

Vowel Length in Eastern Bantu Orthographies

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Abstract: In this paper, vowel length issues in Eastern Bantu languages are investigated which could have implications for orthography development. Apart from phonemic length and vowel concatenation, both of which should usually be written with double letter, a closer look at compensatory lengthening (CL) is taken, i.e. underlyingly short vowels which are lengthened in the environment of labialization, palatalization and prenasalization. This process involves an orthography choice only for those languages which feature a vowel length contrast which is neutralized in CL vowels. Evidence is provided that in some languages, CL vowels group perceptually with short vowels in which case they should be written with single letter, while in others, they group with long vowels in which case they should be written with double letter. This can be tested either through instrumental duration measurements or through elicitation of mother tongue speaker perception. The interaction of length and tone issues and also the influence of Swahili, East Africa's lingua franca, is duly noted as well as the caveat given that linguistic recommendations are often overridden by sociological, historical and political factors.

1. INTRODUCTION

The context for this study is the preparation of an orthography manual for Bantu languages. However, in this paper, only one issue pertinent for the manual is investigated, namely vowel length. As my experience is restricted to Bantu languages in Eastern Africa (particularly Uganda and Tanzania), the caveat of such limitation is reflected in the paper's title. However, works pertaining to Bantu languages in general or to individual languages outside of Eastern Africa have been consulted.

Proto-Bantu has been reconstructed as having seven vowels /ɨ,¹ i, e, a, o, u, ʉ² plus phonemic length (Hyman 2003: 42). From this system, all Bantu vowel systems are derived. The convention is to write short vowels with a single and long vowels with double vowel letter, e.g. <a> versus <aa>. Not all long vowels are underlyingly long, however; and it is these phonetically-conditioned long vowels which have particularly difficult implications for orthography decisions.

Hyman (2003: 48) lists "five sources of vowel length in Bantu":

- underlying representation, i.e. phonemic length;
- vowel concatenation (either across morpheme boundaries or through consonant elision);
- gliding plus compensatory lengthening;
- compensatory lengthening preceding a moraic nasal plus consonant;
- penultimate vowel lengthening.

¹ The vowels ɨ and ʉ constitute extra-high vowels. The subscript diacritic is a convention peculiar to Proto-Bantu vowels.

² Brackets are used as follows: pointed ones <...> for orthographic data, square ones [...] for phonetic, and slashes /.../ for phonological data.

In the following chapter, an overview will be given how these different processes of vowel lengthening have been dealt with in Bantu orthographies. As compensatory lengthening (henceforth CL) poses a particularly difficult problem, it will be investigated in a separate chapter. After a chapter on recommendations for testing, the paper concludes with a summary of the main findings.

2. OVERVIEW OF VOWEL LENGTH ISSUES

Of course, individual Bantu languages have not necessarily kept the original Proto-Bantu vowel system. While quite a few have kept phonemic length to some extent, the conditions of vowel length vary considerably, and some have lost it altogether. If a language has no phonemic length, then no orthographic representation of it will be necessary.

It is no negligible problem that Swahili, being the most wide-spread and influential Bantu language in Eastern Africa, has a deviant phonological structure from the majority of Bantu languages: Swahili has no contrastive pitch, no phonemic length, and it features penultimate stress with raised pitch and phonetic lengthening. In cases of two identical vowels occurring in sequence, these constitute two syllables, e.g. the words <mbaazi> ‘pigeon peas’ and <kuuma> ‘to bite’ are pronounced as [ˈmba.á:zi] and [ku.ú:ma] respectively. As many Bantu mother tongue speakers in East Africa learn to read and write in Swahili first, some of those whose original languages exhibit phonemic vowel length have been observed to encounter difficulties with writing long vowels as double letter as, contrary to Swahili pronunciation, these should be pronounced in the vernaculars as, to use the above examples, [ˈmba:zi] or [ku:ma], i.e. two syllables only instead of three. Reading classes will have to address potential problems in this area.

