

Downstep and Contour Formation in Medumba, a Grassfields Bantu Language*

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1 Introduction

- Medumba is a Grassfields Bantu (GB) language spoken in the West Province of Cameroon.
- Medumba is also referred to as Bangangte or Bamileke-Bangangte in the existing literature.
- Medumba is in the Mbam-Nkam family of languages, subclassified as either Bamileke (Watters 2003) or Nun (Hyman & Tadadjeu 1976: 66). These groups are shown in Figure 1.

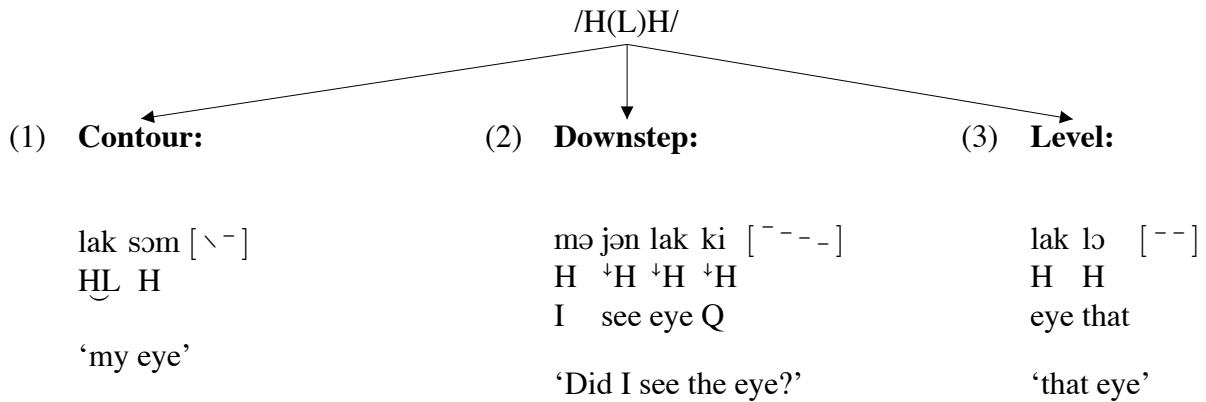
I. Northern Bantoid	G. Wide Grassfields	H. Tikar
II. Southern Bantoid	1. Menchum	I. Ndemli
(Wide Bantu)	2. Western Momo	J. Mbam
A. Tivoid	3. Narrow Grassfields	1. West
B. Jarawan	a. Momo	2. Yambasa
C. Mbe	b. Ring	3. Sanaga
D. Ekoid	1) West	K. (Narrow) Bantu
E. Mamfe (Nyang)	2) Center	
F. Beboïd	3) East	
1. West	4) North	
2. East	c. Mbam-Nkam	
	1) North	
	2) Nun	
	3) Ngemba	
	4) Bamileke	

Figure 1: Southern Bantoid languages, from Watters & Leroy (1989)

- While the Grassfields Bantu (GB) languages are related to Narrow Bantu, one key difference in many GB languages is the segmental loss of syllables on nouns. As a result, the tone systems of many GB languages are very complex. This makes the area very typologically interesting.

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- In Medumba, the sequence of /H(L)H/ can surface as either a contour, downstep, or simply two level tones. This is shown below.



- First we will see how and why sequences containing floating tones come about, and how they are realized. Eventually, we will see that prosodic structure plays an important role to account for the differences in these realizations.
- A note on the glosses: The interlinear gloss line shows the surface tone as H and Ls, and the bracketed tone marks indicate surface pitch levels.

2 The basis for floating tones

- Jan Voorhoeve studied the tonology of Medumba heavily in the 1960s and ’70s.
- Voorhoeve (1971) tested “320 one-syllable nouns in more than forty different frames” (Voorhoeve 1971: 46).
- In short, what he found was that nouns that have the same tone in isolation behave differently in context, and nouns that have different tones in isolation are neutralized in many contexts.
- The words for ‘eye’ and ‘bird’ are both pronounced as H in isolation, but in yes-no questions, only one causes downstep on the H question marker [ki]:



‘Did I see the eye/bird?’

