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Nominal Tone in Mmen

A Grassfield Bantu language of Cameroon

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Author: Mirjam Möller
Supervisor: Laura Downing
Examiner: Åsa Abelin

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Mirjam Möller

Abstract

Mmen is part of the Grassfield Bantu language family, a branch of the Southern-Bantoid languages found in Cameroon. Grassfields Bantu languages are known to have complex tone systems as compared to languages found within Narrow Bantu for example. This study focuses on nominal tone in Mmen as realised within noun stems from noun classes 7 and 9. Mmen has three level tones on the surface, i.e., high [H], mid [M] and low [L], plus the contour tones, i.e., [HM], [HL] and [LH]. The nouns are presented in isolation as well as in different contexts where the stems are preceded by either a /H/ or a /L/ tone. Stems sometimes realise identical tone patterns in isolation but, once put in a context, they show different tonal alternations. This is due to the different underlying tones from which the surface tones are derived. The present study suggests that all surface tones are derived from sequences of two underlying tones, i.e., /H/ and /L/. The sequences of /H/ and /L/ tones are then realised differently on the surface due to the different tonal processes at work in the Mmen noun.

Keywords

African linguistics, automatic downstep, Autosegmental Theory, Central-Ring languages, Grassfields Bantu languages, Mmen, non-automatic downstep, noun class, Register Tier Theory, tone etc.

Contents

Abbreviations

ADJ	Adjective
ASP	Aspect marker
C	Consonant
Cl	Noun class
H	High tone (´
^{H}	Floating high tone
HL	High-low tone (ˆ
HM	High-mid tone (˝)
ꜜH	(Non-automatic) Downstepped high tone
IV	Initial vowel
K.G	Kecha Godlove, consultant
L	Low tone, Non-falling low tone (`
^{L}	Floating low tone
LF	Falling low tone
LM	Low-mid tone (˵)
%L	Low-boundary tone
M	Mid tone (¯
M.C	Mam Mua Christina, consultant
ML	Mid-low tone (˷)
N	Noun
N-	Homorganic nasal
PB	Proto-Bantu
PL	Plural
PNC	Proto-Niger-Congo
PR	Proto-Ring
RTT	Register Tier Theory
S	Sonorant
SG	Singular
TBU	Tone Bearing Unit
V	Vowel
1	Prefix for class 1
2	Prefix for class 2, etc.

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My supervisor, Laura Downing, has assisted me in various ways in the writing process. Her valuable insights and comments on earlier drafts of this paper made me see the importance of not only having accurate data, but also presenting the data in a way that helps the reader understand the analysis. Remaining mistakes are all my own.

Last but not least, I give thanks to God, for his love shown to me through family and friends here in Cameroon.

1 Introduction

Mmen[1] is a Grassfield Bantu (GB) language, a branch of the Southern Bantoid languages, found in Cameroon (Lewis 2013). It is well known that Grassfields Bantu (GB) have some of the most complex tone systems found in Africa (Watters 2003:237). Studying the nominal tone in Mmen confirms the fact that these languages involve complex tone systems. Simple noun stems in Mmen realise three level tones on the surface, i.e., high [H], mid [M] and low [L]. In addition to the level tones there is a low tone which falls in phrase final position. There are also the falling contour tones, i.e., [HM], [HL] and one rising contour, i.e., [LH]. Once found in a context some stems also realise so called floating tones. Watters describes how GB languages have had disyllabic noun stems historically but lost their final vowels or entire final syllables (2003:236). The tone of such a lost syllable remains associated to the stem and results in monosyllabic stems with floating tones, e.g., CV̀ ̀. When such stems occur in a context the floating tones may have an effect on adjacent tones (Yip 2002:76). It is therefore not enough to study the surface tones as they are realised in isolation. Instead, one has to study the stems and their tonal alternations in several different contexts, in order to determine the contrastive tones in a language. This study describes the tonal alternations within several contexts and analyses the underlying tones of noun stems from class 7 and class 9 in Mmen. Studying these contexts also reveals some of the tonal processes manifested both at word level and phrase level. This study focuses on nominal tone in Mmen but also seeks to relate the analysis to the tone systems of related languages.

The paper is organized as follows: Section 2 gives a background to the Mmen language and previous research carried out on neighbouring languages, there is also a description of the theoretical framework used in the present study. Section 3 describes the method of the collection of data and introduces the language consultants which are the source of all data presented. Section 4 reports on the general structure of the Mmen noun and the following section presents the different manifestations of tone within simple noun stems of class 7 and 9 put in different frames, or contexts. The results are then discussed and analysed in section 6, deriving all surface tones from two underlying tones, i.e., /H/ and /L/. The final section gives a summary of the analysis as well as suggestions for further research.

[1] Other alternative names are: Meyn, Mɛn, Bafumen, Bafumeng, Bafoumeng, Bafmen and Bafmeng. Ethnologue (Lewis 2013) and ALCAM, *Atlas Linguistique du Cameroun* (Dieu and Renaud 1983) use the spelling Mmen and it is therefore the name used within this paper as well.

2 Background

Mmen is a Ring language of the Narrow-Grassfields, a sub-group of the Wide Grassfields within the Southern-Bantoid branch of the Niger-Congo language family (Lewis 2013). The area where the highest concentration of Mmen speakers is found is in the village of Bafumen, found along the road between Fundong and Wum. It is part of the Fungom subdivision, of the Menchum division, of the North-West province of Cameroon. Other surrounding villages where Mmen is spoken are, e.g., Cha', Yemgeh, Nyos, Ipalim, shown in figure 1. Speakers of Mmen may of course be found in other parts of Cameroon, not least in the urban areas of, e.g., Bamenda, Yaoundé, Douala etc. It is therefore difficult to give an accurate estimation for the number of speakers. Estimations vary between 30 000 (Troyer et al. 1995:8) and 65 000 (Meh 2011). The most recent census from 2005 estimates the inhabitants of Bafumen to be 45 000, but the census does not include information concerning people's mother tongue. However, given the population growth in general since 1982's census, which reports 30 000 speakers, it is likely that today's number reaches about 60 000.

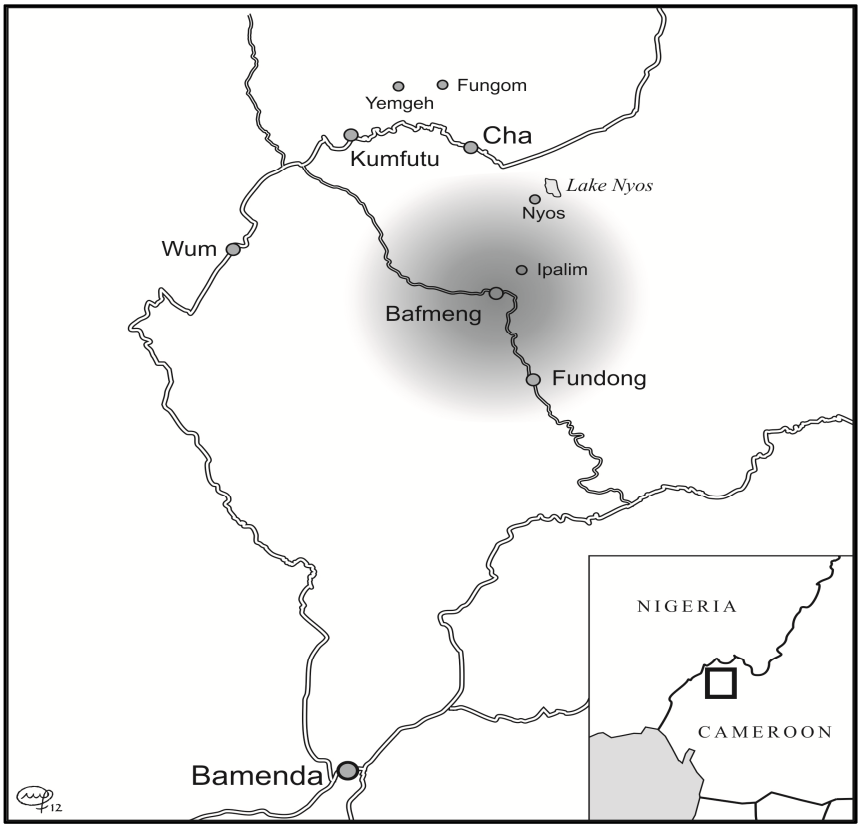


Figure 1. The Mmen-speaking area.© - 2012 Cartography by Monika Feinen

2.1 Grassfields Bantu

The GB language family refers to about 50 languages found in the West and North-West provinces of Cameroon. The landscape of the region is characterised by mountains and fields of tall elephant grass, "Grassfields", which has given the name to the languages spoken in the area (Watters 2003:225). The GB languages' relationship to the Narrow Bantu and other groups of languages found in the border land of Cameroon and Nigeria have been subject to much debate the last century. However, most scholars agree that GB, though one of many parallel branches under Southern-Bantoid, is the group closest related to the Narrow Bantu (Watters 2003:227). The GB languages share several features with the Narrow Bantu languages e.g. extensive noun class systems, agreement within the noun phrase where determiners agree with the class of the head noun etc.

The GB languages have high lexical similarity. Nouns and verbs are primary monosyllabic with the following basic syllable structure: CV, CVC, and V (Watters 2003:233). These syllables may also be combined with semivowels or glides, i.e., CGV and CGVC. Affixes typically consist of: CV, VC, N, V and CVN. Disyllabic stems do occur but are often made up of two morphemes. Compounds and borrowed words may also have two or more syllables. Furthermore it is common to find syllabic nasals as prefixes. Proto-Eastern Grassfields have for example a homorganic nasal *Ǹ-*, as the class prefix for classes: 1, 3, 9 and 10 (Hyman 1980b:182). Several Ring languages have a syllabic *m-*, as the noun prefix for class 6a (ibid. 1980a:248). Some languages have reinterpreted the nasals as part of the stem producing stems such as NCV(C). That is the case for Mmen, where the homorganic nasal of class 9 has become part of the root, e.g., *ndɛ̄, sē-ndɛ̄* 'house(s)' (cl.9/10). Syllabic nasals also feature as grammatical markers or pronouns, e.g., *m* 'I' in Mmen.

As already mentioned, one feature characterising this group of languages is their complex systems of floating tones (Voorhoeve 1970). It is generally assumed that their tone system historically consisted of two tones, i.e., /H/ and /L/ which is also what has been reconstructured for proto-Bantu (Greenberg 1948 and Meeussen1967:84). Since the canonical stem for Proto-Bantu is disyllabic, it gives four classes of stems, i.e., H-H, L-L, H-L and L-H (Kisseberth and Odden 2003). Watters (2003:237) describes how GB languages have at least four different level tones manifesting on the surface, i.e., [H], [M], [L], and low which is falling in phrase-final position, [LF].

2.2 The Ring languages

Within the GB languages, Mmen is found in the group called the Ring languages, which is divided into South, East, West, and Center. The Ring group is known to have complex noun class systems, with up to 12 or more noun classes, with many different pairings of singular and plural. Mmen is part of the Central Ring cluster along with Babanki, Bum, Kom, and Oku. Table 1 on the next page, shows the different noun class prefixes of the Ring languages, as well as the Proto-Ring prefixes. They have six singular classes and six or seven plural classes. The plural class 4 is considered a marginal class, as it only contains a few number of nouns, and its forms also have an alternate plural form in a different class. That is the case in Mmen, where only a few nouns form plural with class 4, and there is always an alternate plural form in class 13. In other words, class 13 in Mmen, seems to gradually replace the function of class 4, e.g., *ē-lîŋ* or *tē-lîŋ* 'bamboos' cl. 4/13. In other languages the class 4 has disappeared completely. Some classes take a suffix instead of a prefix. That is the case for Class 10 in some languages. Furthermore, it is very common in these languages that prefixes are dropped in some contexts. Especially, when followed by determiners within the noun phrase. For example, *ā-ghóm* 'hawk', is presented without a class prefix once followed by a possessive, e.g., *-ghóm kímá* 'my hawk'. Hyman describes these forms in Aghem, a West Ring language. He refers to the forms with a prefix as in-focus forms, and the ones without a prefix as nouns out of focus (Hyman 1979a). The number of the noun classes correspond to those with Proto-Bantu with the addition that Central Ring languages distinguish a noun class 6 from 6a, which is a pre Proto-Bantu distinction (Watters 2003:240).

Table 1 Noun class affixes in Ring (Hyman 1980a:248)

Cl	PR	Mmen	Babanki	Kom	Bum	Oku
1	**ù-*	*Ø-*	*Ø, Ǹ-*	*Ø-*	*Ø, (à-)*	*(ɛb-)*
2	**bá-*	*Ø-*	*və̀-*	*Ø-/(ɣə́-)*[2]	*-á*	*(ɛ-)*
3	**ú-*	*e-*	*ə̀-*	*ə-*	*ù-*	*ɛb-*
4	**í-*	*(e-)*	*--*	*(i-)*	*--*	*(i-)*
5	**í-*	*e-, i-*	*ə̀-*	*i-*	*ì-*	*i-*
6	**á-*	*ə-*	*à*	*a-*	*à-, -á*	*ɛ-*
6a	**mə̀-*	*m-*	*mə̀-*	*ma-*	*m̀-, -mú*	*m-*
7	**kí-*	*a-*	*kə̀-*	*a-*	*à-*	*ke-*
8	**bí-*	*e-*	*ə̀-*	*ə-, N-*	*ù-, -ú*	*ɛb-*
9	** Ø-, Ǹ-*	*Ø-,*	*Ø-, Ǹ-*	*Ø-, N-*	*Ø-, Ǹ-, à*	*Ø-, Ǹ-*
10	** ´..-sí*	*se-*	*-sə́*	*-se*	*sə̀-, -sú*	*-sə́*
13	**tə́-*	*te-*	*tə̀-*	*tə*	*tə̀-, -tú*	*tə-*
19	**fə̋-*	*fe-*	*fə̀-*	*fə*	*fə̀-*	*fə-*

Note: -- means that the class is absent in the language and ( ) indicates marginal noun classes

The nominal tones of Central-Ring have been described as having several level tones, and contour tones, contrastive on the surface. In addition to those tones, they also have floating tones. Babanki has [H], downstepped high [ꜜH], [L], as well as non-falling low before pause [L] (Hyman 1979b:161). There is a contrast between low tone stems which fall in phrase-final position, and stems with a non-falling low, in the example below marked with: ˚. The N2 in (1a) is falling while the N2 in (1b) is not. Hyman then shows how the non-falling low stems have a floating high (´) atttached to the stem, i.e., /ñìn´ /(1b). It is that floating high which causes the low tone not to fall in phrase final position, and thus contrasts with the other low stems. The low stems that fall in phrase final position are instead found with a floating low (` ) attached to the stem, i.e., /-cò ` /(1a) (Hyman 1979b:170).

(1)	a.	kəshí kə fə́cò	'place of squirrel'	/-cò`/
	b.	kə̀shí ká fəñìn˚	'place of bird'	/-ñìn´/

[2] Yuh (1986:26) and Hyman (1980:248) included a /ɣə-/ prefix in class 2 while Shultz (1997:12) analyses the class 2 prefix to be Ø.

Hyman equally describes how Babanki along with several other languages within Central Ring, e.g., Bum, Kom, Mmen and Oku realises a mid pitch, a surface mid tone [M], different from the downstepped high [ꜜH]. In Babanki, the surface mid tone is derived from a process where a /HL/ contour is being simplified to [M] when preceded by a /L/ and followed by a /H/ (Hyman 1979b:175). The mid tone and the downstepped high are distinguished by the fact that the downstepped high sets a ceiling for any following tone; while mid can be followed by a higher pitch, downstepped high cannot.

The Kom noun has three level tones on the surface i.e. [H], [L] and [M] along with four falling tones, i.e., [HL], [HM], [HLF], and [LF][3] which falls in phrase-final position, and two rising contours, i.e., [LH] and [MH] (Jones 1997:6). Oku also realises three level tones on the surface, i.e., [H], [L] and [M], along with three falling tones, i.e.,[HL], [ML] and [LF] (Davis 1997). These surface tones in Kom and Oku have, however, been analysed as being derived from two tones underlyingly, i.e., /H/ and /L/ (Jones 1997, Davis 1997). Table 2 below shows the different underlying tones with their floating tones as superscripts. The table also shows how these underlying tones are realised on the surface. Kom derives its surface tone from eight different underlying sequences of /H/ and /L/. In Oku the surface tones have been analysed as deriving from six different melodies underlyingly. Kom and Oku share many underlying tones and surface realisations, e.g., /H/ is realised as /H/, and the low stems, which fall in phrase-final position [L], are analysed as being followed by a floating low tone, i.e., /L^{L}/. Oku only realises [M] and [ML] together with stems from class 9 that have a nasal prefix, i.e., *Ǹ*-. The stems that surface as [M] are underlyingly /^{L}H/ in Kom. Jones, however, does not give an underlying form for the surface tones, i.e., [LH] and [MH].

[3] Jones refers to the falling low tone as extra-low i.e. [XL].

Table 2 Underlying and surface nominal tone in Kom and Oku

	Kom (Jones 1997:6)		Oku (Davis 1997:2)	
	UNDER	SURF	UNDER	SURF
1	/H/	[H]	/H/	[H]
2	/HL/	[HL]	/H^{L}/	[HL]
3	/^{L}H/	[M]	/^{L}H/	[H] and [M]$^{N-}$
4	/^{L}H^{L}/	[M]	/^{L}H^{L}/	[HL] and [ML]$^{N-}$
5	/L^{H}/	[L]	/L/	[L]
6	/L^{L}/	[LF]	/L^{L}/	[LF]
7	/^{H}LH/	[HM]		
8	/HL^{L}/	[HLF]		

These previous studies show how the surface tones, in these languages, may derive from different tones underlyingly, e.g., with floating tones attached to the stem, either to the left or to the right. The tone systems manifest several tone rules e.g. downstep, tone spreading. The stem's underlying tones, including floating tones, might not contrast in isolation, but once put in a context the floating tone associates, grounds to an adjacent syllable. Since these processes were found in the tone systems described within Central Ring, they are very likely to appear also in Mmen.

2.3 Previous studies on Mmen

Besides the linguistic studies on Ring languages, there are other studies which focus more on the Mmen language. A sociolinguistic survey was carried out on Mmen and Aghem 1995 by SIL[4] (Troyer et al.). Agha (1987) gives the first linguistic report on the phonology of Mmen. Agha analyses Mmen to have five different contrastive tones, i.e., [H], [L], [M], with the contours [LH] and [HL] (1987:67). A more recent analysis of the phonology was carried out by Björkestedt (2011a), which is also the analysis on which the Mmen orthography is based. Björkestedt reports nine surface tones realised with words in isolation. Three level tones, i.e., [H], [M] and [L], three falling contour tones, i.e., [HL], [HM] and [ML]. Björkestedt also comments that two rising contour tones, i.e., [LM] and [MH] were rarely attested in her data. Björkestedt describes that there is a contrast between the level low tone [L] and the low tone which falls in phrase-final position, i.e., [LF]. Björkestedt mentions however that

[4] SIL International, is an organization that carries out linguistic research in minority languages all over the world.

underlying tonemes require further studies (2011a:44). Agha and Björkestedt include nouns, verbs as well as words from other word classes in their examples to show the contrastive tones. They also include nouns from different noun classes, and with different syllable structure of the stems, e.g., CV, CVC. As we will see in following sections these are factors that might affect the realisation of tones. Since neither Agha nor Björkestedt group their examples in a way that makes the tones comparable, the number of tones given by them, might not be all contrastive tones within nouns in Mmen. Furthermore, the examples of tone given in previous studies only present words as they are uttered in isolation, and do not describe any tonal processes at work within the noun phrase.

