

# UC Berkeley

## UC Berkeley PhonLab Annual Report

### Title

The Fall and Rise of Vowel Length in Bantu

### Permalink

<https://escholarship.org/uc/item/796415rp>

### Journal

UC Berkeley PhonLab Annual Report, 15(1)

### Author

Hyman, Larry M.

### Publication Date

2019

### DOI

10.5070/P7151050344

### Copyright Information

Copyright 2019 by the author(s). All rights reserved unless otherwise indicated. Contact the author(s) for any necessary permissions. Learn more at <https://escholarship.org/terms>

Peer reviewed

## **The Fall and Rise of Vowel Length in Bantu**

Larry M. Hyman  
*University of California, Berkeley*

### **ABSTRACT**

Although Proto-Bantu had a vowel length contrast on roots which survives in many daughter languages today, many other Bantu languages have modified the inherited system. In this paper I distinguish between four types of Bantu languages: (1) Those which maintain the free occurrence of the vowel length contrast inherited from the proto language; (2) Those which maintain the contrast, but have added restrictions which shorten long vowels in pre-(ante-)penultimate word position and/or on head nouns and verbs that are not final in their XP; (3) Those which have lost the contrast with or without creating new long vowels (e.g. from the loss of an intervocalic consonant flanked by identical vowels); (4) Those which have lost the contrast but have added phrase-level penultimate lengthening. I propose that the positional restrictions fed into the ultimate loss of the contrast in types (3) and (4), with a concomitant shift from root prominence (at the word level) to penultimate prominence (at the intonational and phrase level). In the course of covering the above typology and historical developments in Bantu, will show that there are some rather interesting Bantu vowel length systems, which I compare to tone, that may or may not be duplicated elsewhere in the world.

### **1. Introduction**

The goal of this paper is to trace the history of vowel length in Bantu. I will discuss and exemplify the stages and processes by which the long vowels present in Proto-Bantu (PB) have been shortened and ultimately lost in many Bantu languages, most of which innovate new vowel lengthening, hence the title “fall and rise of vowel length in Bantu”. Since the status of vowel length can be rather different in one vs. another Bantu language, the survey I will present will also document some of the potential functions of vowel length not only in Bantu, but in language in general. My starting point will be to see to what extent vowel length can fulfill all of the functions that have been documented for tone (§2), after which I will turn to consider length in PB (§3) and successively in different Bantu languages (§4, §5). I conclude with a return to the question of what vowel length can do in language, based on the demonstration from Bantu (§6).<sup>1</sup>

### **2. The functions of tone**

As stated in §1, a general concern is to determine how vowel length stacks up with respect to tone, which has been claimed to be able to be the most versatile of phonological properties:

“... tone can do everything segments and non-tonal prosodies can do, but segments and non-tonal prosodies cannot do everything tone can do.” (Hyman 2011:214, 2018:699)

---

<sup>1</sup> Earlier versions of this paper were presented at the University of California, Berkeley (Feb. 11, 2019), the Philological Society Meeting at SOAS, University of London (Feb. 15, 2019), the 14th Annual Joshua and Verona Whatmough Lecture, Harvard (April 29, 2019), and the Laboratoire de Phonétique et Phonologie, Paris 3 (May 24, 2019). I am grateful to those audiences for their helpful questions and comments.

A quick example of something that only tone can do is seen in (1) from Giriyama [Bantu E72a] (Volk 2011:17).<sup>2</sup>

- (1) a. ni-na-mal-a ku-gul-a ŋguuwo ‘I want to buy clothes’  
 b. a-na-mal-a ku-gul-a ŋguúwo ‘he/she wants to buy clothes’  
     ≠  
     H

In (1a) all of the tone-bearing units (TBUs) are underlying toneless, pronounced with default L(ow) tone. In (1b) there is a H(igh) tone on the penultimate mora, marked with an acute accent. As can also be observed, the only grammatical difference in (1b) is the subject prefix, which introduces a H tone in (1b). As seen, the underlying H of /á-/ ‘he/she (class 1)’ shifts two words to the right, landing on the penultimate mora of the phonological phrase.<sup>3</sup> No other phonological property has the ability to shift long-distance in this fashion.

We also know that tone can have different functions: lexical, morphological, syntactic, pragmatic. The examples from Luganda [JE15] in (2) show a lexical tone contrast on verb roots which can be either /H/, as in (2a) or toneless, as in (2b).

- (2) a. /-bál-/ ‘bear fruit’                      b. /-bal-/ ‘count’  
       /-sínɡ-/ ‘surpass’                        /-sing-/ ‘pledge, bet’  
       /-túum-/ ‘heap up’                       /-tuum-/ ‘heap up’

The morphological function of tone is seen in examples from Noni, a Bantoid language of Cameroon, where the plural of the following L tone singular class 9 nouns is expressed by H tone (Hyman 1981):

- (3) singular :        jè        còn        gvùw        biè        nsààn        mbàsè  
       plural :        jé        cón        gvúw        bíé        nsáán        mbásé  
                   ‘road(s)’ ‘hut(s)’ ‘chest(s)’ ‘fish’ ‘friend(s)’ ‘vegetable(s)’

An example of the syntactic function of tone can be seen in Kilega [D25] (Meeussen 1971:20), where (in certain tenses) a H tone marks a verb followed by direct object:

- (4) a. be-ko-bolot-a tɔŋgɔ ‘they are pulling also’  
       b. be-ko-bolót-á ‘mózígi ‘they are pulling the rope’  
           ∨  
           H

As seen the verb is entirely toneless when followed by an adverb in (4a), but acquires a H tone when followed by an object. Finally, the pragmatic function of tone can be seen in Lusoga [Bantu

<sup>2</sup> Bantu languages will cited with their Guthrie (1967-71) referential letter and number as further developed by Maho (2009).

<sup>3</sup> Volk (2011) also considers the possibility that the H shifts to the final mora, but is subsequently pulled back to the penult, a position of prominence. As we will see in §5, many Bantu languages automatically lengthen a phrase-penultimate vowel. Throughout this study length is indicated by doubling the vowel.



recognized that other cases of long vowels “do not permit any decomposition”, e.g. \**dóot*- ‘dream’, \**pèep*- ‘blow (wind)’, including nouns, e.g. \**béédè* ‘breast’, \**dèèdó* ‘today’.

