

## Cyclicity and Base Non-Identity<sup>1</sup>

Larry M. Hyman

*University of California, Berkeley*

In most studies of cyclic effects, a crucial assumption is made: A cyclically derived form will retain phonological resemblances to the base from which it has been derived. Kenstowicz (1995) terms this “base identity”. The cliché cyclic example from English concerns the pair of words, *compensátion* vs. *condensátion*. In the first word, the vowel of the internal syllable [pən] is completely reduced (and can be deleted). In the second word, the corresponding syllable [den] maintains its full vowel. This difference is attributed to the difference in morphological structure: [ [ compensat ] ion ] vs. [ [ condens ] ation ]. In the inner cycle of the latter form, the stress is *condense*. Hence, when -ation is added, the vowel of the syllable [den] is protected from reduction—as it is in the base form *condense*. In this case we appear to have the “word within a word” phenomenon, a frequent characteristic of cyclicity. We can attribute this recurrent phenomenon to what Vennemann (1972) terms “the dominance of semantically primitive categories”. In this case, the pronunciation of the vowel as [ɛ] in the primitive category, the base verb, inhibits vowel reduction in the the non-primitive nominalization. The effect of Vennemann’s principle will be even more striking in the examples to follow.

Most cases of cyclicity discussed in the literature exhibit a transparent “compositional” or “inside-out” character, either involving prefixing, as in (1a), or suffixes in (1b), or perhaps a combination of the two.

- (1) a. prefixation: [ prefix [ prefix [ ROOT ] ] ]  
 b. suffixation: [ [ [ ROOT ] suffix ] suffix ]

A more rare, but occurring possibility, however, concerns cases which I refer to as “endocyclicity”, shown in (2).

- (2) a. prefixal interfixation:    prefixx + ROOT            prefixx + interfix + ROOT  
 b. suffixal interfixation:    ROOT + suffix            ROOT + interfix + suffix

In (2a) a phonological process, indicated by underlining, first applies between a prefix and a root. Then another prefix is “interfixed” between the two, and the phonological process applies again. The mirror-image situation is obtained in (2b), where some phonology occurs between a root and a suffix, and then another suffix is interfixed between the root and the original suffix. In both cases the affixal trigger and root target of the phonological process are separated by subsequent interfixation, thereby creating a potentially opaque output.

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The cases I will discuss from Bantu are of the suffixal variety in (2b). But first note in (3) that Bantu derivational suffixes typically combine in a concatenative and often compositional way. Thus, in Yao, the root *taam-* can be viewed as suffixed in steps (Ngunga 2000).

- (3)
- |    |                                   |                                    |               |                 |
|----|-----------------------------------|------------------------------------|---------------|-----------------|
| a. | <i>taam-</i>                      | ‘sit’                              |               |                 |
| b. | <i>taam-ik-</i>                   | ‘seat’ (put in seated position)    | <i>-ik-</i>   | (impositive)    |
| c. | <i>taam-uk-ul-</i> <sup>2</sup>   | ‘unseat’                           | <i>-ul-</i>   | (reversive tr.) |
| d. | <i>taam-uk-ul-igw-</i>            | ‘be unseated’                      | <i>-igw-</i>  | (passive)       |
| e. | <i>taam-uk-ul-igw-aasy-</i>       | ‘cause to be unseated’             | <i>-aasy-</i> | (causative)     |
| f. | <i>taam-uk-ul-igw-aasy-an-</i>    | ‘cause each other to be unseated’  | <i>-an-</i>   | (reciprocal)    |
| g. | <i>taam-uk-ul-igw-aasy-an-il-</i> | ‘cause e.o. to be unseated for/at’ | <i>-il-</i>   | (applicative)   |

Derivational suffixes in Bantu thus provide ideal material with which to study cyclic effects.

A pervasive exception to compositionality concerns the interaction between the causative suffix *-i-* and applicative suffix *-il-* (*-el-*, *-ɛl-*, etc.) which marks locatives, benefactives, reasons and, in some languages, instruments and manner.<sup>3</sup> In (4a) we see that in Lomongo there can be a stepwise compositional addition of applicative *-el-* followed by the causative suffix *-i-* (Hulstaert 1965). Note that by a regular process, /l/ is fricated to j [dʒ] before the tense high vowel of the causative suffix *-i-*.

