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**Morphology, Irregularity, and Bantu Frication: The Case of Lulamogi**

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Paper Presented at the Journée d’Etudes de la Société de Linguistique de Paris


“D’après l’hypothèse néogrammarienne... tout changement des sons est conditionné à son début de façon strictement phonétique.... Or les langues bantoues présentent quantité d’exemples où... l’état synchronique suggère que certaines langues bantoues ont effectué un changement phonétique de façon régulière tandis que dans d’autres langues soeurs un changement analogue n’apparaît que dans des contextes morphologiques précis.” (Hyman 1997: 163)

1. **Introduction**

The purpose of this paper is to revisit a set of phonological changes that the first author addressed 18 years ago in the Journée d’Etudes of the Société de Linguistique de Paris, which continue to intrigue Bantuists as presenting apparent problems for the Neogrammarian hypothesis (see above citation). To begin, the elements of the Neogrammarian tradition can be summarized as follows:

(i) “Major” sound changes are “regular”, that is, all of the targeted sounds that meet the conditions undergo the change.

(ii) Such major sound changes are phonetically conditioned. Specifically, morphological structure plays no role in their initiation.

(iii) Apparent counter-examples are due to two other factors: First, sound changes which are “irregular” may be the result of borrowings due to contact. Second, changes which invoke morphology are due to other mechanisms, e.g. analogy.

(iv) The study of sound change requires rigorous application of the comparative method and internal reconstruction.

While most of the Neogrammarian tradition was devoted to the study of Indo-European, a Bantu Neogrammarian tradition has existed for at least 150 years:

“In Bantu studies... research by Bleek, Meinhof, Guthrie, Meeussen and their students has a distinctly comparative and diachronic character that begins more neogrammarian than structuralist.” (Hyman 2005: 22)

Thus, the reconstruction of Bantu lexicon and morphology traces back at least to Bleek (1862, 1869). As reported by Schadeberg (2002:184), since this time different Bantuists have reconstructed the following number of Proto-Bantu (PB) and regional lexical items (with larger numbers admittedly including a number of doublets):¹

<table>
<thead>
<tr>
<th>Language/Subject</th>
<th>PB</th>
<th>CB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meinhof (1899)</td>
<td>270</td>
<td>Meussen (1969)</td>
</tr>
<tr>
<td>Meinhof (1910)</td>
<td>470</td>
<td>Guthrie (1967-71) (CB)</td>
</tr>
<tr>
<td>Bourquin (1923)</td>
<td>1450</td>
<td>Guthrie (1967-71) (PB)</td>
</tr>
<tr>
<td>Homburger (1913)</td>
<td>540</td>
<td>CBOLD (ca. 1996)</td>
</tr>
<tr>
<td>Homburger (1925)</td>
<td>+235</td>
<td>BLR 3 (2002)</td>
</tr>
</tbody>
</table>

¹ Guthrie’s CB = Common Bantu, PB = Proto-Bantu; CBOLD = Comparative Bantu On-Line Dictionary; BLR = Bantu Lexical Reconstructions (Bastin et al).
In addition, a number of studies have established widespread sound changes reminiscent of Indo-European, often identified as “laws” (Schadeberg 2003, Hinnebusch et al. 1981):

<table>
<thead>
<tr>
<th>Law</th>
<th>Change Description</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahl’s Law</td>
<td>TVTV → DVT</td>
<td>(voicing dissimilation)</td>
</tr>
<tr>
<td>Meinhof’s Law</td>
<td>NDVNDV &gt; NVNDV</td>
<td>(nasal+consonant simplification)</td>
</tr>
<tr>
<td>Katupa’s Law</td>
<td>ThVTh &gt; TVTh</td>
<td>(dissimilation of aspiration)</td>
</tr>
</tbody>
</table>

Concerning the Neogrammarian hypothesis, Bantu languages offer a gold mine for studying the tension between regular sound change and other mechanisms of change which affect lexical items and phonological systems. First, there are many (ca. 500) closely related Bantu languages whose sound systems have been studied. Second, these Bantu languages have a complex morphological structure which appears at first glance to be implicated in phonological change (Hyman 1997, Hyman & Moxley 1996). They are known, for example, for a complex agglutinative verb structure which Meeussen (1967) reconstructs as in (1).

(1)   verb
      pre-stem stem base final vowel (FV) (extensions)

The following illustrates the structure with a Luganda example:

pre-stem root extensions FV
(2)  a- bá- tá- lí- ké- léët -ér -ágán -á ‘those who do not bring it to each other’
AUG-they-NEG-FUT-it- bring- APPL- RECIP- FV (AUG = augment; APPL = applicative; FV = final vowel)

With the above established, we now turn to the issue of Bantu frication.