What’s clear is that whole regions of Bantu languages contrast long and short vowels, often with minimal pairs, as in Lulamogi [Bantu JE10] (Hyman 2017:66):

- |        |             |                   |    |              |                            |
|--------|-------------|-------------------|----|--------------|----------------------------|
| (8) a. | ó-ku-siβ-á  | ‘to tie’          | b. | ó-ku-siiβ-á  | ‘to fast’                  |
|        | ó-ku-sen-á  | ‘to draw (water)’ |    | ó-ku-seen-á  | ‘to become thin’           |
|        | ó-ku-tum-á  | ‘to send’         |    | ó-ku-tuum-á  | ‘to jump’                  |
|        | ó-ku-hol-á  | ‘to lend (money)’ |    | ó-ku-hool-á  | ‘to differentiate between’ |
|        | ó-ku-many-á | ‘to know’         |    | ó-ku-maany-á | ‘to pluck’                 |

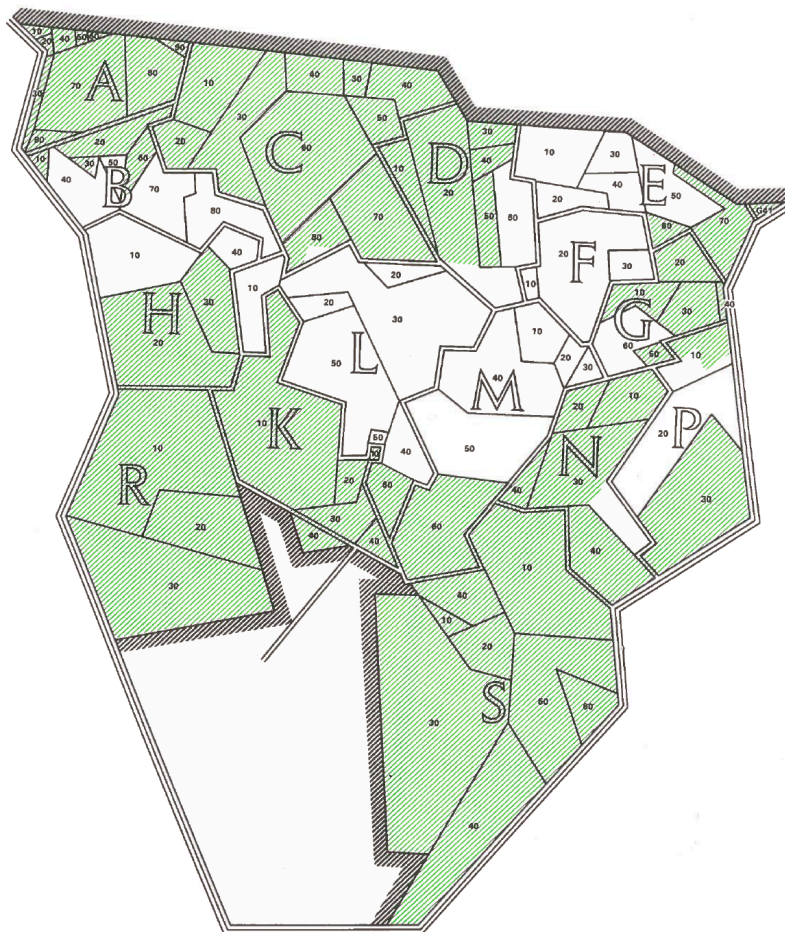
In addition, while not present in PB, many Bantu languages like Lulamogi also support length contrasts in post-root position, as in (9a):<sup>4</sup>

- |        |                |               |     |                 |                   |
|--------|----------------|---------------|-----|-----------------|-------------------|
| (9) a. | ó-ku-lagir-á   | ‘to command’  | vs. | ó-ku-tamíír-á   | ‘to become drunk’ |
|        | ó-ku-lekér-á   | ‘to cease’    |     | ó-ku-tegéér-á   | ‘to know’         |
|        | ó-ku-sitúk-á   | ‘to stand’    |     | ó-ku-sihúúk-á   | ‘to fade’         |
|        | ó-ku-tolók-á   | ‘to run away’ |     | ó-ku-tolóól-á   | ‘to go around’    |
|        | ó-ku-sigál-á   | ‘to stay’     |     | ó-ku-liráán-á   | ‘to become near’  |
| b.     | ó-ku-leekáán-á | ‘to shout’    |     | ó-ku-suuβíízy-á | ‘to fade’         |
|        | ó-ku-siimúúl-á | ‘to wipe’     |     | ó-ku-kaaβúúk-á  | ‘to go around’    |

This produces the possibility of more than one long vowel in the verb stem, as in (9b). On the other hand, as seen in Map 1 from Guthrie (1967:66), many Bantu languages have lost the inherited vowel length contrast.

---

<sup>4</sup> Although rarely explicitly stated, I believe the general view is that vowel length did not contrast in pre- or post-root position in PB. Thus, Guthrie (1967:71) speaks only of “the disappearance of the distinction \*VV, \*V > V in first position” (vol. 2, p.56, §51.31). Non-etymological vowel length contrasts generally result from the loss of an intervocalic consonant. Thanks to Thilo Schadeberg for discussion of this issue.



Map 1. Languages which have lost the PB vowel length contrast (in green)

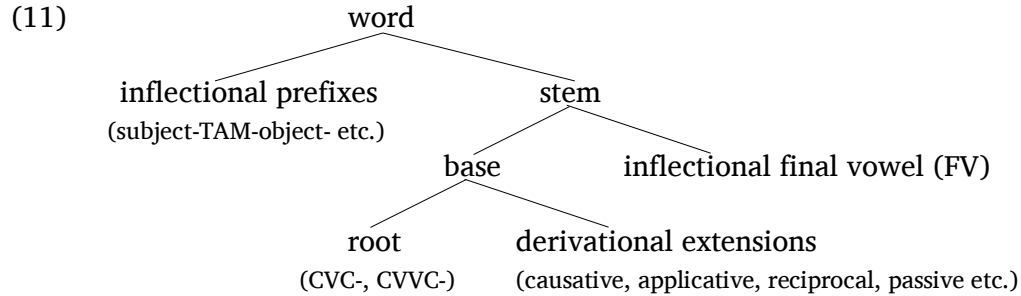
The question is how? What I will now show is that they didn't just merge long and short vowels across the board, rather there were intervening steps. In the following discussion, I will distinguish four "types" of Bantu vowel length systems:

- (10) Type 1: the \*V/\*VV contrast survives and is extended without restrictions on where long vowels can occur<sup>5</sup>
- Type 2: the \*V/\*VV contrast survives with restrictions on where long vowels can occur
- Type 3: the \*V/\*VV contrast is lost (with or without creation of new long vowels)
- Type 4: the \*V/\*VV contrast is lost with predictable penultimate lengthening being introduced

To consider these types, we recognize the following traditional structure of the Bantu verb (Meeussen 1967).

---

<sup>5</sup> I know of no Bantu language that restricts the vowel length contrast to the root syllable and allows the length to surface without restriction. Cf. the discussion of type 2 systems in §4.