Other linguistic works on Mmen discuss the noun class system (Agha-ah 1993), and the noun phrase (Bangha 2003). Another report describes verb serialisation in Mmen (Meh 2011). None of these reports, however, focus on tone, and Agha-ah and Bangha, do not give any further tone analysis, besides the five tones given by Agha (1987). Möller (2012) gives a report on the noun and the verb phrase where it is mentioned briefly that simple verb stems either take a high or low tone. The noun is described as realising three contrastive tones on the surface, i.e., [H], [M] and [L] as well as the contours i.e. [HL] and [LH]. Möller mentions though that more research is needed in order to determine the underlying tones. Möller also pointed out the fact that noun classes take different tones in the agreement prefixes within the noun phrase. Classes 1, 6a and 9 take a low tone together with their agreement, while other classes take a high tone. Grammatical tone in Mmen is also found on tense markers. Two of the tense markers for future are only contrasting in tone, i.e., *nə̀* (2) and *ná* (3).

(2) *m̀* ***nə̀*** *kìŋ-ə̀* *ndɛ̄*
I ***F1*** *close-ASP* *house*
'I will close the house today'

(3) *m̀* ***ná*** *kìŋ-ə̀* *ndɛ̄* *ēyìsə́'ə́*
I ***F2*** *close-ASP* *house* *tomorrow*
'I will close the house tomorrow'

Kiessling et al. (2009 and 2010) have carried out studies on speech acts within the Mmen and Isu communities. Their findings focused on how speakers of Mmen and Isu carry out complaints, apologies and requests and do therefore not include any analysis of lexical tone. Kiessling (2010) included Mmen in a study on initial consonant mutations within some Ring languages. Kiessling describes the morphophonological processes between noun class prefixes and the stem. In Mmen, the prefixes of class 3 and 8, i.e., *e^{w}-* cause the initial stem

consonants to be labialised. Kiessling (2010:201) suggests that the presence of a labial glide derive from the PR prefix, i.e., *ú-* where the high and rounded feature of the prefix has spread to the following stem consonant, causing it to be labialised.[5] Class 8 nouns do not only display labialization but also palatalization and velarization. Since there are other noun class prefixes which also involve the vowel /e/ as the class prefix but do not manifest this change, i.e., classes 4 and 5, the processes must be considered a morphological feature attributed to classes 3 and 8.

(4)

	Singular	**Plural**	**Gloss**
Labialization	ē-l**ûŋ** (cl.3)	ē-lîŋ (cl.4)	'bamboo(s)'
	ē-nd**w**ɔ̀ (cl.3)	m̄-ndɛ̀ (cl.6a)	'stomach'
	ē-t**w**ɔ́yn (cl3)	m̄-táyn (cl.6a)	'ceiling'
	ā-mbɔ̀ (cl.7)	ē-mb**w**ɔ̀ (cl.8)	'fish'
	ā-kə́m (cl.7)	ē-k**w**ə́m (cl.8)	'crab(s)'
	ā-ghə́f (cl.7)	ē-gh**w**ɔ́f (cl.8)	'bone(s)'
Palatalization	ā-səs (cl.7)	ē-**sh**ɔ̄s (cl.8)	'broom(s)'
	ā-zá' (cl.7)	ē-**zh**ɔ́' (cl.8)	'mushroom(s)'
	ā-tɛ̂ (cl.7)	ē-**ch**wɔ̂ (cl.8)	'palm branch(s)'
Velarization	ā-pɛ́ (cl.7)	ē-p**gh**á (cl.8)	'leopard(s)'
	ā-páyn (cl.7)	ē-p**gh**áyn (cl.8)	'fufu corn(s)'

Kiessling has also shared two unpublished manuscripts: *Sketch of Men*[6], and *Men tonology* of which the latter one suggests five surface contrastive tone melodies within class 10: [H], [L], [M], [HL] and [HM]. Example 5 gives Kiessling's suggestion on how the surface tones might reflect the underlying tones.

(5)

Surface	**Underlying**
H	/HH/ or /HL/
HL	/HL^{L}/
HM	/HL^{H}/
L	/H-L$^{?}$/
M	/LH/

These previous reports, on Mmen, raise several questions which the present paper aims to address:

(i) what are the contrastive surface tones?

(ii) what are their underlying tones?

[5] Kom and Aghem are examples of related languages which also involve labialization of the first stem-consonant in class 3 nouns (Hyman 2005:316).

[6] An alternate spelling of Mmen

(iii) what tone processes are involved in the nominal tone system in Mmen e.g. downstep, spread, grounding of floating tones, tone simplification etc.?

Once these questions have been answered it is also interesting to see how this present study relate to the previous analyses on Mmen and related languages.

2.4 Theoretical framework

This paper presents rigorous and accurate data which helps to determine the tonal contrasts and their alternations. But, the surface tones are also linked to different underlying tones through an analysis based on Register Tier Theory (RTT) (Snider 1999). RTT describes the tone system based on the different levels of autosegmental features (Goldsmith 1976). The autosegmental theory is the theoretical approach found in studies on related languages within the Grassfields Bantu languages (e.g., Hyman 1979, 2005).

Autosegmental phonology views the speech stream as being divided into horizontal layers. Features which behave as independent units are represented on independent tiers, associated to elements on other tiers by association lines (Goldsmith 1976). Autosegmental theory defines several conventions that govern the association of tone to TBUs:

(6) **a. Association Conventions (Goldsmith 1990:14)**

For any given morpheme, map the individual tones of its tonal melody onto its tone-bearing units,

(i) From left to right

(ii) In a one-to-one relation

b. Well-formedness condition (WFC) (Goldsmith 1976:207):

(i) Each vowel must be associated with at least one toneme

(ii) Each toneme must be associated with at least one vowel

(iii) Association lines do not cross

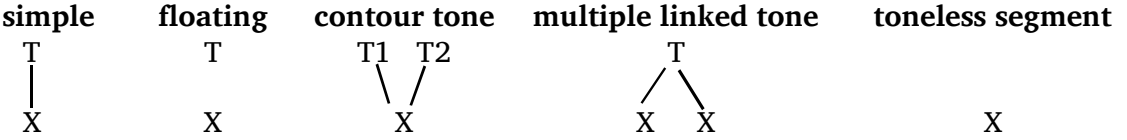
c. Obligatory Contour Principle (Goldsmith 1990:309):

Adjacent identical features are prohibited on the same tier

A tonal melody may however be realized differently on specific morphemes. The normal case is that a morpheme consists of segments with a tonal melody. A morpheme may however manifest a tonal melody without a segment. In that case, it has a floating tone. A language may also have morphemes without a tonal melody, so called toneless morphemes. It is not uncommon to find languages that manifest all three types of morphemes (Snider

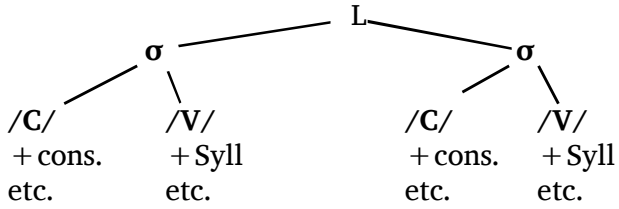
1999:6). Since tones are highly independent, as compared to consonants and vowels and their features, it makes sense to represent them as suprasegmental features, separated from the segmental tier. Example 7 shows how tones may associate differently to a TBU. A tone associated to one TBU is the simple structure where one feature, in this case a tone, is linked to one segment. A floating tone is not associated with any TBU, until it grounds on an adjacent TBU. A contour tone is two different tones being associated to one single TBU. A toneless morpheme does not carry an underlying tone. It is not associated to any tone until an adjacent TBU's tone spreads or grounds to it.

(7)



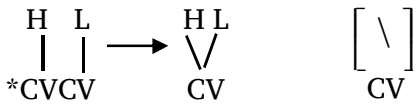
Tone is highly independent and free to relate with other segments within a word or across word boundaries. In example 8 below, the L tone is found on a tonal tier, separated from both its tone bearing units (TBU), and from the segmental tier. The representation in (8) shows how the tone is separated from both its TBUs and their segmental features. Because of the OCP, two TBUs pronounced with the same tone are analysed as being linked to one and the same tone, rather than having a tone following another identical tone. Instead the tone in (8) is represented as one tone associated to the two TBUs of the word.

(8)

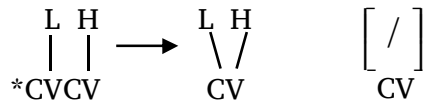


Many times in African languages, a combination of level tones, i.e., /H/ and /L/, either two or more in a sequence, appear as composite contours (Goldsmith 1990:40). Contours in African languages are furthermore, often found at the edge of a word or morpheme, as they reflect historical loss of a TBU. As the tone of such a deleted TBU associates to a new TBU, it joins with that other tone and form a composite contour. The tone melodies of such contours connect onto one TBU forming either a falling (9) or rising (10) contour.

(9)

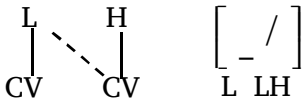


(10)



Other composite contours may be the result of the spreading of a level tone from one word or morpheme to the edge of the TBU of an adjacent word or morpheme (Snider 1999:57). A high might spread to a TBU with a low tone, forming a falling contour (11). A low tone may equally spread to a high tone, resulting in a rising contour (12). Both types of spreading are commonly found in African languages (Hyman 2007:2).

(11) 

(12) 

While autosegmental theory is restricted to two tiers: a segmental tier and a tonal, Register Tier theory develops the different tiers further. As seen in figure (2), the tonal tier and the segmental tier are not only single tiers on their own, but rather "a composition of many tiers that are arranged in a hierarchical geometric structure" (Snider 1999:21). Register Tier Theory demonstrates that tone melodies only employs high or low tones on any given register. It divides the representation of tone into: i) the Register Tier, where the register features are *h* and *l*, ii) the Tonal Tier, where the tonal features are *H* and *L*, iii) the Tonal Root Node Tier is where the previous tiers get linked to moras at the iv) Tonal-Bearing Unit Tier.

(13) Multiplane representation of tone:

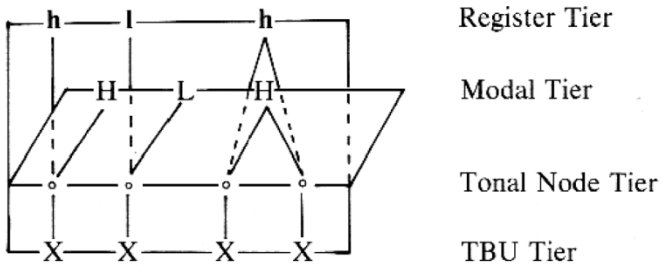


Figure 2. Multiplane representation of tone (Snider 1990:191)

2.4.1 Tone processes common within African languages

When analysing nominal tone it is important to be aware of the processes and/or rules that are commonly found within West African languages, concerning tone. African languages commonly display what is referred to as level tone systems (Hyman 2010:283). They are more likely to manifest level tones than contour tones. Contour tones are derived from level tones and are often limited to the last syllable. Tonal phenomena such as downstep, association of floating tones, and tone spreading are common (Hyman 2010:284). Tone equally has both lexical and grammatical functions.

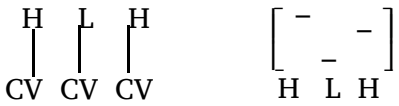
Hyman and Shuh (1974) describe different tonal processes found cross-linguistically within tone languages. They divide the different tone rules into two groups: natural diachronic rules and natural synchronic rules (also referred to as phonetic tone rules and morphophonemic tone rules).

(13) **Tone rule typology (Hyman 2007:2)**

a. phonetic tone rules
   i. assimilation: horizontal and vertical
   ii. contour simplification: absorption vs. levelling
b. morphophonemic tone rules: dissimilation, copying, polarization, replacement, floating tones

Horizontal assimilation is a basic tonal process which refers to cases when a tone perseverates and is realized on a neighbouring TBU through tone spreading (Hyman 1975:223). In African languages it is common to find a progressive assimilatory process where a tone spreads left-to-right, e.g., a H – L sequence is realized as H – HL sequence due to H tone spreading (as in 11). Vertical assimilation is what regulates the up- and downward adjustment of pitches, e.g., when a /L/ tone causes a /H/ tone to be downstepped. A /H L H/ sequence is phonetically realised as in (14). The phenomenon of downstep is discussed further in sections 2.4.3-2.4.4.

(14)



2.4.2 Floating tones

The phenomenon of floating tones has already been introduced in previous sections where it was briefly described as deriving from historically lost segments. Niger-Congo languages in general, are analysed as having had disyllbic stems historically, but have lost their final vowels or syllables (Watters 2003:236). GB languages therefore, tend to have mostly monosyllabic stems. However, the tone of the lost syllable or vowel, still remains as a feature of the root. Since the roots have lost their final vowels or syllables the floating tone are often found to the right of the stem, i.e., /H^L/ and /L^H/. Floating tones may, however, also occur to the left of the stem, i.e., /^{H}L/ and /^{L}H/. That is the case for nouns where the noun class prefix is lost but the tone of the lost prefix is still present (Watters 2003:237).

Snider (2014) has summarised a table of how languages associate tones, that derive from disyllabic stems, differently. Some monosyllabic noun stems realise the tone of the lost

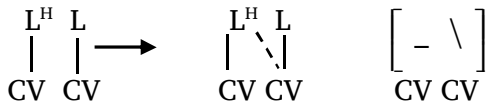
syllable as joined with the preceding tone of the stem, forming a contour tone. Other stems might have floating tones either to the right or the left, e.g., `cv́ or cv̀ ´. Other syllables simplify two level tones into one, either by merging a sequence of a /H/ and /L/ tone into mid, i.e., cv̄, or by deleting a tone. One and the same language may realise several of these different strategies to associate the origional tone of the Proto Niger-Congo (PNC) stems to a monosyllabic stem.

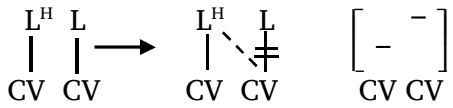
Table 3 Tone in Proto Niger-Congo (Snider 2014)

Tones	**PNC**	Languages with monosyllabic roots				
H	*cv́cv́	cv́	cv́	cv́	cv́	cv́
L	*cv̀cv̀	cv̀	cv̀	cv̀	cv̀	cv̀
LH	*cv̀cv́	cv̌	cv̌	`cv́	cv̄	cv̀
HL	*cv́cv̀	cv̂	cv̂	´cv̀	cv̄	cv́

Although the floating tone is not associated to a syllable it often affects the adjacent TBUs. It is therefore through adjacent syllables in a context, that one can determine whether a stem is preceeded, or followed by a floating tone.

The stems which realise two level tones, i.e., either /LH/ or /HL/ might realise the tones differently depending on the syllable structure of the stem. The syllable structure of the stem affects the possible number of TBUs, or the tone bearing material. This is due to the fact that all moras are not equal when it comes to manifesting tone. The sonority of the coda, for example, often proves to be relevant to tone analysis as tone assignment is sensitive to consonant type. Sonorants (S), for example, are more likely to be tone-bearing compared to obstruents (C) (Zhang 2001:32). In other words a CVS stem might be more likely to manifest a contour tone than a CVC stem. If the floating tone is not manifested as a contour on the monosyllabic stem, it might spread to an adjacent TBU. Once the floating tone finds somewhere to "land", it may either, join with the original tone of that TBU and form a contour (15), or displace the original tone of the second TBU by delinking it (16).

(15) 

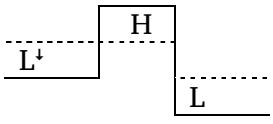
(16) 

Though floating tones in most cases are associated with morphemes, which either begin or end in floating tones, there are floating tones that are sole morphemes on their own without any segmental material. Markers with grammatical functions which have lost their segmental attributes are now, only marked by tone, e.g., associative markers, tense or aspect markers (Watters 2003:237). A clitic may also consist of a floating tone, found at the edges or boundaries of certain syntactic constituents. It has lost its segmental attributes resulting in what is referred to as a boundary tone, found in the beginning or end of phrases (Snider 1999:45).

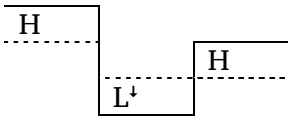
2.4.3 Automatic downstep

Many African languages manifest a phenomenon referred to as automatic downstep, where any /H/ after a /L/, has a lower pitch than any /H/ preceding that same /L/. The presence of a /L/ tone in a phrase triggers a downward shift in tonal register, the frequency at which the tones are realised (Snider and Van der Hulst 1993:8). The /L/ causes any following /H/ to be realised on the same register as the preceding /L/ tone. In other words, the /L/ tone causes the /H/ to be downstepped. Two tones may therefore have the same tone underlyingly, but are realised with different pitches on each TBU, due to the current register. The register is lowered after each /L/, causing a downdrift tendency where each /L/ is lower than the previous one (17). A downstepped /H/ assimilates to the register of the /L/, forming a 'terrace-like' sequence where each downstepped /H/ becomes a 'ceiling' for any other /H/ following it (18). So once a register is lowered, it is never raised again within that same phonological phrase (Snider 1999:49). The dotted line in example 17 represents the change of register in a L-H-L sequence. Example 18 illustrates the phonetic realisation of a H-L-H sequence where the second high tone is realised on a lower register than the first high tone. The illustration is adapted from Snider (1999:46).

(17)

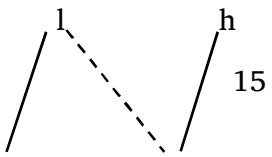


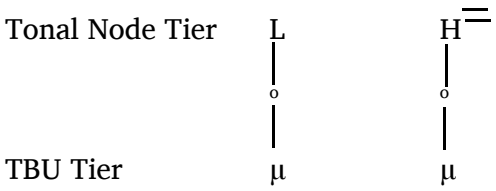
(18)



RTT (Snider 1999) accounts for downstep as being derived from a spreading of a l on the Register Tier to the Tonal Node Tier of the underlyingly /H/ TBU. The spread of l causes the original /H/ to be delinked and the TBU to be realised on the same register as the preceding /L/ tone (19).

(19) Register Tier



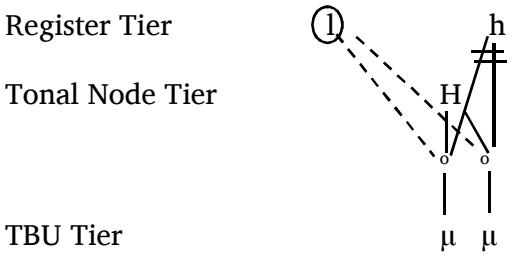


Spreading may be either iterative or non-iterative. In other words, a feature spreads to as many targets as possible, or it just spreads to the first target. The direction of the spread, i.e., left or right, as well as the domain within which the /L/ spreads is language specific. However, in many African languages the spread of a register low tone is rightward and iterative, i.e., where the register low tone spreads to as many TBUs as possible, not restricted only to the adjacent TBU (Snider 1999:47).

2.4.4 Non-automatic downstep

As discussed in the section on floating tones (2.4.2), stems might lose a final vowel or final syllable through, e.g., vowel elision, apocope, etc., and no longer manifest synchronically in the language. However, any tone which was associated to that lost segment normally remains part of the morpheme underlyingly. It might then surface on another adjacent TBU (Snider 1999:5). Non-automatic downstep is downstep caused by a floating l on the register tier, within the circle (20). It spreads to the H on the tonal tier, and all TBUs which it is associated to are downstepped. The original h on the register tier is delinked.

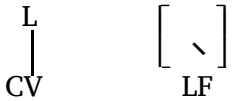
(20)



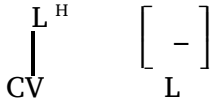
2.4.5 L tones

Most Niger-Congo languages manifest /L/ tones as falling when they are in phrase final position (Snider 1999:46). This contrasts the /L^H/ to the simple /L/ tone that falls in phrase-final position (21). When a /L^H/ stem is found in a phrase-final position, or before a pause, it manifests only as a level tone, i.e., [L] (22).