Actually, all other Eastern Bantu languages to the orthographies of which I had access feature contrastive vowel length, i.e. Gungu (E/J.101³) as described in Moe & Mbabazi (1998), Gwere (E/J.17) in Nzogi (2005), Rangi⁴ (F.33) in Stegen (2005a), Temi⁵ (E.46) from a linguistic consultant session in February 2005, Tharaka (E.54) in Kithinji et al (1998), Zinza (E/J.23) in Matthews (2002), and the ten languages Bena (G.63), Bungu⁶ (F.25), Kinga (G.65), Malila (M.24), Ndali (M.301), Nyakyusa (M.31), Nyiha (M.23), Safwa (M.25), Sangu (G.61), and Vwanji⁷ (G.66) as reported in Kutsch Lojenga et al (2004). All of these have chosen double letter writing for phonemically long vowels (only for Bungu, no official decision has been made yet).

Long vowels can also result from cross-morphemic vowel sequences, at times involving vowel assimilation in case of non-identical vowels. This can occur through direct concatenation as in example (1)⁸.

- 1) *Rangi*: éékire ‘he has shut [implied: the door]’ < á+ék+ire

Or it involves consonant elision as in example (2).

- 2) *Rangi*: ámwímbéire⁹ ‘he has sung for him’ < á+mú+ímb+ir+ire

In most cases, such long vowels will be written with double letter, as they can be semantically distinct from the same segmental sequence with short vowel, as demonstrated in example (3) in contrast to example (2)¹⁰.

- 3) *Rangi*: ámwímbiré ‘he should sing for him’ < á+mú+ímb+ir+é

An interesting variant of vowel length resulting from concatenation are cases which would result in vowel length longer than normal length, e.g. the sequencing of three or more vowels, or the sequencing of a short plus a long vowel and suchlike. In languages which disallow the pronunciation of triple length and reduce all potential instances of it to normal length, this does not pose a problem as no sequences like <aaa> would ever occur, as example (4).

³ These geographical classifications follow Maho 2003.

⁴ This language is also spelled Langi in the literature.

⁵ This language is also called Sonjo which, however, seems to be a derogatory term for its speakers.

⁶ This language is also spelled Wungu in the literature. Its contrastive vowel length might be restricted to grammatical function in the verb paradigm. Lexically contrastive vowel length has not been confirmed.

⁷ Usually, this language has been spelled Wanji. However, Vwanji speakers attending the grammar workshop April 13-30, 2004, in Mbeya insisted on the spelling Vwanji, as their language distinguishes between <w> and <vw>.

⁸ The relevant vowels will appear bold underlined in the examples.

⁹ In Rangi orthography, as in several other Bantu orthographies, the strikethrough letters <#> and <#̂> represent second-degree height vowels, i.e. phonemic vowels between <u> and <o>, and between <i> and <e> respectively. Also, tone marks have been supplied to show surface high tone, even though this is not how tone is represented in the Rangi orthography.

¹⁰ Admittedly, there is also a difference in the tonal melody of both verb forms.

- 4) *Zinza*: /yaagaamba + aáti/ ‘he said this’ > [yaagaambaáti]

By contrast, in those languages which allow triple and longer length pronunciations, as shown in example (5), a choice has to be made.

- 5) *Tharaka*: baaakire ‘they built (long ago)’ < ba+a+ak+ire

The Tharaka example /baaakire/ is written <baakire>, thus disallowing triple sequences of identical vowels in the orthography even though they occur in pronunciation. Despite potential under-differentiation, Kithinji et al (1998) give the following explanation¹¹:

In some cases it is possible that three identical vowels occur in sequence. This is especially the case in distant past verbs which have the tense prefix *-a* [sic]. In such cases all three vowels will not be written but only two. For example, *ba + a + akire*, ‘they built’ is written *baakire* (not *baaakire*). This means that in the surface form this will not be distinguished from the recent past, *ba + akire*, spelt *baakire*. The two forms are pronounced with different tone patterns, and the context will determine in most cases which form is intended. (Kithinji et al 1998: 3)

While it is conceivable that Bantu orthographies would allow triple and longer vowel sequences, no such examples were found in my sample. Also, in such cases, a way may have to be found to identify the morpheme break, e.g. to distinguish the sequence <aaa> into long vowel followed by short vowel /aa.a/ versus the other way round /a.aa/.