- Further, the word for ‘cloud’ is pronounced as a level L in isolation, and the word for ‘belly’ is pronounced as a falling L. However, in a non-final context, they are neutralized and both pronounced as level L:

(3) mə jən ndut ki [^ - - -]
 H ^H L H
 I see cloud Q

(4) mə jən bam ki [^ - - -]
 H ^H L H
 I see belly Q

‘Did I see the cloud/belly?’

- Medumba nouns are primarily monosyllabic. Voorhoeve analysed Medumba nouns as having lost the segmental noun prefix in addition to the second syllable of the Proto-Bantu root. The tones associated with these syllables remain as floating tones. (Voorhoeve 1971; Watters 2003)
- The word for “tooth” in a related language and Medumba (Hyman & Tadadjeu 1976):

(5) a. Mundum (Ngemba):
 n̩is̩̀d̩̀ŋ́

b. Medumba:
 `sò´

- Voorhoeve (1971) analyzes all Medumba nouns as having this three-tone structure, e.g.:

(6) bam (L)L(L) ‘belly’ [^]
 ndut (L)L(H) ‘cloud’ [-]
 lak (L)H(L) ‘eye’ [-]
 saŋ (L)H(H) ‘bird’ [-]

- [bàm] ‘belly’ is pronounced as a falling low and [ndùt´] ‘cloud’ is pronounced as a level low (or raised low). These two nouns are neutralized in non-final positions. [sáŋ´] ‘bird’ and [lák`] ‘eye’ sound the same in isolation and are only differentiated by the following tones in context. Voorhoeve attributed these differences to the underlying tonal structure of the nouns.
- While the effects of these floating tones are minimal in isolation, in context they are necessary to describe certain effects.

3 Realizations

3.1 Downstep: /H(L)H/ becomes H⁺H in the associative construction

- Using the frame *The _____ of the child*, Voorhoeve observed a number of different tonal patterns whose representations were not entirely clear. Once again, nouns that behave similarly in contexts like (1–4) behave differently in the associative construction:

(7) lak mɛn [^ -]
 H⁺H⁺H
 ‘eye of child’

(8) mɛn mɛn [^ -]
 H⁺L H
 ‘child of child’

- Although complex and opaque, this derivation was to account for the eight expected patterns with varying head nouns¹ in the associative construction, shown below:

(15') # _____ mən # 'The _____ of the child'

<i>mfən</i>	L(L)-(L)-(L)H(L)	[- . . . - .] → [- -]
<i>bam</i>	L(L)-(H)-(L)H(L)	[- . . . † .] → [ˈ -]
<i>naʔ</i>	L(H)-(L)-(L)H(L)	[- . . . - .] → [- -]
<i>kə</i>	L(H)-(H)-(L)H(L)	[- . . . † .] → [ˈ -]
<i>mən</i>	H(L)-(L)-(L)H(L)	[- . . . - .] → [- -] or [ˈ -]
<i>ju</i>	H(L)-(H)-(L)H(L)	[- . † . † .] → [- -] or [ˈ -]
<i>njwi</i>	H(H)-(L)-(L)H(L)	[- . . . - .] → [- -] or [ˈ -]
<i>ti</i>	H(H)-(H)-(L)H(L)	[- . . . † .] → [- -]

Figure 2: The associative construction, from Voorhoeve (1971: 50)

- These representations are quite complex and the reasoning for all of them cannot be fully explained here. From this example you should take that each noun consists of three tones, and then there is an additional floating tone for the associative marker.
- With these representations, Voorhoeve (1971) devised the following rules to derive the surface forms found in the associative construction (paraphrased):
 - (9) a. H becomes downstepped after HL.
 - b. Any floating tones adjacent to linked tones are deleted.
 - c. Remaining floating tones attach to the left to form a contour (optional if this results in a fall).
- To see how this derivation works, I will use the example *eye of child*. Below are the lexical representations of these two nouns:

(10) lak
 (L) H (L)
 'eye'

(11) mən
 (L) H (L)
 'child'

¹In order from top to bottom, these nouns are: *chief, sack, cow, spear, child, thing, women, tree* and using either a H or L associative marker. Also, in this example, dots represent floating tones and dashes represent associated tones. Ticks upwards or downwards indicate rises and falls, respectively. Downstep is indicated by downward arrows.