Type 1 languages are those which have preserved the \*V/\*VV contrast on roots and have typically extended the contrast to other positions as well. Again, Lulamogi [JE10] can serve as a typical example supporting long vowels in all positions:

- (12) a. prefixes: tw-aaká-βál-á 'we have just counted'  
 b. root: ó-ku-huum-úl-á 'to rest'  
 c. extensions: ó-ku-lir-áán-á 'to become near, be close'  
 d. final vowel: ó-ku-tiis-y-áá = ku 'to frighten a little'

The long vowel in (12a) is from the gliding of the /u/ of /tu-aka-/ with the following /a/ undergoing compensatory lengthening (CL). While common, not all Bantu languages accompany gliding with CL. The root length in (12b) is as we saw in (8b). In (12c) we see a derivational suffix of the shape *-aan-* which like comes from the loss of an intervocalic consonant, possibly a reduplicated *-an-an-* or *-agan-* (earlier *\*-a(n)g-an-*) which otherwise exists as the reciprocal extension, e.g. *ó-ku-βon-ágán-á* 'to see each other'. Lastly, in (12d) the inflexional final vowel is long as a result of the gliding of the causative *-i-* suffix accompanied by CL.<sup>6</sup> In the following sections we will consider first type 2 systems (§4) and then types 3 and 4 (§5).

#### 4. Type 2: Systems with vowel length restrictions

A number of Eastern and Western Bantu languages maintain the PB vowel length contrast on roots, but do not allow the length to be realized if the root is followed by too many syllables within the word or phrase. As seen in (13), depending on the language, vowel length may be restricted to occurring only in penultimate position, or it may be allowed if it is either penultimate or antepenultimate:

- (13) a. penultimate syllable only, e.g. Cokwe [K11] (van den Eynde 1960:17)  
 ku-huul-a 'peel off' vs. ku-hul-il-a 'to peel off for/at' (-il- 'applicative')  
 b. antepenultimate or penultimate syllables only, e.g. Lunda [L52] (personal notes from work with Boniface Kawasha)  
 ku-kwáat-a 'to hold, arrest'  
 ku-kwáat-ish-a 'to make hold, arrest' vs. ku-kwát-ish-il-a 'to make hold for/at'

<sup>6</sup> The infinitive in (12b) is shown accompanied by the class 17 enclitic =ku 'a little' since the final vowel would otherwise undergo final vowel shortening in word-final position: *ó-ku-tiis-y-á* 'to frighten'.

Such restrictions exemplify three different general tendencies in languages. The first is the tendency for there to be more contrasts and contrast-preservation in “strong” or prominent positions, e.g. root and (ante-)penultimate syllables. In Punu [B43] not only are long vowels restricted to the root, but this also is the only position where the five vowels /i, ε, u, ɔ, a/ contrast (Kwenzi Mikala 1980:8). The second tendency is the widely reported process of “compensatory shortening” studied mostly in European languages: as more syllables are added, the stressed syllable is shortened, both at the word level (*speed* vs. *speedy*, *speedily*) and in syntactic combinations (*speed kills*). Punu is also susceptible: *u-wé:l-a* ‘to marry’ vs. *u-wél-<sup>l</sup>án-a* ‘to marry each other’, *mi:la* ‘rivers’ vs. *milá mya:mi* ‘my rivers’.

The third tendency is the targeting of phrase-level shortening on the head noun or verb in specific syntactic contexts. A good case in point comes from Kimatuumbi [P13] which has contrastive vowel length but two rules that shortens long vowels depending on position. The first which Odden (1996: 157-162) terms “stem shortening”, affects long vowels in pre-antepenultimate position within the word. This first process is consistent with “compensatory shortening”:

- (14) a. penultimate VV → pre-antepenultimate V  
       káat-a       ‘cut’                   kát-anik-a   ‘be cuttable’  
       nóol-a       ‘sharpen’                   nól-eyelw-a ‘be sharpened up’
- b. antepenultimate VV → pre-antepenultimate V  
       búund-ik-a ‘store bananas’   búnd-ikiy-a ‘store bananas to complete ripeness’  
       chíl-iy-a   ‘be late’               chíl-ikiy-a   ‘be late for’

In addition, there is a second syntactically conditioned rule of phrasal shortening (Odden 1996: 218-233) which (among other things) affects nouns when followed by modifiers. The examples in (15) show such shortening occurring before a possessive pronoun, an adjective, a relative clause, and a determiner:

- (15) a. ki-kóloombe ‘cleaning shell’   ki-kólombe chaángu               ‘my cleaning shell’  
       b. mi-kaáte   ‘loaves’               mi-katé mikólu mikóló       ‘large loaves’  
       c. lu-kaámba   ‘string’               lu-kambá lwalúpowaaniiké   ‘string which broke’  
       d. m-boópo   ‘machete’               mbopó ye                       ‘the machete’

The last example shows that shortening is not by syllable position, since the long vowel in the input /m-boópo ye/ should otherwise be allowed in phrase-antepenultimate position. The process is thus syntactically determined. In the case of nouns, it is clear that the “modifier” has to be within the same noun phrase, as in (16a), where *ki-kóloombe* ‘cleaning shell’ is shortened before the modifying adjective *kikóló* ‘large’:

- (16) a. naampéi ki-kóloombe kikóló ‘I gave him a large shell’  
       I-him-gave shell large  
       b. naampéi ki-kóloombe kikóló ‘I gave the large one a shell’  
       I-him-gave shell large

In (16b), on the other hand, the same word *kikóló* occurs in its own (headless) noun phrase and *ki-kóloombe* is not shortened.



Verb stems also shorten their vowel when followed by an object (Odden 1996:225-231). Prefixal length is not affected:<sup>7</sup>

- (17) a. *n-aa-kálaang-ite* ‘I fried’  
 b. *n-aa-kálang-ite* *chóolyá* ‘I fried food’  
     I-PAST-fry-APPL.PERF food  
 c. *n-aa-n-kálaang-iile* ‘I fried for him’  
 d. *n-aa-n-kálang-ile* *lí* ‘I didn’t fry for him’  
     I-PAST-him-fry-APPL.PERF NEG

In (17a) we see that *n-aa-kálaang-ite* ‘I fried’ has both a prefixal and stem long vowel. (17b) shows that only the latter is shortened when the object *chóolyá* is added. In the corresponding applicative verb form in (17c), there are two long stem vowels, both of which shorten in (17d). The fact that phrase-antepenultimate *-iile* is affected before the negative marker *lí* again shows that the process targets a non-final verb independent of the syllable position in which the long vowel appears. Crucially, as the examples in (18) demonstrate, only the lexical head N of an NP or V of a VP can be targeted (Odden 1996:222):

- (18) a. *ki-keéle* *chaángu* ‘my red (thing)’  
         red          my  
 b. *ki-keéle* *ki-kólú* ‘large red (thing)’  
         red          shell

In these examples the adjective *ki-keéle* ‘red’ is not the head of the (zero-headed) noun phrase, hence its long vowel is not affected. This obligatory head-targeting property guarantees that there can be only one occurrence of phrasal shortening per immediate XP. Thus while *ki-kóloombe* undergoes vowel shortening in (19), neither *ki-keéle* nor *yaángu* do.

