their final H is lowered, as in (49).

- (49) a. còndùūk [3-3] néenè 'this box' (cf. (46b))
 b. t̀òrǎn [3-3] néenè 'this donkey' (cf. (47a))

In (49a) the word-final LH of underlying còndũuk is changed to LM by H-lowering, and in (49b) the word-final LH of underlying t̀òrǎn is changed to M as the combined effect of LH-simplification and H-lowering.

REFERENCES

- Andersen, Torben. 1988a. Ergativity in Pãri, a Nilotic OVS language. *Lingua* 75: 289-324.
 ———. 1988b. Downstep in Pãri: The tone system of a Western Nilotic language. *Studies in African Linguistics* 19: 261-315.
 ———. 1991. Subject and topic in Dinka. *Studies in Language* 15: 265-294.
 Evans-Pritchard, E.E. 1932. Ethnological observations in Dar Fung. *Sudan Notes and Records* 15: 1-61.
 Goldsmith, John A. 1990. *Autosegmental and metrical phonology*. Oxford: Basil Blackwell.
 Köhler, Oswin. 1955. Geschichte der Erforschung der nilotischen Sprachen. *Afrika und Übersee*, Beiheft 28.
 Stewart, John M. 1983. Downstep and floating low tones in Adioukrou. *Journal of African Languages and Linguistics* 5: 57-78.
 Tucker, A.N., and M.A. Bryan. 1956. *The non-Bantu languages of north-eastern Africa*. London: Oxford University Press.

Department of Communication
Aalborg University