2. Frication before the high vowels *i, *u

The consonant and vowel systems reconstructed by Meeussen (1967), Schadeberg (2003) and others for Proto-Bantu are presented in (3):²

(3) a. consonants  b. vowels (three interpretations)
    p t c k i u i u i u
    b l j g i u i o e o
    m n ŋ e o e e e e
    a a a a

² Although there are two alternative interpretations of the oral voiced series, *b, *d, *j, *g and *β, *l, *y, *y, we shall cite these as stops, except for *l (which is typically realized [d] after a nasal, most commonly otherwise as a liquid). *e and *y were most likely affricates ([tʃ, dʒ]), but are often realized as [s, z]. For further discussion of the vowel system see also Hyman (1999). Finally, two tones, *H and *L are reconstructed (Greenberg 1948).
There has been considerable discussion concerning what the nature was of the distinction between the first vs. second degree high vowels in PB:

c. *i̅, *u̅ tense vs. *i̅, *u̅ lax (or [± ATR]; Hyman 1999)
d. *i, *u high vs. *e, *o mid-high (Guthrie 1967)

What is crucial is that consonants often undergo a wide range of “frication” processes (also known as “Bantu spirantization”) before *i̅, *u̅:

(5) *pi̅ > pʰi, pfi, fi, psi, tsi, si *pu̅ > pʰu, pfu, fu, ču
   *bi̅ > bvi, vi, bzi, dzi, zi *bu̅ > bu̅, vu, ju
   *ti̅ > tʰi, tsi, si *tu̅ > tʰu, tsu, su, tfu, pfu, fu, ču etc.
   *li̅ > di, dzi, zi *lu̅ > du, dzu, zu, dvu, vu, ju
   *ki̅ > kʰi, kzi, si *ku̅ > kʰu, kxu, xu, kfu, pfu, fu, ču
   *gi̅ > dzi, zi *gu̅ > guv, buv, vu, ju

Most, but not all of the languages which undergo these changes also merge the first and second degree high vowels: *i̅, *i > [i] et *u̅, *u > [u] (Schadeberg 1994-5). Although we will be citing examples from languages with the resulting five-vowel system, we will continue to transcribe *i̅, *u̅ for [i, u] which derive from the PB first degree vowels *i̅ and *u̅ and *i, *u where [i, u] derive from the PB second degree vowels *i and *u.

3. The problem

The problem which we face with respect to the Neogrammarian regularity of sound change will now be illustrated from Luganda, where PB *t, *l, *k, *g > [s, z] before *i̅ in all four of the possible morphological environments:

(6) within root : *-t̅i- ‘rub, grind’ > -s̅i-a ‘rub, pulverise’ *t > s
   *-k̅i- ‘be silent’ > -s̅il-k-a ‘be silent’ *k > s
   *-l̅i- ‘extinguish’ > -z̅i-m-a ‘extinguish’ *d > z
   *-g̅i- ‘be taboo’ > -z̅il-a ‘be taboo’ *g > z

causative -j̅- : *-l̅oot̅- ‘dream’ > -l̅oos-a ‘make dream’ < -lées-y-
   *-jiluk̅- ‘run’ > -ddu̅s-a ‘make run’ < -ddus-y-a
   *-bal̅- ‘count’ > -b̅az-a ‘make count’ < -baz-y-a
   *-jig̅- ‘learn’ > -y̅iz-a ‘make learn’ < -yiz-y-a

agentive *-j̅- : *-l̅oot̅- ‘dream’ > mu-l̅oos-i ‘dreamer’ < -l̅oot-i
   *-jiluk̅- ‘run’ > mú-ddus-i ‘fugitive’ < -ddūk-i
   *-jig̅- ‘learn’ > mu-y̅iz-i ‘apprentice’ < -yiz-i

perf. *-k̅-e : *-l̅oot̅- ‘dream’ > a-l̅oos-e ‘he has dreamt’ < -l̅oos-y-e
   *-jiluk̅- ‘courir’ > á-ddūs-e ‘he has count’ < -ddūk-e
   *-bal̅- ‘count’ > a-baz-ê ‘he has counted’ < -baz-y-e
   *-jig̅- ‘learn’ > a-y̅iz-e ‘he has learned’ < yiz-y-e
As seen in the above forms, *i glides to y before another vowel, but then is “absorbed” into the preceding [s] or [z]. While the above changes are consistent in all four environments, (7) shows that *p̩i and *b̩i become [si] and [zi] only within a morpheme: ³

(6) within root :  
  *-pīlah ‘pus’  >  ma-sīrà ‘pus’  
  *-kapī ‘oar’  >  n-kasī ‘oar’  
  *-pju ‘knife’  >  ki-sô ‘knife’ (< -syô)  
  *-bīmb ‘swell’  >  -zīmb-a ‘swell’  
  *-bii ‘excrement’  >  ma-zī ‘excrement’  

causative -i- :  
  *-puup‘ ‘blow’  >  -fuuy-a ‘make blow’  
  *-lip ‘pay’  >  -liy-a ‘make pay’  
  *-lāb- ‘look’  >  -lāb-y-a ‘make look’  
  *-kūb- ‘beat’  >  -kūb-y-a ‘make beat’  

agentive *-i :  
  *-puup- ‘blow’  >  mu-fuuy-i ‘horn blower’  
  *-jīb- ‘steal’  >  mū-bb-i ‘thief’  
  *-gab- ‘distribute’  >  mu-gab-i ‘generous person’  
  *-lūb- ‘fish’  >  mu-vub-i ‘fisherman’  

perf. *-i-l-e :  
  *-jīb- ‘steal’  >  á-bb-y-e ‘he has stolen’  
  *-gab- ‘distribute’  >  a-gab-y-ē ‘he has distributed’  
  *-kūb- ‘beat’  >  a-kūb-y-ē ‘he has beaten’  

It is generally assumed that the above four contexts constitute a hierarchy of most to least likely environments to produce frication (Bastin 1983; Hyman 1997; Labroussi 1999):

(7)   a.  + .... Cɨ .... + : before tautomorphemic *ɨ  
 b.  C + -i- + V : before the causative *-i- suffix, which, followed by a vowel, glides to [y]  
 c.  C + -i : before the agentive *-i derivational suffix  
 d.  C + -i-l-e : before the perfective *-i-l-e inflectional suffix  

If correct, the expected implicational hierarchy would be as in (8).

