Penultimate lengthening in Bantu

Analysis and spread

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It is often remarked that Eastern and Southern Bantu languages that have lost the historical Proto-Bantu vowel-length contrast tend to have a process of penultimate lengthening (PL). However, there has never been a general, cross-linguistic survey of the phenomenon. In this paper I (i) delimit the geographical distribution of PL; (ii) determine the domain within which PL occurs: it is assumed that the process was innovated before pause, later "narrowing" to the right edge of phrases, then words; (iii) survey the factors that contribute to or block PL; and (iv) propose a historical relationship between PL and the restriction of length contrasts to metrically strong positions (penultimate, antepenultimate), which, I argue, leads to the ultimate loss of contrastive length.

1. Introduction

In her work, Johanna Nichols applies great analytic skill to issues that arise in the typological, historical, and areal documentation of significant linguistic phenomena. Particularly impressive is the careful attention she pays to the cross-linguistic distribution of relatively fine-grained typological variables, as seen in Nichols (1992) and more recent work in the AutoTyp project with Balthasar Bickel. The purpose of this paper is to look at a specific phenomenon attested in a large area, but one smaller than those Johanna typically takes on. In the following sections, I address the process of penultimate lengthening in Bantu, which, although widespread over much of the Bantu zone and often cited in individual language studies, has not received serious comparative analysis. In Section 2, I first provide an overview of penultimate lengthening in Bantu, followed by a discussion in Section 3. I then turn in Section 4 to the near-complementary process of pre-(ante)penultimate shortening, also widely attested in Bantu. Having documented both phenomena and considered their possible historical relationship, I conclude in Section 5 with some diachronic and typological observations.

2. Bantu penultimate lengthening: An overview

Many Bantu languages have been reported to have penultimate prominence of one sort or another, often called *accent* or *stress*. The most commonly observed effect is penultimate lengthening (henceforth, PL) of the vowel:

> En règle générale, l'accent dynamique tombe sur la syllabe pénultième et s'accompagne d'allongement de la voyelle. (Van Bulck 1952: 859)

> Cet accent tombe, dans plusieurs langues bantoues, sur la pénultième et s'accompagne d'un allongement de la voyelle… (Burssens 1954: 46)

> Stress in Nguni [Xhosa, Zulu, Swati, Ndebele] is normally on the penultimate syllable which is also normally long… (Doke 1967: 94)

Typical examples are provided from Shona in (1), which show predictable penultimate lengthening realized on different morphemes as causative and applicative suffixes are added:

(1) *ku-seːk-a* 'to laugh'
ku-sek-eːs-a 'to cause to laugh'
ku-sek-eːr-a 'to laugh at'
ku-sek-es-eːr-a 'to cause to laugh at'

While the Shona forms are highly representative of a number of Eastern and Southern Bantu languages (see below), descriptions of other languages contain no mention of length, or the role of length is downplayed:

> The stress in Lamba is normally on the penultimate syllable of each word, and in this way is to a great extent the determining factor in word-division.… Unlike Zulu the penultimate stress is not of necessity accompanied by length. Penultimate length is merely incidental in Lamba. (Doke 1938: 33)

In other cases, penultimate accent has been posited to account for tonal effects in a number of Bantu languages. As seen in (2), in Haya a phrase-final low boundary tone (L%) will be drawn to the penult, converting a H(igh) to a HL falling tone (Byarushengo et al. 1976: 187, 191):[1]

(2) /ku-bón-a/ → ku-bón-a [kù-bôn-à] 'to see'

H H L%

1. In (2) and subsequent examples, an acute accent (ˊ) marks H(igh) tone, a circumflex (ˆ) marks HL falling tone, and unaccented vowels are tonally underspecified, receiving L(ow) tone by default.

A second example, illustrated in (3), is the long-distance shifting of a H tone to the penult in Chizigula (Tanzania) (Kenstowicz & Kisseberth 1990: 171):

(3) /á-ku-gulus-a/ → a-ku-gulús-a 'he is chasing you'

H H

Although Kenstowicz & Kisseberth consider the above to be the attraction of a H tone to an accented, penultimate position, they go on to clarify:

> We are using the term 'accent' here in an abstract sense. The Chizigula penult does not display the normal cues for stress – it does not have increased duration (except in phrase-final position), nor is it necessarily raised in pitch. Rather, its prominence is manifested phonologically by attracting a tone from its left. (Kenstowicz & Kenstowicz 1990: 166)

While the effects vary, taken together, quite a few Bantu languages can be said to have penultimate prominence of one type or another. Thus, Downing (2004: 121) lists twenty-six Bantu languages with "penultimate stress-accent."

In this paper I am primarily interested in cases of PL that unambiguously involve the addition of a moraic tone-bearing unit (vs. phonetic lengthening). Although not universally the case, this additional mora often has a significant effect on the tone. Thus, compare the following realizations of /ku-túm-a/ 'to send' in Ikalanga (Hyman & Mathangwane 1998: 199):

(4) a. *non-phrase final* b. *phrase final*

ku-túm-á... [kùtúmá] ku-túm-á → ku-tuum-a [kùtû:má]

H H L H

In both (4a) and (4b), we see that the underlying H of /-túm-/ 'send' spreads to the inflectional final vowel /-a/. However, when the vowel becomes lengthened in (4b), the penult becomes a HL falling tone followed by H. As indicated, in an unusual process, the inserted mora requires an L tone, which splits the H tone and produces the HL penultimate contour.