(4) Two scopes, one surface suffix order in Mongo (Hulstaert 1965)

- a. [ [ verb-applicative ] causative ]                      CVC-el-*i-* [CVC-ej-*i-*]
- | root           | root+applicative               | root+applicative+causative               |
|----------------|--------------------------------|--|
| -kó- ‘reach’   | -kó-el- ‘progress’             | -kó-ej- <i>i-</i> ‘make progress’        |
| -ɔtsw- ‘enter’ | -ɔtsw-ɛl- ‘penetrate’          | -ɔtsw-ɛj- <i>i-</i> ‘make penetrate’     |
| -it- ‘pour’    | -it-el- ‘spill, spread (intr)’ | -it-ej- <i>i-</i> ‘spill, pour out (tr)’ |
- b. [ [ verb-causative ] applicative ]                      CVC-el-*i-* [CVC-ej-*i-*]
- | root                | root+causative                   | root+applicative+causative               |
|---------------------|----------------------------------|--|
| -bómb- ‘keep’       | -bómb- <i>i-</i> ‘make/let keep’ | -bómb-ej- <i>i-</i> ‘make keep for/at’   |
| -kók- ‘suffice’     | -kók- <i>i-</i> ‘make suffice’   | -kók-ej- <i>i-</i> ‘make suffice for/at’ |
| -fúk- ‘move (intr)’ | -fúk- <i>i-</i> ‘move (tr)’      | -fúk-ej- <i>i-</i> ‘move (tr) for/at’    |

Although the order applicative+causative is compositional, such derivations are typically obtained when the applicative is lexicalized—as one can tell from the glosses in (4a). The more productive and pervasive derivation is shown in (4b): A root is “first” causativized with *-i-* and

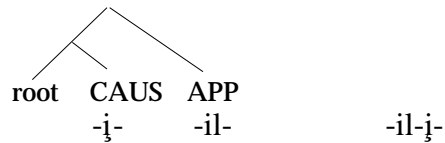
<sup>2</sup>By a general phonological rule, suffixal /i/ becomes [u] when followed by another suffix with [u]. See Ngunga (2000), Hyman (1999).

<sup>3</sup>Thus, in Chichewa, *mang-ir-*, the applicativized form of *mang-* ‘tie’, may mean ‘tie for (someone)’, ‘tie with (some instrument or manner)’, ‘tie at (some place)’, ‘tie for (some reason or circumstance)’, etc.

then applicativized with *-el-*, yielding the same *-ej-ĩ-* sequence.<sup>4</sup> What these data show is that there is a basic conflict between causative *-ĩ-* and applicative *-el-* (*~ -el-*) in Lomongo, which was already present in Proto-Bantu: First, the applicative morph *-el-* or *-el-* must precede the causative morph *-ĩ-*. But, second, the earlier occurring applicative morph *-el-* or *-el-* has scope over the following causative morph *-ĩ-*, as was seen in (4b).<sup>5</sup>

The fixed template *\*-id-ĩ-* in Proto-Bantu (*\*d > l*) has suggested a “methathesis” of morphs to Bantu scholars, particularly to the Tervuren School inspired by Meeussen. Thus, Polak (1975) proposes a process of metathesis, which she terms “Transfer of Causative” in Shi:

(5) A “metathesis” of morphs?



In Hyman (1994) I suggested that analogous facts in Bemba should be accounted for by “interfixing” the applicative *-il-* or *-el-* morph of that language. The evidence comes from the phonology—specifically from the cyclic “frication” conditioned by the tense *-ĩ-* of the causative morph. As seen in (6a),

(6) Phonological evidence for interfixing *-il-/el-* in Bemba (Hyman 1994)

a.	<i>-leep-</i>	‘be long’	<i>-leef-ĩ-</i>	‘lengthen’	(p,b f)
	<i>-lub-</i>	‘be lost’	<i>-luf-ĩ-</i>	‘lose’	
b.	<i>-fiit-</i>	‘be dark’	<i>-fiis-ĩ-</i>	‘darken’	(t,d,l,k,g s)
	<i>-cind-</i>	‘dance’	<i>-cins-ĩ-</i>	‘make dance’	
	<i>-lil-</i>	‘cry’	<i>-lis-ĩ-</i>	‘make cry’	
	<i>-buuk-</i>	‘get up (intr)’	<i>-buus-ĩ-</i>	‘get [s.o.] up’	
	<i>-lúng-</i>	‘hunt’	<i>-lúns-ĩ-</i>	‘make hunt’	

causative *-ĩ-* changes labials to *f*. In (6b) it changes linguals to *s*.<sup>6</sup> I refer to such mutations, which vary from Bantu language to language, as “frication” (Hyman 1997).