(21)



(22)



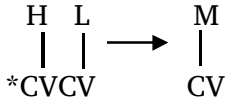
2.4.6 HL and LH sequences

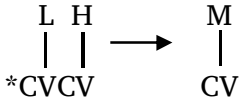
Contour tones in African languages are clearly a concatenation of two or more level tones and are often limited to the last syllable of a phrase (Goldsmith 1990:40). A /HL/ sequence might therefore be realised as a contour tone with monosyllabic stems (23), and then as two level tones on disyllabic stems (24). However, contour tones are not limited to only these two combinations of tone underlyingly but may consist of more than just two level tones underlyingly (Snider 1999:3).

(23) 

(24) 

When looking at floating tones in section 2.4.2, it became clear that PNC's syllable structure was disyllabic, i.e., *CVCV (Watters 2003:236). Table 3 showed how languages solve the problem of assigning tones from *CVCV stems onto CV stems. It is not uncommon to find languages that simplify LH or HL sequences into one level tone either L or H. Some stems might realise contour tones, while other stems realise the two tones as merged into one level tone, i.e., [M].

(25) 

(26) 

3 Method

The organizations Folk&Språk and CABTAL (Cameroon Association for Bible Translation and Literacy) invited me to Cameroon, first in 2011, and then in 2014, as a linguistic volunteer in a literacy and development program for Mmen. It was during that time that this field study was carried out. All data presented in this paper were collected directly from native speakers living in the area where the language is spoken. A researcher should always seek data that reflect natural speech as well as any possible variation. The consultants helped me to find natural frames which reflect natural speech. All elicited data were transcribed using the newly developed Mmen orthography (Björkestedt 2011b), but with the addition that tone was marked accurately primarily by using the letters H, M and L, as these tone levels are contrastive on the surface. Tone transcription was also done by drawing horizontal bars to represent the different pitch levels and falling and rising contours. Most examples in this paper are therefore presented by both the letters and the bar transcription within brackets, in order to visualize the phonetic representation of the different tone heights.

All data were also recorded in order to enable numerous repetitions, and could then be looked at in more detail using the software PRAAT. Recording lists of nouns and phrases enables repetitions without having to exhaust the consultant. It made it possible to check the consistency of the transcription; that the same things were transcribed the same way. The consultants monitored the recording device and gave comments, explanations, and possible variation of meanings spontaneously during the elicitation sessions. The data collection was therefore not only researcher driven but enabled the consultants to inform the data collection.

3.1 Language consultants

The data presented in this study was collected during the months of March, April and May 2014. Due to previous field work in the area, in 2011, contacts had already been established with the Mmen community's language committee (MELANGCO), established since 2008. It consists of 10 to 15 volunteers, all mother tongues speakers of Mmen, who gather regularly to develop materials for the Mmen language. They have recently produced, e.g., a lexicon, and reading and writing materials for their literacy program. In order to avoid physical differences of voice quality in the recordings, one consultant, who is equally a member of the language committee, Mam Mua Christina, was chosen as the main reference, and the main source of all data presented in this paper. Mam Mua Christina, born in 1962 has lived in the Mmen community for most of her life, except some few years of childhood that she spent with relatives who lived out of the language community. Other consultants, e.g., Mua Benjamin, resident in Mmen, and Keche Godlove, presently living in Sweden, have also helped in confirming different parts of the data. Unfortunately, because of time limitations the whole questionnaire was not checked by all three consultants, but parts of it were and the consultants' pronunciation followed the same tone patterns except for one case (see section 7).

3.2 Data collection

A questionnaire was developed in order to build a database, a corpus of nouns and noun phrases. The questionnaire was based on the word collection which began by Björkestedt and which then Mua (2014) has continued to develop. The database is built in Fieldworks Language Explorer (FLEX), a software program developed by SIL international for dictionary development, morphological analysis etc. Nouns were first recorded in isolation. However, many tonal alternations manifest at phrase level, so to look at nouns' citation form does not necessarily reveal all the contrastive tones or tonal processes at work within the noun. It is therefore important to put the nouns in different phonological frames or phrases, where

tonal change is likely to manifest. It is difficult to know in advance what type of phrases or frames to use, which will bring out the different tonal contrasts. Directions found in Hyman (2010b) and Snider (2014) on how to study tone languages, helped in understanding what phrases and contexts to start with. Earlier studies on Mmen (Möller 2012) also helped form the questionnaire at an early stage. Phrases and frames were then added as the analysis developed along with the data collection.

3.3 Questionnaire

To begin with, lists of nouns uttered in isolation had been collected from the lexicon and database in FLEX. The database contains about 4000 entries, of which half are nouns. This study focuses on nouns consisting of simple stems, as in contrast to compounds or complex nouns which might have gone through tonal processes, and have a more complex realisation of the tones. Simple noun stems in Mmen are mainly monosyllabic. Only a few disyllabic stems were found in the database and they seemed to involve more than one morpheme, e.g., *mbɔ̀-lə́* 'cow' (cl.9), *tà-lə́* 'a type of dress' (cl.9), *ā-wú-lə́* 'heaven', *ā-tyə̀yn-sè* 'image'. Other words with more than one syllable were clear compounds e.g. *āfóf-ā-tɛ́ā* 'storm' (cl.7) (lit. wind of strength), *chā'-è-fghāyn* 'ankle ring' (cl.9) (lit. ring of leg). These nouns were not included in the questionnaire since it is difficult to know if there are other tonal processes, e.g., between the stem and the other morphemes affecting the realisation of tone. Understanding the processes of the monosyllabic noun stems will hopefully help understand other more complex nouns as well.

Tone melodies might furthermore be affected by the structure of the syllable, e.g., if the coda is sonorant or not. These different categories of syllables were therefore labelled in the database, in order to distinguish the CVC nouns with an obstruent coda, i.e., stops and fricatives, from those with a sonorant coda CVS, i.e., liquids and nasals. This distinction of syllables is also called the syllable profile of the stem, and refers to the syllable's structure as relevant to tone analysis rather than to the internal structure of the syllable (Snider 2014). Consonants in the onset have not proved to affect tone in Mmen, so the onsets of the syllables are therefore labelled C, independent of it being a sonorant or not.

Nouns from different noun classes may involve different morphophonological processes that could affect the tone differently. Studying nouns from all noun classes would not be possible due to the time frame of this field study. Remember from the general introduction on Central Ring languages that Mmen have classes with L tone on the concord, i.e., 1, 6a and 9, while the other classes have a H tone assigned to their concord prefixes, i.e., 3, 4, 5, 6, 7, 8,

13, 10 and 19. By choosing one of the H classes and one of the L classes, one ought to cover all regular tone patterns and processes within the noun phrase. The two largest classes that contain the highest number of nouns are classes 7 and 9. This study will therefore focus on those two classes.

The database, which consists of about 4000 words (Mua 2014), was developed using the software FLEX where the nouns were grouped according to their noun class, surface tone, stem type, e.g., simple, complex, as well as syllable structure, i.e., CV, CVC and CVS. The wordlist in FLEX was used in order to select nouns from each syllable profile and with the different surface tones. In order to find any assimilation processes or spreading of tone, each noun would be put in frames where the noun is preceded as well as followed by a L tone and H tone respectively. In other words, the nouns were put in analogous and identical environments. The nouns are preceded by a L tone with the preposition *è* 'with'. The concord prefix for class 7 is /H/ and for class 9 it is /L/, so any determiner that follows the noun will manifest those concord prefixes immediately after the noun. So in order to test a frame where there is not any influence from the different concords the nouns will be preceded by a /L/ tone verb e.g. *fùŋ* 'hit' followed with the same verb in a different form i.e. *fùŋà* 'hitting'. Both noun classes can be followed by and preceded by a /H/ tone verb e.g. *tól* 'lift(ing)'. CVC verbs were chosen since it might be easier to distinguish the pitch of CVC words compared to CV words which easier might assimilate with the following word. The frames that were used to begin with are displayed in table 4. Note though that the gloss for e.g. N tól 'N is lifting' might not be exactly accurate, more research on the verb in Mmen is needed in order to give precise glossing of that frame.

Table 4 Example from the questionnaire

Frame	Mmen	Gloss	Frame	Mmen	Gloss
L__	è N	'with N'	__ L __	N è N	'N with N'
L__	fùŋ N	'hit N'	__H __	N sé N	'N to N'
H__	tól N	'lift N'	___ L	N -ìm	'my N'
_ H	N tól	'N lifting'			

3.4 The software PRAAT

Transcribing tone accurately is not always an easy task. Though one can get used to the tone patterns of a specific language and learn to determine the different pitches, it may be difficult to transcribe all tones correctly at the first attempt. Since the questionnaires were recorded, the transcription could be checked with the help of the program PRAAT. PRAAT is a free software program developed at the phonetic Science Department at the University of

Amsterdam for the analysis of acoustic speech signals (Boersma and Weenik 2011). PRAAT gives a high-quality picture of the speech signal and a pitch trace in the spectrogram for any sound wave it analyses. The blue line found in the spectrograms below is the fundamental frequency (F_0) of the acoustic speech signal, measured in Hertz (Hz). Changes in the F_0 are recognized by the hearer as a change of pitch. Below are two spectrograms of two nouns of class 7, a minimal pair which only contrasts in tone, i.e., *ā-tám* 'trap' and ā-tàm 'hippopotamus'. The tone sequence in figure 3 was transcribed as [M-H], while that of figure 4 was transcribed [M-L]. The pitch traces in the two spectrograms confirm the difference as both starts the word around 1500 Hz, the one with a high tone then has a higher frequency than the one with a low tone.

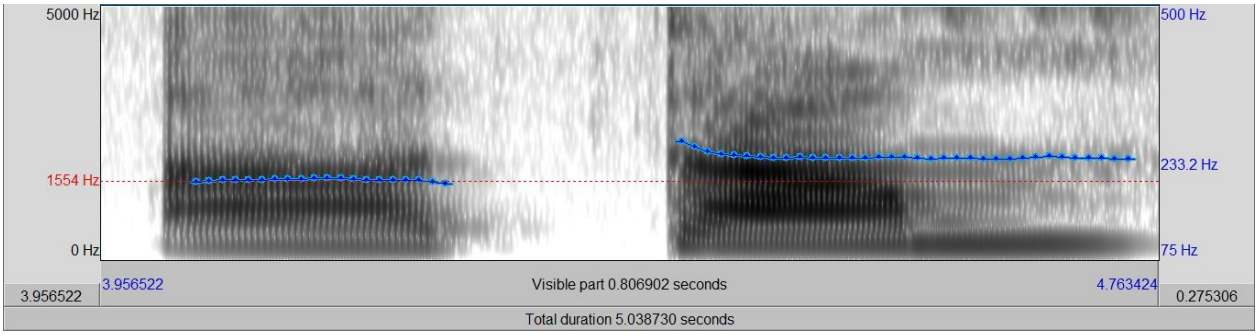


Figure 3 The spectrogram for [ā-tám] 'trap' cl.7

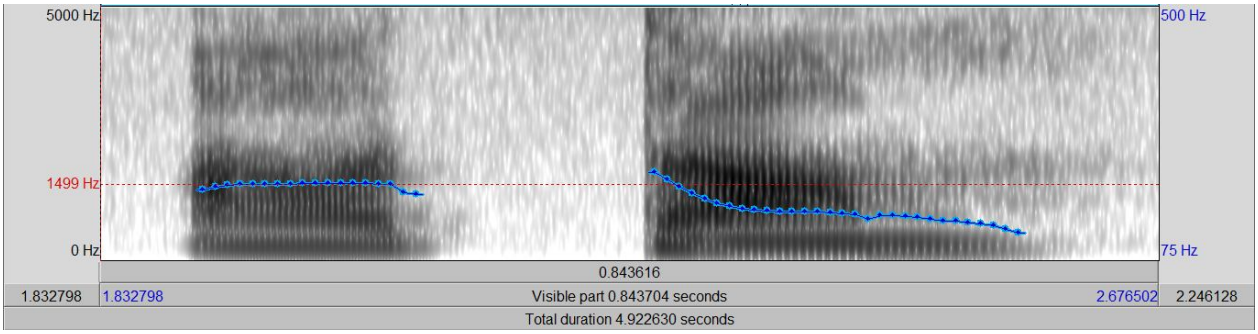


Figure 4 The spectrogram for [ā-tàm] 'hippopotamus' cl.7

The pitch trace may however demonstrate a lot of fluctuation due to e.g. background noise. Furthermore the phonological tone is rarely constant over the syllable due to, e.g., perturbations caused by obstruents. Presence of voiced consonants may produce a dip in the trace. An utterance that begins with a H may demonstrate a slightly raised pitch trace. An utterance beginning with a L may begin with a short fall till it reaches the level of the unperturbed tone. This is often the case when the syllable has either voiced or voiceless consonants in the onset (Snider 2014). Voiceless consonants tend to break the pitch trace and may cause a raising effect both before and after the break. The spectrogram below shows a slightly falling pitch with a sudden rise before the voiceless stop. The utterance was, however, transcribed as [H H M] on the surface.

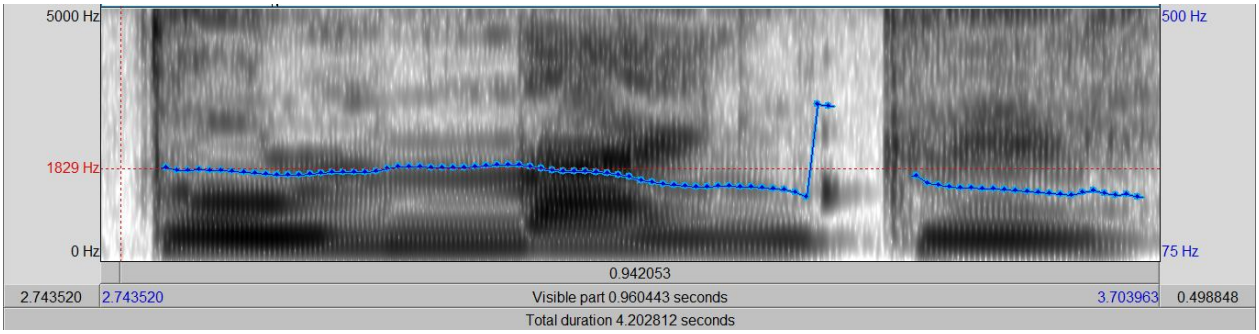


Figure 5 [Tól náyn-kē] 'lift the rock'

The transcription of tone was not solely based on the pitch trace tracks of PRAAT, but was rather based on the pitch as perceived by the mother tongue speaker, in order to get the surface tone melodies. Tones were therefore transcribed with the help of the consultant either whistling or humming the pitch. One aim during the data collection was to keep the elicitated phrases as simple and short as possible, yet capturing the necessary processes. This was due to the fact that the accurate transcription of tone becomes more difficult the longer a phrase is. The consultant knew that the focus of the data collection was to determine the different tone patterns, and therefore helped pointing out differences that I was not skilled enough to hear. PRAAT was mainly used as means to confirm that, what was perceived as the pitch level was accurate. PRAAT was used in order to compare two possibly contrasting melodies, especially in cases where a specific phrase seemed to differ from other data within the same paradigm. Just hearing two utterances in isolation after one other might help determine any differences in pitch.

No measurements of the frequency were taken for the different level tones. First, the present study does not focus on the phonetic features of the tone. Secondly, measuring the frequency of a syllable in order to compare it with other phrases, takes data that can be compared in more detail, e.g., having the same consonants preceding, or following the TBU being measured. If a specific question concerning the phonetic features of the nominal tone were to be looked at, more data would need to be collected, and measurements would have to be tested for statistical significance, etc. In other words, that would require a different type of study than the present one.

4 The Mmen noun

Before looking into the contrastive tones in Mmen nouns, as they are realised on the surface, there are some general features to observe about the noun that is of relevance to tone analysis. It was mentioned in section 2.1 that noun stems in GB languages are mainly monosyllabic. Mmen also shows a preference for monosyllabic stems, with the following

basic syllable structure: CV, CVC, CGV and CGVC. Noun class prefixes have following structures: V, N and CV, e.g., class 7 *a-*, class 6a *m-* and class 19 *fe-*. Example (27) displays the syllable structures of noun stems, the examples are all from class 7 with an a- prefix.

(27)

Root structure	**Example**	**Gloss**
CV	ā-fí	'spitting cobra'
CVC	ā-fɨ̄f	'poverty'
CGV	ā-kwú	'raffia palm nut'
CGVC	ā-tyá'	'strength'

The majority of simple noun stems are monosyllabic. There are examples of bisyllabic roots, but they are often made up of two morphemes, e.g., *mbɔ̀-lə́* 'cow' (cl.9), *tà-lə́* 'a type of dress' (cl.9), *ā-ngɔ́ŋ-né* 'ant sp.', *ā-wâm-nè* 'cross'. Borrowings may also be disyllabic, e.g., *làpá* 'loincloth' (cl.9) (from pidgin *wrapa*), *nánâs* 'pineapple' (cl.9), *ānyɔ̀s* 'onion' (cl.7). Other stems with more than two syllables are most likely compounds, e.g., *ā-wû-ā-ghàmà* 'tree sp.' (cl.7), *kàm-à-zə̀s* 'bird sp.' (cl.9), *kyā'ā-ndɛ̄* 'floor' (cl.9). A few roots with more than two syllables have reduplicated sequences as these examples from class 7: *ā-nyɔ́ŋɔ́nyɔ́ŋ* 'mosquito', *ā-kwàkwə̀* 'duck', *ā-shɔ́shɔ́* 'termite' and *ā-tyántáyn* 'box'.

A formula of the morphological structure of the nouns is seen below. An optional initial vowel (IV) *ə-* is present when nouns with CV- or Ø- prefixes, i.e., 1-2, 6a, 9, 10, 13 and 19, are uttered in isolation. Since the noun phrase in Mmen is head-initial the common position for the noun is in the initial position. The initial vowel (IV) *ə-* is always manifested with a M pitch.

(28)

(Initial vowel)	+	**Noun class prefix**	+	**Noun stem**	
ə̄-		Ø-		-ndòm	'man' cl1
ə̄-		Ø-		-ghɨ́	'humans' cl2
ə̄-		mī-		-ká'	'wood' cl6a
ə̄-		Ø-		-tsə̀m	'dream' cl9
ə̄-		sē-		-ndɛ̀	'house' cl10
ə̄-		tē-		-ngòm	'bananas' cl13
ə̄-		fē-		-kàm	'fists' cl19

Prefixes in Mmen manifest a M tone in isolation. Hyman (1979:36) proposes that the noun class prefixes for all noun classes except 1, 6a and 9 are underlyingly H. The H prefix is then lowered in initial position because it is preceded by a low boundary tone %L, found at the beginning of phonological phrases. Phonological phrases in many Niger-Congo languages have /L/ boundary tones assigned to their left and right edges (Snider 1999:46). Hyman also reports that other Central-Ring languages, e.g., Kom and Oku have /H/ tone class prefixes

which are pronounced with a mid-pitch, a default pitch for all prefixes (2005:3, 2010b:17) (this is discussed further in section 6.1).

(29) 

'bat'

(30) 

'debt'

The prefixes are however realised as suffixes or clitics when found within a phrase. They do not only attach to the noun stem, but are found attached to any modifier within the noun phrase. The clitics are often identical with the prefixes, but an optional form adds the concord consonant, e.g., for class 7 the clitic is either *-a* or *-ke*.