- (19) a. *ki-kóloombe* *ki-keéle* *chaángu* ‘my red shell’  
         shell          red          my  
 b. *i-kóloombe* *yaángu* *yanaachímá* ‘my many shells’  
         shells          my          many

While the verbal examples show that prefixal length is not affected by shortening in Kimatuumbi, prefixes do undergo shortening in Safwa [M25] when followed by three or more moras (Voorhoeve, n.d.):

- (20) a. *a-gaa-gúzy-a* ‘he can sell’  
 b. *a-ga-buúzy-a* ‘he can ask’  
 c. *a-ga-buzy-aág-a* ‘he may ask’

These facts suggest a succession of changes as summarize in Hypothesis 1:

---

<sup>7</sup> Odden (1996:225n) suggests that this is because the long vowel of *n-aa-* derives from *ni + a-* (1sg + past), with vowel coalescence counterfeeding the shortening rule.

- (21) *Hypothesis 1*: Positional effects and categorical VV > V started out at the stem level and only later generalized to the word and “tight” head + modifier/complement constituents.

According to this view, Kimatuumbi represents an earlier stage, which Safwa takes one step further by shortening vowels in the prefix domain. The last stage is to generalize to phrasal configurations. In support of this direction of change, Kifuliiru [JD63] can be cited, where “any long vowel is shortened if it is followed by three or more morae within the domain of the phonological word” (van Otterloo 2011:59):

- (22) a. kú-húúmb-à ‘to dig up something’  
 b. kú-húúmb-ír-à ‘to dig up sth. for someone’  
 c. kú-húmb-írír-à ‘to dig up intensively’

As seen, the long vowel of the root *-húúmb-* ‘dig up’ is maintained in penultimate (22a) and antepenultimate (22b), but not preantepenultimate position (22c). The same facts are seen in (23), where the length appears in the prefixal domain:

- (23) a. à-gáà-ly-à ‘he will eat’ (/ -gáá- / ‘FUTURE2’)  
 b. à-gáá-hík-à ‘he will arrive’  
 c. à-gá-bàlà-m-à ‘he will travel’

Van Otterloo (2011:60) is unequivocal concerning the domain in which shortening occurs: “The fact that this rule does not apply across word boundaries in phrases shows that this rule operates over the domain of the word, at the word-building (lexical) stage.”

Further evidence for the word domain comes from Ngangela [K12b], where a vowel can be long only if all of the vowels that follow it up to the penult are also long (Maniacky 2002:20):

- |         |             |                       |               |                       |
|---------|-------------|-----------------------|---------------|-----------------------|
| (24) a. | -tééta      | ‘cut’                 | -teetááŋga    | ‘share’               |
|         |             |                       | -teetaaŋgééni | ‘share! (pl.)’        |
| b.      | -vuulwííθa  | ‘recall, remind’      | -vulúka       | ‘remember’            |
|         | -taambwííθa | ‘distribute’          | -tambúla      | ‘receive’             |
|         | -ʃaambwííθa | ‘infect, contaminate’ | -ʃambúka      | ‘be contaminated’     |
| c.      | -púla       | ‘cut with a knife’    | -pulááŋga     | ‘cut into slices’     |
|         | -holóka     | ‘cool, calm (intr.)’  | -holwééθa     | ‘cool, calm (tr.)’    |
|         | -áʃa        | ‘throw, launch’       | -aʃááŋga      | ‘reach several times’ |

In (24a) we see that the long vowel of *-tééta* ‘cut’ is maintained in the related verbs to the right, since all of the vowels are long up to the penult. This contrasts with (24b) where the root syllable has a long vowel in the forms on the left, which has to be shortened in the forms on the right because the penult is short. That there is no rule of lengthening of prepenultimate vowels is seen in (24c): the root vowels in the forms on the left remain short in the verbs to the right where the penultimate vowel is long. The interpretation I would like to give to the Ngangela facts is that vowel length cannot occur in a less prominent position (pre-penultimate) without it also

occurring in a more prominent position (penultimate). Otherwise the long vowel shortens as in the forms to the right in (24b).<sup>8</sup>

The above Ngangela facts support the key idea of Hypothesis 1 that shortening begins as a stem- then word-level process. It can however potentially expand, as it optionally does to noun + possessive constituents, which have a particularly tight bond in other Bantu languages: *ngóombe yáaŋge* or *ngómbe yáaŋge* ‘my cow’ (Maniacky 2002:20). In other words, what is systematic at the word level is transitional within the noun phrase.<sup>9</sup> This brings us to the second hypothesis:

(25) *Hypothesis 2*: Positional restrictions are subject to being generalized, ultimately leading to the loss of vowel length contrasts in all positions, as in many Bantu languages.

We now turn to consider what happens in such languages.

### 5. Types 3 and 4: Systems which have lost the PB vowel length contrast

I identify as type 3 those languages which have lost the PB vowel length contrast with or without introducing new long vowels via consonant deletion and vowel assimilation. These are distinguished from type 4 systems which have also lost the PB vowel length contrast, but have introduced phrase-level penultimate lengthening. As seen on Map 2, type 4 systems cluster in Eastern and Southern Bantu (the orange dots), while the type 3 systems are found further to the west (the blue dots).<sup>10</sup> In other words most of the zones D-S Bantu languages which have lost the vowel length contrast also have phrase-level penultimate lengthening (PUL), e.g. Shona [S10], where the length on the root in (26a) is non-contrastive:

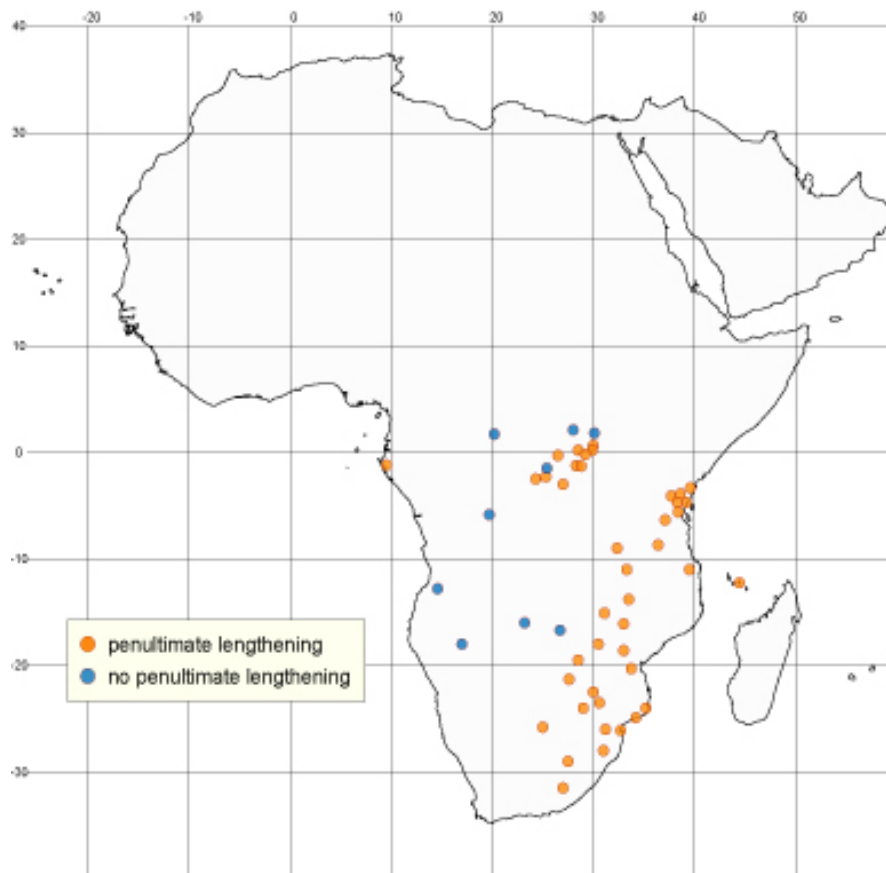
- (26) a. ku-té:ng-á            ‘to buy’  
       b. ku-téng-é:s-á        ‘to sell, cause to buy’    (causative -es-)  
       c. ku-téng-és-é:r-a    ‘to sell for/at’            (applicative -er-)  
       d. ku-téng-á za:nze    ‘to sell fruit’