Most instances of PL are found in Eastern and Southern parts of the Bantu zone. In addition, PL is most expected on languages that have lost the Proto-Bantu (PB) vowel-length contrast in stems:

> Many Bantu languages have an H and L tone with a superimposed penultimate accent. This accent may cause vowel lengthening (especially if the vowel length contrast of Proto-Bantu has been lost), or it may affect the tone of the penultimate syllable. (Hyman 1978: 14)

The distribution of PL in languages that have lost the inherited length contrast is shown by the light dots on the accompanying map (produced, with thanks, by Guillaume Segerer based on a survey of over one hundred Bantu languages):

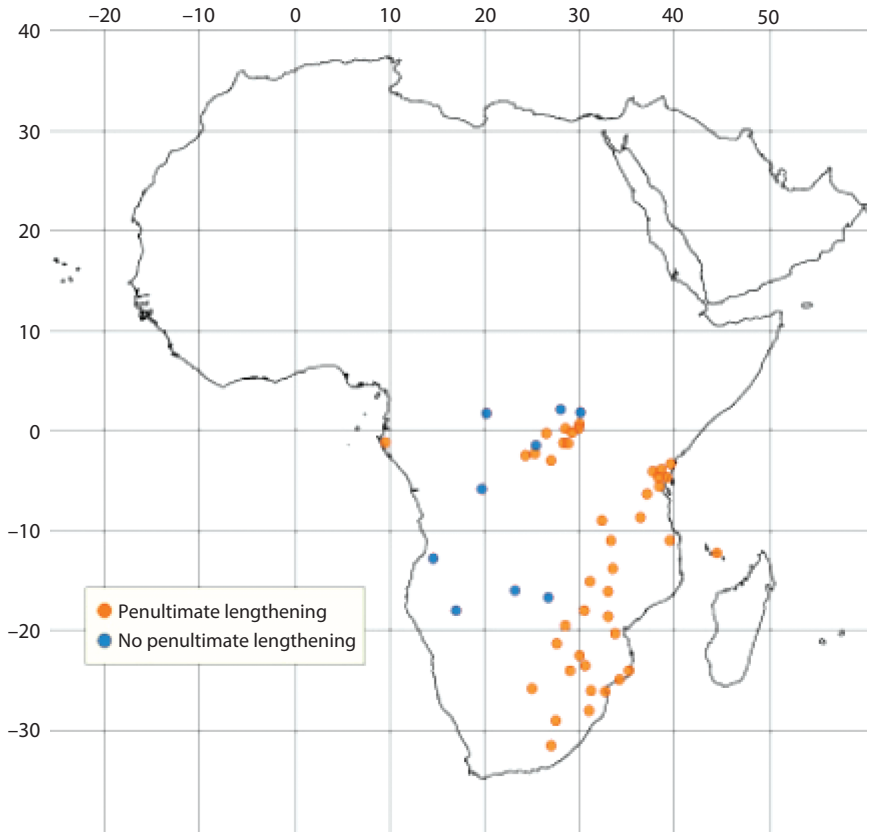

Figure 1. Distribution of penultimate length in Bantu

As seen, with the exception of Mpongwe way over in the west (and perhaps a few neighboring languages in Gabon), PL is areally contained. The blank areas in between the light dots indicate Bantu languages that have retained the PB vowel-length contrast (and that typically lack PL). The dark dots indicate languages such as Tonga, which have also lost the contrast but do not have PL.

It is tempting to hypothesize that there is a direct relation between PL and the loss of PB length: With the loss of length contrasts, PL is free to lengthen the penultimate vowel without threat of merger – versus non-PL languages such as Luganda, which have such contrasts such as *-lim-* 'cultivate' versus *-liim-* 'spy on'. Still, a few PL languages do exhibit marginal length contrasts (cf. the discussion of Matengo in (24) below):

> In some other [Tanzanian] Bantu languages, such as Makonde, Kirufiji and Kishambaa, there is at least partial contrastive vowel length as well as automatic penultimate stress which is in the case of Kishambaa realized phonetically by subphonemic increases in vowel duration, so that short stressed vowels are somewhat longer than short unstressed vowels, and long stressed vowels are somewhat longer than long unstressed vowels. (Odden 1999: 192–193)

Other languages with a V:/V contrast have been shown to have PL effects at the phonetic level: for example, Luganda (Hubbard 1994), Yao (Ngunga 1995), Kinyarwanda (Myers 2005), and Bangubangu (Meeussen 1954: 6).