(31)	**prefix**	**ā**-tám			'trap'
(32)	**clitic a-/-ke**	è tám-**á**	OR	è tám-**ké**	'with trap'
(33)	**clitic a-/-ke**	tám kɨ́m-**á**	OR	tám kɨ́m-**ké**	'my trap'

4.1 Noun classes

In section 2.2, table 1 showed the noun class system of different Central Ring languages. Nouns in Mmen are grouped into 13 classes, six singular classes, i.e., 1, 3, 5, 7, and 9, class 6a for mass nouns and six plural classes, i.e., 2, 4, 6, 8, 10, and 13. As mentioned in previous section, the noun class prefixes for classes: 2, 3, 4, 5, 6, 7, 8, 10, 13, and 19, are analysed as being underlyingly /H/, though they are realised with a mid pitch when nouns are uttered in isolation. Classes 1, 9 and 6a have a /L/ tone in PR, but the /L/ tone has not been found featuring as a class prefix for these classes today (Möller 2012). However, for the concord prefixes classes: 1, 6a, and 9, clearly take a /L/ tone and not a /H/ as the other classes. That these classes take a /L/ tone is common within Ring languages and is also the case for the concord prefixes for the PR forms as proposed by Hyman (Hyman 1980:249, 251).

Table 5 Noun class prefixes and concord prefixes in Mmen

	Noun class prefixes		Concord prefixes	
Class	**PR**	**Mmen**	**PR**	**Mmen**
1	**ù-*	***w-/Ø-***	**w ̀*	***v̀***
2	**bá-*	***gh-/Ø-***	**b ́*	***ɣ ́***
3	**ú-*	***e-(w)***	**w ́*	***v́***
4	**í-*	***(e-)***	**y ́*	***(ź)***
5	**í-*	***e-***	**y ́*	***ź***
6	**á-*	***ə-***	**ɣ ́*	***ɣ́***
6a	**mə̀-*	***m-***	** m̀*	***m̀***
7	**kí-*	***a-/ ke-***	** k ́*	***ḱ***
8	**bí-*	***e-(w)***	**b ́*	***v́***
9	** Ø-, Ǹ-*	***Ø-***	**y ̀*	***z̀***
10	** ́ ..-sí*	***se-***	**s (y)́*	***ś***
13	**tə́-*	***te-***	**t(y)́*	***t́***
19	**fə́-*	***fe-***	**f ́*	***f́***

Note: ( ) indicates it is a marginal noun classes

However, not all classes have an equal number of nouns. Classes 1 and 2 include names referring to human beings, but only a few nouns are inherently from those classes. Many nouns found in the classes are compounds, e.g., *wù-zhɔ́yn* 'woman' (cl.1) (lit. human buy, market). Classes 3, 4, 5, and 8, all have an *e-* prefix. The plural class 4 is, however, only used with very few nouns, which also have a plural form in class 13 (Möller 2012). Some nouns of class 3 and 8 are not only distinguished by an e- prefix but also by labialization, e.g., ē-t**w**ɔ́yn, m̄-táyn 'ceiling(s)' cl.3/6a, ā-ká̱m, ē-**kw**ə́m 'crab(s)' cl.7/8 (Möller 2012, Kiessling 2010) (see more examples in section 2.3). However, the classes with largest number of nouns and equally the most frequent pairings of singular and plural are: classes 5/13, 7/8, and 9/10.

(34)	**Singular**	**Plural**	**Gloss**	**Class**
	ē-fíŋ	tē-fíŋ	'bruise(s)'	5/13
	ē-kɔ́	tē-kɔ́	'clan(s)'	5/13
	ā-ghə́f	ē-wə́f	'bone(s)'	7/8
	ā-ghóm	ē-ghóm	'hawk(s)'	7/8
	wà	sē-wà	'cup(s)'	9/10
	kɔ̂	sē-kɔ̂	'tree sp.'	9/10

The noun class system in Mmen also allows for many alternate combinations (figure 6, dotted lines). Some singular classes form regular plural pairings with several classes, e.g., class 5 nouns may form plural in class 6 or 13. Class 13 is more or less a default class in Mmen with which several singular classes form their plural, e.g., 1, 3, 5 and 7.

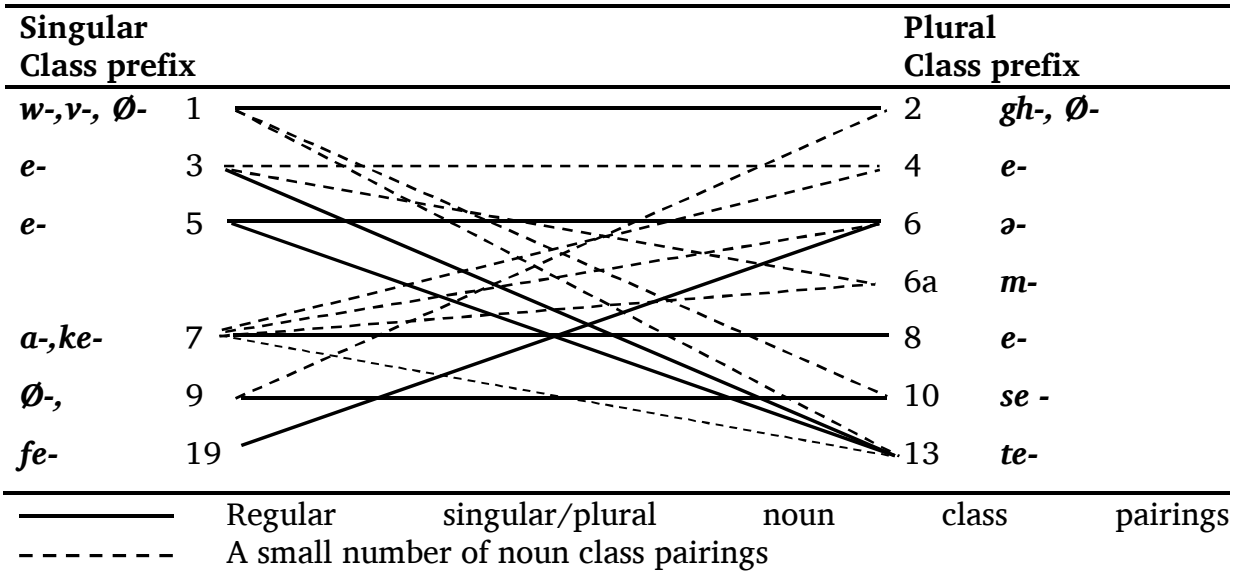


Figure 6. *Noun class pairings in Mmen*

Determiners in Mmen, e.g., numerals, demonstratives, possessives, etc., within the noun phrase, take agreement with the noun that governs the noun phrase. This phenomenon is found across all Bantu languages in general, the agreement or concord prefixes appear on other determiners, within the noun phrase, as they agree with the head noun (Katamba 2003:111). It can be observed in table **6**, on the next page, that the plural classes 2 and 6 have identical concord markers, i.e., *gh́-*. Since their noun prefixes are different, however, they are considered two separate classes. Classes 3 and 8 also take the same concord, i.e., *v́-* but are still distinctive due to the fact that class 3 is a singular class, and class 8 is a plural class. Classes 4 and 5 also have identical concord prefixes. However, since class 4 is merging with class 13, most speakers only use the concord *z´-* for expressing singular of class 5. Table **6** displays the nouns without their prefixes, since the determiner, i.e., the demonstrative *–inə,* take agreement with the head noun, it is that agreement which shows the class of the noun. It is not considered ungrammatical to include the prefix in this context, i.e., ***ē-kwî v-ínə̀,*** but is considered a marked or less natural utterance.

Table 6. Example of the noun class concords

Cl	Example	H L	Gloss
3	-kwî	**v-**ínə	'this bed'
8	-fghá	**v-**ínə	'these things'
2	-ghɔ́yn	**gh-**ínə	'these children'
6	-ndzɨ́s	**gh-**ínə	'these knees'
4	-lîŋ	**z-**ínə	'these bamboos'
5	-ndzɨ́s	**z-**ínə	'this knee'
7	-fghá	**k-**ínə	'this thing'
10	-ndɛ̄	**s-**ínə	'these houses'
13	-lú'	**t-**ínə	'these places'
19	-nyí	**f-**ínə	'this knife'
		L L	
1	-váyn	**v-**ìnə	'this child'
9	-ndɛ̄	**z-**ìnə	'this house'
6a	-kwî	**m-**ìnə	'this beds'

5 Surface tone

The next two sections describe the contrastive tones in Mmen as they are realised on the surface. The examples include nouns with the different syllable profiles: CVS, CVC and CV. The segments are marked with accent marks on the transcription. The pitch is transcribed within brackets in order to visualize the pitch distinctions. Note that the tone transcription in the coming sections (5.1-5.2) reflect the surface tone and not the underlying tones, e.g., [H M M] does not mean that it is underlyingly /H M M/. The analysis of the underlying contrastive tones will be presented in section 6. The prefix of class 7 is marked with a mid pitch i.e. *ā-*, though it was shown in previous section (4) that it is analysed as underlyingly /H/. Each example is presented first as it is realised in isolation, then with two frames. First, when the stem follows a /L/ tone, e.g., è ___ 'with N' and when the stem follows a /H/ tone, e.g., tól ___ 'lift'. Some stems are exemplified with other contexts as well, to show a contrast or a realisation which did not show in the first two frames. The examples are written with the Mmen orthography with the addition that all tones are being marked. The letter –gh- represents the velar fricative [ɣ] and the letter / '/ refers to the glottal stop [ʔ] in IPA. Note as well that NC sequences are written n-C whatever the following consonant e.g. *ā-**n**gǒ*, which would be transcribed [āŋgǒ] in IPA.

5.1 Surface tone in class 7

Class 7 is one of the larger noun classes in Mmen. It includes nouns from various semantic fields e.g. animals, fruits, things etc. Nouns in class 7 are characterised by an *a*-prefix and

pair most frequently with noun class 8 in plural. Besides the *a*-prefix there are a handful of nouns that display a CV prefix, i.e., *ke-*, compare to the PR **kí-*. The *ke-* prefix is replaced with the prefix *e-* of class 8 in plural, e.g., ***kē****-tɔ́ŋɔ́pɛ̀,* ***ē*** *-tɔ́ŋɔ́pɛ̀* 'millipede(s)' cl.7/8. The examples that manifest a *ke-* prefix are however compounds rather than simple noun stems, e.g., *kè-tòlə̀mkàm* 'praying mantis', *kē-pghāshūŋə̀* 'roller'[7]. Since compounds are more likely to have undergone tonal processes, e.g., assimilation etc., these examples have not been included in this study.

Example 35 includes noun stems from class 7. They all display the *a*-prefix with its surface mid tone when found in phrase-initial position. The noun stems show the tonal pattern as manifested on the surface when the nouns are uttered in isolation. The pitch tracks for the [M HL] and [M HM] have a lower [M] than the rest of the examples in order to visualize that one of the contours, i.e., [HM] falls to the level of the prefix, while the other contour, i.e., [HL] continues to fall. Note as well that there is a contrast between low stems which has a falling low tone, i.e., [M LF], and the stems which have a level low tone, i.e., [M L].

(35)

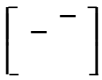
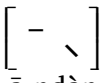
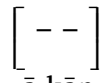
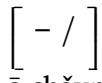
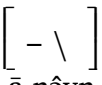
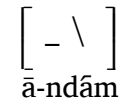
	[M H]	[M LF]	[M-L]	[M M]	[M LH]	[M HL]	[M HM]
CVS							
	ā-ndím	ā-ndàŋ	ā-kàŋ	ā-kāŋ	ā-shǒyn	ā-nô̌yn	ā-ndâ̌m
	'bat'	'debt'	'lie'	'lie'	'basket'	'crowd'	'iron'

Table **7**, on the next page, shows the different nouns used for this study, as well as the distribution of tone across the three syllable profiles. The tones, as they are realised on the surface, are distributed differently across the three syllable profiles. Almost all surface tones manifest with CVS stems, which is the most frequent syllable profile within monosyllabic stems. Rising tones in general are very rare, only occurring with a few stems, i.e., CVS and CV stems. The only contour tone which surfaces with a CVC stem as the only TBU is the [HL] falling contour.

[7] bird sp.

Table 7 Surface tone in isolation class 7

	CVS	**CVC**	**CV**	Total
H	37	27	22	86
LF	8	12	11	31
L^{o}	2	2		4
HL	20	9	11	40
HM	9		3	12
LH	1		2	3
M	11	3	3	17
Total	88	53	52	193

With these different surface tones there are many minimal pairs found within the data where tone is the only contrast. Below is an example of a stem with three different tonal melodies. However, there were still nouns which realised identical tone(s), both in isolation and in the different contexts looked at in this study, yet have different meaning which can only be determined by the context, e.g., *ā-zâ* 'ram' or 'mushroom sp.' .

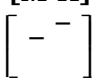
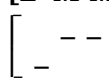
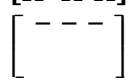
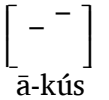
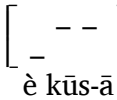
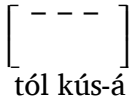
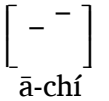
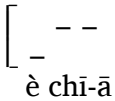
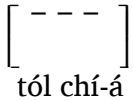
(36)

[M H]	[M M]	[M LF]
ā-tám	ā-tām	ā-tàm
'heart'	'dove'	'hippopotamus'

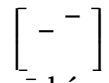
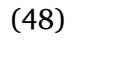
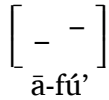
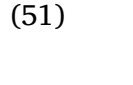
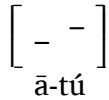
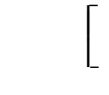
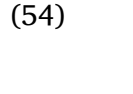
Following sections (5.1.1-5.1.7) give examples of each tonal melody as manifested on the surface within nouns of class 7.

5.1.1 [H] High stems

The noun stems of class 7 that realise a [H] tone in isolation can be divided into two groups, those that manifest a high tone on following tone bearing units (37-45), and those that manifest a mid pitch to the right of the stem (46-52). When the [H] stems of the first group are preceded by a low tone, the stems are realised with a mid pitch, i.e., [L **M**-M] (38, 41, and 44). But once preceded by a high tone the high group nouns manifest a high pitch, i.e., [H **H**-H] (39, 42 and 45). Any clitic that follows these stems are realised at the same level as the preceding stem; a mid pitch when the stem is realised with a mid pitch, i.e., [L M-**M**] (38, 41 and 44), and a high pitch when the preceding stem is high, i.e., [H H-**H**] (39, 42, and 45).

		[M-H]		**[L M-M]**		**[H H-H]**
CVS	(37)		(38)		(39)	
		ā-ndím ‘bat’		è ndīm-ā ‘with bat’		tól ndím-á ‘lift bat’
CVC	(40)		(41)		(42)	
		ā-kús ‘knot’		è kūs-ā ‘with knot’		tól kús-á ‘lift knot’
CV	(43)		(44)		(45)	
		ā-chí ‘land’		è chī-ā ‘with land’		tól chí-á ‘lift land’

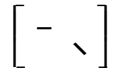
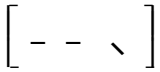
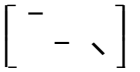
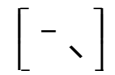
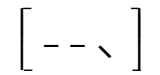
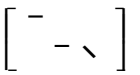
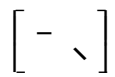
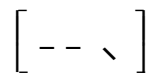
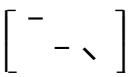
The second group of [H] noun stems also realise a [H] pitch in isolation, i.e., [M-**H**] (46, 49, and 52). When they are preceded by a /L/ tone the stem together with the following clitic do not realise two tones at the same level, i.e., [L M-M] as the other H stems do (37-45). Instead, these nouns take two different level tones, i.e., [L **M-L**] (47, 50, and 53). Once preceded by a /H/ tone these stems realise a [HM] falling contour on the stem, i.e., [H **HM-M**] (48, 51, and 54) and not three level tones, i.e., [H H-H] as the other H stems do (37-45). Any clitic that follows these stems realise a low or mid pitch, i.e., [L M-**L**] and [H HM-**M**]. Since these noun stems contrast with previous stems (37-45), they must have different tones underlyingly.

		[M-H]		**[L M-L]**		**[H HM-M]**
CVS	(46)		(47)		(48)	
		ā-káŋ ‘bowl’		è kāŋ-à ‘with bowl’		tól kâŋ-ā ‘lift bowl’
CVC	(49)		(50)		(51)	
		ā-fú’ ‘garden’		è fū’-à ‘with garden’		tól fû’-ā ‘lift garden’
CV	(52)		(53)		(54)	
		ā-tú ‘head’		è tū-à ‘with head’		tól tû-ā ‘lift head’

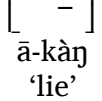
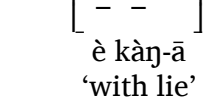
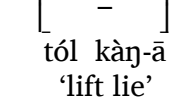
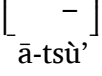
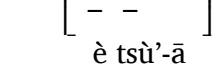
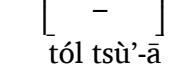
5.1.2 [L] Low stems

The nouns that realise a [L] tone in isolation also turn out to be divided into two groups: one group where the low tone is falling before pause, when uttered in isolation, or found phrase finally (55-63), and one group whose low tone is not falling, i.e., [L] (64-69). When

the first group of [L] stems is found phrase-finally, the last TBU manifests as a falling low tone. These stems manifest a [L] pitch whether preceded by a /L/ (56, 59, and 62) or a /H/ tone (57, 60, and 63). Any following clitic realises a falling-low tone [LF].

		[M LF]		**[L L-LF]**		**[H L-LF]**
CVS	(55)		(56)		(57)	
		ā-ndàŋ		è ndàŋ-à		tól ndàŋ-à
		‘debt’		‘with debt’		‘lift debt’
CVC	(58)		(59)		(60)	
		ā-tàs		è tàs-à		tól tàs-à
		‘spoon’		‘with spoon’		‘lift spoon’
CV	(61)		(62)		(63)	
		ā-chì		è chì-à		tól chì-à
		‘wound’		‘with wound’		‘lift wound’

The second group of low noun stems realises a level tone when uttered in isolation [M-**L**] (64 and 67), not a falling low as previous examples (55-63). The class clitic *-a* surfaces with a [M] pitch both when preceded by a /L/ tone and a /H/ tone, i.e., [L **L-M**] (65 and 68) and [H **L-M**] (66 and 69). This contrasts this group of nouns from the other low nouns which manifest a falling tone in phrase final position, i.e., [L L-LF] and [H L-LF] (55-63). Note that no CV stem was attested with this low non-falling pitch.

		[M-L]		**[L L-M]**		**[H L-M]**
CVS	(64)		(65)		(66)	
		ā-kàŋ		è kàŋ-ā		tól kàŋ-ā
		‘lie’		‘with lie’		‘lift lie’
CVC	(67)		(68)		(69)	
		ā-tsù’		è tsù’-ā		tól tsù’-ā
		‘pestle’		‘with pestle’		‘lift pestle’

5.1.3 [M] Mid stems

The stems that realise a level mid tone in isolation [M-**M**] (70, 73 and 76) are found with all three syllable profiles, i.e., CVS, CVC and CV. When these stems are preceded by a low or high tone the following clitic realises the same level as the stem, i.e., [L M-**M**] (71, 74, and 77) and [H M-**M**] (72, 75, and 78). However, when these stems are preceded by a low tone the tone of the stem is downstepped, i.e., (71, 74, and 77), and realised on a lower level

compared to the other contexts. Note as well, that the level of the mid stems in following sequence: [L M-**M**] (71, 74, and 77), is lower than the [H] stems with in the same context (38, 41, and 44).

		[M-M]		**[L M-M]**		**[H M-M]**
CVS	(70)	ā-kūŋ 'flood'	(71)	è kūŋ –ā 'with flood'	(72)	tól kūŋ–kē 'lift flood'
CVC	(73)	ā-səs 'broom'	(74)	è səs –ā 'with broom'	(75)	tól səs–kē 'lift broom'
CV	(76)	ā-ngwā 'ruin'	(77)	è ngwā–ā 'with broom'	(78)	tól ngwā–kē 'lift ruin'

5.1.4 [LH] Low-high stems

Only three nouns in class 7 realise the contour rising tone [M-**LH**] in isolation: one CVS, and two CV stems, i.e., a-shɔ̌yn 'basket'[8], ā-ngǒ 'fool' and ā-tɛ̌ 'stick'[9]. When preceded by a /L/ tone these stems manifest as a mid, i.e., [L **M**-L] (80, and 83). When these stems follow a /H/ tone they realise a [LM] contour, i.e., [H **LM**-L] (81, and 84). Any following clitic manifests a low level pitch, i.e., [L M-**L**] (80, 81, 83, and 84).