(8)  

<table>
<thead>
<tr>
<th></th>
<th>(7d)</th>
<th>(7c)</th>
<th>(7b)</th>
<th>(7a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
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<td>+</td>
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In this case, the diachronic analog would be the reverse: frication begins within morphemes, then extends out: (7a) > (7b) > (7c) > (7d). This position has been taken by both Hyman and Labroussi:

“C’est-à-dire la fricativisation aurait commencé à l’intérieur des morphèmes avec des extensions successives touchant les trois suffixes un à un: causatif, agentif, perfectif.” (Hyman 1997:173)

³ Note that *p > w, y (according to the front-backness of the following vowel), but remains [p] after a preceding nasal: *pā- > wā- ‘give’ vs. m-pā- ‘give me’.
“The various processes that constitute the phonological change globally refer[r]ed to as ‘spirantisation’ are first triggered off morpheme-internally, that is, where no morphological boundary is blocking the influence of the tense high vowels on preceding consonants.” (Labroussi 1999: 364)

For a sound change to have begun exclusively within morphemes, hence with reference to grammatical information, would constitute a serious challenge to the Neogrammarian hypothesis that major sound changes are regular, i.e. apply generally without restriction to morphological structure.4

A more Neogrammarian alternative has however proposed by both Downing (2007) and Bostoen (2008). Frication would have begun as a regular sound change, but a counter-force (“paradigm regularization”) would have favored the non-fricated base forms, thereby creating new derivatives in competition with the old fricated forms. As a result, certain languages would have lost frication in the derived contexts, specifically before perfective *-ĵl-e, agentive *-ĵ, and causative *-ĵ- (presumably in this order). According to this interpretation, *pĵ, *bĵ would have originally become [ŝ, ẑ] in Luganda in all contexts. However, by paradigm regularization, the root final consonants [p] and [b] would also have been produced as alternate competing forms gradually replacing [s] and [z], as schematized in (9).

(9) Proto-Bantu Stage I Stage II
a. *ku-bín-a ‘to dance’ > ku-zín-a > ku-zín-a (frication)
b. *ku-kúb-a ‘to beat’ > ku-kúb-a > ku-kúb-a
c. *mu-kúb-i ‘beater’ > mu-kúb-i ~ mu-kúz-i > mu-kúb-i
d. *ku-kúb-i-a ‘make beat’ > ku-kúb-i-a ~ ku-kúz-i-a > ku-kúb-i-a (frication + defrication)
e. *a-kúb-il-e ‘he has beaten’ > a-kúb-il-e ~ a-kúz-il-e > a-kúb-il-e

Would such an interpretation have been acceptable to the Neogrammarians? We know that Hermann Paul and others were conscious of the effects of the paradigm and of analogy as confounding variables (Morpurgo Davies 1978:44). However, two questions arise concerning the Luganda situation:

First, why don’t we find (more) vestiges of *b+i > [zi]? An extensive search through Snoxall (1967) has produced only one apparent case:

(10) a. o-ku-naab-a ‘to bathe (oneself)’
    b. o-ku-naaz-a ‘to bathe someone’ (causative)

This is assuming that the [z] in (10b) derives from *-naab-i- rather than having an irregular allomorph with *i: ?*naal-i-a > -naaz-i-a > -naaz-y-a > -naaz-a.

The second question is why the labial *p and *b would have been the only consonants to undo the original frication to *s and *z? Perhaps we can attribute this to phonetic distance (Comrie 1979): the alternation b~z is phonetically greater and considerably less attested cross-linguistically than either d~z or g~z. Another idea is that the labials were subject to a proportional analogy. As seen in (11), the labial nasal /m/ is one of only two consonants which do not alternate before *i in Luganda (the other is /n/):

4 It should be noted that Labroussi justifies this analysis in part in comparison with velar palatalization (*k, *g > č, ğ) which she assumes also to have begun intramorphemically. If correct, this too would be a problem for the Neogrammarian hypothesis. However, for a quite different analysis invoking analogy, see Hyman & Moxley (1996).
In the following section we consider the much more complex frication facts from Lulamogi which may shed further light on the different factors at play.

4. Lulamogi

Since August 2013 we have been able to study Lulamogi [olulamooj i], a small, understudied language to the northeast of Luganda with Andrew Mukacha from Busulumba village in Kaliro district, Uganda. Although very little information has been available from the literature, there are detailed lexicons of both Lusoga (Gulere 2009), with which Lulamogi is usually identified, and Lugwere (Kagaya 2006, Nzogi & Diprose 2012), with which it is in fact dialectal. Like Luganda, all of these language variants have merged the original seven vowels of Proto-Bantu into five: *ɪ̞, *ɪ > i; *u̞-, *u > u. The striking fact is that Lulamogi, Lugwere and certain dialects of Lusoga are the only languages in the region which do not have regular frication in the four contexts discussed in §3. In this section we will illustrate this by showing the reflexes of PB *l in Lulamogi. For other correspondences, see the Appendix.