Even if we set aside marginal and phonetic cases, Bantu PL shows considerable cross-linguistic variation with respect to its domain and utterance type (which isn't always made explicit). At least three domains can be distinguished. First, PL may be utterance penultimate, as in Southern Sotho (and perhaps all of Southern Bantu):

> Normally in Sotho each isolated word and the final word in each sentence has stress on the penultimate syllable accompanied by length. The length of the vowels of the penultimate syllables is appreciably shortened when words are not final in the sentence. (Doke 1967: 125)

Second, PL may be phrase penultimate, as in Chichewa (Kanerva 1990), Tumbuka (Downing 2006), Makonde (Kraal 2005), and Matengo (Yoneda 2005), where there is a relationship between phrasing and focus. Finally, one language, Komo, has been reported to have PL at the word level: "Penultimate vowel lengthening. That is a word-level boringly regular phenomenon in Komo" (Paul Thomas, pers. comm., 2008). Also reported is a distinction between full phrasal PL versus "half-length" on the penultimate vowel of every word, thus producing three degrees of length in Tswana and Shona, respectively:

> Full length occurs in the penultimate syllable of a word pronounced in isolation or at the end of a sentence.… This constitutes the characteristic penultimate accent of Tswana.… When a word is in non-final sentence position, it still retains its penultimate accent, but in much lesser degree, i.e. only half-length is used. Normal short length occurs in final and non-penultimate syllables, and in some monosyllabic words." (Cole 1955: 55)

> When an utterance consists of several phonological words, the final word of the utterance, which may be followed by a pause, carries a marker of penultimate length relatively longer than those of preceding vowels. *úːya* 'come', *úˈya kúːnó* 'come here!', *úˈya kúˈnó, mwàːná* 'come here, child!', *úˈya kúˈnó mwànáːŋgù* 'come here, my child!' (Fortune 1980: 1.36)

In some languages pre-pausal moraic PL depends on the utterance type, as in Tswana:

> Utterances consisting of statements and questions with interrogative morphemes are characterized by a syllable length pattern in which the penultimate syllable is longer than other syllables. (Cole 1955: 1.35a)

> Questions without interrogative words differ from statements by, among other signs, the lack of the relatively longer penultimate length. *áto'ra rugwaːkú* 'he has taken the spoon' vs. *áto'ra rugwa'ku?* 'has he taken the spoon?' (Cole 1955: 1.39)

Similarly, pre-pausal PL is observed in citation forms and declaratives in Shekgalagari but not in corresponding yes-no questions (where short H–H alternates with long HLː-L) (Hyman & Monaka 2011):

(5) a. *ri-nâːrɪ*
'buffalos'

b. *a-bal-a ri-nâːrɪ*
'He is counting buffalos'

(6) a. *ri-nárí*
'Buffalos?'

b. *a-bal-a ri-nárí*
'Is he counting buffalos?'

Since such variations by utterance type are usually not fully described, a number of colleagues were contacted and asked to compare our findings for Shekgalagari with the distribution of PL in several other Bantu languages. The results are provided in Table 1.[2]

Table 1. Functions of penultimate lengthening in Bantu

	Shekgalagari	**Sesotho**	**Ikalanga**	**Kinande**	**Ndebele**	**Chichewa**
Declaratives	+	+	+	+	+	+
Yes–No Q	–	–	+	–	+	+
WH Q	–	–	+	–	+	+
Ideophones	–	–	–	–	+	+
Paused lists	–	+	–	+	+	+
Imperatives	–	+	+	+	+	+
Hortatives	–	+	+	+	+	+
Vocatives	–	±	+	+	+	+
Exclamatives	–	–	+	+	+	+
Monosyllable	–	+	+	+	+	+

2. Table 1 was made possible by generous personal communications (2008) from Malillo Machobane and Katherine Demuth (Sesotho), Joyce Mathangwane (Ikalanga), Ngessimo Mutaka (Kinande), Galen Sibanda (Ndebele), and Sam Mchombo and Al Mtenje (Chichewa).

To illustrate the relevant utterance types, we begin with the Shekgalagari examples in (7)–(11), which show that there is no PL in WH questions, imperatives, hortatives, vocatives, and exclamatives (ˈmarks a downstep on the following H tone):

(7) a. *ri-nárí zhé ˈríhí*
'Which buffalos?'

b. *ányí a-bɔ́n-á ri-nárí*
'Who sees the buffalos?'

(8) a. bal-á
'Count!' (cf. xʊ-*baːl-a* 'to count')

b. *bal-á ˈrí-nárí*
'Count the buffalos!'

(9) a. *á ˈhí-bál-ɛ*
'Let's count!'

b. *á ˈhí-bál-ɛ ri-nárí*
'Let's count the buffalos!'

(10) a. *mʊnaká*
'Monaka!'

b. *ntó gabalʊxúŋ*
'Come here, Ghabalogong!'

(11) a. *á ˈʃí-xúlú*
'What a situation!'

b. *á ˈʃí -ʧúʧʊ ʃá mú-khyʊ*
'What an idiot of a person!'