- In isolation, both nouns have the tonal representation (L)H(L). The associative marker for [lak] is (H). For the associative construction, we get the following derivation:

(12) a. lak (AM) mɛn
 (L) H (L) (H) (L) H (L)
Underlying Representation

b. lak (AM) mɛn
 (L) H (L) (↑H) (L) ↑H (L)
Apply Downstep

c. lak (AM) mɛn
 H (↑H) ↑H
Delete floating tones adjacent to linked tones

d. lak mɛn
 H↑H ↑H
Attach floating tone leftwards to form contour

- The phrase we derived above has the same tonal structure as *ju mɛn* from (15') above. Because the last rule is optional, this phrase can also be pronounced as H[↑]H, which is the famous “double downstep” example cited a number of times for its typological and theoretical interest. (Hyman & Tadadjeu 1976; Hyman 2003; Chumbow & Nguendjio 1991)

3.2 Contour: /H(L)H/ becomes HL H in possessive pronoun constructions

- However, these rules break down and begin to make incorrect predictions when applied to other parts of the grammar.
- The phrase ‘my eye’ consists of the noun [lak] and the H possessive pronoun [sɔm], shown below. The floating (L) tone is part of the structure for ‘eye’.

(13) lak sɔm
 H (L) H
 ‘my eye’

- If we now apply the same rules for the associative construction, we get the following derivation:

(14) a. lak sɔm
 H (L) H

b. * lak sɔm
 H (L) ↑H
Apply Downstep

c. * lak sɔm [- -]
 H ↑H
Delete floating tones adjacent to linked tones

- As indicated, however, the result of this derivation is incorrect. Instead, we should have gotten the following:

(15) lak sɔm [\ ^]
 HL H
 ‘my eye’

Instead of the L tone causing downstep on the following noun, it forms a contour with the preceding noun.

4 Why the difference?

- We have seen so far that the sequence /H(L)H/ can either cause downstep, as it does in the associative construction, or be realized as a contour, as it is in the possessive pronoun construction above. **What accounts for this difference?**
- **Hypothesis 1:** One potential explanation is that, according to Hyman & Tadadjeu (1976), floating tones should be classified into two types: lexical floating tones and grammatical floating tones. **Lexical floating tones** are found in the lexical representation of segmental words, like those in [lak] above. **Grammatical floating tones** are entire morphemes consisting of only a floating tone, such as the associative marker.

(16) a. Lexical floating tones in the UR for ‘eye’: ∅ lak ∅ L H L	b. A grammatical floating tone, the associative marker: ∅ H
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- The problem with this hypothesis is that there are situations where the phonological structure should be identical to the possessive pronoun construction, yet we see downstep instead of a contour. Yes-no question formation is such a situation.

(17) mə jən lak ki [^ - - -] H ^H ^H ^H I see eye Q	(18) mə jən saŋ ki [^ - - -] H ^H ^H H I see bird Q
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‘Did I see the eye/bird?’

- Recall that the representation of [lák`] ‘eye’ and [sáj´] ‘bird’ differ in their tonal structure, specifically with [lák`] ‘eye’ having a floating L suffix tone. This is why the question marker [kí] is downstepped in (17) but not in (18).
- The tonal sequence for [lak ki] is /H(L)H/, the same as it is in [lak sɔm]. **The same lexical floating tone can either cause downstep in one construction (yes-no questions) or a contour in others (possessive pronouns).** This tells us that the lexical/grammatical floating tone distinction is not the deciding factor in whether the tone forms a contour or causes downstep.