		[M LH]		**[L M-L]**		**[H LM-L]**
CVS	(79)	ā-shɔ̌yn 'basket'	(80)	è shɔ̄n-à 'with basket'	(81)	tól shɔ̌yn-kè 'lift basket'
CV	(82)	ā-ngǒ 'fool'	(83)	è ngō-ā 'with fool'	(84)	tól ngǒ-kè 'lift fool'

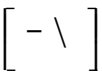
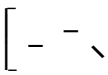
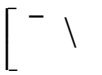
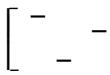
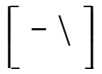
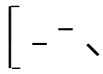
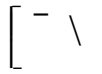
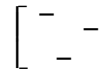
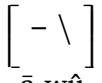
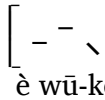
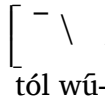
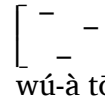
5.1.5 [HL] High-low stems

There are a number of noun stems that realise a [HL] falling contour in isolation, i.e., [M-**HL**] (85, 89, and 93). When these stems are preceded by a /L/ tone they surface as a level

[8] a small basket which one ties around the waist while working in the farm

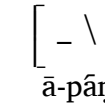
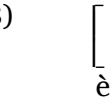
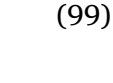
[9] refers to a stick used when removing fruits from a tree

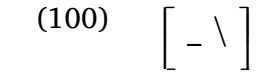
[M] tone, [L **M-**LF] (86, 90, and 94). When preceded by a /H/ tone, they are realised as a contour [H **HL**-LF] (87, 91 and 95). Any clitic that follows the stem is realised with a falling low tone [LF], i.e., [H M-**LF**] and [H HL-**LF**]. That the low tone falls when found in phrase-final position makes these stems contrast with the [H] stems which were followed by a level tone on following clitic, i.e., [L M-**L**] and [H HM-**M**] (46-52). The noun stems that realise a [HL] contour in isolation also surface without a prefix when followed by the H tone verb tól. Instead there is a clitic following the stem realized with a low pitch, i.e., nɔ́n-**à** 'crowd', kɔ́s-**à** 'slave' and wú-**à** 'shell' (92, 88 and 96).

		[M-HL]		**[L M-LF]**		**[H HL-LF]**		**[H-L M]**
CVS	(85)		(86)		(87)		(88)	
		ā-nɔ̄yn 'crowd'		è nɔ̄yn-kè 'with crowd'		tól nɔ̄yn-kè 'lift crowd'		nɔ́n-à tōl 'crowd lift'
CVC	(89)		(90)		(91)		(92)	
		ā-kɔ̂s 'slave'		è kɔ̄s-kè 'with slave'		tól kɔ̄s-kè 'lift slave'		kɔ́s-à tōl 'slave lift'
CV	(93)		(94)		(95)		(96)	
		ā-wû 'shell'		è wū-kè 'with shell'		tól wū-kè 'lift shell'		wú-à tōl 'shell lift'

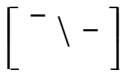
5.1.6 [HM] High-mid stems

A handful number of noun stems manifest a high-mid falling contour in isolation, i.e., [M-**HM**]. The stems that manifest this falling tone are either CVS or CV stems (97, and 100). These stems surface as [M] when preceded by a /L/ tone, i.e., [L **M-**H] (98 and 101). When following a high tone the CVS stems are realised as [H], i.e., [H **H-**M] (99), but CV-stems surface with a falling [HM] contour, i.e., [H **HM**-M] (102). The clitic following the stem is realised with different levels of pitch, it takes a high level when the stem is preceded by a /L/ tone, i.e., [L M-**H**] (98, and 101) and a [M] tone when the stem is preceded by a /H/, i.e., [H H-**M**] (99, and 102).

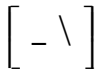
CVS	(97)		(98)		(99)		
		ā-pāŋ 'palm nut'		è pāŋ–á 'with palm nut'		tól páŋ–kē 'lift palm nut'	

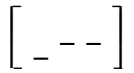
CV (100) 
ā-kó
‘forest’

(101) 
è kō-á
‘with forest’

(102) 
tól kó-kē
‘lift forest’

Two other CVS stems, i.e., *a-nd̄il* ‘pool’ and *a-sā́m* ‘toad’ (103), also surface as a HM stem in isolation. However, when preceded by a /L/ tone they surface as two level tones, i.e., [L **M-M**] (104), and not with a [L M-H] melody as the other [HM] stems did (98 and 99).

CVS (103) [M HM] 
ā-sā́m
‘toad’

(104) [L M-M] 
è sām-ā
‘with toad’

5.1.7 Summary of surface tone in class 7

Noun stems in class 7 have eight different realisations of tone on the surface, when they are uttered in isolation. Some contexts, including the isolation form, neutralize the difference between contrasting tones. Contrast between some nouns, was therefore visible first when put in a context, or a frame, where the noun is preceded by a /L/ or /H/ tone. There were two different groups of high stems that behaved differently in identical environments: one group realised a [H] clitic, and the second group of high stems realised a [M] on following clitic. Also, the low stems were divided into two groups as one group realised a falling low tone in phrase-final position, while the second group had a level low tone [L].

5.2 Surface tone in class 9

Class 9 differs from class 7 in several ways concerning the noun. Class 9 nouns do not manifest a clear prefix or class clitic as nouns in class 7 do. Stems in class 9 may, however, be preceded by the optional initial-vowel, always realised with a mid pitch, e.g., *ə̄-ndɛ̄* ‘house’, *ə̄-zí* ‘bee’. The examples given in this section do not include the initial vowel, since it is optional and the consultants preferred to pronounce the nouns in isolation without it.

The PR prefix for class 9 consists of a low tone homorganic nasal, i.e., **Ǹ-* . Among Bantu languages it is still common to find *N-* as the class 9 prefix (Hyman 2003a:49). In modern Mmen the *N-* is no longer functioning as a prefix, it has instead become part of the root. It is never replaced by other prefixes when assigning nouns to other classes for formation of plural, or diminutive, e.g., *ndɛ̄* ‘house’ and *fē-ndɛ̄-tà* ‘small house’. However, about half of the simple noun stems found in the database, i.e., 50 out of 128 involve a homorganic nasal, *N-*, which changes its place of articulation according to the following consonant. These stems

have a NCVC and NCV structure while the rest of class 9 stems have a simple CVC or CV structure.

The PR prefix also involves a low tone *$\grave{N}$-. About 50 simple stems realise a [L] tone. If the low tone of these nouns is the result of a low tone feature attributed to this noun class, there should be a contrast when these roots appear in a different class, i.e., plural class 10. Only three nouns manifested a difference in tone (105): having a L tone in singular in class 9 and a H tone when forming plural with class 10.

(105)

class 9	**class 10**	**Gloss**
nyàm (L)	sē-nyám (M-H)	'animal(s)'
pfɨyn (L)	sē- pfíyn (M-H)	'mountain(s)'
kyə̀ (L)	sē-kyə́ (M-H)	'voice(s)'

The number of stems undergoing this change, from low tone in singular and high tone in the plural, is too small to claim the L tone to be part of the class prefix in Mmen today. The question remains though, why some nouns would display a change in tone between nouns in class 9 and plural in class10, while other stems do not (106). A study on class 9 nouns and the different derived nouns into other classes, e.g., 10, and 7, could probably bring more insight on a possible L tone prefix. That, however, goes beyond the scope of the present study.

(106)

class 9	**class 10**	**Gloss**
pɨ̄yn (M)	sē-pɨ̄yn (M-M)	'locust(s)'
pìŋ (L)	sē-pìŋ (M-L)	'year(s)'
tsò (L)	sē-tsò (M-L)	'stream(s)'

Example 107 shows CV noun stems from class 9 and their contrasting surface tones as when uttered in isolation. Just as in class 7, nouns in class 9 also contrast between low stems which falls in phrase-final position, i.e., [LF], and stems which have a level low tone, i.e., [L].

(107)

Pitch	**H**	**M**	**LF**	**L**	**LH**
CV	ˉ	ˉ	ˉ ˎ	ˎ	ˊ ˇ
	njó	pū	nyàm	ŋjàm	kǒ
	'penalty'	'dog'	'animal'	'axe'	'palm kernel'

The contour tone LH is realised in isolation only together with five CV-stems. Also, there are no falling contours, i.e., HL or HM within this class, as were found in class 7.

Table 8 Surface tone in isolation class 9

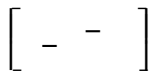
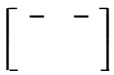
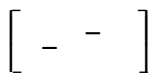
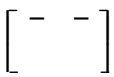
	CVS	**CVC**	**CV**	Total	
H	24	6	9	39	
L	7	10	4	21	
L̊	8	3	1	12	
LH			5	5	
M	15	8	12	35	
Total	54	27	31	112	

Class 9 stems do not take a clitic like class 7 stems do. For this reason, stems in class 9 do not associate any floating tone following the stem until another word follows it. The frames used for class 9 will therefore look different from those used for nouns in class 7. Some nouns are presented with the /L/ tone, è 'with' preceding the stem. Other examples are preceded by the /H/ verb, *tól*. In some frames the verb *tól* follows the stem, other stems are followed by the low demonstrative z-*ìŋ* 'this'. Also in these sections (5.2.1-5.2.4) the tone transcription reflects the surface tone and not the underlying, e.g., a [L M] sequence is not to be read as /L M/.

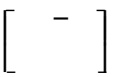
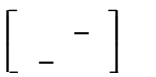
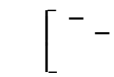
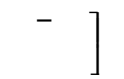
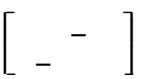
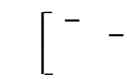
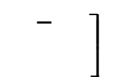
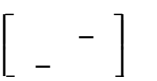
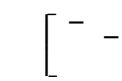
5.2.1 [H] High stems

The noun stems within class 9 that realise a high pitch when uttered in isolation (108, 111 and 114) are realised with a mid pitch once preceded by a /L/ tone, i.e., [L **M**] (109, 112 and 115). When these stems follow a /H/ tone they are realised with the same pitch as preceding /H/ tone, i.e., [H **H**] (110, 113 and 116). Stems that realized this tone were from all three syllable profiles: CVS, CVC and CV.

Pitch		**H**		**L M**		**H H**
CVS	(108)	ˉ	(109)	ˍ ˉ	(110)	ˉ ˉ
		tím		è tīm		tól tím
		'heart'		'with heart'		'lift heart'

CVC	(111)		(112)		(113)	
		ngwá’ ‘njangi’[10]		è ngwā’ ‘with njangi’		tól ngwá’ ‘lift njangi’
CV	(114)		(115)		(116)	
		zɨ́ ‘bee’		è zɨ́ ‘with bee’		tól zɨ́ ‘lift bee’

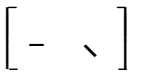
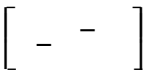
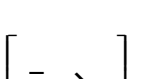
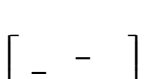
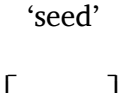
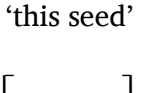
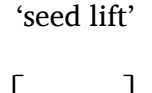
Another group of stems also realise a high pitch in isolation (117, 120 and 123), but a mid pitch when following a /L/ tone, i.e., [L **M**] (118, 121, and 124). However, once these stems are preceded by a high tone they do not manifest a [H H] sequence as previous examples did (108-116). These stems are realised with a [M] pitch instead i.e. [H **M**] (119, 122, and 125). Since these nouns contrast with the previous group of [H] stems, in identical contexts, the two groups of nouns must have different tones underlyingly.

Pitch		**[H]**		**[L M]**		**[H M]**
CVS	(117)		(118)		(119)	
		shə́yn ‘bag’		è shəyn ‘with bag’		tól shəyn ‘lift bag’
CVC	(120)		(121)		(122)	
		ngɔ́’ ‘white ant’		è ngɔ̄’ ‘with white ant’		tól ngɔ́’ ‘lift white ant’
CV	(123)		(124)		(125)	
		ngɛ́ ‘wrinkle’		è ngɛ̄ ‘with wrinkle’		tól ngɛ̄ ‘lift wrinkle’

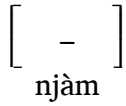
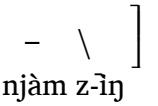
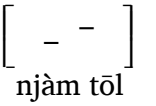
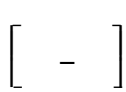
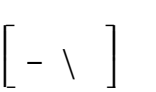
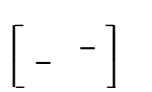
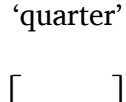
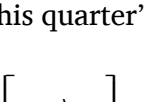
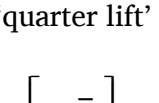
5.2.2 [L] Low stems

The noun stems in class 9 that realise a low tone, are always realised as a falling low tone, i.e., [**LF**] when ever found in phrase-final position (126, 129, and 132). When these stems are followed by the demonstrative *z-ìŋ*, the demonstrative is realised with a falling low tone, i.e., [L **LF**] (127, 130, and 133). These stems also cause any following /H/ tone verb, e.g., *tól* to be downstepped, realising a [M] pitch, i.e., [L **M**] (128, 131, and 134).

[10] a njangi group or a njangi meeting is a local banking system where each person in a group contributes an amount each month and at the end of the year gets back the money s/he has saved during the year.

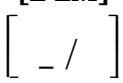
Pitch		**[LF]**		**[L LF]**		**[L M]**
CVS	(126)	 nyàm ‘animal’	(127)	 nyàm z-ìŋ ‘this animal’	(128)	 nyàm tōl ‘animal lift’
CVC	(129)	 ngwà’ ‘seed’	(130)	 ngwà’ z-ìŋ ‘this seed’	(131)	 ngwà’ tōl ‘seed lift’
CV	(132)	 ndzɛ̀ ‘sheep’	(133)	 ndzɛ̀ z-ìŋ ‘this sheep’	(134)	 ndzɛ̀ tōl ‘sheep lift’

The second group of low stems in class 9 contrast to the previous stems (126-134) as they realise a level tone, and not a falling-low tone, when found in phrase final position, i.e., [**L**] (135, 138, and 141). When these stems are followed by *z-ìŋ* ‘this’ the demonstrative is realised with a mid-low falling contour, i.e., [ML] (136, 139, and 142). and not a falling low tone as the other low stems do (127, 130, and 133). Note that there was only one CV stem in this class attested in the data with this non-falling low tone (141).

Pitch		**[L]**		**[L ML]**		**[L M]**
CVS	(135)	 njàm ‘axe’	(136)	 njàm z-ìŋ ‘this axe’	(137)	 njàm tōl ‘axe lift’
CVC	(138)	 tə̀’ ‘quarter’	(139)	 tə̀’ z-ìŋ ‘this quarter’	(140)	 tə̀’ tōl ‘quarter lift’
CV	(141)	 njà ‘meat’	(142)	 njà z-ìŋ ‘this meat’	(143)	 njà tōl ‘meat lift’

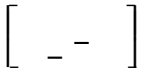
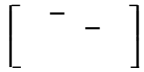
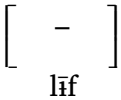
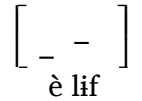
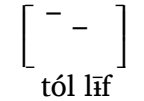
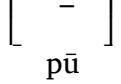
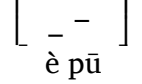
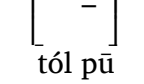
5.2.3 [LH] Low-high stems

Five CV stems in class 9 realised a [LH] tone in isolation (144). When preceded by a low or high tone these stems take a LM contour i.e. [L **LM**] (145), [H **LM**] (146).

Pitch		[LH]		[L LM]		[H LM]
CV	(144)		(145)		(146)	
		kǒ		è kǒ		tól kǒ
		‘palm kernel’		‘with palm kernel’		‘lift palm kernel’

5.2.4 [M] Mid stems

The noun stems in class 9 that realise a [M] are from all syllable profiles, i.e., CVS, CVC and CV (147, 150, and 153). When these stems are preceded by /H/ tone the stems realise the same [M] level tone, i.e., [H **M**] (149, 152 and 155). However, when these stems are preceded by a low tone the tone of the stem is downstepped, i.e., (148, 151 and 154). The tone is realised on a lower level compared to when pronounced in the other contexts. Note as well that, just as with [M] stems of class 7, the level to which these stems are downstepped in [L **M**] is lower than that the level to which [H] stems are downstepped, in the same context (118, 121, and 124).

Pitch		[M]		[L M]		[H M]
CVS	(147)		(148)		(149)	
		chīŋ		è chīŋ		tól chīŋ
		‘cricket’		‘with cricket’		‘lift cricket’
CVC	(150)		(151)		(152)	
		līf		è lif		tól līf
		‘poison’		‘with poison’		‘lift poison’
CV	(153)		(154)		(155)	
		pū		è pū		tól pū
		‘dog’		‘with dog’		‘lift dog’

5.3 Summary of surface tone in class 7 and 9

Having looked at the surface realisations of tone in class 7 and 9 there are several observations to be made. Class 7 had eight tone realisations in isolation while class 9 only had five. There were no [HL] or [HM] stems in class 9. Contour tones in general were very rare in the database. Only three stems were attested with a [LH] melody on the stem. CVC stems were only attested with one contour, i.e., the [HL] contour.

In both class 7 and 9 there were nouns that realised identical pitch in isolation. However, once put in a context they differed. Class 7 [H] stems turned out to contain two groups of noun stems. One group had a high level pitch followed by a high clitic when preceded by a high tone, i.e., [H **H-H**] and the other group had a high-mid falling contour and a mid pitch

on any following clitic, [H **HM-M**]. In class 9 there were [H] stems that realised as high when preceded by a /H/ tone, i.e., [H **H**]. Other stems were lowered, realised with a mid pitch when following a high tone, [H **M**]. To summarise, there are high stems which are simply high. There are other [H] stems in class 7 which are followed by a lowering realised on any following clitic. The stems contrast in analogous and identical environments, a contrast which cannot be predicted from the segmental or syllabic composition of these words. The stems which are followed by a lower tone on the clitic, could be caused by a floating low tone maybe, i.e., /H^{L}/. Within class 9 there are high stems which are simply high and those that are lowered when following a high tone. Such stems could maybe be preceded by a floating low tone, i.e., /^{L}H/.

There was also a difference between low tones that fall in phrase final position. i.e., [LF] and the low stems that did not fall, but were instead realised with level tones, [L˚]. Since these stems contrast in analogous and identical environments they must be having different tones underlyingly. Any following clitic to these stems in class 7 manifest a mid pitch e.g. [L L-**M**] and [H L-**M**]. Maybe such stems could have a floating high tone attached to the stem, i.e., /L^{H}/.

The present description of surface tones do not differ a lot from what previous studies have suggested, e.g., Agha (1987:67) who gave five different contrastive tones, i.e., [H], [L], [M], with the contours [LH] and [HL]. Björkestedt (2011a) added another two falling contour tones, i.e., [HM], and [ML], as well as two rising contour tones, i.e., [LM] and [MH] to the contrastive surface tones in Mmen. Björkestedt comments, however, how these contour tones were only rarely attested in her data. No [ML], [LM], or [MH] were attested in the database used for this study. Björkestedt, furthermore, mentions that there is a contrast between the level low tone [L] and the low tone which falls in phrase-final position, i.e., [LF].