In addition, there is no PL in ideophones, whose pre-pausal vowel undergoes final devoicing:

(12) a. *y-á-rɪ bílʊ̥*
'It (fish) appeared suddenly out of water'
(lit. it-said *bílʊ̥*)

b. *a-rɪ bítsɪ̥*
'He left in a hurry'
(lit. he-said *a-rɪ bítsɪ̥*)

Similarly, there is no PL in "paused lists", where each paused word may optionally undergo final lengthening:

(13) a. *a-bal-a ri-namaː … ri-nawáː … lí ri-nâːrɪ*
'He's counting meats, beans, and buffalos'

b. *a-bɔ́n-á lʊ-rʊliː … malílɪː … lí mʊ-rîːri*
'He sees dust, rubbish, and hair'

Finally, when the pre-pause word is monosyllabic there is no PL (versus the other languages in Table 1, which lengthen the last vowel of preceding word):

(14) a. *ri-nárí ʒé*
'these buffalos'
b. *a-bat-a ʃé*
'He wants this one'

To summarize, there are four different intonational patterns before pause in Shekgalagari:

(15)	a.	PL	declaratives, citation forms
	b.	final devoicing (no PL)	ideophones
	c.	final lengthening (no PL)	paused lists
	d.	Ø (none of the above)	questions, imperatives, hortatives, vocatives, exclamatives, monosyllabic words

As indicated in (15d), there is an important "mismatch" in Shekgalagari: While a short penult is *phonologically* unmarked, it is *pragmatically* marked, appearing as it does in questions, imperatives, vocatives, and so forth. As seen in the examples, some of the utterance types involve specific grammatical constructions: for example, the marker *á* in hortatives and exclamatives. On the other hand, the only difference between a declarative and a yes–no question is the presence versus absence of PL. Thus Hyman & Monaka suggest that the absence of intonation yields a yes–no question![3] As seen on the accompanying map, and despite the variations in Table 1, it is clear that PL is quite widespread but varied in Bantu. In the following section, I take up some of the questions raised by these and other facts.

3. Discussion

The variation seen in Table 1 and the examples from Shekgalagari, raise a number of questions: (i) What is the full range and distribution of PL properties in Bantu?, (ii) How and why does PL originate?, (iii) How is PL related to other length phenomena reported in Bantu? For example, many Bantu languages with a short/long contrast restrict long

3. Interrogatives need not involve raising of the overall pitch range – which may occur on both statements *and* questions to mark excitement and other "attitudinal" (Bolinger 1978) or "paralinguistic" (Ladd 1996) functions. It should be pointed out that there is an independent, paralinguistic process of PL called emphatic lengthening – see Hyman & Monaka (2011).

vowels to the penult (or to penultimate and antepenultimate positions). As will be discussed below, we must ask whether PL or such positional restrictions are a cause versus an effect of the loss of the Proto-Bantu *V/V: contrast?

An additional question concerns the relation of PL to accentual prominence (stress). There are three common claims concerning accent placement in Bantu:

(16) a. initial — mostly NW Bantu; e.g. Duala, Kukuya, Bobangi, Ntomba, Bolia, Tetela
b. penult — mostly Eastern and Southern Bantu (examples above)
c. none — scattered, probably widespread; e.g. Mongo

As seen, initial and penultimate prominence are largely in complementary distribution, characterizing the Northwest versus East-South of the Bantu zone, respectively. Other languages are said to lack stress altogether:

> L'accent dynamique est entièrement éclipsé [in Lomongo] par la marcation bien plus essentielle des tons.[4] (Hulstaert 1934: 79)

> Even [those Ngombe speakers] who readily recognize the position of tone in the words of their own language, find it difficult to decide where the stress of a given word lies. (Price 1944: 28)

In fact, initial and penultimate *accent* are not parallel. *Initial* usually means *stem initial*, as in Ntomba: "Cet accent porte en général sur la première syllabe de la racine.… Un radical monosyllabique reporte l'accent sur le préfixe de classe." (Mamet 1955: 11) On the other hand, as we have seen, *penultimate* usually means *utterance* or *phrase-penultimate*. Even the attraction of H to the penult can be across words, as in Giryama (Philippson 1998: 321):

(17) a. ku-tsol-a ki-revu 'to choose a beard'
b. ku-on-a ki-révu 'to see a beard'
H

From the observed variation we can hypothesize that penultimate prosody starts out as intonational and undergoes *boundary narrowing* as indicated in (18).

(18) Utterance > Intonational phrase > Phonological phrase > Word

While Komo has been said to have word-penultimate PL, which may be unique within Bantu, there are occasional cases of languages with stem-level prosody – for example,

4. Hulstaert (1961: 129) went as far as to design experiments showing that there is no stem-initial stress in Lomongo.

accent assignment in Kivunjo Chaga: "Assign accent to a lexical stem, choosing the penult, if possible" (McHugh 1990: 226). However, McHugh's further description makes it clear that his "accent" is rather abstract – and not even obligatory: "The Kivunjo accent is unlike that of more typical accentual languages in that it has no overt phonetic manifestation. Rather, it serves an organizational function.… In addition, some stem classes are lexical exceptions to the Accent Rule, producing…no accent."