---

<sup>8</sup> This idea of prominence would have to be scalar: the further away a syllable is from the penult, the less prominent it is. An alternative would be an ad hoc constraint against a CVV.CV.CVV sequence, i.e. a short vowel flanked by long vowels—in other words, a CVV.CV sequence would only be permitted if the long vowel is in the penultimate syllable. Under either interpretation a pre-penultimate long vowel must be followed by another long vowel.

<sup>9</sup> This is opposite to the view I took in Hyman (2013), where I assumed that vowel shortening begins at the phrase level and gradually narrows down.

<sup>10</sup> I would like to thank Guillaume Segerer for producing Map 2 for publication in Hyman (2013). While there is an outlier far to the west, I am still unclear as to whether (and which) Myene [B10] languages of Gabon may have penultimate lengthening. In my 2013 study I was careful to consider only languages where the lengthening was phonological, i.e. involving the insertion of a mora. In most such languages the lengthening is quite noticeable and often affects the tone patterns as well, as in Shekgalagari [S311] (see (28) below).



Map 2. Languages which have introduced penultimate lengthening (in orange)

As seen in (26b,c) when the causative *-es-* and applicative *-er-* suffixes are added, the suffix vowel in penultimate position is lengthened. The example in (26d) shows that PUL is a phrase-level process: only the last word in the phrase undergoes lengthening. However, the size of the phrasal domain and the application of PUL vary considerably across Bantu languages. This brings us to Hypothesis 3:

(27) *Hypothesis 3*: PUL started out as an intonational property of utterances and then underwent “boundary narrowing”: *Utterance* > *Intonational phrase* > *Phonological Phrase* > *Word*.

The idea is that PUL begins as an intonational property of utterances and only later “narrows” to smaller domains—exactly the opposite of vowel shortening.

The first piece of evidence is that there are Bantu languages where PUL clearly is intonational. In Shekgalagari [S3111] PUL is a property of declarative utterances (Hyman & Monaka 2011), clearly visible in citation forms such as (28a) and sentences such as (28b).

- |         |                     |                            |
|---------|---------------------|----------------------------|
| (28) a. | ri-nâ:rɪ            | ‘buffalos’                 |
|         | b. a-bal-a ri-nâ:rɪ | ‘he is counting buffalos’  |
| vs.     | c. ri-nárí          | ‘buffalos?’                |
|         | d. a-bal-a ri-nárí  | ‘is he counting buffalos?’ |

In (28a,b) the underlying form /ri-ná-rí/ ‘buffalos’ undergoes both PUL and a tonal change from H-H to HL-L. In (28c,d), however, we see that PUL does not apply to yes no-questions. There also is no penultimate lengthening in the environments in (29).

(29) *WH questions*

ri-ná-rí zhé ↓ríhí	‘which buffalos?’	ányí a-bón-á ri-ná-rí	‘who sees the buffalos?’
<i>Imperatives</i>			
bal-á	‘count!’	bal-á ↓rí-ná-rí	‘count the buffalos!’
<i>Hortatives</i>			
á ↓hí-bál-ε	‘let’s count!’	á ↓hí-bál-ε ri-ná-rí	‘let’s count the buffalos!’
<i>Vocatives</i>			
monaká	‘Monaka!’	ntó, Gabaluxóŋ	‘come here, Ghabalogong!’
<i>Exclamatives</i>			
á ↓ʃí-xólú	‘what a situation!’	á ↓ʃí -tʃúʃu ʃá mó-khyu	‘what an idiot of a person!’
<i>Monosyllabic words</i>			
ri-ná-rí zé	‘these buffalos’	a-bat-a ʃé	‘he wants this one’
<i>Ideophones (with final devoicing)</i>			
y-á-ri bíŋ	‘it appeared suddenly out of water’	a-ri bítsɿ	‘he left in a hurry’
<i>Paused lists (with final lengthening)</i>			
a-bal-a ri-nama: ... ri-nawá: ... lí ri-nâ:ri	‘he’s counting meats... beans... and buffalos’		

It is interesting to note that the declarative is pragmatically unmarked, but prosodically marked (by PUL) in Shekgalagari, while the environments in (29) are pragmatically marked, but prosodically unmarked. It is for example not necessary to raise the pitch in a yes-no question, which ends without PUL and with its underlying tones unmodified. Yes-no questions can therefore be said to lack intonation (see Hyman & Monaka 2011).

While intonational PUL is rather restricted in Shekgalagari, other Bantu languages allow it in more, ultimately all clause types, as seen in the table in (30).

(30) Shekgalagari Sesotho Ikalanga Kinande Ndebele Chichewa

	[S311]	[S33]	[S16]	[JE42]	[S44]	[N31]
Declaratives	+	+	+	+	+	+
Yes-No Q	-	-	+	-	+	+
WH Q	-	-	+	-	+	+
Imperatives	-	+	+	+	+	+
Hortatives	-	+	+	+	+	+
Vocatives	-	±	+	+	+	+
Exclamatives	-	-	+	+	+	+
Monosyllables	-	+	+	+	+	+
Ideophones	-	-	-	-	+	+
Paused lists	-	+	-	+	+	+

With thanks to Malillo Machobane and Katherine Demuth (Sesotho), Joyce Mathangwane (Ikalanga),

Ngessimo Mutaka (Kinande), Galen Sibanda (Ndebele), and Sam Mchombo and Al Mtenje (Chichewa).