- It is also not likely that the syllable structure is affecting the behavior of the floating tone, as in each case the noun is CVC and the following segments are CV(C).

5 Hypothesis 2: Prosodic Structure affects tone

- We have seen that a /H(L)H/ sequence is treated differently in possessive pronoun constructions. The contour in this construction contrasts with the downstep we see elsewhere, such as in the associative construction and yes-no questions.
- It is therefore likely that pronouns are being treated differently by the phonology than other overt nouns. **If we analyze the pronouns as clitics, this would give possessive pronoun constructions a different prosodic structure than the associative construction, and we can begin to account for the tonal differences in these structures.**
- Additionally, if possessive pronouns are indeed clitics, **we would expect other sandhi processes to be sensitive to this same structure.**
- Some possible processes, first described in Voorhoeve (1965), are a lateralization and a spirantization rule. I have formalized the rules below:

- (19) a. **Lateralization:** /d/ → [l] / ___ V
b. **Spirantization:** /g/ → [ɣ] / ___ V
c. **Final Devoicing:** /b, d, g/ → [p, t, k] / ___ C, pause

- **Hypothesis:** If the tone rules affecting /H(L)H/ sequences are sensitive to certain prosodic boundaries, then we should see other rules, such as the lateralization and spirantization rules mentioned above, sensitive to these same boundaries.
- We will test for these rules in several environments: between possessee and possessor (in both the associative construction and possessive pronoun constructions), between verb and object, and between a noun and various grammatical elements.

5.1 Consonant alternations and evidence for clitics

- For these sentences, I will use the frame *The dog ate x*. Below is the entry for one of the verbs meaning *to eat*, taken from the lexicon in Voorhoeve (1976).

(20) /-féd-/ manger (des choses solides) (Voorhoeve 1976: 116)

- This verb serves our purposes nicely, as it ends in /d/ which should create the proper environment for the lateralization rule.
- We will first test this verb with singular object pronouns, all of which are a vowel or begin with a vowel:

(21) mβɸ fɛ[l] ɔm [- - -]
 H †H H
 dog eat me
 ‘The dog ate me.’

(23) mβɸ fɛ[l] i [- - -]
 H †H H
 dog eat him
 ‘The dog ate him.’

(22) mβɸ fɛ[l] u [- - -]
 H †H H
 dog eat you
 ‘The dog ate you.’

- As expected, we see the lateralization rule take place, as the verb is now pronounced [fɛl] instead of with a stop.
- We see the same lateralization effect in addition to the spirantization effect when we use a noun plus a possessive pronoun, shown below:

(24) ndu[l] ɔm
 L H
 cloud my
 ‘my cloud’

(26) mvɛ[l] ɔm
 H L
 friend my
 ‘my friend’

(25) mβɔ[ɣ] ɔm
 H H
 fire my
 ‘my fire’

(27) ŋga[b] ɔm
 H L
 chicken my
 ‘my chicken’

- The possessive pronoun for these nouns is either [ɔm] or [ɔ̃m]. This is different from the pronoun for [lák`] ‘eye’ which is [sɔm] due to the remnants of a noun class system.
- So far, we have seen that L&S can occur between verb and object pronoun, and between noun and possessive pronoun.
- Certain *wh*-questions in Medumba are formed with a cleft structure on the left, and a phrase-final marker [ɔ] on the right. We also see L&S effects between the noun and this marker:

(28) a wui za jən ndu[l] ɔ
 L H L H L H
 it-is who that saw cloud Q
 ‘Who saw the cloud?’

(30) a wui za jən mvɛ[l] ɔ
 L H L H H L
 it-is who that saw friend Q
 ‘Who saw the friend?’

(29) a wui za jən mβɔ[ɣ] ɔ
 L H L H H H
 it-is who that saw fire Q
 ‘Who saw the fire?’