The question that needs to be addressed is, why the penult should receive intonational/phrasal prominence? As I argued for penultimate stress (Hyman 1977: 45), there is a tendency for prosodic contrasts to avoid the final syllable. In the Bantu context we note the following:

1. Final position is not a good place for tonal contrasts. Utterances like to end low. As a result, utterance-final H can be lowered to M (Kukuya), contoured to HL (Luganda), delinked to L (Nkhotakota Chichewa), and/or realized anticipatorily on the penult (Chichewa, Haya). In addition, a H to L pitch change is more optimally realized on two syllables than as a HL falling contour on a final syllable.
2. Final position is not a good place for quantity contrasts. Thus numerous Bantu languages have final vowel shortening (FVS), which also begins before pause but can be "narrowed" to smaller domains, as in Luganda (Hyman & Katamba 1990). Interestingly, no Bantu language realizes inherited vowel length as long before pause. For example, combinations of CV verb root + the final inflectional vowel *-a*, which may be realized with long vowels in medial position, typically undergo pre-pausal FVS: /pa-a/ 'give', /li-a/ 'eat' → medial [paː], [lyaː], utterance-final [pa], [lya].
3. Even beyond prosody, final position is not a good place for segmental contrasts. In this case there is a strong tendency for phrasal restrictions to generalize to word-final position. While PB and "canonical" Bantu systems lack codas altogether, those languages that have developed codas typically restrict these to a subset of consonants found in onset position, with the frequent lack of a voice contrast. In addition, some Bantu languages have restrictions on word-final vowel contrasts. Thus, Lunda, which has an underlying five-vowel system /i, e, u, o, a/ does not permit final /e, o/.

What I would like to propose is that penultimate prominence (lengthening and so forth) is a post-PB innovation, areally diffused, possibly as separate innovations in some cases. In this context, compare the position of Bennett (1978: 14–15) who assumes PB had initial primary and secondary final accent, the latter ultimately becoming penultimate:

> The frequency of primary or secondary penultimate stress, coupled with the devoicing of final vowels in such languages as Gisu, the general shortening of final vowels, the reduction of tonal contrasts on final vowels, and the complete

loss of final vowels in many languages of Zaire and the northwest, suggests that a situation such as that ascribed to Bolia (stem stress with secondary penultimate stress), or at least a strong avoidance of final stress, must have been quite widespread at some earlier stage.

Much of Bennett's argument is based on the distribution of vowels within the Bantu word. As seen in (19), which includes all word classes, PB vowel contrasts were restricted by position:

(19)

Prefix V	-	*First stem V*	-	*Internal Vs*	-	*Final stem V*
*i *ɪ *ʊ *a		*i *u *ɪ *ʊ *ɛ *ɔ *a		*i *ɪ *ʊ *a		*i *u *ɪ *ʊ *ɛ *ɔ *a
*L		*H, *L		*L		*H, *L

4. Antepenultimate and pre-antepenultimate shortening

While the penult shows no tendency to license a fuller set of vowel quality contrasts, it may be implicated in the realization of contrastive length. A number of (East and West) Bantu languages limit contrastively long vowels by position, producing alternations such as those in (20):

(20) a. pre-penultimate shortening in Cokwe (van den Eynde 1960: 17)
ku-huul-a 'peel off' → *ku-hul-il-a*
'peel off for' (APPLICATIVE)

b. pre-antepenultimate shortening in Lunda (elicited with Boniface Kawasha)
ku-kwáat-a 'to hold, arrest' → *ku-kwáát-ish-a*
(CAUSATIVE)
→ *ku-kwát-ish-il-a*
(CAUSATIVE+APPLICATIVE)

As indicated in (20), some languages such as Cokwe limit vowel length contrasts to the penult, while others such as Lunda restrict contrastive length to the penult and antepenult. Other languages with such restrictions include Chimwiini (Kisseberth & Abasheikh 1974), Kimatuumbi (Odden 1990a), Safwa (Voorhoeve, n.d.), Malila (Kutsch Lojenga 2007), Kikongo (Odden 1990b), Beembe (Jacquot 1962: 241), and Yaka (Ruttenberg 2000). In some languages there is a double restriction in that the (ante)penult must coincide with the first stem syllable. In Punu vowel length is contrastive only on a stem-initial penult. Thus, of 232 verb stems with initial /CVː/ in Blanchon (1995), all but 7, or 97 percent, are bisyllabic. Similarly, in Yaka, long vowels

are limited to a stem-initial penultimate or antepenultimate syllable. Of 753 verb stems with initial /CVː/ identified from Ruttenberg (2000), 335 are bisyllabic, 408 trisyllabic, and only 10 (or 1.3%) quadrisyllabic.

A most interesting case is found in Ngangela, where a vowel can be long only if all of the following vowels up to and including the penult are also long. Otherwise, there is pre-penultimate shortening:

> Une voyelle ne peut être longue qui si toutes les voyelles qui suivent jusqu'à la pénultième comprise sont également longues. (Maniacky 2002: 20)

This restriction produces alternations such as those seen in (21).