As seen in (12), the sequence *lɪ̞ corresponds in general to [li] in Lulamogi vs. [zi] or [si] in neighboring languages:


‘tears’ *-liga á-ma-llibá a-ma-ziga a-ma-ziga a-ma-siga máa-sika
‘bury’ *-li-ip- ō-ku-liik-á o-ku-zik-a o-ku-zik-a o-ku-siik-a xuu-siix-a
‘woman’ *-kálí ō-mu-kalí o-mu-kázi ō-mu-kázi o-mu-gási ō-mu-xasi
‘goat’ *-búli ō-m-búli e-m-búzi e-m-búzi e-m-búzi e-m-buši ēe-m-busi
‘month’ *-jélí ō-mw-eelí o-mw-éézi o-mw-éézi o-mw-éézi o-kw-éézi kú-mw-eesi

At the same time, there are Lulamogi correspondences with [zi]:


‘heavy’ *-lɪto -zíto -zíto -zíto --- -síto -síro
‘spirit’ *-lɪ-mu- ō-mu-zímú o-mu-zímu o-mu-zímu mu-jímu ō-mu-símo
‘block’ *-lɪb- ō-ku-zíb-á o-ku-zíb-a o-ku-zíb-a --- o-ku-siíja xúu-síb-ula?
‘wide’ *ga-ŭli -gaźí -gaźí --- -gaźí ---
‘moon’ *-jélí ō-mw-eézi o-mw-éézi o-mw-éézi o-kw-éézi o-kw-éézi kú-mw-eesi

≠ ‘month’ ō-mw-eelí o-mw-éézi o-mw-éézi o-kw-éézi o-kw-éézi kú-mw-eesi

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5 Our study began with an undergraduate field methods course attended by Sarah Bothfeld, Justin Lei, Emil Minas, Mark Morales, Donnie Schultz, Jeff Spingeld, Alejandro Vargas. We are grateful for the contributions of the above students as well as graduate students Matt Faytak and Nik Rolle, but especially to Andrew Mukacha for his great dedication to this and other work on Lulamogi.

We shall argue that cases of [zi] are due to contact rather than a direct Lulamogi reflex of PB *li. There are three arguments that *li escaped frication in “proper” Lulamogi. First, [zi] > [li] is not a natural phonetic sound change. Second, one cannot claim a process of undergoing [zi] to [li], since cases of [zi] which derive from *ji remain [zi], e.g. PB *-įįjį > ą-mā-įzi ‘water’, not *ą-mā-įli. Finally, Lulamogi is surrounded by languages where *li > zi (> si in Kijita and Lubukusu). Only Lugwere and certain dialects of Lusoga share the [li] reflex with Lulamogi. Cases where Lulamogi has [zi] corresponding to PB *li are thus certainly due to contact.

The same thing is true of certain words containing suffixes with *i. As seen in (14), the agentic suffix *-i produces doublets, where the form with [zi] has a specialized meaning:7

(14) verb reflex = [li] reflex = [zi]
    ó-ku-lamul-á ‘to judge’ ó-mú-lámül-i ‘judger’ ó-mú-lámúz-i ‘judge’
    ó-ku-tuund-á ‘to sell’ ó-mú-túúnd-i ‘seller’ ó-mú-túúnz-i ‘salesman’

As seen, the fricated variants refer to specific professions, while the forms with [li] simply refer to a person who judges or who sells. This pattern seems to have caught on for the purpose of creating new professional derivatives. Thus, from the verb ó-ku-sal-á ‘to cut’, one can produce both ó-mú-sál-i ‘a cutter, someone who cuts’ and ó-mú-sáz-i ‘a cutter, e.g. someone who cuts cloth professionally’. (Luganda has only o-mu-sázi ‘one who cuts’). On the other hand, it isn’t possible to produce a fricated derivative in the absence of a dedicated profession, e.g. ó-ku-byaal-á ‘to give birth’ can only become ó-mú-byááld-i ‘a child bearer’, not *ó-mú-byáádz-i. Similarly, ó-ku-bal-á ‘to bear fruit’ can only become ó-mú-bál-i ‘fruit-bearing’, not *ó-mú-báz-i.

The situation concerning the causative suffix *-i- is even more telling. It is clear that the productive causatives are produced with [l]:

(15) infinitive + causative -i-
    ó-ku-sal-á ‘cut’ ó-ku-sal-y-á ‘make cut, cut with (instrument)’
    ó-ku-kol-á ‘work’ ó-ku-kol-y-á ‘make work, work with (instrument)’
    ó-ku-hal-á ‘scratch’ ó-ku-hal-y-á ‘make scratch, scratch with (instrument)’

In addition, the causative suffix does not fricate an l-final suffix:

(16) causative + applicative -il-/-el-
    ó-ku-sal-y-á ‘make cut’ ó-ku-sal-il-y-á ‘make cut for (someone)’
    ó-ku-kol-y-á ‘make work’ ó-ku-kol-él-y-á ‘make work for (someone)’
    ó-ku-hal-y-á ‘make scratch’ ó-ku-hal-il-y-á ‘make scratch for (someone)’

    causatif + intensive -ilil-/-elel-
    ó-ku-sal-y-á ‘make cut’ ó-ku-sal-ilil-y-á ‘make cut continuously’
    ó-ku-kol-y-á ‘make work’ ó-ku-kol-élél-y-á ‘make work continuously’
    ó-ku-hal-y-á ‘make scratch’ ó-ku-hal-ilil-y-á ‘make scratch continuously’

However, at the same time there are causative doublets where the form with [zya] has a direct or specialized meaning:

7 The corresponding Luganda nouns are o-mu-lamuz-i and o-mu-tuunz-i. Recall that *l is pronounced [d] after [n], hence Lulamogi óku-tuund-á, Luganda oku-tuund-a ‘to sell’.
The same type of doublets are also found with other root-final consonants, e.g. *k:

(18)  
verb | reflex = k-y-a | reflex = s-y-a  
--- | --- | ---  
ó-ku-sek-á ‘laugh’ | ó-ku-sek-y-á ‘make laugh’ | ó-ku-ses-y-á ‘entertain’  
ó-ku-luk-á ‘weave’ | ó-ku-luk-y-á ‘make weave’ | ó-ku-lus-y-á ‘weave in and out’  
ó-ku-tuuk-á ‘arrive’ | ó-ku-tuuk-y-á ‘make arrive’ | ó-ku-tuus-y-á ‘until’ < ‘to reach’

Even if one cannot identify a meaning difference, the doublets often have a different lexical structure which one sees when a transitive verb is causativized. For example, the verb ó-ku-sik-á ‘to pull’ can be causativized as either ó-ku-sik-y-á or ó-ku-sis-y-á ‘to make pull, to pull with (instrument)’. However, as seen in (19), their ability to license arguments is different:

(19) a. ó-ku-sik-y-á → nyaBa-ku-sik-y-á émótoká ómúgúha ‘I will pull the
b. ó-ku-sis-y-á → nyaBa-ku-sis-y-á émótoká na ómúgúha car with a rope’

While there is some variation, a transitive verb which is causativized without frication becomes ditransitive, as in (19a), while a verb which is causativized with frication remains monotransitive, thus requiring the preposition na ‘with’ in (19b). What this shows is that forms with frication are lexicalized and are, in fact, borrowings.9

Proof that such fricated causatives are borrowed is seen from the reflexes of PB *-jog-i- ‘wash (someone)’. In the following examples root-initial *f > Ø:

(20)  
PB *-jog- ‘bathe’ | Luhaya | Lulamogi | Luganda *l-í-, *g-í- > [zi]  
--- | --- | --- | ---  
‘bathe, swim’ | o-kw-og-a | --- | ---  
‘wash’ | o-kw-og-y-á /-og-i-/ | ó-kw-oz-y-á o-kw-oz-a /-ol-i-/  
‘wash for (s.o.)’ | o-kw-og-ya /-og-el-i-/ | o-kw-ol-ke-ya o-kw-ol-ke-a /-ol-el-i-/  

The most direct realizations of PB *-jog- ‘bathe’ are seen in Luhaya, which does not fricate velars. In Lulamogi we see that the *g is realized [z] in ó-kw-oz-y-á ‘to wash’, as it is in Luganda (where, however, the related noun e-ky-og-el-o ‘basin for washing a baby’ retains the [g]). Neither Luganda nor Lulamogi have the non-causative verb. However, both show a non-etymological reflex [l] in ‘wash for (someone)’. Lulamogi has also borrowed this reflex, which Luganda introduces to avoid fricatives in two successive syllables (Hyman 2003:71):

(21) -CVg-i- → -CVz-i- → -CVz-el-i- → -CVz-ez-i- → -CVl-ez-i-

In fact, on the basis of the newly created non-etymological root -ol-, Lulamogi has introduced

---

8 Cf. Lugwere, which has less frication than Lulamogi: /ó-ku-tuuk-i-á/ → ó-ku-tuuč-a.
9 Recall from (12) that the Lulamogi reflex of *-li-ik- ‘bury’ is -liik-. However, as further evidence of Lulamogi speakers adapting to surrounding speakers, our consultant volunteered that they sometimes use -ziik- to talk to speakers of Lutenga (the standard Lusoga dialect) so that they can understand better.
a competing causative form \( \dot{o}-kw-\text{ol-y-á} \) which, as in (19a) licenses two objects (vs. \( \dot{o}-kw-\text{oz-y-á} \) which takes only one object):

\[
\begin{align*}
(22) \quad & \text{a. } \dot{o}-kw-\text{ol-y-á} \rightarrow \text{nyaBa-}kw-\text{ol-y-á } \text{éngoyé } \text{ósaa} \text{bóoni } \text{I am going to wash} \\
& \text{b. } \dot{o}-kw-\text{oz-y-á} \rightarrow \text{nyaBa-}kw-\text{oz-y-á } \text{éngoyé } \text{na } \text{ósaa} \text{bóoni } \text{clothes with soap}
\end{align*}
\]

Thus, Lulamogi \( \dot{o}-kw-\text{ol-y-á} \) suggests a transitive, non-etymological root /-ol-/ whose causative derivative /-ol-i-/ is ditransitive. On the other hand, \( \dot{o}-kw-\text{oz-y-á} \) is lexicalized and monotransitive. Just as in the case of agentives ending in [zi], causatives with [z-y-] are identified with lexemes (of which only a handful are ditransitive), while [l-y-] causatives are clearly derivational and quite productive. We conclude that [-ol-y-a] would have been very unlikely if two factors were not the case: First, the forms -oz-y-a and -ol-ez-y-a in (20) are borrowed (most likely from Luganda), which creates -ol-ez-(y)-a by the defrication of -oz-ez-(y)-a as in (21). Second, the extrapolation of the form -ol-y-a in (28a) is possible in large part because causative -i- does not condition frication in the indigenous vocabulary of Lulamogi. Thus, the non-frication of -ol-y-a has nothing to do with paradigm regularization.