Finally, before turning to CL, it should be pointed out that vowel length issues are often intertwined with tone issues, e.g. “Vowels bearing a falling tone are always pronounced long even when it is phonemically short due to the dual pattern of the contour tone thereof” (Nzogi 2005: 18). Such interaction will have to be taken into account and, of course, presented to and checked with mother tongue speakers before making orthography decisions.

3. COMPENSATORY LENGTHENING¹²

In specific environments, underlyingly short vowels are lengthened, a process which is called compensatory lengthening. In Bantu languages, this occurs particularly frequently after labialized and palatalized consonants, and before prenasalized consonants. The lengthening results from the desyllabification of moraic segments, namely a high back vowel in the case of labialization, a high front vowel in the case of palatalization, and a moraic nasal in the case of prenasalization. Examples are given in (6).

- 6) *Gungu*: mu+erí ‘moon’ > mw+erí > [mwe:rí] (moraic length of /u/ linked to /e/)
Gwere: bi+ayo ‘lifestock’ > by+ayo > [b’a:jo] (moraic length of /i/ linked to /a/)
Ndali: i.ŋo.m.be ‘cow’ > i. ŋo.mbe > [iŋo:^mbe] (moraic length of /m/ linked to /o/)

Serious orthography choices only result for those languages which neutralize a phonemic length contrast in these environment. In languages which do not feature contrastive length in the first place, CL vowels will be written with a single letter as every other vowel in such a language. According to De Chene & Anderson (1979), languages without phonemic length should not exhibit CL anyway, as an environment of potential CL “leads to the development of length if and only if a length contrast is independently motivated in the system of the language concerned” (De Chene & Anderson 1979: 505)¹³. On the other hand, in languages which show contrastive length also in environments of labialization, palatalization and prenasalization, as demonstrated for the latter in (7), and as has been shown for Matuumbi (P.13) by Odden (1996), such length distinctions will then have to be differentiated orthographically in all instances.

¹¹ The draft orthography statement which I accessed may have been revised since 1998.

¹² Much of what I know about the implications of compensatory lengthening for Bantu orthography comes from an email written by Ron Moe in 2004. The relevant part of his email can be found in the appendix. While by no means attempting to absolve myself of authorial responsibility, I only considered it fair to let the reader know the source of my inspiration.

¹³ While predominantly containing examples from Indo-European languages, they also include individual examples from Finnish, Turkish, and Hausa as well as Uralic, Dravidian and Australian languages. Another seminal paper on CL in a Bantu language is Clements (1986). Unfortunately, I was not able to access it in time for inclusion in this paper’s discussion.

- 7) *Rangi*: *mūsinga* ‘child’ *versus* *mūriinga* ‘beehive’
Bungu: *nánda* ‘I have begun’ *versus* *náánda*¹⁴ ‘I am beginning’

Thus, it is only languages which have contrastive length elsewhere but only long vowels in these environments of CL which have a choice between writing such CL vowels with either single or double letter.

Again, the influence of Swahili as a language without phonemic length, and consequently without CL, is considerable. It may well be responsible for the overwhelming preponderance throughout Bantu languages of writing CL vowels with a single letter. For Bantu mother tongue speakers who are accustomed to Swahili spelling, it would be no small matter to deviate in their vernacular spelling from Eastern Africa’s lingua franca; some examples of Bantu-wide cognates occurring in many Eastern African languages apart from Swahili are given in (8).