(21)	a.	*-teetááŋga*	'partager'
		cf. *-tééta*	'couper'
		-teetaaŋgééni	'partagez! (pl.)'
	b.	*-vuulwííθa*	'rappeler, remémorer'
		cf. *-vulúka*	'se rappeler'
		-taambwííθa	'distribuer'
		cf.*-tambúla*	'recevoir'
		-ʃaambwííθa	'infecter, contaminer'
		cf. *-ʃambúka*	'être contaminé'
	c.	*-pulááŋga*	'couper en tranches'
		cf. *-púla*	'couper au couteau'
		-holwééθa	'refroidir (tr.), calmer'
		cf. *-holóka*	'refroidir (intr.), se calmer'
		-aʃááŋga	'atteindre plusieurs fois'
		cf. *-áʃa*	'lancer'

In (21a) we see that the length of the vowel of *-tééta* remains in related tri- and quadrisyllabic verb stems, since all of the vowels up to the penult are also long. The verbs in (21b) contain the underlying roots *-vuul-*, *-taamb-* and *-ʃaamb-*. As seen, their length is preserved in the forms involving the *-iθ-* causative extension, which becomes *-iiθ-* by compensatory lengthening when the preceding /u/ glides to [w]. On the other hand, the root vowel loses its length in the corresponding non-causative forms to the right, where the penultimate vowel is short. Finally, (21c) shows that this is not a case of length agreement (whereby pre-penultimate syllables lengthen before a long penult). Thus the roots *-pul-*, *-hol-* and *-aʃ-* do not become long in the forms on the left.

The interpretation I would give to the Ngangela facts is the following: (i) syllables form an increasing prominence cline (crescendo) up to the penult, and (ii) a long vowel is licensed in a less prominent syllable only if it occurs in all more prominent

syllables.[5] While it is the word-penultimate position that licenses preceding length, it should be noted that there is some variation in the noun phrase. Thus Maniacky (2002: 20) reports that 'my cow' can be pronounced *ŋgóombe yáaŋge* or *ŋgómbe yáaŋge*. In the first realization, the penult of the first word is calculated independently of the second word (and length is thus preserved), while in the second realization, the penultimate position is calculated over the two-word noun phrase ("syntagme nominal"). Since the short vowel in [mbe] separates [ŋgó:] from the long penult [yáa], *ŋgóombe* shortens to *ŋgómbe*. Given that a number of Bantu languages treat noun + possessive as a single domain, it is likely that *ŋgómbe yáaŋge* is the older realization. Unfortunately, phrase-level shortening appears to be unsystematic in Ngangela (Maniacky 2002: 20).

To summarize, we have seen that positional shortening may target either pre-penultimate or pre-antepenultimate long vowels. In addition, the Ngangela facts show that positional shortening may be suspended via licensing from length in the prominent penult. While Ngangela suggests that such licensing is calculated on the basis of the word-penultimate syllable, restrictive (ante)penultimate length is typically calculated at the phrase level in other languages, which may restrict shortening to underlying contrastive length: for example, length that originates in the stem versus derived from V+V concatenation within prefixes or between a prefix and V-initial stem. Thus, as the following examples show, pre-antepenultimate shortening affects only stems but is calculated at the phrase level in Kimatuumbi (Odden 1990a: 260, 261):

(22)	a.	*kɨ̱kóloombe*	'cleaning shell'
		kɨ̱kólombe chaángu	'my cleaning shell'
	b.	*naa-kálaangɨ̱te*	'I fried'
		naa-kálangɨ̱te chóolya	'I fried food'

Differing from Kimatuumbi, the pre-stem is subject to shortening in Safwa (Voorhoeve, n.d.). Thus *-gaa-* shortens in (23b).

(23)	a.	*a-gaa-gúzy-a*	'he can sell'
	b.	*a-ga-buúzy-a*	'he can ask'
		cf. *a-ga-buzy-aág-a*	'he may ask'

Despite Voorhoeve's characterization of the process in terms of syllables ("…any long vowel preceding the third syllable [mora?] from the final word boundary is reduced

5. This notion of a crescendoing cline has rarely been documented but also nicely seems to describe the optional pre-penultimate reduction of [e, o] to [a] in Shimakonde (Liphoola 2001). It is not possible for reduction to affect a vowel to the right of a mid vowel that has not also been reduced (cf. Ettlinger 2008).

to a short vowel." (p. 10)), (23b) suggests that shortening applies to any long vowel that precedes the third *mora* of the word (cf. Botne 1998 and Kutsch Lojenga 2007 for closely related Ndali and Malila, respectively). A moraic basis has been recognized also in Beembe: "L'opposition entre voyelles brèves et voyelles longues se trouve neutralisée entre consonnes dans les noms verbaux lorsque la dérivation par suffixes aboutit à la formation de radicaux comptant plus de quatre mores." (Jacquot 1962: 241). The generalization appears to be that pre-penultimate shortening is calculated by syllable, while pre-antepenultimate shortening is calculated by mora. Thus, two situations are predicted not to occur: (i) since pre-penultimate shortening is not calculated by mora, no language should shorten a penultimate vowel when the final vowel is long; and (ii) since it is not calculated by syllable, pre-antepenultimate shortening should not allow both the penultimate and antepenultimate vowels to surface as long. While one can imagine how these generalizations might be undermined by subsequent sound changes, I am aware of only one case from Kimatuumbi (Odden 1996).[6] The first non-attestation may also be accounted for by saying that the vowel length of the final syllable is irrelevant to positional shortening. Otherwise we would expect underlying /CVV.CV.CVV/ to undergo (moraic) pre-antepenultimate shortening of the first long vowel. Instead, the form typically is realized with the antepenultimate syllable vowel long and the final vowel short.