Finally, since we have not said anything about it, we note that Lulamogi never fricates before the perfective suffix *-I-e which undergoes vowel height harmony as if it derived from a degree-2 high vowel *i (> [e] after mid vowels):

\[
\begin{align*}
(23) \quad & \text{a. } y-a-\text{lim-ilé } \text{‘s/he cultivated’} \\
& \text{b. } y-a-\text{sek-elé } \text{‘s/he laughed’} \\
& \text{c. } y-a-\text{tum-ilé } \text{‘s/he sent’} \\
& \text{d. } y-a-\text{kol-elé } \text{‘s/he worked’} \\
& \text{e. } y-a-\text{βal-ilé } \text{‘s/he counted’}
\end{align*}
\]

5. Conclusion

The natural question to ask in light of the above discussion is how the Neogrammarian Hypothesis fares with respect to Bantu frication. We think quite well. From the evidence we have presented we can see that two confounding variables potentially play against the regularity of sound change in a Bantu language without frication: borrowing, which can introduce frication in a language without frication, and paradigm regularization, which can introduce non-fricated derivatives in a language with frication. Although paradigm regularization is often assumed to exert its effects against phonetic changes which have achieved completion, these effects can logically act from the very inception of regular sound changes (cf. Bostoen 2008:344). By this logic, irregular diachronic correspondences represent the natural interaction between Neogrammarian sound changes and Humboldt’s Universal “one meaning, one form” (Vennemann 1972).

This having been said, the fact that Lulamogi has *Li- > [li] intramorphemically, coupled with examples like -ol-y-, show that contact also plays an important role, especially in languages or dialects which are so close to one another, but which differ in the degree of frication, schematized in (24).

\[
\text{(24) Less frication} \quad \text{Less frication} \quad \text{More frication}
\]

\[
\text{Lugwere < Lulamogi < Lusoga (Lupakoyo) < Lusoga (Lutenga) < Luganda}
\]

In this context we consider one final idea in the form of a question: Given the counter-pressure of the paradigm, would it be possible in such a continuum of dialects where speakers recognize cognates so easily, for “borrowed” frication to be limited to the intramorphemic context? If so, the resulting situation could produce another deceptive
counterexample to the Neogrammarian Hypothesis. There is much more to be said, and so we end as modestly as the first author did 17 years ago:

"...nous présentons notre idée prudemment et même timidement en attendant que les données de fricativation dans les autres langues bantoues soient examinées comme nous avons fait pour le lu-GANDA.” (Hyman 1997: 174)

Appendix

In this appendix we present the reflexes of PB *p, *t, *k, *b, *d, *g before *i̯ and *u, with brief discussion. Proto-Bantu roots are glossed only where they differ significantly from the Lulamogi meaning. All PB roots are found in the BLR 3 (Bastin et al. 2002). The reconstructions marked with ‘Tv’ (proposed by the team at the Royal Museum for Central Africa, Tervuren) are local to the languages in and around Zone J. (In what follows *d is used instead of *l to be consistent with BLR.)

Certain CV sequences (*pi̯, *ki̯, *gi̯, *pu̯, *ku̯) develop in the same way in Lulamogi and all surrounding languages. However, in other cases (*bi̯, *di̯, *tu̯, *bu̯, *du̯, and perhaps *ti̯ and *gu̯), the regular Lulamogi reflex differs from that of some other language(s) in the area (most notably Luganda). In these cases, extensive borrowing has led to a situation where a single *CV sequence appears to have two reflexes in Lulamogi. In some cases, the borrowed vocabulary outnumbers the native vocabulary.

*pi̯: Lulamogi _PROTO-BANTU
áma-sirá ‘pus’ *pí̯dá
én-sigó ‘kidney’ *pí̯gó
éki-so ‘knife sp.’ *pí̯ó
óku-siinyá ‘press w/ finger or fist’ *pi̯ñí
éi-sigá ‘cooking stone area’ *pí̯gá ‘cooking stone’
vs. ókw-oohyá ‘tempt’ *jòp-i (Tv)
éki-tahisyó ‘vessel for drawing water’ *táp-icí-ô (Tv)

PB *pi̯ regularly develops to si̯. The two examples with h involve a causative suffix, and thus the roots were likely leveled to the non-causative form with final h < *p.

*tí̯: Lulamogi _PROTO-BANTU
éki-síki ‘log’ *tí̯kí ‘stump’
óku-síjá ‘tie’ *tí̯b ‘stop up/shut’
óku-síindiká ‘push’ *tí̯ndik
óku-simá ‘dig w/ stick’ *tí̯m ‘dig’
óku-sígalá ‘stay’ *tí̯gad
ókw-esítáálá ‘be startled’ *tí̯tad ‘stumble’
óku-síniká ‘show teeth’ *tí̯ník
áma-síndë ‘field plowed for first time’ *tí̯ndè ‘stubble’
óku-sísimúká ‘wake up violently’ *tí̯tí̯múk ‘be startled/wake up’
eáki-fúuná ‘fist’ *kúntí
vs. óm-píti ‘hyena’ *pí̯tí
éi-kóti ‘neck’ *kòtì
óku-tyeeréré ‘slip/slip/glide’ *tí̯édí́d
The three instances of *ti are difficult to explain away, as they appear in rather basic vocabulary. It may be that *ti was in fact the regular reflex of *t̪i, and that the words with *si are borrowings, but this case is much more difficult to make than with the voiced counterpart *di. In Lugwere the situation is much the same, but note *ei-tinde for Lulamogi áma-siindé.