While starting as a property of the intonational phrase, in some Bantu languages PUL has been narrowed to considerably smaller phonological phrases. A particularly striking case occurs in Simakonde [P23] (Manus 2018), from which non-contrastive PUL can be observed in the following citation verb infinitive and noun forms:

- (31) a. kú-lúúma ‘to bite’  
 kú-lúmúúla ‘to cut’  
 kú-lúmúláánga ‘to cut into small pieces’  
 kú-lúmúlángííla ‘to cut into small pieces for s.o.’
- b. lí-ngéela ‘mango’  
 vi-loôngo ‘pots’  
 i-pooso ‘present’  
 sí-lóólo ‘mirror’

As seen in (32), both a head noun and most modifiers undergo separate PUL are hence analyzed as two phonological phrases ( $\varphi$ ) (Manus 2003:114):

- (32) *noun + adjective* : lí-ngéela lí-kúmeêne ‘big mango’  
*noun + numeral* : vi-loôngo vi-viíli ‘two pots’  
*noun + genitive* : lí-ngéela lyá nkoôngwe ‘the woman’s mango’  
*noun + relative* : vi-loôngo vyá ngúsúmiile ‘the pots that I bought’

Although the possessive pronouns generally phrase with the head noun, as in (33a), an alternative appositional version is also available in (33b), with separate phrasing, where the pronoun has the same tone pattern it takes in an independent noun phrase (cf. *yáangu* ‘mine’):

- (33) a. i-posó yaángu ‘my present’  
 b. i-pooso yáangu ‘my present’ (= ‘present mine’)

Demonstratives, on the other hand, obligatorily phrase with the head noun, which they also require to be all H tone:

- (34) a. í-pósó aiiilá ‘that present’ (cf. i-pooso, with all L tone)  
 b. ví-lóngó aviilá ‘those pots’ (cf. vi-loôngo, with L-LHL-L tone)

As seen in the table in (35), Makonde dialects differ considerably in how they phrase noun modifiers (Rolle & Hyman 2018):

(35)

Source	Dialect	POSS	DEM	ADJ	NUM
Leach (2010)	Plateau Shimakonde	1 $\varphi$	1~2 $\varphi$	2 $\varphi$	2 $\varphi$
Devos (2004)	Makwe	1 $\varphi$	1~2 $\varphi$	2 $\varphi$	2 $\varphi$
Manus (2003, 2018)	Zanzibar Simakonde	1~2 $\varphi$	1 $\varphi$	2 $\varphi$	2 $\varphi$
Kraal (2005)	Chinnima	1 $\varphi$	1 $\varphi$	2 $\varphi$	2 $\varphi$
Liphola (2001)	Coastal Shimakonde	1 $\varphi$	1 $\varphi$	1 $\varphi$	2 $\varphi$
Odden (1990a,b)	Chimaraba	1 $\varphi$	1 $\varphi$	1 $\varphi$	1 $\varphi$
Odden (1990c)	Chimahuta	1 $\varphi$	1 $\varphi$	1 $\varphi$	1 $\varphi$

All but the last two dialects studied by Odden show a contrast between modifiers which phrase with the head noun vs. those which don't. The generalizations from the above comparison are that possessive pronouns and demonstratives tend to form a single phonological phrase with the head noun, while adjectives and numerals tend to phrase separately, with numerals being the most prosodically independent noun modifier. The example in (36) shows that an NP can potentially consist of several phonological phrases, each undergoing PUL:

- (36)            NOUN                    ADJ                    GEN                    NUM  
                   (vi-loôngo) $\varphi$  (ví-kúmeêne) $\varphi$  (vy-á naáswe) $\varphi$  (vi-víli) $\varphi$     'two big white pots'  
                   CL8-pot                    CL8-big                    CL8-GEN white                    CL8-two

However, all of the 1 $\varphi$ /2 $\varphi$  dialects exhibit cases of "prosodic smothering" (Bennett, Harizanov & Henderson 2018): A 1 $\varphi$  modifier that targets the head noun to form a phonological phrase "entraps" intervening 2 $\varphi$  modifiers (Rolle & Hyman 2018). An example again comes from Simakonde (Manus 2003, 2018), when a demonstrative is added to the ADJ-GEN-NUM sequence in (36) where modifiers were seen to phrase separately:

- (37).            NOUN                    ADJ                    GEN                    NUM                    DEM  
                   ( ví-lóngó      ví-kúméné      vy-á náswé      ví-víli      aviilá ) $\varphi$     'those two big white pots'  
                   CL8-pot                    CL8-big                    CL8-GEN white                    CL8-two      cl8.DEM'

Because of the requirement that a demonstrative phrase with the head noun, this overrides the separate phrasing property of the ADJ, GEN and NUM which intervene and PUL applies to the one  $\varphi$ . Note that the demonstrative, which tends to come last, also requires all of the preceding words in the NP to be all H tone, thereby confirming that a single phonological phrase has been formed.

Another case of prosodic smothering is found in Coastal Shimakonde (Liphola 2001), e.g. when a 1 $\varphi$  adjective follows a 2 $\varphi$  numeral:

- (38) a.        ( NOUN                    ADJ ) $\varphi$   
                   ( má-pápájá      má-ngúlúguuma )                    'round papayas'                    (1 $\varphi$ )  
       b.        ( NOUN ) $\varphi$                     ( NUM ) $\varphi$   
                   ( ma-papáaja ) ( ma-taátu )                    'three papayas'                    (2 $\varphi$ )  
       c.        ( NOUN                    NUM                    ADJ ) $\varphi$   
                   ( má-pápájá      má-tátú      má-ngúlúguuma )                    'three round papayas'                    (1 $\varphi$ )

In this dialect, adjectives phrase with the head noun, as in (38a), while numerals phrase separately, as in (38b). However, when the adjective follows the numeral, as in (38c), a single phonological phrase is formed: the 1 $\varphi$  requirement of the adjective has overridden the 2 $\varphi$  requirement of the numeral.

Finally, concerning the verb phrase, PUL is closely integrated into expressing differences in information structure, in what is known as the conjoint-disjoint distinction in Bantu (van der Wal 2017), e.g. as in the present tense in Simakonde (Manus 2017:246,249):

- (39) a. conjoint (1 $\varphi$ ) : ( á-tót-á sí-júulu ) $\varphi$  ‘she is sewing a HAT’  
CL1.SUBJ-sew-FV CL7-hat
- b. disjoint (2 $\varphi$ ) : ( a-nku-tóóta ) $\varphi$  ( sí-júulu ) $\varphi$  ‘she is sewing a hat’  
CL1.SUBJ-PRES.DJ-sew-FV CL7-hat
- c. utterance-finally : ( a-nku-tóót-a ) $\varphi$  ‘she is sewing’  
(\*a-toot-a) $\varphi$

As seen in (39a) the conjoint form of the verb is used when focus is on the postverbal element, and both the verb and object are phrased together. In (39b), which has more “even” focus, the disjoint form of the verb is used and the two constituents are phrased separately. (39c) shows that the conjoint verb must have something after it with which it phrases. It cannot occur at the end of a main clause utterance where the disjoint form of the verb must be used.