5. Conclusion

In the preceding sections, we have seen that penultimate lengthening is widespread in Bantu but varied in its distribution by utterance type. We have also seen that the penult is privileged as a position for the realization (and licensing) of contrastive length. The question is whether there is a historical link between non-lexically contrastive PL and pre-(ante)penultimate shortening which often neutralizes lexical contrasts. Consider

6. In Kimatuumbi, although an antepenultimate long vowel generally shortens before a penultimate long vowel, as expected, such shortening fails to apply before the applicative + reciprocal combination *-y-aan-* (Odden 1996: 157). In addition, the two moras of the perfective final *-ịte* (and variants) appear to be counted as only one (Odden 1996: 160). Similarly, subsequent developments sometimes obscure otherwise general PL. For example, in Kinande, PL fails to apply to verb forms where imperfective **-ag-a* has undergone *g*-deletion to become final *-aː* (ultimately, short *-a*) (Mutaka 2000: 107). PL also fails to apply when the perfective final is shortened in Makonde (Manus 2003: 388), where **-ile* > *-ii* and in Zulu (and elsewhere in Nguni): for example, *ɓaɓoniːlɛ* → *ɓaɓɔnɛː* 'they saw' (Doke 1967). In such cases, PL is calculated on the basis of the full forms /-ag-a/ and /-il-e/ but is not realized as PL since the targeted vowel is realized surface finally.

languages with pre-antepenultimate shortening. As was seen in Safwa in (23b), if both the antepenult and the penult are underlyingly long, only the latter will survive.[7] This also true of Chimwiini, which allows only one long vowel per phrasal domain (Kisseberth & Abasheikh 1974), which Selkirk (1986) interpreted by assigning a Latin stress–like metrical structure. What this means is that even in languages in which the one permitted long vowel may be antepenultimate or penultimate, the latter position is privileged. Might this, then, have been a contributing factor to the loss of contrastive vowel length and the development of PL?

It was stated in Section 2 that PL almost exclusively occurs in languages that have lost the PB vowel-length contrast. However, among the few languages that have retained the contrast, Matengo shows that positional length restrictions can coexist with PL:[8]

> Long vowels…only appear in the antepenultimate, penultimate or final [ʔ] syllables of any word. Long vowels before the antepenultimate syllable are shortened.… It should be noted that although the unit of the rule 'vowel in the penultimate syllable becomes long vowel' is the tone phrase, the unit of shortening of long vowels in the pre-antepenultimate syllable is the word. (Yoneda 2005: 394)

As seen in (24a), a phrase-penultimate short vowel undergoes PL:

(24)	a.	/kibega/	→	[kibeːga]
		/kibega kinjahi/	→	[kibega kinjaːhi]
				(glosses not given)
	b.	/-dʒoːba/	→	[dʒoːba]
				'to peel'
		/-dʒoːbeka/	→	[dʒoːbeːka]
				'to peel for'
		/-dʒoːbatoka/	→	[dʒobatoːka]
				'to peel off'
	c.	/-dʒoːbeka likalatasi/	→	[dʒoːbeka likalataːsi]
				'to peel paper for'

The first two forms in (24b) show that contrastive length can be realized in penultimate and antepenultimate position, while the third form shows pre-antepenultimate

7. I do expect there to be languages in which a combination of a long root vowel followed by a long suffix vowel result in the shortening of the latter. Languages such as Punu and Yaka have gone one step further by restricting the length contrast to the initial stem syllable.

8. In this citation I have added a question mark to indicate that the existing rare cases of final length appear to be limited to a few grammatical morphemes: for example, *àsêː* 'this (class 7)', *lêːlôː* 'yes–no question marker' (Nobuko Yoneda, p.c., 2009). I also have corrected "antepenultimate" to *pre*-antepenultimate in the last line.

shortening of /dʒoː/ to [dʒo]. The example in (24c) confirms Yoneda's point that PL is phrasal, since only the second word undergoes PL. However, pre-antepenultimate shortening is a property of the word domain, as seen from the preservation of the underlying length of /- dʒoːbeka/, despite the presence of a following noun object.

In Section 3 it was suggested that PL originates from intonation and gradually undergoes boundary narrowing (cf. (18)). One question that has not been dealt with is whether PL could represent the phonologization of a tempo effect. Recall from Table 1 that PL is blocked in yes–no questions in some of the Bantu languages. In addition, one finds descriptions in the literature such as the following concerning Xhosa: "There is a gradual resetting of the baseline of pitch upwards from the beginning of the sentence…and the shortening…of the length of the penult with the increase of the tempo of the speech production" (Louw 1995: 239). If there was an original tempo difference between declarative and interrogative sentences, perhaps this could have played into the phonologization process. PL might then have first arisen as a mark of declarative intonation, thereafter gradually spreading into other utterance types, some of which might originally have had brisker tempos (e.g. imperatives, exclamatives). In this case Shekgalagari would be ultra-conservative and Ndebele and Chichewa innovative (cf. Table 1).

While the above may seem intuitive, tempo considerations do produce at least one complication, documented in Chinima Makonde (Kraal 2005). Abbreviating penultimate lengthening as PUL, Kraal (2005: 75) states the situation as follows: "Every p-phrase is subject to PUL. But with fast speech, the penultimate syllable of a non-final p-phrase may be reduced" (*p-phrase* = phonological phrase). The complication, thus, is that a penultimate vowel may first be lengthened, but then shortened in fast speech, as shown in (25a), where % marks a phonological phrase boundary:

(25) a.