### Proto-Bantu *k̪j regularly develops to *si.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>óbú-sirú</td>
<td>*k̪jú</td>
</tr>
<tr>
<td>éki-sígi</td>
<td>*k̪jé</td>
</tr>
<tr>
<td>óku-siríká</td>
<td>*k̪jík (Tv)</td>
</tr>
<tr>
<td>ómw-oosí</td>
<td>*jók̪j</td>
</tr>
<tr>
<td>éki-suulé</td>
<td>*k̪juude (Tv)</td>
</tr>
<tr>
<td>óku-síkíimbá</td>
<td>*k̪jíkimb (Tv)</td>
</tr>
<tr>
<td>èi-siindó</td>
<td>*k̪jíndò</td>
</tr>
<tr>
<td>èn-siingó</td>
<td>*k̪íngó ‘neck’</td>
</tr>
<tr>
<td>èkí-siínzíró</td>
<td>*k̪íngjídò</td>
</tr>
</tbody>
</table>

### Proto-Bantu *b̪j regularly develops to *zi.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>óku-byaalá</td>
<td>*b̪jád</td>
</tr>
<tr>
<td>áma-bí</td>
<td>*b̪jí</td>
</tr>
<tr>
<td>óku-bíimbá</td>
<td>*b̪jímb</td>
</tr>
<tr>
<td>óku-jíiná</td>
<td>*b̪jín</td>
</tr>
<tr>
<td>óku-jíísá</td>
<td>*b̪jíc</td>
</tr>
<tr>
<td>vs. éki-zíimba</td>
<td>*b̪jímbà ‘abces/swelling’</td>
</tr>
<tr>
<td>èn-zíró</td>
<td>*b̪jídò ? ‘soot/dirt’</td>
</tr>
<tr>
<td>óku-zíiriingá</td>
<td>*b̪jíding</td>
</tr>
<tr>
<td>ómu-zíru</td>
<td>*b̪jídu ‘medlar tree’</td>
</tr>
<tr>
<td>èn-gózi</td>
<td>*g̪b̪j</td>
</tr>
</tbody>
</table>

It is likely that *b̪jí is the regular reflex, with *zi (the Luganda reflex) appearing in borrowings.

### Proto-Bantu *d̪j regularly develops to *di.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ómu-kálí</td>
<td>*kádi</td>
</tr>
<tr>
<td>ómw-eerí</td>
<td>*jédi</td>
</tr>
<tr>
<td>ómú-bulí</td>
<td>*bádi</td>
</tr>
<tr>
<td>áma-ligá</td>
<td>*dígi (Tv)</td>
</tr>
<tr>
<td>éi-zuúlí</td>
<td>*júúdī</td>
</tr>
<tr>
<td>écci-díjjà</td>
<td>*d̪b̪jà ‘pond/well’</td>
</tr>
<tr>
<td>ékí-bálí</td>
<td>*bádí ‘open space’</td>
</tr>
<tr>
<td>ékí-kólí</td>
<td>*kódī</td>
</tr>
<tr>
<td>óku-kálíká</td>
<td>*kádiŋg</td>
</tr>
<tr>
<td>ókw-edíímá</td>
<td>*díem (Tv)</td>
</tr>
<tr>
<td>ómu-lii</td>
<td>*dí ‘root’</td>
</tr>
<tr>
<td>óku-liiíká</td>
<td>*dílk</td>
</tr>
<tr>
<td>vs. ólu-sozí</td>
<td>*códi</td>
</tr>
<tr>
<td>ómw-eëzi</td>
<td>*jédi</td>
</tr>
<tr>
<td>óku-zíiingá</td>
<td>*díŋg</td>
</tr>
<tr>
<td>ómu-zímú</td>
<td>*dímú ‘spirit/god’</td>
</tr>
</tbody>
</table>
As discussed above, li/di is taken to be the regular reflex, with zi appearing in borrowings.

Proto-Bantu *gi regularly develops to zi.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ômu-zíro ‘tribal taboo’</td>
<td>*gidò</td>
</tr>
<tr>
<td>ámá-zíma ‘truth’</td>
<td>*gímà ‘whole/healthy’ (‘truth’ in J)</td>
</tr>
<tr>
<td>ôn-zige ‘locust’</td>
<td>*gígè</td>
</tr>
<tr>
<td>ômu-zigó ‘tooth gap’</td>
<td>*gígó ‘molar’</td>
</tr>
<tr>
<td>olú-zíizi ‘swarm of buzzing insects’</td>
<td>*gígí</td>
</tr>
</tbody>
</table>

vs.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>éki-siinzíró ‘heel’</td>
<td>*kingidò</td>
</tr>
</tbody>
</table>