To summarize, there is considerable evidence that PUL was originally intonational occurring at the clause level but has a tendency to be narrowed to smaller phonological phrases. In this context it should be noted that there is no evidence for word-level penultimate prominence in early Bantu that could have been “widened” to phrasal prominence. Cases in Eastern Bantu where nouns and/or verbs show a bisyllabic minimality effect are clearly innovative, e.g. Kinande [JE42], where the imperative consists of the bare verb stem (*tum-à* ‘send!’) unless the stem is monosyllabic, in which case the second person singular subject prefix is required (*u-swa* ‘grind!’) (Mutaka & Hyman 1990:112; Mutaka 2019:174-5). In fact, only one language, Komo [D23], has extended PUL to the word level (Paul Thomas, pers.comm.). It would be hard to explain the limitation of Shekgalagari PUL to declarative utterances as coming from word-level penultimate stress with other factors suppressing it in non-declaratives. Finally, there is other evidence, e.g. tonal, for phrase-penultimate prominence.

In this context recall the Giryama example in (1), where the H tone shifts to the penultimate mora of the phonological phrase, which also undergoes PUL. In Haya [JE22], which doesn’t have PUL, tone changes apply at the end of an intonational phrase (IP), e.g. prepausally (Byarushengo, Hyman & Tenenbaum 1976:201-2, Hyman 1999:155). As seen in (40a), an IP-penultimate H tone becomes a HL falling tone triggered by the L% phrasal boundary tone:

- (40) a. e-m-búzi → e-m-bûzi ‘woman’      b. o-mu-tí → o-mú-ti ‘tree’  
  
(cf. e-m-búzi yange ‘my goat’)                      (cf. o-mu-tí gwange ‘my tree’)

(40b) shows that the same L% causes an utterance-final H to shift to the penult. The forms in parentheses show that these processes do not occur phrase-internally. Finally note in (41) that the L% boundary tone is clearly related to information structure:

- (41) a. base sentence: a-ba-kázi ni-ba-bal-íl-a ó-mw-ána é-m-bûzi ]<sub>IP</sub>  
H H H HL%  
 ‘the women are counting the goats for the child’
- b. nested IPs: ni-ba-zi-mu-bal-íl-a ]<sub>IP</sub> á-ba-kázi ]<sub>IP</sub> ó-mw-ána ]<sub>IP</sub> é-m-bûzi ]<sub>IP</sub>  
HL% HL% HL% HL%  
 ‘they are counting them for him, the women, the child, the goats’





- (44) bót-a ‘give birth’ → bóot-ε ‘give birth for’  
 bel-a ‘speak’ → beel-a ‘speak to’  
 kas-a ‘fight’ → kaas-a ‘fight on behalf of’  
 són-ɔ ‘write’ → sóon-ɔ ‘write for’  
 koj-a ‘nibble’ → kooj-ε ‘nibble for’

As an example of a syntactically conditioned length fact the long vowel of the Haya [JE22] today past tense marker /-áa-/ seen in (45a) shortens when the verb is non-final, as in (45b) (Hyman 1999:160):<sup>12</sup>

- (45) a. y-áá-léet-a ‘he brought’  
 b. y-a-leet-a Káto ‘he brought Kato’

What’s important is that shortening is not an automatic consequence of phrasing since it is limited to this tense and, as seen in (45b), the length of the root is not shortened.

It is thus clear that vowel length can have a variety of functions in Bantu, as it can in language in general. While vowel length can fulfill the four functions in (43), it still can’t do everything tone can do—it would be thus be quite surprising if there were a parallel case to Giryama in (1) involving vowel length: If the subject prefix has an underlying long vowel, the length shifts to the penultimate syllable of the phonological phrase. In fact, as was said, nothing but tone can do this. Another thing length cannot do is harmonize. While such features as front-back, round, height, ATR can participate in vowel harmony, a process of length harmony such as in (46) is unattested:

- (46) a. /lim-il-e/ → lim-il-e  
 b. /liim-il-e/ → liim-iil-ee

If we assume that features “assimilate by spreading” (Hayes 1986), vowels cannot assimilate in length because length is not a feature—there is no [+long] that could assimilate, rather a long vowel has two moras (vs. a short vowel which has one).

I know of only one case of apparent length agreement in Leggbó [Cross-River; Nigeria], which affects verb roots (Hyman & Udoh (2007:79).

- (47)
- |                |                 |                |
|----------------|-----------------|----------------|
|                | + -ē ‘him, her’ | + -ó ‘you sg.’ |
| ffin-à ‘touch’ | ffìn-ēē         | ffìn-òó        |
| tùm-à ‘stop’   | tùùm-ēē         | tùùm-òó        |
| mān-ā ‘hold’   | māān-ēē         | māān-òó        |

The verbs in the left column consist of a CVC root with a lexicalized /-a/ suffix. As seen, when one of the two object pronouns having the shape -V is added, fusion takes place: /a + ε/ → εε, /a + ɔ/ → ɔɔ. When (and only when) this happens, the vowel of the root is also lengthened. The question is whether this should be seen as a process of length harmony. Unfortunately the

<sup>12</sup> The H tones are also reduced, as per the process seen earlier in (42).

language conspires against testing whether the process is iterative (unbounded), since it does not provide appropriate inputs. While Hyman & Udoh (2007) consider several different analyses of the above root vowel lengthening, the interpretation I'd like to give to it is similar to the interpretation given of the Ngangela data in (24): Vowel length cannot occur in a less prominent position (here, suffixal) without it also occurring in a more prominent position (root). Otherwise, not to be outranked by the affix, the root vowel lengthens. Whereas Ngangela shortens a vowel in weak position to avoid such a conflict, Leggbó lengthens a vowel in strong position. We thus once again note the versatility of vowel length which can mark positional prominence, clause types, syntactic headedness, and linguistic and paralinguistic intonation by itself. In the Bantu case what is especially striking is the shift from the paradigmatic function of tone distinguishing lexical morphemes to various types of syntagmatic functions. While segmental features cannot as readily do everything that length can do, the functions of length line up more along the lines of what tone and stress can do. While each has its own properties and limitations, length is probably second only to tone.