- 8) *Swahili* <*mwana*> ‘child, son’ *versus* *potentially vernacular* <*mwaana*>¹⁵
Swahili <*vyako*> ‘your (cl.8)’ *versus* *potentially vernacular* <*vyaako*>
Swahili <*ng’ombe*>¹⁶ ‘cow’ *versus* *potentially vernacular* <*ng’oombe*>

However, following the Swahili example may have other unforeseen and potentially unwelcome consequences. For example, Zinza orthography has the following rule: “Vowels preceding a prenasalized consonant are always long and are written with a single rather than double letter. Likewise vowels following a labialized or palatalized consonant are always long and are written with a single letter” (Matthews 2002: 9). As Zinza also marks tone in the orthography, e.g. distinguishing high, falling and rising tone on long vowels written with double letter as <áá>, <áa> and <aá> respectively, the writing of CL vowels with a single letter results in the introduction of two additional tone marks, namely <â> for falling and <ã> for rising tone in addition to <á> for high tone. This is not to say that Zinza orthography has to be changed as, apparently, it has been accepted after a decade of testing, local committee meetings and community discussion. The situation may simply serve as a vivid reminder that sociological, historical and political factors will more often than not override linguistic arguments and recommendations.

There is still more to CL than meets the eye at a first glance, for a CL vowel in one language isn’t necessarily a CL vowel in another. Maddieson (2003) reports the following from instrumental duration studies of Ganda (E/J.15) and Sukuma (F.21):

Both languages have contrasts of vowel quantity and compensatory lengthening of vowels before prenasalized stops. But there are interesting differences between the two. Lengthened vowels are much closer in duration to underlying long vowels in Ganda than they are in Sukuma. Sukuma lengthened vowels are almost exactly intermediate between underlying short and long vowels, and the nasal portion is quite long. [...] the difference from Ganda is related to the fact that lengthened vowels count in a different way in tone assignment rules in these languages. (Maddieson 2003: 37)

An even more compelling explanation¹⁷ for this difference seems to be that in Sukuma, CL is a post-lexical phonetic process of which speakers would not be aware without phonetic training. Also, the lengthened vowels are not equal to long vowels, and consequently should be written with a single letter.¹⁸ Ganda speakers, by contrast, perceive CL as a neutralization of a phonemic contrast. For them, lengthened vowels are equal to long ones and should be written with double letter.

Finally, Maddieson’s remark about tone assignment differences as well as the Zinza situation related above are reminders that vowel length cannot be separated from tonal issues, neither in phonological analysis nor in orthography choices. This is corroborated by Hyman (1992) who reports “cases in three Bantu languages (Luganda [E/J.15], Cibemba [M.42], Runyambo-Haya [E/J.21-22]) where a preconsonantal nasal counts as a mora for one process [viz. CL], but does not count as a mora for another [viz. tone assignment]” (Hyman 1992: 255). In my opinion, this is a strong indication that orthography decisions cannot be made on an individual basis but that they have to be presented to the community and the decision makers as a whole, i.e. as an interwoven network. For example, it should not happen that segmental orthography decisions are made first because of their presumed ease while tonal issues are only decided later.

¹⁴ As Bungu does not seem to feature phonemic length in lexical stems, the example may not be proper phonemic length but rather the result of concatenation, comparable to Swahili <naandika> ‘I write’ from /na+andika/.

¹⁵ All three vernacular examples represent the actual spelling of these words in Rangi.

¹⁶ <ng’> is the Swahili spelling for the velar nasal [ŋ].

¹⁷ I am grateful to Ron Moe for bringing this to my attention.

¹⁸ In a linguistic consultant session in February 2005, Temi language speakers came to the same conclusion. They perceived CL vowels to be closer in duration to short vowels than to long vowels, and consequently decided to write such vowels with a single letter.

4. RECOMMENDATIONS FOR TESTING

With regard to how to write vowel length in a language's orthography, it will first have to be established whether that language exhibits contrastive length. This can be accomplished by eliciting several hundred (or if possible even thousand) words, and then looking at bisyllabic lexical stems, at this stage nouns and verbs only. It should be easy enough to note whether CVCV stems fall into one or two groups, i.e. potentially CVCV versus CV:CV or not, as long as CL environments (CSVCV and CVNCV) are kept separate. At the same time, tone should be noted (cf. Stegen 2005b), especially in order to find out about potential contour tones on long vowels. It is not uncommon to find only high and low tones on short vowels, but additionally falling and rising tones on long vowels (cf. the discussion on Zinza in chapter 3 above).