Table 9, on the next page, gives a summary of the different surface tones and the different syllable profiles, with which the different surface tones were realised, in class 7 and 9. The exact numbers are not the most relevant in this study. However, one can observe that the most common surface tones are: [H], [L] and [M], for both class 7 and 9. The [HL] stems were only attested within class 7 but was one of the more common tone melodies within the database.

Table 9 Surface tone with possible floating tones in class 7 and 9

	Class 7			**Class 9**			
	CVS	**CVC**	**CV**	**CVS**	**CVC**	**CV**	**Total**
H	33	22	18	21	3	9	106
H^{L}	4	5	4				13
^{L}H				3	3		6
L /LF	8	12	11	7	10	4	52
L^{H} /L˚	2	2		8	3	1	16
HL	22	9	11				42
HM	9		3				12
LH	1		2			4	7
M	9	3	3	15	8	13	51
Total	88	53	52	54	27	31	305

Some of the noun stems in classes 7 and 9 have identical realisations in isolation, but contrast in specific contexts. It is proposed that these nouns have different floating tones found, either to the left or to the right of the stems, e.g., CV ´, ` CV. The stems which have not manifested clear floating tones, e.g., [HL], [LH] and [M] might still be derived from different tones underlyingly. The underlying tones should be the same for both noun classes, but the underlying tones might differ in their realisation depending on the noun class and the syllable structure of the stem. That is what next section aims to describe.

6 Analysis

The following sections (6.2-6.14) propose the underlying tones of the noun stems from classes 7 and 9, presented in previous section (5). All surface tones can be derived from sequences of the two underlying tones, i.e., /H/ and /L/, through the tonal processes at work in Mmen, presented in following section (6.1).

All segments transcribed with their underlying tones are marked / /. Any surface realisation is given within brackets [ ] and the bar transcription is given as well to distinguish the different pitch heights.

6.1 Tone rules

There are some tonal processes at work in Mmen which are of importance for the analysis of tone. The presentation of rules is, however, far from exhausting all tonal processes at work within Mmen. The processes presented below are the ones that were found within the present analysis. Further studies will hopefully reveal more on the tone rules in Mmen. Section 2.4.1 presented a number of tone rules grouped according to their function, i.e., phonetic, diachronic rules, and morphophonemic, synchronic rules. According to this grouping (13) there are both phonetic tone rules: assimilation, both horizontal and vertical, and morphophonemic tone rules: floating tones, active in Mmen.

(13) **Tone rule typology (Hyman 2007:2)**

c. phonetic tone rules
   i. assimilation: horizontal and vertical
   ii. contour simplification: absorption vs. levelling

d. morphophonemic tone rules: dissimilation, copying, polarization, replacement, floating tones

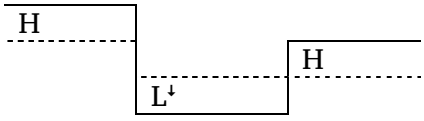
6.1.1 Automatic downstep

Like many West African languages and other GB languages, Mmen nouns manifest automatic downstep, also called downdrift. Whenever a /L/ tone occurs in between /H/ tones in Mmen, the /H/ tone which follows the /L/ is having a lower pitch than the one preceding the /L/ tone (156).

(156) [_ ¯]
/á-káŋ/ ‘bowl’ cl.7

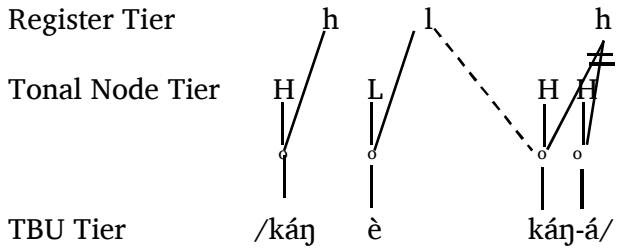
(157) [¯ _ _ _]
/káŋ è káŋ-á/ ‘bowl with bowl’

Example (157) can be represented as in (18), also given in one of the earlier sections (2.4.3), which illustrates the change of register, dotted line.

(18)


Using the representation of RTT, a downstepped /H/ can be analysed as in (158). The process is analysed as a spreading of a l from the Register tier to the H on the Tonal Node tier. The h of the register tier is delinked, resulting in that the H is pronounced on the same register as preceding L.

(158)



Any /H/ preceded by a /L/ is automatically downstepped even when there is no preceding /H/ to compare the second /H/ to. The /H/ tone in *sé* preceded by a /L/ (159) is noticeable lower than the regular non-downstepped /H/, when *sé* is preceded by a /H/ (160).

(159) tàs-à sé tàs-à
'spoon to spoon'

(160) kús-á sé kús-á
'knot to knot'

In the following sections a non-automatic downstepped /H/ is marked by an arrow, i.e., ꜜH. An automatically downstepped /H/, caused by a preceding associated /L/, will not be marked. Its pitch level is visible in the bar transcription within brackets.

6.1.2 Non-automatic downstep

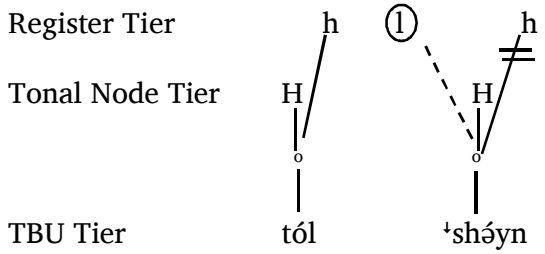
Non-automatic downstep takes place when a /H/ tone is preceded by a non-associated /L/ tone, in other words a floating /L/. The verb *tól* 'take', is a /H/ tone verb in Mmen, so whenever a /H/ stem follows it, the two words manifest the same pitch, i.e., [H H] (161). There are, however, stems in class 9 which realise a [H] tone in isolation, but do not follow the [H H] pattern. Instead they manifest a lower pitch of the noun than the preceding /H/, i.e., [H M], (162). Though both nouns manifest a high pitch when uttered in isolation they come out differently when following a /H/ tone. The stems that manifest a lower pitch when following a /H/ tone have a floating /L/ tone preceding the noun stem. The floating /L/ causes the /H/ tone to be downstepped, i.e., ꜜH. In other words, it causes the second /H/ to be realised on a lower register than the preceding /H/.

(161) H /ŋám/ 'pliers' cl.9 /tól ŋám/ [tól ŋám] 'lift the pliers'

(162) ᴸH / `shə́yn/ 'bag' cl.9 /tól `shə́yn/ [tól ꜜshə́yn] 'lift the bag'

Using the representation of RTT, a non-automatic downstepped /H/ can be analysed as in (163). The process is analysed the same as automatic downstep with the only difference that the l on the Register tier is floating and not associated. It spreads however to the H on the Tonal Node tier. The h of the register tier is delinked. And the H is pronounced on the same register than preceding L.

(163)



The downstepped /H/ is realised with a [M] pitch on the surface, as it was transcribed in section 5, but is not to be considered a mid tone underlyingly. Not all [M] surface tones, however, are downstepped high tones (see section 6.13).

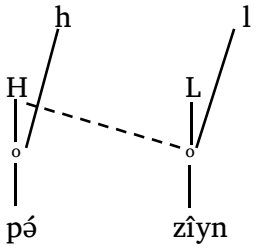
6.1.3 /H/ Tone spreading

Mmen manifest horizontal assimilation where a tone spreads rightwards to the adjacent TBU. This takes place for example when the demonstrative *-ìyn* 'this', which is having a /L/ tone is preceded by a /H/ tone. The /H/ tone spreads to the next tone bearing unit and results in a [H HL] sequence. The demonstrative is pronounced as a high-low falling contour, i.e., [HL] (164). When the demonstrative is preceded by a /L/ noun stem, the demonstrative is pronounced with a falling low tone [LF] (165).

		CVS	CVC	CV
(164)	**H HL**	shə́yn z-îyn 'this bag'	ngɔ́' z-îyn 'this termite hill'	pə́ z-îyn 'this furrow'
(165)	**L L**	pìŋ z-ìyn 'this year'	sə̀f z-ìyn 'this bag'	tsò zìyn 'this stream'

The process of /H/ tone spreading can be represented in the RTT as in (166) where the h from the register tier spreads to the L on the Tonal Node tier. The l on the register tier is not delinked. Instead the h which spreads joins the tone on the TBU tier forming a falling contour [HL].

(166)



The /H/ tone in Mmen spreads in some contexts but not in all (167). The example below show a phrase where a /L/ tone is found in between two /H/ stems, no spreading of the /H/ is taking place in this case. Maybe spreading is not taking place in this context because the /L/ tone is not found phrase finally? More data would need to be collected in order to define in what contexts the /H/ spreads and not.

(167) ā-tsól è tsól-á ‘mushroom with mushroom’ cl.7

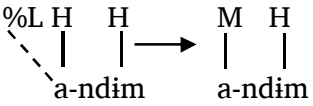
6.2 Tone of class 7 prefix

The class 7 prefix manifests a [M] tone when found in initial position. Looking at the PR noun class prefixes given by Hyman they have a high tone in all classes except: classes 1, 6a, and 9. Hyman reports how other Central-Ring languages, e.g., Kom and Oku, have /H/ tone class prefixes which are pronounced with a mid-pitch, a default pitch for all prefixes (2005:3, 2010b:17). Hyman attributes the lowering of H tone prefixes in initial position to a %L boundary tone, found at the beginning phonological phrases. Phonological phrases in many Niger-Congo languages have /L/ boundary tones assigned to their left and right edges (Snider 1999:46). The %L boundary tone would have a lowering effect on the /H/ causing it to be pronounced with a mid pitch, [M]. Previous section (6.1.1) showed how /H/ tones are downstepped when following a /L/ tone. Maybe the [M] prefixes could be the result of downstep? One question remains though; why is a /H/ tone of the stem not affected by the boundary %L tone? Normally any low tone cause all following /H/ tones within the same phrase (168), to be manifested on that same register, but that is not the case when /H/ stems follow the prefix (169).

(168) è ndím-á ‘with bat’

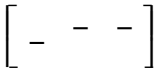
(169) (%L) á-ndím ‘bat’

Instead of seeing the prefix as being downstepped it could be analysed as having merged with the underlying /H/ tone forming a [M] tone (170).

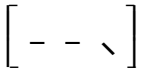
(170) 

6.3 Tone of the class 7 clitic

When nouns in class 7 follow the preposition è ‘with’, the prefix is deleted and a class marker appears after the stem instead, e.g., *–a.* The clitic takes a /H/ tone when preceded by a /H/ stem (171) and when preceded by a /L/ stem it is realised with a falling low tone (172).

(171) 

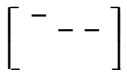
/è ndɨ́m-a/ [è ˈndɨ́m-á] ‘with bat’

(172) 

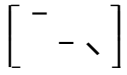
/è ndàŋ-a/ [è ndàŋ-à] ‘with debt’

If the suffix was underlyingly /H/ it would have manifested a downstepped high tone ˈH, as /H/ tones do in other environments when preceded by a /L/. It would have resulted in a [L L M] melody rather than a [L L LF] (172). The clitic can, therefore, not be considered underlyingly /H/. Analysing the clitic as being underlyingly /L/, would need a rule for /H/ stems to spread unto the clitic and then delinking the low tone. Other examples of /H/ spreading (6.1.3), however, show how the /H/ tone do not delink the /L/ tone, but rather joins the /L/ tone, in phrase-final position, to form a contour, i.e., [HL]. Instead the clitic must be toneless rather than underlyingly /H/ or /L/, manifesting the tone of the stem or any floating tone attached to the stem.

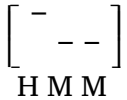
The class 7 clitic is having two forms, i.e., *-a,* identical with the prefix, and *–ke*, both are toneless taking the tone of the preceding stem: [H] when the stem is /H/ (173), [L] when the stem is /L/ (174), and [M] when the stem is [M] (175).

(173) 

H M M tól tám-**á** OR tól tám-**ké** ‘lift trap’

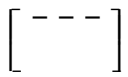
(174) 

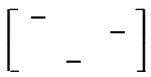
H L LF tól ndàŋ-**à** OR tól ndàŋ-**kè** ‘lift debt’

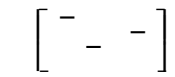
(175) 

H M M tól tɔ̄ŋ-**ā** OR tól tɔ̄ŋ-**kē** ‘lift king fisher’

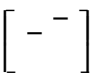
Another marker, i.e., *-ə́*[11], realised together with the concord consonant, i.e., *–k-ə́*. Once it is followed by a /H/ stem it realises the same pitch as preceding /H/ (176). When the preceding stem is /L/, this marker is downstepped, realised on a lower register than the /H/ preceding the /L/ stem (177), this results in [H L-M] sequence, and not a [H L LF] sequence as the stem together with a toneless clitic realise (174). Furthermore, the *–k-ə́* marker is realised with a higher pitch than a preceding [M] stem, yet realised on a lower register than preceding /H/ (178). Since the *–k-ə́* marker does not take the tone of preceding stem it cannot be considered toneless, instead it can be analysed as underlyingly /H/.

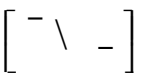
(176) 
/fé tám-ká/
'see trap'

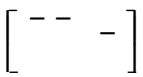
(177) 
/fé ndàŋ-ká/
'see debt'

(178) 
/fé tɔ̄ŋ-ká/
'see king fisher'

The *–k-ə́* marker is, furthermore, downstepped when preceded by a floating /L/ (181). The toneless clitic –ke takes a low tone when following this same stem with a floating /L/ (179).

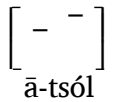
(179) 
/á-káŋ`/
'bowl'

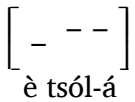
(180) 
/tól kâŋ-kè/
'lift bowl'

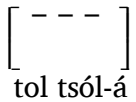
(181) 
/fé káŋ-ˡká/
'see bowl'

6.4 Underlyingly /H / stems

Both class 7 (182) and class 9 (185) have stems from all three syllable profiles that realise a [H] tone, both in isolation and different contexts. When these stems follow a /H/ tone the stems are realised at the same level as the preceding /H/ (184, 187). However, when preceded by a /L/ tone these stems are downstepped (183, 186), in other words realised with a lower pitch than a non-downstepped high (184, 187). Any following clitic, e.g., as for class 7, realise a /H/ tone (183).

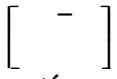
class 7 (182) [M-H] 
ā-tsól
'mushroom'

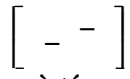
(183) [L M M] 
è tsól-á
'with mushroom'

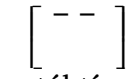
(184) [H H-H] 
tol tsól-á
'lift mushroom'

class 9 (185) [H] (186) [L M] (187) [H H]

[11] It did not become clear in this study, in what contexts this marker occurs, e.g., only together with the verb *fe* 'see' and not together with *tól* 'lift'. More data is needed in order to determine the function of this marker.


tím
‘heart’

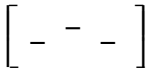

è tím
‘with heart’

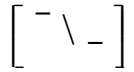

tól tím
‘lift heart’

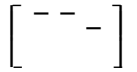
6.5 Underlyingly /H^{L}/ stems

There are nouns in class 7 that are realised as [H] when uttered in isolation. They are downstepped by preceding /L/ tones just like /H/ stems. However, when those stems are followed by a clitic, the clitic manifests a lower pitch than the preceding stem (189). When preceded by a /H/ tone and followed by a toneless clitic, the stems are realised with a falling contour, [HL] (190). When these stems are found in between two /H/ tones, the stems surface as [H], but the following /H/ is downstepped (191). The low tone on following clitic (189), and the stem being realised as a falling contour (190), as well as following /H/ tones being downstepped (191), must derive from a floating /L/ following the stem, i.e., /H^{L}/. These stems contrast to the previous examples of /H/ stems (182-187). Note that there were no stems within class 9 that realised this pattern.

(188) 
ā-káŋ
‘bowl’

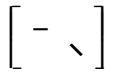
(189) 
è káŋ-à
‘with bowl’

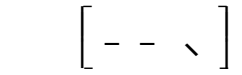
(190) 
tól kâŋ-à
‘lift bowl’

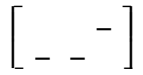
(191) 
fé káŋ-ꜜkɔ́
‘lift bowl’

6.6 Underlyingly /L/ stems

As mentioned in section 2.4.5., it is common among Niger-Congo languages to have /L/ tones which fall when they are found in phrase-final position. This is the case also in Mmen. Both class 7 (192) and class 9 (195, 196) have stems that are realised with a falling-low in isolation, or in phrase final position, i.e., [LF]. These nouns cause /H/ tones to be downstepped (194, 197). The following clitic for nouns of class 7 is realised as [L] (194) and [LF] when in phrase-final position (193).

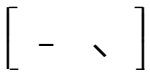
class 7 (192) [M LF]

ā-ndàŋ
‘debt’

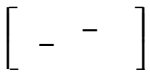
(193) [L L-LF]

è ndàŋ-à
‘with debt’

(194) [L-L M]

ndàŋ-a tol
‘debt lift’

class 9 (195) [LF]

nyàm
‘animal’

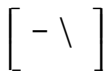
(196) [L LF]

è nyàm
‘animal’

(197) [L M]

nyàm tól
‘animal lift’

6.7 Underlyingly /HL^{L}/ stems

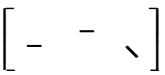
There are noun stems, from all syllable profiles, in class 7, which are realised as a falling contour, [HL], in isolation. When these stems are preceded by a /L/ tone the stem is realised as a level tone, i.e., [L **H** LF] (199). When preceded by a /H/ tone the stem is again realised with a contour (200, and 201).

(198) [M HL]



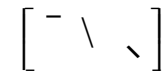
ā-nɔ̀yn
'crowd'

(199) [L H LF]



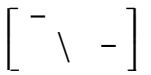
è nɔ́yn-kè
'with crowd'

(200) [H HL LF]



tól nɔ̂yn-kè
'lift crowd'

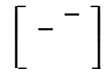
(201) [H HL M]



fé nɔ̂yn-ká
'see crowd'

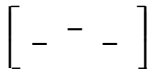
The stems that manifest a [HL] contour in isolation resemble the realisations of the stems that are analysed as /H^{L}/ (section 6.5). But comparing the two groups of stems when preceded by a /L/ (199 and 189) there is a difference in the pitch they realise. The /H^{L}/ stem is followed by a level low tone realised on the clitic, i.e., [L H **L**] (189, 190). The [HL] stems, however, are followed by a falling low tone on the clitic, i.e., [L H **LF**] (199, 200). /H^{L}/ stems cause any following high tone to be downstepped /H/, as when followed by the *k-á* marker, i.e., [H H-ꜜ**H**] (191). The same marker is realised on a lower level when following the [HL] stems. The level of the downstepped high in (201) is lower than that of (191).

(188) [M H]



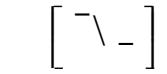
ā-káŋ
'bowl'

(189) [L M L]



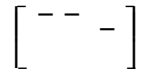
è káŋ-à
'with bowl'

(190) [H HL L]



tól kâŋ-à
'lift bowl'

(191) [H H M]



fé káŋ-ꜜká
'see bowl'

At first look the stems that manifest a [HL] contour in isolation may seem to be having a simple /HL/ tone underlyingly. However, the examples in 198-201 clearly contrast with stems that are /H^{L}/. Therefore, they cannot be analysed as having the same /HL/ sequence of tones underlyingly. Could the stem in examples 198-201 be followed by a floating /L/ tone, i.e., /HL^{L}/? The floating low attached to the stem, i.e., /HL^{L}/ would then cause any following high to be downstepped lower (201) than when following a /H^{L}/ stem (191). Jones analyses [HLF] stems in the neighbouring language Kom, as having a /HL^{L}/ underlyingly.