## References

- Bastin, Yvonne, André Coupez, Evariste Mumba & Thilo C. Schadeberg (eds). 2002. *Bantu lexical reconstructions 3*. Tervuren: Musée Royal de l'Afrique Centrale, online database.
- Bennett, Ryan, Boris Harizanov & Robert Henderson. 2018. Prosodic smothering in Macedonian and Kaqchikel. *Linguistic Inquiry* 49.195-246.
- Byarushengo, Ernest Rugwa, Larry M. Hyman & Sarah Tenenbaum. 1976. Tone, accent, and assertion in Haya. In Larry M. Hyman (ed.), *Studies in Bantu tonology*, 185-205. Department of Linguistics, University of Southern California.
- Ellington, John. 1977. *Aspects of the Tiene language*. Doctoral dissertation, University of Wisconsin, Madison.
- Eynde, Karel van den. 1960. *Fonologie en morfologie van het Cokwe*. Leuven: Universiteit te Leuven.
- De Chene, Brent & Stephen R. Anderson. 1979. Compensatory lengthening. *Language* 55.505-535.
- Gussenhoven, Carlos. 2006. Between stress and tone in Nubi word prosody. *Phonology* 23.192-223.
- Guthrie, Malcolm. 1967-71. *Comparative Bantu*, Volumes I-IV. Farnborough, Hants: Gregg Press.
- Harry, Otelemate & Larry M. Hyman. 2014. Phrasal construction tonology: the case of Kalabari. *Studies in Language* 38.649-689.
- Hayes, Bruce. 1986. Assimilation as spreading in Toba Batak. *Linguistic Inquiry* 17.467-499.
- Hyman, Larry M. 1981. *Noni grammatical structure*. Southern California Occasional Papers in Linguistics 9. Los Angeles: Department of Linguistics, University of Southern California.
- Hyman, Larry M. 1999. The interaction between focus and tone in Bantu. In Georges Rebuschi & Laurie Tuller (eds), *The grammar of focus*, 151-177. Amsterdam: John Benjamins.
- Hyman, Larry M. 2010. Affixation by place of articulation: the case of Tiene. In Michael Cysouw & Jan Wohlgemuth (eds), *Rara & Rarissima. Collecting and interpreting unusual characteristics of human languages*, 145-184. Berlin/New York: Mouton de Gruyter.
- Hyman, Larry M. 2011. Tone: Is it different? In John Goldsmith, Jason Riggle & Alan Yu (eds), *The Handbook of Phonological Theory*, 2nd edition, 197-239. Blackwell.
- Hyman, Larry M. 2013. Penultimate lengthening in Bantu. In Balthasar Bickel, Lenore A. Grenoble, David A. Peterson & Alan Timberlake (eds), *Language typology and historical contingency: In honor of Johanna Nichols*, 309-330. Benjamins.
- Hyman, Larry M. 2017. Prefixal vowel length in Lulamogi: A stratal account. *Journal of African Languages & Linguistics* 38.65-87.
- Hyman, Larry M. & Ernest Rugwa Byarushengo. 1984. A model of Haya tonology. In G.N. Clements & John Goldsmith (eds), *Autosegmental studies in Bantu tone*, 53-103. Dordrecht: Foris.
- Hyman, Larry M. & Kemmony C. Monaka. 2011. Tonal and non-tonal intonation in Shekgalagari. In Sonia Frota, Gorka Elordieta & Pilar Prieto (eds), *Prosodic categories: production, perception and comprehension*, 267-290. Springer Verlag.

- Hyman, Larry M. & Imelda Udoh. 2007. Length harmony in Leggbó—a counter-universal?” In Peter Austin & Andrew Simpson (eds), *Linguistische Berichte*, Sonderheft 14, *Endangered Languages*, 73-92.
- Kavitskaya, Darya. 2002. *Compensatory lengthening: phonetic, phonology, diachrony*. London & New York: Routledge.
- Kwenzi Mikala, J. 1980. Esquisse phonologique du punu. In F. Nsuka-Nkutsi (ed.), *Éléments de description du punu*, 7-18. CRLS, Université Lyon II.
- Lehiste, Ilse. 1972. The timing of utterances and linguistic boundaries. *Journal of the Acoustic Society of America* 51.2018-24.
- Liphola, Marcelino M. 2001. *Aspects of phonology and morphology of Shimakonde*. Doctoral dissertation, Ohio State University.
- Maho, Jouni Filip. 2009. NUGL online: The online version of the New Updated Guthrie List, a referential classification of the Bantu languages. <http://goto.glocalnet.net/mahopapers/nuglonline.pdf>
- Maniacky, Jacky. 2002. *Tonologie du ngangela*. Doctoral dissertation. Paris: INALCO.
- Manus, Sophie. 2003. Morphologie et tonologie du símákòndè. Doctoral dissertation. INALCO, Paris.
- Manus, Sophie. 2017. The conjoint/disjoint alternation in Símakonde. In Jenneke van der Wal & Larry M. Hyman (eds), *The conjoint/disjoint alternation in Bantu*, 239-257. Berlin/Boston: Walter de Gruyter.
- Manus, Sophie. 2018. Penultimate shortening in NPs: The case of Símakonde. In Eugene Buckley, Thera Crane & Jeff Good (eds.), *Revealing structure: Papers in honor of Larry M. Hyman*, 141-154. Stanford: CSLI Publications.
- McPherson, Laura. 2014. *Replacive grammatical tone in the Dogon languages*. Doctoral dissertation, University of California, Los Angeles.
- Meeussen, A.E. 1967. Bantu grammatical reconstructions. Tervuren: Musée Royal de l’Afrique Centrale.
- Meeussen, A.E. 1969. Bantu Lexical Reconstructions. Tervuren: Pro manuscripto.
- Meeussen, A.E. 1971. *Éléments de grammaire lega*. Tervuren: Musée Royal de l’Afrique Centrale.
- Meeussen, A.E. 1979. Vowel length in Proto-Bantu, *Journal of African Languages & Linguistics* 1.1-7. [Originally published in 1954, “Klinkerlengte in het Oerbantoe”, *Kongo-Oversee* 20.423-31.]
- Meeussen, A.E. 1980. Bantu Lexical Reconstructions. [With an English index by F. Rodegem.] (Archives d’Anthropologie, 27.) Tervuren: Musée royal d’Afrique Centrale
- Mutaka, Ngessimo M. 2018. The phonology of tone in the imperative in Kinande. In Eugene Buckley, Thera Crane & Jeff Good, *Revealing structure*, 173-188. Stanford: C.S.L.I.
- Mutaka, Ngessimo M. & Larry M. Hyman. 1990. Syllables and morpheme integrity in Kinande reduplication. *Phonology* 7.73-119.
- Myers, Scott & Benjamin B. Hansen. 2005. The origin of vowel-length neutralisation in vocoid sequences: evidence from Finnish speakers. *Phonology* 22.317-344.
- Odden, David. 1996. *The phonology and morphology of Kimatumbi*. Oxford University Press.
- Rolle, Nicholas. 2018. *Grammatical tone: Typology and theory*. Doctoral dissertation, University of California, Berkeley.
- Rolle, Nicholas & Larry M. Hyman. 2019. Phrase-level prosodic smothering in Makonde. In *Supplemental Proceedings of the 2018 Annual Meeting on Phonology*. Washington, DC: Linguistic Society of America.
- Selkirk, Elizabeth. 1984. *Phonology and syntax: the relation between sound and structure*. Cambridge, MA: MIT Press.
- van der Wal, Jenneke. 2017. What is the conjoint/disjoint alternation? Parameters of crosslinguistic variation. In Jenneke van der Wal & Larry M. Hyman (eds), *The conjoint/disjoint alternation in Bantu*, 14-60. Berlin/Boston: Walter de Gruyter.
- van Otterloo, Karen. 2011. *The Kifuliiru language*, vol. 1. Phonology, tone, and morphological derivation. Dallas: SIL.
- Volk, Erez. 2011. *Mijikenda tonology*. Doctoral dissertation. Tel Aviv University.
- Voorhoeve, Jan. n.d. *A grammar of Safwa*. Ms. Leiden University.