In a second step, the value of CL vowels has to be determined (this is presuming that the language exhibits a length contrast which is neutralized in CL positions). Basically, the question is whether vowels in CSVC and CVNC syllables group with vowels in CVC or with vowels in CV:C syllables. While instrumental duration measurements could answer that, it is recommended to elicit mother tongue speaker perception. This not only avoids the pitfalls of instrumental studies like producing suitable recordings, establishing statistically representative samples or applying reliable and consistent criteria for speech segmentation, it also involves the language community more directly in the orthography decision process.

For example, a group of speakers could be asked to categorize cards with vernacular words according to vowel length. However, length distinctions would **not** be written on the cards, e.g. the Rangi words /pata/ 'receive' and /paata/ 'carve' would both be spelled <pata> on the cards (a gloss will have to be given underneath each word in order to disambiguate such minimal pairs and to help word recognition in general; depending on the sociolinguistic setting, such a gloss could be given in English, in the national language or alternatively as a picture). It could then be observed where speakers put words exhibiting CL.

Alternatively, especially in languages where vernacular literacy has started already, a group of new vernacular writers could be taught to write phonemic length without particularly mentioning CL, and then it could be observed whether they write vowels in CL environments long or short (i.e. whether they perceive them as long or short). The results of this particular test may be skewed by Swahili influence, that is writers who presumably were first trained to write in Swahili may write CL vowels with single letter due to Swahili tradition and not by vernacular intuition.

Finally, the results of these tests together with the various orthography options will have to be presented to the decision makers. As mentioned earlier, it will be beneficial to present the issues as an interactive whole rather than individually. For example, the issue of marking contour tones on long vowels should be presented together with the issue of whether to write CL vowels long or short.

5. CONCLUSIONS

With regard to writing vowel length in Eastern African Bantu languages, the following generalizations can be stated (individual exceptions notwithstanding):

- Languages with phonemic length write single versus double vowel letters, e.g. <a> vs <aa>.
- Long vowels resulting from concatenation tend to be written with double letter.
- CL vowels which are perceived to group with short vowels should be written with single letter. CL vowels which are perceived to group with long vowels should be written with double letter (even though this is not yet standard practice in Bantu orthographies).

Issues of vowel length interact with tone as well as with vowel elision and assimilation. This interaction should be taken into account and presented as an interactive whole when dealing with orthography decisions.

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References

- Clements, George. 1986. "Compensatory lengthening and consonant gemination in LuGanda", in Leo Wetzels & Engin Sezer (eds.). Dordrecht: Foris Publications, 37-77.
- De Chene, Brent & Stephen Anderson. 1979. "Compensatory Lengthening", *Language* 55/3, 505-534.
- Hyman, Larry. 1992. "Moraic mismatches in Bantu", *Phonology* 9, 255-265.
- Hyman, Larry. 2003. "Segmental Phonology", in Nurse & Philippson (eds.). *The Bantu Languages*, 42-58.
- Kithinji, Stephen, Leila Schroeder & Nick Lunn. n.d. "Tharaka Orthography". Unpublished manuscript. Nairobi: BTL.
- Kutsch Lojenga, Constance, Martin Tlustos & Helen Eaton. 2004. "Report on the Phonology / Orthography Workshop". Mbeya: SIL.
- Maddieson, Ian. 2003. "The Sounds of the Bantu Languages", in Nurse & Philippson (eds.). *The Bantu Languages*, 15-41.
- Maho, Jouni. 2003. "A Classification of the Bantu Languages: An Update of Guthrie's Referential System", in Nurse & Philippson (eds.). *The Bantu Languages*, 639-651.
- Matthews, Tom. 2002. *Echizinza Orthography Guide*. Nairobi: SIL.
- Moe, Ron & James Mbabazi. 1998. "Lugungu Orthography Guide – Preliminary Version". Unpublished manuscript. Nairobi: SIL.
- Nurse, Derek & Gérard Philippson. 2003. *The Bantu Languages*. London & New York: Routledge.
- Nzogi, Richard. 2005. "Lugwere Orthography Statement". Work in Progress. Entebbe: SIL.
- Odden, David. 1996. *The phonology and morphology of Kimatuumbi*. Oxford: Clarendon.
- Stegen, Oliver. 2005a. "M̩lɔ́ngoryo wa kwaand̩ka K̩laangi" [Rangi Spelling Guide]. Work in Progress. Dodoma: SIL.
- Stegen, Oliver. 2005b. "Tone in Eastern Bantu Orthographies", Paper presented at the SIL Bantu orthography meeting, Dallas, November 7-12, 2005.