6.8 Underlyingly /L^{H}/ stems

There are also several nouns within both class 7 and 9 that manifest a low tone followed by a floating high, i.e., /L^{H}/. The contrast between the /L^{H}/ stems from the /L/ stems is found both in isolation and in phrases. The /L/ stems fall whenever found phrase-finally (202). The /L^{H}/ stems manifest a level low tone (204), and not a falling. Once the /L^{H}/ stems in class 7 are followed by the noun class clitic, the floating tone lands on the adjacent TBU and manifest a mid pitch (205) and not a falling low tone (203).

(202) /-pàs-/ ā-pàs ‘saw’ (203) /-pàs-/ è pàs-à ‘with saw’

(204) /-tsù’´-/ ā- tsù’ ‘pestle’ (205) /- tsù’´-/ è tsù’-á ‘with pestle’

Class 9 do not manifest a noun class clitic as class 7, a different frame needs to be used in order for the different underlying tones not to be neutralised. A context that clearly shows the contrast between the /L/ stems and /L^{H}/ stems is when they are followed by the demonstrative, z–ìŋ. The nouns that are underlyingly /L/ are realised with a [L **LF**] sequence (206). Nouns that have a floating high tone /L^{H}/ form a falling [L **ML**] contour as the floating high tone lands on the following low-tone demonstrative (207).

		CVS	CVC	CV
(206) /L L/ ⟶ L LF		pìŋ z-ìyn	sə̀f z-ìyn	tsò zìyn
		‘this year’	‘this bag’	‘this stream’
(207) /L^{H} L/ ⟶ L ML		chɨ̀ŋ zī̀yn	tə̀’ zī̀yn	njà zī̀yn
		‘this hunger’	‘this village’	‘this’

However the floating /H/ is not always grounding on the adjacent TBU. When followed by an underlyingly /L/ tone within a phrase, i.e., *N è N* ‘N with N’, the floating /H/ seems to be deleted with the first noun (208), while the second noun stem realises the floating /H/ on the following clitic. Furthermore, /H/ tones which follow this /L^{H}/ stems are not downstepped (209) as it is when following a /L/ stem (210).

(208) /á-kwɨ̀l ´ è kwɨ̀l-a/ ⟶ [ā-kwɨ̀l **è** kwɨ̀l-ā] ‘dove with dove’ cl.7

(209) /á-kwɨ̀l sé kwɨl-a/ ⟶ [ā-kwɨ̀l **sé** kwɨ̀l-ā] ‘dove to dove’ cl.7

(210) /á-tàs sé tàs-a/ ⟶ [tàs-à **sé** tàs-à] ‘spoon to spoon’ cl.7

The floating high of /L^{H}/ noun stems from class 9 also seems to ground in some environments, e.g., when following /L/ tone is in a phrase-final position (207), but not within a phrase (211). A following /H/ tone is not downstepped (212) as it is when following a /L/ stem in (213).

(211) /chɨŋ´ è chɨŋ´/ ⟶ [chàm è chàm] ‘hunger with hunger’ cl.9

(212) /chɨŋ´ sé chɨŋ´/ ⟶ [chɨŋ sê chɨŋ] ‘hunger to hunger’ cl.9

(213) /nyàm sé nyàm / ⟶ [nyàm sê nyàm] ‘animal to animal’ cl.9

6.9 Underlyingly /LH^{L}/ stems

It has already been observed that very few stems manifest a full rising contour [LH] in isolation. Only one CVS and two CV stems in class 7 are realised as [LH] in isolation (214, 217). When these stems are followed by the clitic in class 7 it takes a low tone i.e. [H LH **L**] (215, 218). And a high tone is downstepped when following the stem, realised as [H LH-M] (216, 219) and not [LH-H].

(214) [M LH] ā-ngǒ ‘fool’

(215) [H LH-L] tól ngǒ-kè ‘lift fool’

(216) [H LH-M] fé ngǒ-$^{↓}$ká ‘see fool’

(217) ā-shɔ̌yn ‘basket’

(218) tól shɔ̌yn-kè ‘lift basket’

(219) tól shɔ̌yn-$^{↓}$kə́ ‘see basket’

Class 7 has, in addition to these [LH] stems, low stems followed by a floating high, i.e., /L^{H}/. Furthermore, there were no CV stems attested having a low stem followed by a floating high. Could it be that CVC stems are realised as /L^{H}/ (221) and CV stems as full LH contour (222)? Can stems in 220-221 and the stem in 222 have the same underlying tones?

(220)

CVS	/-fɨm ´-/	[– _] ā-fɨm̊	‘carpenter bee’

(221)

CVC	/-tsù’ ´-/	[– _] ā-tsù’	‘pestle’

(222)

CV	?	[– /] ā-ngǒ	‘fool’

Looking at an identical environment where one CVS stem is having a [L^{H}] tone (224) and the other one a [LH] (225), these stems would realise an identical sequence of tones if they were having the same tone underlyingly. The phrase is: N è N ‘N with N’, where the same noun occurs first in initial position, and then again following the low tone. But as seen below, the two phrases come out quite differently. The /L^{H}/ stem is realised as [L-H] when found in the N2 position (224). The [LH] stem is instead realised with a [H-L] melody when found in the final position (225). These stems cannot have the same tone underlyingly. Since the [LH] stem is realised as [H-L] (223), identical to the sequence in (82), maybe this stem could be followed by a floating low tone i.e. /LH^{L}/?

(224)

/-kwɨ̀l ´-/	á-kwɨ̀l ´ è kwɨ̀l-á	⟶	[– _ _ _ –] [ā-kwɨ̀l è **kwɨ̀l-á**]	‘dove with dove’ cl.7

(225)

/- ngǒ ` -/	á-ngǒ è ngǒ-a	⟶	[– / _ _ _] [a-ngó è **ngó-à**]	‘fool with fool’ cl.7

That the [LH] contour in class 7 has a floating low tone following the stem is also confirmed by following phrase, *N sé N* ‘N to N’. The high tone of the word *sé* is realised with a low pitch when placed in the middle of the [LH] stems (226). When *sé* is in between two low stems it is just downstepped, realised on the same register as preceding low (227).

(226)

/- ngǒ ` -/	á-ngǒ sé ngǒ-a	⟶	[‾ – _ –_] [ngó-à **sè** ngó-à]	‘fool to fool’ cl.7

(227)

/- tàs -/ á-tàs sé tàs-a ⟶ [tàs-à **sé** tàs-à] ‘spoon to spoon’ cl.7

However, the /LH^{L}/ sequence underlyingly was just attested with two stems in the data, i.e., *ā-tɛ̌* ‘stick’ and *ā-ngǒ* ‘fool’. I just want to point out the fact that one of the stems is having a NCV structure, i.e., *ā-**ngǒ***. We know from before that class 9 has had a low tone homorganic nasal, i.e., *Ǹ- historically (Hyman 1980a:248). Could it be that this stem is originally from class 9 and that the L tone derives from the class 9 prefix? There are other nouns that are derived from class 9 into class 7 and is continued to be used in both classes, but with a different meaning, e.g., *ndɛ̄* ‘house’ cl.9 and *ā-ndɛ̄* ‘relative’. This surely need more investigation but is not within the scope of the present study.

6.10 Underlyingly /LH/ stems

In addition to the [LH] stems in class 7 there are also four stems in class 9 that are realised with a rising contour, i.e., [LH] (228). Could the [LH] stems in class 9 and the [LH] stems in class 7 be having the same underlying tones, i.e., /LH^{L}/? There is a difference between class 7 nouns and class 9 nouns. Stems in class 7 are followed by a clitic which gives any floating tone a TBU to spread on to (232, 233). With the class 9 stem there is no clitic or following TBU for the tone to spread to (229, 230). So based on these two contexts it is not possible to determine whether the two stems have the same tones underlyingly.

(228) [LH] kǒ ‘meat’

(229) [L LM] è kǒ ‘with meat’

(230) [H LM] tól kǒ ‘lift meat’

(231) [M LH] ā-ngǒ

(232) [L M-L] è ngó-à

(233) [H LM-L] tól ngǒ-kè

Looking at another environment where there is a high tone following the stems in the frame: *N sé N,* the two stems contrast. The class 7 stem is underlyingly /LH^{L}/, and the floating low causes the following /H/ *sé* to be realised with a low pitch (234). The [LH] stem in class 9 however do not cause any change in the following /H/ (235). This stem does not have any floating tone attached to the stem. It is therefore considered to be /LH/ underlyingly.

(234)

/á-ngǒ ` sé ngǒa/ ⟶ ngó-à **sè** ngó-à ‘fool to fool’ cl.7

(235)

/kǒ sé kǒ/ ⟶ kǒ **sé** kǒ] ‘palm kernel to palm kernel’ cl.9

6.11 Underlyingly /ᴸH/ stems

A handful number of nouns in class 9 manifest a high tone preceded by a floating low, i.e., /ᴸH/. The nouns contrast with the /H/ nouns when preceded by a high tone, e.g., the high verb *tól* ‘lift’. The stems which are preceded by a floating low tone realise a downstepped high [ꜜH] (236). In this context they contrast with the high stems which instead realise two high tones at the same level or register [H H] (237).

(236) H ᴸH ⟶ H ꜜH

tól ꜜshə́yn ‘lift bag’

(237) H H ⟶ H H

tól ŋám ‘lift pliers’

It seems as if this floating /L/ tone only affects the following stem when found in-between two /H/ tones. Once these stems are found in initial position, e.g., in isolation (238) or when followed by the /H/ verb *tól*, the floating /L/ preceding the stem does not cause the stem to be downstepped. One would have to collect more data, in order to determine when the floating low tone affects the stem and in what contexts it does not cause any effect.

(238)

/ ` sh**ə́**yn/ shəyn ‘bag’

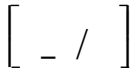
(239)

shə́yn tól ‘bag lift’

The two CV stems that follow this same pattern, being underlyingly /ᴸH/, both involve the homorganic nasal N- as part of the stem, i.e.,` *njó* ‘moon’ and `*ngɛ́* ‘wrinkle’ (243). Compare these nouns with the other /LH/ stems in class 9, i.e., *kǒ* ‘palm kernel’, *shǐ* ‘gizzard’, *sǐ* ‘fish sp.’, and *pə̌* ‘furrow’ (240).

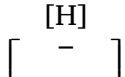
(240) [LH]

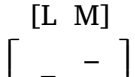
kŏ
‘meat’

(241) [L LM]

è kŏ
‘with meat’

(242) [H LM]

tól kŏ
‘lift meat’

(243) [H]

ngɛ́
‘wrinkle’

(244) [L M]

è ngɛ́
‘with wrinkle’

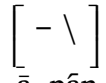
(245) [H M]

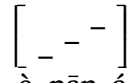
tól ˡngɛ́
‘lift wrinkle’

It turns out none of the nouns that manifest a full [LH], involves the N- in the stems. CVC, CVS and NCV stems are having a floating low to their left, i.e., /^{L}H/, simple CV stems without an N-, on the other hand, are realised as a full contour /LH/. Since the PR prefix for class 9 is *Ǹ-, the low tone in all these stems is most likely derived from that prefix but realised differently with the different syllable profiles. However, it is difficult to assign a low tone as a prefix of all nouns in class 9 since there are a few [H] stems which do not manifest a floating low to the left, e.g., *fǐf* ‘fellow-wife’, *ŋgwá*’ ‘njangi meeting’, *tǐm* ‘heart’, *ŋám* ‘pliers’.

6.12 Underlyingly /HLH/ stems

Twelve nouns within class 7, in the data, were attested with a high-mid falling contour when uttered in isolation i.e. [HM]. These stems differ from other falling contour stems not only that it is falling from high to mid, i.e., [HM] (246) as contrast to the other falling contour, i.e., [HL]. These stems surface as with three different level tones when preceded by the low *è* (247). The third level tone in the sequence in (247), is realised on the same level as the downstepped high (249). and not just [L M-M] as [H] stems do, or [L M-L] as [HL] stems do. When following a high tone these same stems are realised as [H-M] (248). When these stems are preceded and followed by a high tone i.e. *fé* ___ *-k-á*, the following high is downstepped (249).

(246)

ā- pā̌ŋ
‘palm nut’

(247)

è pāŋ–á
‘with palm nut’

(248)

tól páŋ–kē
‘lift palm nut’

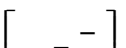
(249)

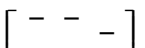
fe páŋ–ˡká
‘see palm nut’

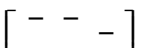
There were no CVC stems attested with this [HM] contour in isolation. One CVC stem, i.e., *a-zá’* ‘ram’ (250) is however realised with identical patterns as the [HM] stems in the other environments (251-253). This CVC stem must therefore have the same underlying tone as the [HM] stems, though it is not realised as [HM] in isolation. It is natural for the same

tones to be realised differently, since the CVC stem has less tone bearing material for the tone(s) to land on, as compared to CV and CVS stems.

(250) 
ā- zá’
‘ram’

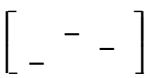
(251) 
è zā’–á
‘with ram’

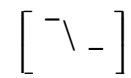
(252) 
tól zá’–kē
‘lift ram’

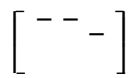
(253) 
fe zá’–ꜜká
‘see ram’

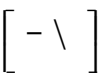
Comparing these [HM] stems to those that are underlyingly /H^{L}/ (188-191) and /HL^{L}/ (198-201), there is a clear contrast. When preceded by the low tone è, [HM] stems are realised as three level tones (247, and 251), while the /H^{L}/ stems surface as [L **H-L**] (189), and /HL^{L}/ stems with a [L **H-LF**] sequence (199). The [HM] stems must involve some other tone underlyingly than just [HM].

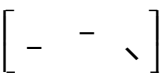
(188) [M H] 
ā-káŋ
‘bowl’

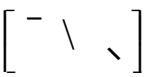
(189) [L H L] 
è káŋ-à
‘with bowl’

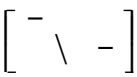
(190) [H HL L] 
tól kâŋ-à
‘lift bowl’

(191) [H H M] 
fé káŋ-ꜜká
‘lift bowl’

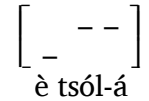
(198) [M HL] 
[ā-nɔ̀yn]
‘crowd’

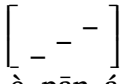
(199) [L M LF] 
è nɔ́yn-kè
‘with crowd’

(200) [H HL LF] 
tól nɔ̂yn-kè
‘lift crowd’

(201) [H HL M] 
fé nɔ̂yn-ká
‘see crowd’

How come that [HM] stems are realised with three different level tones (247, and 251)? The third level tone in the sequence is realised at the same level as the downstepped high (254). If the [HM] stem is downstepped, the following clitic would be realised with the same level. But that is not the case. The [HM] stems cannot be simply /HL/ or /H/ underlyingly.

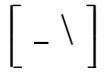
(254) 
è tsól-á
‘with mushroom’

(247) 
è pāŋ–á
‘with palm nut’

Looking at the neighbouring languages might give an idea how others have analysed these stems within Central Ring. Kom for example, also have stems which surface as [HM]. Jones (1997:6) analyses [HM] stems in Kom as underlyingly /^{H}LH/. Could [HM] stems in Mmen be having a floating high attached to the stem as well, making the underlying tone /HLH/? Kiessling (2011b) in his report on Mmen tonology suggests the same underlying form for [HM] stems.

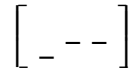
Two other CVS stems i.e. a-sə̂m ‘toad’ and a-ndɨ̂l ‘pool’, also surface as [HM] in isolation but differ from the other [HM] stems. The two nouns surface with two tones at the same level when preceded by è, i.e., [L **M-**M] (104) and not as the other [HM] stems do (247, and 251). These two environments, i.e., when the word is uttered in isolation and preceded by è are not enough to determine why these two stems behave differently. More frames would be needed in order to determine their underlying tones, data which was not available in the database at the moment.

(103) [M HM]



ā-sə̂m
‘toad’

(104) [L M-M]



è səm-ā
‘with toad’

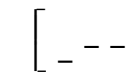
6.13 [M] Mid stems

Both class 7 (255) and 9 (258) have stems with all syllable profiles, i.e., CVS, CVC and CV that are realised with a mid pitch [M]. These stems realise a mid pitch in isolation (255, 258) and when they follow a high tone, but when they follow a low tone the tone of the stem is downstepped (256, 259). The level to which these stems are downstepped, is lower than that the level to which [H] stems are downstepped. When a /H/ tone follows these stems, the /H/ tone is realised on a lower level than preceding /H/ tone (257, 260).

Class 7 (255)

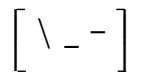
ā-kūŋ
‘flood’

(256)



è kūŋ –ā
‘with flood’

(257)

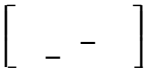


fê kūŋ–ká
‘see flood’

Class 9 (258)

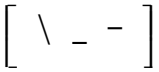
chīŋ
‘cricket’

(259)



è chīŋ
‘with cricket’

(260)

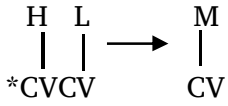


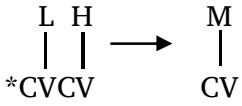
fê chīŋ-ə
‘lift cricket’

It has already been said that tone within GB languages origin from two tone heights underlyingly. The level tone realised with these stems clearly contrast with the /L/ and /H/. Maybe, the [M] stems can derive from a combination of /L/ and /H/ tones underlyingly.

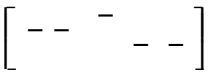
Reduction from disyllabic stems in PNC, into monosyllabic stems in languages today, has caused tones to remain floating. However, these stems do not realise any floating tones, neither to the left nor to the right of the stem. When looking at the way languages associate

the origional tone of the PNC stems to monosyllabic stems (see section 2.4.2 and 2.4.6), one strategy languages use is to leave a tone floating. The [M] tone in Kom and Oku, has been analysed as deriving from a floating low tone preceding a high, i.e., a /^{L}H/ sequence underlyingly (Jones 1997:6, Davis 1997:2). Another strategy is to 'mix' two tones or merge them into one level tone, i.e., [M]. A mid tone could therefore derive from either a HL (261) sequence or LH (262) sequence underlyingly.

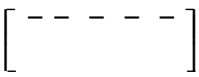
(261) 

(262) 

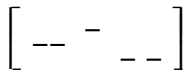
In the phrase, *N sé N* 'N to N', a difference between high, low and mid stems can be observed. High stems keep the same register throughout the phrase (264) while the mid stems manifest the second noun on a lower register (263) just as low stems do (265). If the mid stems derive from a /LH/ sequence then the change of register can be linked to the presence of the /L/ tone underlyingly.

(263) 

ā-kāŋ kāŋ-ā sé kāŋ-ā 'lie to lie' cl.7

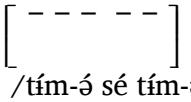
(264) 

ā-tsól tsól-á sé tsól-á 'mushroom to mushroom' cl.7

(265) 

ā-tàs tàs-à sé tàs-à 'spoon to spoon' cl.7

The stems within class 9 that display a mid tone show a similar change of register with the same phrase as previous examples. The nouns that are underlyingly /H/ realise the tones on one and the same register and level (266). The M stems show a change to a lower register once found in the position after the high tone preposition sé 'to' (267). The mid stems can also be compared to the CV-stems that manifest the full contour /LH/ where again the second noun is uttered on a lower register due to the presence of a low tone (268).

(266) 

/tɨ́m-ə́ sé tɨ́m-ə́/ 'heart to heart' cl.9

(267) 

/chīŋ sé chīŋ/ 'hunger to hunger' cl.9

(268) [/ \ /]
/shǐ sé shǐ/ ‘gizzard to gizzard’ cl.9

Simplification of contours is found in other Central Ring languages. Hyman gives a rule for Babanki that once a [HL] sequence is preceded by a low tone and followed by high tone the [L-HL] sequence is simplified as [L-M] (1979:23).

Simplification of contours takes place also in Mmen. As seen in some of the previous examples, there are stems that realise a contour tone in isolation (198, 246), and in some contexts (200, and 201), but realise a level tone in other contexts (199, 247-249).