Proto-Bantu *pú regularly develops to pu.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ôku-faanáná ‘resemble’</td>
<td>*púnanan</td>
</tr>
<tr>
<td>ôku-fuuhá ‘blow’</td>
<td>*púup</td>
</tr>
<tr>
<td>éí-fúlo ‘foam’</td>
<td>*púdò</td>
</tr>
<tr>
<td>ôku-fuukúlá ‘uproot’</td>
<td>*púukud (Tv)</td>
</tr>
<tr>
<td>ôku-fuuhá ‘despise/underrate’</td>
<td>*púup (Tv)</td>
</tr>
<tr>
<td>áka-fuunjó ‘hemorrhoid sp.’</td>
<td>*púlnjo (Tv) ‘incurable wound’</td>
</tr>
<tr>
<td>ôku-faabirirá ‘concentrate/put heart into’</td>
<td>*púabidid (Tv) ‘work hard’</td>
</tr>
<tr>
<td>ôku- ‘go bad/become spoiled’</td>
<td>*púabagan (Tv) ‘yield under own weight’</td>
</tr>
<tr>
<td>faaabágáná</td>
<td></td>
</tr>
<tr>
<td>ôku-řukúmúlá ‘shake (dirt) off of sth.’</td>
<td>*púkumud ‘overturn’</td>
</tr>
<tr>
<td>ém-fúka ‘hoe’</td>
<td>*púkà (Tv)</td>
</tr>
<tr>
<td>ômú-fúko ‘bundle/load’</td>
<td>*púkò ‘bag’</td>
</tr>
<tr>
<td>ôku-řuumbá ‘steam (food)’</td>
<td>*púmb (Tv)</td>
</tr>
<tr>
<td>ômu-řuumbé ‘tree sp.’</td>
<td>*púmbè</td>
</tr>
<tr>
<td>ôku-řuungúlú ‘dilute’</td>
<td>*púngud</td>
</tr>
<tr>
<td>ôku-řootóká ‘be missshapen (dented)’</td>
<td>*pútok (Tv) ‘be soft’</td>
</tr>
</tbody>
</table>

vs.

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ôku-řukúlú ‘uproot’</td>
<td>*púukud (Tv)</td>
</tr>
<tr>
<td>ôku-řuuhá ‘despise/underrate’</td>
<td>*púup (Tv)</td>
</tr>
<tr>
<td>ôn-ťaahú ‘castrated animal’</td>
<td>*táapú (Tv)</td>
</tr>
<tr>
<td>ômu-řwá ‘thorntree’</td>
<td>*júpye (Tv)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lulamogi</th>
<th>Proto-Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ôku-řyahúlú ‘be misshapen (dented)’</td>
<td>*nyápyúd (Tv) ‘beat with switch’</td>
</tr>
</tbody>
</table>

(var.)
The regular reflex of *pu seems to be fu. The examples with hu are somewhat puzzling. The first two are free variants of fu-initial roots, but it is not clear why this variation exists. The adjectival form -taahu is derived from a verb root -taah-, and was likely subject to leveling.

*tu: Lulamogi
- éí-sumó ‘spear’
- óku-suumbá ‘cook’
- óku-suná ‘get/possess’
- ii-swe ‘1st person pronoun’
- óku-sumítá ‘stab’
- ón-swáásua ‘spitting snake’
- óku-swiikáná ‘cross a limit/boundary’
- óku-suundá ‘churn in gourd’
- óku-fuujá ‘spit’
- óku-fuumbírwá ‘get engaged’ (‘be cooked for’)
- óku-funá ‘get/possess’

vs. Proto-Bantu
- *túmò
- *túmb
- *tún ‘desire’
- * italiane
- *túmit
- *tú ‘spit’
- *túkaní (Tv) ‘cross’
- *túdik (Tv)
- *túnd (Tv)
- *túmb ‘cook’
- *tún ‘desire’

The regular reflex of *tu is su. The words with fu are borrowings, likely all ultimately from Luganda.

*kú: Lulamogi
- ómú-nófu ‘slice of meat’
- óku-fá ‘to die’
- ém-fúufu ‘dust’
- éki-fubá ‘chest’
- óku-fukámírá ‘kneel’
- óku-fuunzyá ‘narrow a gap’
- óku-fiirwá ‘to die’
- óku-fúufu ‘return’
- óku-fulumúká ‘dash off’
- óku-fuumúló ‘pierce hole through’
- óku-fuumbátá ‘embrace’
- óku-fuumplá ‘pound to demolish’
- ómú-fúmu ‘doctor’
- éki-fuínda ‘knot’
- éki-fuundikó ‘cover’
- óku-funyá ‘fold’
- óku-fumyála ‘crumble’
- éki-fuuni ‘fist’
- áma-fútá ‘oil’
- ómú-hófu ‘blind (figuratively) person’

vs. Proto-Bantu
- *kúðu (Tv) ‘meat’
- *kú ‘spit’
- *kúkaní (Tv) ‘cross’
- *kúdik (Tv)
- *kúnd (Tv)
- *kúmb ‘cook’
- *kúnd ‘be narrow’
- *kúdu (Tv)
- *kúdu ‘be narrow’
- *kú ‘spit’
- *kúdumuk (Tv) ‘come back’
- *kúmul (Tv)
- *kúbat ‘hold in arm’
- *kúmpud (Tv)
- *kú ‘spit’
- *kúndó
- *kúndikídó
- *kúny (Tv)
- *kúniad (Tv)
- *kúntjá
- *kúntát ‘hold in arm’

Proto-Bantu *kú regularly develops to fu. The form of ‘tortoise’ perhaps suggests a local variant *kúdú with two second degree vowels, though even Lugwere has o-fudu.

*bú: Lulamogi
- *pokú ‘blind’

vs. Proto-Bantu
- *kúdú (kúdú, kúdú)
It appears that *zu is the native Lulamogi reflex, which is shared by no other language in the area. Thus, these cannot be borrowings, while the words with *vu could be borrowed from any of the surrounding languages.

Proto-Bantu *dʊ regularly develops to *zu. The words with *vu must be borrowings, perhaps from Luganda in which *vu is the regular reflex.
óku-vuumbulá ‘discover/uncover’ *gũmbud
vs. éki-zúma ‘seed’ *gũmá (Tv)
óku-zúná ‘help’ *gũn

It may be that as with *bu̠ and *du̠, the regular Lulamogi reflex is zu̠, but there is too little data to be sure.

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