Appendix

The following excerpt originates from an email by Ron Moe, written on April 16, 2004, as a response to the question whether CL vowels should be written with single or double letter. I reproduce it here with his permission as it is both quite to the point and has positively influenced my writing of this paper:

"[...] the practice all over the Bantu region is to write phonetically lengthened vowels with a single vowel [sic]. There are a few languages (Kimatuumbi in Tanzania) where there is a contrast before prenasalized and after labialized and palatalized consonants. In these languages you have to write length everywhere. But I haven't found any languages like this in Uganda. So if vowel length is not conditioned in these environments, you must write it. If it is conditioned, you have a choice.

There are two primary factors in deciding whether or not to write predictable length: (1) If you don't write it, the words are shorter. This is not a trivial reason. Words are already long and people don't want them any longer. (2) If you do write it, length is uniformly written, both in phonemic cases and in predictable cases. There is an interesting theoretical issue behind this. Presumably if a phonological rule is conditioned by the phonological environment, that rule should be phonetic and native speakers should not be aware of it. However if the rule changes one phoneme into another phoneme, native speakers should be aware of it. In the case of compensatory lengthening, we need to find out if the rule is changing one phoneme into another phoneme. This could be why people tend to write length everywhere, even in those environments where it is predictable. For them there is a phonemic distinction. The technical term for this phenomena is 'neutralization of contrast'. A phonemic contrast is neutralized in a particular context, i.e. there is no contrast between phonemically long and short vowels in these two environments (_NC, CS_). However the pronunciation of the vowel in these environments is like the

long phoneme. You should test this instrumentally. Is a conditioned vowel just as long as a phonemic one, or is it somewhere in between?

Both writing systems could work. People can learn to write a single vowel [sic] in the conditioned environments. But they may have difficulty doing so. You need to get native speaker reaction. Present both options to the language committee. Discuss the pros and cons fairly and without bias. Let them decide. Then test it. Give some dictation exercises to some people and see how they spell conditioned vowels. The theorists may propound a theory today and change it tomorrow. So test, test, test. See what people want and what they do. The two may be in conflict. Ultimately what they do will tend to come out ahead, because it reflects the phonemic system in their heads.

There are three possibilities as to what is in their heads. (1) The so-called conditioned vowels are perceived as phonemically long. If you tell them to write the vowel with a single letter, they must consciously look at the environment to know if a long vowel should be written single or double. This would be similar to trying to get people to write a phonetic distinction. Some people can be taught to do write a phonetic distinction, but most will have serious difficulty, everyone will make mistakes, and some will never get it. (2) They are perceived as short. This would be true, if for instance the length is not the same as a phonemically long vowel. Then you will have difficulty getting them to write it double--for the very same reason. You are asking them to make an orthographic choice on the basis of the environment. (3) The vowel is unspecified for phonemic length and the length is purely a matter of environmental conditioning (i.e. phonetic/post-lexical). In this case you will have trouble getting people to write them consistently no matter what orthographic choice you make. If you tell them to double the letter, people will sometimes write it single. If you tell them to write it single, people will sometimes write it double. You will have to make a choice and teach them to write consistently. In this case probably the best choice is to write the vowels singly, since this would shorten the words. This is why testing will help you determine what is in people's heads.

I'm not sure if option (3) above is even theoretically possible. I threw it in anyway because sometimes underlying segments are unspecified for some value (e.g. homorganic nasals) and the value gets specified by some rule. In the case of conditioned vowels, I think it can be shown that they are underlyingly short. I think this is one reason why people have recommended that they be written short. We know we have a rule that lengthens the underlyingly short vowel. Whether that rule just adds a little length or changes the short vowel into a long vowel may be the critical issue."