(198) [– \ ]
ā-nɔ̀yn
‘crowd’

(199) [– – ◝]
è nɔ́yn-kè
‘with crowd’

(200) [¯ \ ◝]
tól nɔ̂yn-kè
‘lift crowd’

(201) [¯ \ –]
fé nɔ̂yn-ká
‘see crowd’

(246) [– \ ]
ā- páŋ
‘palm nut’

(247) [– – –]
è pāŋ–á
‘with palm nut’

(248) [¯ ¯ _]
tól páŋ–kē
‘lift palm nut’

(249) [¯ ¯ _]
fe páŋ–ˡká
‘see palm nut’

In class 9, there were stems that had a floating low attached to the stem but instead of realising a contour tone the stems were downstepped (269). Though a downstepped high and a mid tone are realised with the same pitch, they are not the same underlyingly. However, these synchronic processes at work in Mmen can be seen as the different stages the language has gone through in developing its current surface tone.

(269) a) /L ᴸH/ ⟶ [L M] [– –]
è shə́yn ‘with bag’

b) /H ᴸH/ ⟶ [H M] [¯ _]
tól ˡshə́yn ‘lift bag’

6.14 Summary of underlying tones within classes 7 and 9

This previous section (6) has proposed an analysis of the underlying tones of noun stems from classes 7 and 9 in Mmen. Section 5 showed how noun stems in class 7 and 9 could be described or grouped according to ten different tone patterns. Those ten tones have been proposed deriving from sequences of two underlying tones, i.e., /H/, and /L/. Noun stems

from both class 7 and 9 were attested having a floating tone to the right of the stem. Stems with a floating tone to the left of the stem were only attested in class 9.

Class 7 realised seven surface tones as nouns were uttered in isolation. As the seven types of stems were studied in the different environments there were a total of eight different tone melodies. The noun stems have been analysed as underlyingly: /H/, /L/, /H^{L}/, and /L^{H}/. Nouns in Mmen are more frequently realised as level tones than as contour tones. The contour tones that were attested in the data were analysed as deriving from a sequence of three level tones underlyingly, i.e., [HL], [HM], and [LH] were analysed as /HL^{L}/, /HLH/ and /LH^{L}/underlyingly. The surface [M] tone was proposed as being derived from a /LH/ sequence underlyingly.

Noun stems of class 9 realised five different tones on the surface. The stems were looked at in different contexts, and turned out to be six different types of stems underlyingly, i.e., /H/, /L/, /H^{L}/, /L^{H}/, and /^{L}H/. The [M] tone was proposed as deriving from a /LH/ sequence underlyingly. However, class 9 also realised 4 nouns with a [LH] rising contour. Those stems were also analysed as /LH/ underlyingly.

Table 10 shows the underlying tones of nominal stems in Mmen. Comparing the underlying tones in Mmen with those of Kom (Jones 1997:6), and Oku (Davis 1997:2), there are several sequences with same or similar surface realisations. All three languages realise the [H] and [L] tones, where the low tone falls in isolation or phrase-final position, [LF], which contrasts to the /L^{H}/ stems, as they manifest a level low tone and not a falling-low tone. The contours are composed by two or three level tones underlyingly, in all three languages.

The stems that were realised as [L] and [H] on the surface have been analysed in Kom and Oku as: /L^{L}/ and /H^{H}/ underlyingly instead of just /L/ and /H/. The main reason for the proposed underlying tones being two, instead of just one, is that the stems derive from disyllabic stems historically from PNC-disyllabic stems where there was a sequence of two tones underlyingly. However, this study is based on autosegmental theory, and there is an obligatory contour principle which prohibits adjacent identical features on the same tier. The [H] and [L] stems are, therefore, analysed as underlyingly /H/ and /L/. The /L/ stems are falling simply because of the absence of a floating /H/ tone.

Table 10 underlying tones in Mmen, Kom and Oku

		Mmen		Kom		Oku	
	UN	SURFACE		UN	SU	UN	SU
		cl 7	cl 9				
1	/H^H/	[H]	[H]	/H^H/	[H]	/H^H/	[H]
2	/H^L/	[H]		/HL/	[HL]	/H^L/	[HL]
3	/^{L}H/		[H]	/^{L}H/	[M]	/^{L}H/	[H] and [M]$^{N-}$
4	/LH/	[M]	[M]	/$^L H^L$/	[M]	/$^L H^L$/	[HL] and [ML]$^{N-}$
5	/L^H/	[L]	[L]	/L^H/	[L]	/L/	[L]
6	/L/	[L] /[LF]	[L] /[LF]	/L^L/	[LF]	/L^L/	[LF]
7	/HLH/	[HM] or [H]^{1CVC}		/^{H}LH/	[HM]		
8	/HL^L/	[HL]		/HL^L/	[HLF]		
9	/LH/		[LH]^{4CV}				
10	/LH^L/	[LH]$^{2CV,\ 1CVS}$					

Kiessling (2011b) suggested the underlying tones of nouns as presented in (5). His proposal is not too different from the one suggested in this study. Kiessling also suggests that the falling contours [HL] and [HM] are composed by a sequence of three /H/ and /L/ tones i.e. /HL^L/ and /HL^H/ respectively. Kiessling equally proposes that the surface [M] tone is derived from a /LH/ sequence underlyingly. In addition to Kiessling's underlying forms this study proposes that there are stems with a /L^H/ and /L^H/ tone underlyingly.

(5)

Surface	**Underlying**
H	/HH/ or /HL/
HL	/HL ^{L}/
HM	/HL^H/
L	/ $L^?$/
M	/LH/
L	/L L/ cl.9

7 Discussion

In an earlier section of this paper (2.3) there were three questions, concerning nominal tone in Mmen, this study set out to answer:

(i) what are the contrastive surface tones?

(ii) what are their underlying tones?

(iii) what tone processes are involved in the nominal tone system in Mmen e.g.

downstep, spread, grounding of floating tones, tone simplification etc.?

Section 5 described the surface tones in noun stems of class 7 and 9. In class 7 there were eight different realisations of tone on the surface, as the nouns were uttered in isolation. Class 9 realised five contrastive tones in isolation. However, it was observed that the most common surface tones are: [H], [L] and [M], for both class 7 and 9. The [HL] stems were only attested within class 7 but was one of the more common tone melodies within the database.

There were, furthermore, two types of L tones attested in both class 7 and class 9, i.e., the low which falls in phrase-final position [LF] and the low which is realised as a level tone in isolation [L]. These two tones are considered contrastive even though no minimal pair was attested in the data. When the consultant (M.C) was asked concerning if the difference of pitch was just optional the consultant instead confirmed that the two tones are contrastive. Pronouncing the level low stems with the falling low would not be “good” Mmen.

Some contexts, including the isolation form, neutralized the difference between contrasting tones. Contrast between some nouns, was therefore visible first when put in a context, or a frame, where the noun was preceded by a /L/ or /H/ tone. Thus, when these stems were studied in different environments and phrases, it turned out that there were ten different tonal melodies. These ten melodies or tone patterns derived from sequences of /H/ and /L/ tones underlyingly. Several noun stems were found having floating tones underlyingly, e.g., /L^{H}/ in both class 7 and 9, /H^{L}/ was only attested in class 7, and /^{L}H/ was only attested in class 9.

On the surface there are three contrastive level tones, i.e., [H], [M] and [L]. Both /H/ and /L/ tones are able to form contours, they are found as floating tones, as well as they are subject to different tone rules, e.g., downstep and /H/ tone spreading. The [M] tone is realised, phonetically, as [M] in all environments, but does not spread and does not feature as a floating tone. Following /H/ tones are, however, realised on a lower pitch than /H/ tones preceding a [M] tone. This study, therefore, presents an analysis where the [M] tone is derived from a /LH/ sequence underlyingly, where the two level tones have ‘merged’ into one level tone.

Level tones are more frequently occurring than contour tones, in general. However, class 9 had four CV-stems with a [LH] rising contour. Why are these CV stems not realised as [M]? If there had been no CV stems which were realised as [M] one could have argued that the

/LH/ sequence is realised as a full contour on CV stems and as a [M] tone on CVC and CVS stems. However, since there are CV stems which are realised as [M], the question still remains why some CV stems would not be realised as [M]? The four stems were the only rising contours attested in the data. In other words, no stem from class 7 was realised with a rising contour. Maybe the /LH/ sequence in the CV stems derive from the class 9 having had a low tone prefix historically *Ǹ-. However, the synchronic function of [M] tones could be an argument for Mmen developing into a three height distinction also underlyingly. This is something that needs further investigation.

The many surface alternations of tone within the nouns are the results of tonal processes at work in Mmen. The phonetic, or diachronic, rules which have been mentioned in this study are: downstep and /H/ tone spreading. Downstep could be seen as a vertical assimilation where any /L/ tone causes other tones to be realised on a lower register than tones preceding that same /L/ tone. Non-automatic downstep was also attested in Mmen, where a non-associated /L/ tone of nouns in class 9 cause /H/ stems to be realised on a lower register than any /H/ preceding the floating /L/. Horizontal assimilation was also attested as H stems spread onto phrase-final /L/ tones.

This study has analysed several surface tone melodies as deriving from so called floating tones. The way the floating tones ground, or how they affect adjacent TBU is part of the morphophonemic, or synchronic, tone rules at work in Mmen. It has been mentioned that floating /L/ tones cause downstep. Floating /H/ tones may join the tone of following TBU to form a contour tone. However, the functions and restrictions of these rules would need further description and analysis, e.g., how floating tones ground, when /H/ spreads and when it does not etc. One of the reasons why the analysis did not give only the four tone melodies proposed for Proto-Bantu, i.e., H-H, L-L, H-L and L-H is probably because there are other tone rules or tonal processes involved between the tone of the prefix and the tone of the stem. Such an analysis would probably need to expand the research to the rest of the classes, e.g., class 6a and class 5. If for example /LH/ stems would be attested only for nouns from class 9, 6a and 1 one could link the /L/ tone to the former /L/ tone of the class prefixes of those classes. However, such questions are left for future studies to investigate further.

Furthermore, this study confirms the proposed analysis that Grassfields Bantu are underlyingly having a two level height system, where both /H/ and /L/ are phonologically active. Both tones are able to form contours, found as floating tones as well as they are subject to different tone rules or processes at work in Mmen, e.g., downstep and /H/ tone

spreading. Deriving all surface tones and their alternations from two tones underlyingly, i.e., /H/ and /L/ makes it clear that the underlying tones are closely linked to, and partly identical with the reconstruction of tone sequences for proto-Grassfields and Proto-Bantu, i.e., H-H, L-L, H-L and L-H (Kisseberth and Odden 2003). It is clear that the nominal tone system in Mmen derives from a two-height tone system underlyingly.

7.1 Suggestions for future studies

The questionnaire used within this study would have to be developed for future studies on the Mmen tonology. Any further study on nominal tone should include the associative noun phrase i.e. N1 of N2 such a phrase might reveal more on how the floating tones associate to adjacent TBUs.

The questionnaire used in this study was partly checked with another consultant and the tone patterns were identical for the two consultants. However there were a few cases were the pronunciation differed. The phrase è *shɔn-a* 'with basket' was realised with a mid pitch, i.e., [L M-**M**] when pronounced by one consultant (K.G) while the other pronounced it [L M L] (M.C). There might have been several factors that influenced the first consultant to pronounce the phrase with a different pattern in that particular frame. The fact that he has been living out of the language area for several years might influence his pronunciation. The two consultants (K.G) and (M.C) agreed in their pronunciation in the rest of the questionnaire which was elicitated with both of them. However, any further study on Mmen tonology should involve at least two main consultants in order to be able to check the data and any possible variation within the language.

Some tone patterns were attested with only a handful number of nouns. All data is needed when describing a language but it is not always easy to make generalisations based on just a few examples. This study is an initial description of the nominal tone in Mmen and every example is worth including. However, if one wants to investigate nominal tone in Mmen further it would be important to look at neighbouring languages as well. Maybe some of the more complex tone alternations with just few examples turn out to be borrowings or complex stems and not simple stems.

Mmen, as well as other related Ring-Languages, is in need of more description and analysis, not only relating to tone but also concerning other areas of the structure of these languages. This study has added to the knowledge about Central Ring languages and hopefully it will inspire others to carry out further research on the languages found in this province of North-West Cameroon.

8 Conclusion

Nominal tone in Mmen has many surface realisations. Looking at classes 7 and 9 there are a total number of eight different tone melodies on the surface, when nouns are uttered in isolation. The most common surface tones were: [H], [L] and [M], for both class 7 and 9. The contour tones, i.e., [HL], [HM], and [LH], were also attested within the data but was not as common as level tones. When studying the noun stems in different contexts and frames the stems realised ten different tone patterns underlyingly. The ten tone melodies were analysed as deriving from sequences of /H/ and /L/ tones. The underlying tones are realised differently on the surface due to the tonal processes at work in Mmen. Mmen proved to have both automatic and non-automatic downstep, caused by any /L/ tone. The data used for this study also realised spreading of /H/ tones unto phrase-final /L/ tones. This study has analysed several surface tone melodies as deriving from so called floating tones. The noun stems have been analysed as underlyingly: /H/, /L/, /H^{L}/, and /L^{H}/, the contour tones have been analysed as deriving from a sequence of three level tones underlyingly, i.e., /HL^{L}/, /HLH/ and /LH^{L}/. The surface [M] tone is proposed deriving from a /LH/ sequence underlyingly. This study of nominal tone in Mmen, thus confirms previous analyses that Grassfields Bantu languages are underlyingly having a two-height level tone system, i.e., /H/ and /L/.

References:

Agha-ah, C. B. 1993. The Noun Class System of Mmen. Yaoundé: University of Yaounde.

Agha, G. B. 1987. The Phonology of Mmen. Yaoundé: University of Yaounde.

Bangha, G. F. The Mmen Noun Phrase. 2003. Yaoundé: University of Yaounde.

Björkestedt, L. 2011a. A Phonological Sketch of the Mmen Language. Yaoundé: CABTAL.

———. 2011b. Mmen Orthography Guide. Yaoundé: CABTAL.

Boersma P. and Weenink, D. 2011. Praat: doing phonetics by computer [Computer program]. Version 5.2.15, retrieved 12 February 2011 from http://www.praat.org/

Davis, L. 1997. *Tone in the Oku Noun and Verb*. Yaoundé: SIL.

Fieldworks Language Explorer (FLEX). 2013. [Computer program]. SIL International.

Goldsmith, J. A. 1976. Autosegmental Phonology.

———. 1990. Autosegmental and Metrical Phonology. Oxford: Blackwell Publishers.

Greenberg, J. H. 1948. The tonal system of Proto-Bantu. *Word* 4: 196-208.

Hyman, L. M. and Shuh R. G. 1974. Universals of tone rules: Evidence from West Africa. *Linguistic Inquiry* 5. 81-115.

Hyman, L. M. 1975. *Phonology: Theory & analysis*. New York: Holt, Rinehart & Winston.

----------. 1979a. *Aghem grammatical structure- with special reference to noun classes, tense-aspect and focus marking.*

———. 1979b. Tonology of the Babanki Noun. *Studies in African linguistics* 10. 159-178.

———. 1980a. Babanki and the Ring Group. In: Bouquiaux L., Hyman L. M. and Voorhoeve J. (eds.), *Les Classes Nominales dans le Bantou des Grassfields. L'expansion Bantoue: Actes du Colloque International du Centre National de la Recherche Scientifique, Viviers 4-16 Avril 1977*. 225-258. Paris: Société des Etudes Linguistiques et Anthropologiques de France (SELAF).

----------. 1980b. *Reflections on the Nasal classes in Bantu.* In: Hyman, L. M. (ed.), *Noun classes in the Bantu Borderland,* 179-210. Los Angeles: University of Southern California.

----------. 2007. Universals of tone rules: 30 years later. In: Riad T. and Gussenhoven C. (eds.), *Tones and tunes: Studies in word and sentence prosody*. 1-34. Berlin: Mouton de Gruyter.

----------. 2005. Initial Vowel and Prefix Tone in Kom: Related to the Bantu Augment? In: Bostoen K. and Maniacky J. (eds.), *Studies in African Comparative Linguistics with Special Focus on Bantu and Mande: Essays in Honour of Y. Bastin and C. Grégoire*. 313-341. Tervuren: Musée Royal de l'Afrique centrale (MRAC).

----------. 2010a. Do tones have features? In: *Phonology Laboratory Annual Reports*. 1-20. Berkeley: University of California.

————. 2010b. How to study a tone language, with examplification from Oku (Grassfields Bantu, Cameroon). In: *Phonology Laboratory Annual Reports.* 179-209. Berkeley: University of California.

Katamba, F. 2003. Bantu Nominal Morphology. In: Nurse D. and Philippson G. (eds.). *The Bantu Languages*. 103-120. London & New York: Routledge.

Kießling, R., Neumann B. and Schröter D. 2009. What Can I Offer My Child? - How to Impose on Others in Isu (Grassfields Bantu). In: M. Brenzinger and M. Fehn A. (eds.), *Proceedings, 6th World Congress of African Linguistics, Cologne 2009*. 419-429. Cologne: Köppe Verlag.

----------. 2011. "O owner of the compound, those things you are saying – it is the talk of vagueness!": Requesting, Complaining and Apologizing in two Languages of the Cameroonian Grassfields. In: Sommer G. and Vierke C. (eds.), *Speech Acts and Speech Events in African Languages*. 83-144. Köln: Köppe (Topics in Interdisciplinary African Studies, 23).

Kießling, R. 2010. Infix Genesis and Incipient Initial Consonant Mutations in Some Lesser Known Benue-Congo Languages. In: Bachmann A., El Mogharbel C. and Himstedt K. (eds.), *Form und Struktur in der Sprache - Festschrift für Elmar Ternes*. 187-220. Tübingen: Gunter Narr.

————. 2011a. A Sketch of Men. (ms.)

————. 2011b. Men Tonology. (ms.)

Kisseberth, C. and D. Odden 2003. Tone. In: Nurse D. and Philippson G. (eds.). *The Bantu Languages*. 225-256. London & New York: Routledge.

Lewis, M. P., Simons G. F. and Fennig C. D. (eds.). 2013. *Ethnologue: Languages of the World, Seventeenth edition.* Dallas, Texas: SIL International. Online version: http://www.ethnologue.com.

Meeussen, A. E. 1967. Bantu grammatical reconstructions. *AL* 3:80-122.

Meh, N. D. 2011. *Serial Verb Constructions in Mmen*. Yaoundé: University of Yaoundé.

Mua, B. 2014. Mmen-English lexicon with English-Mmen Index. Yaoundé: CABTAL.

Möller, M. 2012. *The noun and Verb in Mmen*. Yaoundé: CABTAL.

Snider, K. 1990. Tonal upstep in Krachi: evidence for a register tier. In: Snider K. *Studies in Guang phonology*. Dissertation: Leiden University. The chapter was originally published 1990 in Language 66 (3): 453-474.

————. 1999. *The Geometry and Features of Tone*. Dallas: SIL.

————. 2014. *Tone analysis for Field Linguistics*. (ms.), SIL International.

Snider, K. and van der Hulst Harry. 1993. (co-editor with Harry van der Hulst) The Representation of Tonal Register. Berlin: Mouton de Gruyter.

Troyer, D., Huey P., and Mbongue J. 1995. A Rapid-Appraisal Survey of Mmen (ALCAM 821) and Aghem Dialects (ALCAM 810) Menchum Division, Norhwest Province.

Watters, J. R. 2003. Grassfields Bantu. In: Nurse D. and Philippson G. (eds.). *The Bantu Languages*. 225-256. London & New York: Routledge.

Yip, M. 2002. *Tone*. Cambridge: Cambridge University Press.

Zhang, J. 2001. *The effects of duration and sonority on contour tone distribution—Typological survey and formal analysis.* Ph. D. diss., UCLA.