(31) a wui za jən ŋga[b] ɔ
 L H L H H L
 it-is who that saw chicken Q
 ‘Who saw the chicken?’

- We have seen so far that L&S occur between verb and object pronoun, noun and possessive pronoun, and noun and the *wh*-question marker [ɔ].

5.2 Lack of application between overt nouns

- So far, we have only tested for L&S between nouns and either pronouns or grammatical elements. Now, we will now test for the alternations using overt nouns in the object position and in possessive constructions (the associative construction).
- In Medumba, almost no nouns or verbs begin with a vowel. In Voorhoeve's (1976) lexicon, the only entries he has that begin with vowels are pronouns or other grammatical items.
- To get around this, I will use the proper nouns *Ariane* and *America*. Although they are not native Medumba words, the speaker is very comfortable saying them and in fact says them both often (as her name is Ariane and she lives in the US).

(32) mβɸ fɛ[t] a.ri.an
 H ʰH L.L.HL
 dog eat Ariane
 'The dog ate Ariane'

(33) mβɸ fɛ[t] a.mɛ.ri.gə
 H ʰH L.H.L.L
 dog eat America
 'The dog ate America.'

- According to Voorhoeve's rules, we would expect to see L&S in this environment. **Not only do we not see this alternation, but we also see the allophone [t], which Voorhoeve states occurs only before another consonant or pause.**
- Next we will use regular H nouns in our frame sentence.

(34) mβɸ fɛ[t] saŋə
 H ʰH ʰH.H
 dog eat bird
 'The dog ate the bird.'

(35) mβɸ fɛ[t] mɛn
 H ʰH ʰH
 dog eat child
 'The dog ate the child.'

(36) mβɸ fɛ[t] mβɸ
 H ʰH ʰH
 dog eat dog
 'The dog ate the dog.'

- In each sentence, the sequence of verb and object noun creates the sequence of /H(L)H/, and in each case, the second H is downstepped.
- Additionally, as expected, we see the verb surface with the allophone [t].
- Now, let's look at the associative construction:

(37) ndu[t] a.ri.an
 L L.L.HL
 cloud Ariane
 'cloud of Ariane'

(38) ndu[t] a.mɛ.ri.gə
 L L.H.L.L
 cloud America
 'cloud of America'

(39) mβɔ[k] a.ri.an
 H L.L.HL
 fire Ariane
 'fire of Ariane'

(40) mβɔ[k] a.mɛ.ri.gə
 H L.H.L.L
 fire America
 'fire of America'

- | | |
|--|---|
| (41) mvɛ[t] a.ri.an
H L.L.HL
oil Ariane
‘oil of Ariane’ | (42) mvɛ[t] a.mɛ.ri.gə
H L.H.L.L
cloud Ariane
‘oil of America’ |
| (43) la[k] a.ri.an
H L.L.HL
eye Ariane
‘eye of Ariane’ | (44) la[k] a.mɛ.ri.gə
H L.H.L.L
eye America
‘eye of America’ |

- Once again, L&S fail to apply.
- With H nouns in the associative construction, we see downstep as well:

- | | |
|---|--|
| (45) lak mɛn
H ⁺ H ⁺ H
‘eye of child’ | (46) saŋ mɛn
H ⁺ H ⁺
‘bird of child’ |
|---|--|

6 Summary of Distributions

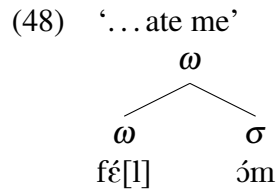
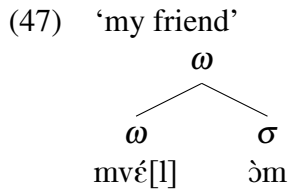
- L&S do not occur in the associative construction or between verb and an overt object, even when there is the proper segmental environment. Furthermore, in these situations, /H(L)H/ results in downstep.
- In environments where L&S do occur, such as between verb and object pronoun, and noun and possessive pronoun, /H(L)H/ results in a contour [HL H].
- Both of these points are show in the table below:

Environment	Example	/H(L)H/:	L&S?
Possessive Pronoun	lâk sóm	Contour	Yes
Object Pronoun	... fɛ́lóm	n/a	Yes
<i>wh</i> -marker	... mvɛ́lò	n/a	Yes
yes-no/rel. clause	... lák ⁺ kí	Downstep	n/a
Associative Construction	sáj ⁺ mɛ́n	Downstep	No
Overt Object	... fɛ́t ⁺ mɛ́n	Downstep	No

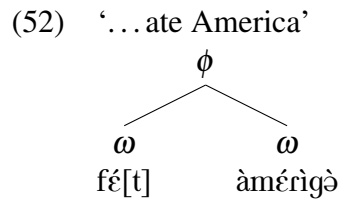
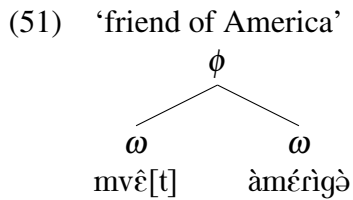
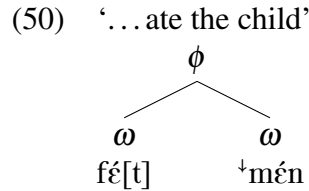
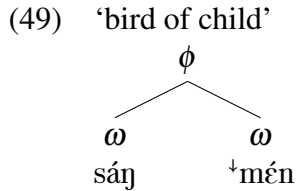
Table 1: Summary of results

- All of the situations where we see L&S can be described as being within a smaller prosodic unit than those where we see downstep. The former includes pronouns and phonologically weak grammatical markers.
- Using a basic model of the prosodic hierarchy that allows for recursive prosodic word formation², we can analyze the pronouns as clitics, forming a prosodic word with the host:

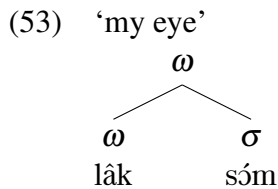
²The analysis is not dependent on recursivity within the prosodic word, as a model using the Clitic/Composite



- Moreover, the environments that allow downstep and block the consonant alternation would then be between prosodic words, as shown below:



- An input of /H(L)H/ within a prosodic word would only be allowed to form a contour or be realized as two level tones:



- This demonstrates that the associative construction consists of two prosodic words. This is not unheard of for this region: Hyman's (1985) analysis of Bamileke-Dschang (Yemba) involves analyzing the associative construction with boundaries above the word level in conjunction with lexical and postlexical rules. However, the difference between Yemba and Medumba, in this case, is that the distinction was needed in Yemba to account for patterns within the associative construction, whereas in Medumba the evidence for extra prosodic structure only comes from elsewhere in the language.
- Most importantly, **the occurrence of downstep can now be used as evidence for a larger prosodic boundary, and lack of downstep where it would be expected based on the underlying tones is evidence for smaller boundaries.** This can be applied to the verb system, where Voorhoeve often used ad hoc additions of floating tones to account for the many tonal phenomena in the verb system. The analysis may become simpler when the prosodic structure is taken into consideration.

group (Nespor & Vogel 1986) would work just as well.

7 Conclusions

- Jan Voorhoeve first analyzed Medumba as rich with floating tones, observing many instances of downstep and contour formation.
- The associative construction is even more complex than Voorhoeve described due to its prosodic structure, but this structure is only evident when looking at the distribution of downstep and L&S across the language.
- In this new analysis, it is shown that downstep cannot occur within a prosodic word. Instead, a /H(L)H/ sequence will form a contour or be realized as two level tones.
- Using L&S and downstep as the keys to identifying prosodic boundaries, other aspects of the grammar can be more easily analyzed without having to resort to a number of ad hoc rules and exceptions.
- Thank you!

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