Normal speech rate	*Fast Speech*
vàlúúmè % vàvìílì	vàlúmè vàvìílì 'two men'
vàlúúmè % vàkúlúùngwà	vàlúmè vàkúlúùngwà 'big men'

b. /vàlúmé/ → vàlúumé → vàlúúmè → vàlúmè
PL H-retraction penultimate shortening

Kraal presents tonal evidence to show that one cannot simply say that PL is suspended in fast speech. In (25b), PL first applies, thereby triggering the retraction of the final H tone onto the penult. With fast-speech shortening, the result is a H-L stem *-lúmè*. Had PL and H retraction not applied, the stem would have been realized *-lúmé*, as it is phrase internally. What this means is that PL is not the only attested innovation, since penultimate shortening can also be phonologized based on tempo considerations. By

recognizing this possibility, we are forced to consider the alternative that Shekgalagari may have had more widespread PL but lost it in most utterance types.

So, with so many open questions, what can we reasonably conclude from the above? First, since PL is almost exclusively found in a contiguous group of Eastern and Southern Bantu languages, it is most straightforwardly interpreted as a post-PB innovation. Second, PL is innovated at the (declarative) utterance level, then narrows to phonological phrases. Third, PL has nothing to do with stem-initial *accent*, which has very different properties. Fourth, at least when introducing a moraic tone-bearing unit, PL most likely originated in languages having lost the PB *V/Vː contrast. Finally, PL may co-occur with positional restrictions on vowel length. This yields the following typology of vowel length systems in Bantu:

Table 2. Typology of Bantu vowel length systems

Lexical contrast	Penultimate lengthening	Positional shortening	Example
+	+	+	Matengo
+	+	–	Bangubangu
+	–	+	Kimatuumbi
+	–	–	Luganda
–	+	n/a	Shona
–	–	n/a	Tonga

Of these, all but the first two are quite widely attested within Bantu.

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Appendices

Identification and location of the Bantu languages surveyed for this study (references available upon request).

The following listings of Bantu languages indicate the revised Guthrie designation from Maho (2009), as well as the (primary) country where the language is spoken.

Appendix 1. Languages with PL that have lost the PB *V/VV contrast

Guthrie designation	Language	Where spoken
B11a	Mpongwe (Myene)	Gabon
C76	Ombo	DRC
D.31	Bhele (Piri)	DRC
D22	Amba, Hamba, Buyu	DRC
D23	Komo	DRC
D25	Lega	DRC
D43	Nyanga	DRC
E72a	Giryama	Kenya
E73	Digo	Kenya
E74a	Dabida (Taita)	Kenya
G12	Kagulu, N. Sagara	Tanzania
G22	Pare, Asu	Tanzania
G23	Shambala, Sambaa, Shambaa	Tanzania
G31	Zigula	Tanzania
G44d	Shimaore	Mayotte
G51	Pogolo	Tanzania
JD41	Konzo, Konjo	Uganda
JD42	Nande, Shu =J.42.	DRC
JD51	Hunde	DRC
M22	Namwanga	Zambia
N21a	Tumbuka	Malawi
N31a	Nyanja	Malawi
N31b	Cewa, Peta	Malawi
N41	Nsenga	Zambia
N43	Nyungwe, Tete	Mozambique

(*Continued*)

Guthrie designation	Language	Where spoken
P23	Makonde	Tanzania
S.31a	Tswana	Botswana
S.61	Copi, Lenge	Mozambique
S11	Korekore (Shona)	Zimbabwe
S12	Zezuru	Zimbabwe
S16	Kalanga	Botswana
S21	Venda	South Africa
S31b	Kgatla	Botswana
S31c	N'watu	Botswana
S3111	Shekgalagari	Botswana
S32a	Pedi, N.Sotho	South Africa
S33	S.Sotho	Lesotho
S41	Xhosa	South Africa
S42	Zulu	South Africa
S43	Swati	Swaziland
S44	Ndebele	Zimbabwe
S53	Tsonga	South Africa
S54	Ronga	Mozambique
S62	Tonga, Shengwe	Mozambique

Appendix 2. Languages without PL that have lost the PB *V/VV contrast

Guthrie designation	Language	Where spoken
C41	Ngombe	DRC
D13	Mituku	DRC
D33	Nyali	DRC
D332	Budu	DRC
K.21	Lozi	Zambia
L11	Pende	DRC
M64	Tonga	Zambia
R11	Umbundu	Angola
R21	Kwanyama	Angola, Namibia

Appendix 3. Languages with positionally restricted vowel length

Guthrie designation	Language	Where spoken
B43	Punu	Gabon
JE413	Tiriki	Kenya
G412	Mwiini	Somalia
H10a	Tuba (Kituba)	DRC
H11	Bembe	DRC
H16	Kikongo	DRC
K12b	Ngangela	Angola
L.52	Lunda	Zambia
M25	Safwa	Tanzania
N13	Matengo	Tanzania
P13	Matumbi	Tanzania