<sup>4</sup>To bring these examples to the surface, one must add an inflectional final vowel, typically *-a* before which causative *-j-* glides to *y* [j], which is then absorbed into the preceding *j* [dʒ], e.g. *-kó-ej-j-a* *-kó-ej-y-a* *-kó-ej-a*.

<sup>5</sup>The seven vowels of Proto-Bantu are generally transcribed /j, i, e, u, o, a/ (Meeussen 1967), standing for the phonetic realizations [i, I, ε, u, U, ɔ, a]. Mongo has modified the original system to /i, e, ε, u, o, ɔ, a/, i.e. where there is a  $\pm$ ATR distinction in the mid vowels, rather than in the high vowels. The vowel of the applicative suffix is generally a reflex of *\*i* (i.e. second degree), and it lowers after degree three vowels (*\*e, \*o*). In many Bantu languages *\*i/\*I* and *\*u/\*U* have merged, and one has a canonical five vowel system, transcribed as /i, e, u, o, a/.

<sup>6</sup>Again, it is necessary to add a final vowel, e.g. *-a*, for these forms to surface. This *-a* causes *-j-* to glide, e.g. *-leef-y-a* ‘lengthen’. In addition, *s* palatalizes to [š] before /i, e/, and the glide *y* that is obtained before *-a* may be absorbed into the preceding alveopalatal fricative. Hence, *lis-j-a* *lišya* *liša* ‘make cry’.

What is crucial is that when the causatives in (6) are applicativized, as in (7), frication applies again and -il- or -el- become -is- and -es-:

(7) Cyclic frication in Bemba

a.	-leef- <sub>ɿ</sub> -	‘lengthen’	-leef-es- <sub>ɿ</sub> -	‘lengthen for/at’
	-luf- <sub>ɿ</sub> -	‘lose’	-luf-is- <sub>ɿ</sub> -	‘lose for/at’
b.	-fiis- <sub>ɿ</sub> -	‘darken’	-fiis-is- <sub>ɿ</sub> -	‘darken for/at’
	-cins- <sub>ɿ</sub> -	‘make dance’	-cins-is- <sub>ɿ</sub> -	‘make dance for/at’
	-lis- <sub>ɿ</sub> -	‘make cry’	-lis-is- <sub>ɿ</sub> -	‘make cry for/at’
	-buus- <sub>ɿ</sub> -	‘get [s.o.] up’	-buus-is- <sub>ɿ</sub> -	‘get [s.o.] up for/at’
	-lúns- <sub>ɿ</sub> -	‘make hunt’	-lúns-is- <sub>ɿ</sub> -	‘make hunt for/at’

The cyclic analysis with interfixation of applicative -il- is illustrated in (8).

(8) Cyclic analysis with “interfixation” of applicative -il- (Hyman 1994, Orgun 1996)

	UR	Morphology1	Phonology1	Morphology2	Phonology2
a.	-lub- ‘be lost’	-lub- <sub>ɿ</sub> - ‘lose’	-luf- <sub>ɿ</sub> -	-luf-il- <sub>ɿ</sub> - ‘lose for/at’	-luf-is- <sub>ɿ</sub> -
b.	-lil- ‘cry’	-lil- <sub>ɿ</sub> - ‘make cry’	-lis- <sub>ɿ</sub> -	-lis-il- <sub>ɿ</sub> -	-lis-is- <sub>ɿ</sub> - ‘make cry for/at’

We begin with the underlying representations -lub- and -lil-. The morphology adds the causative suffix -<sub>ɿ</sub>-, which is then submitted to the phonology where frication applies. We resubmit -luf-<sub>ɿ</sub>- and -lis-<sub>ɿ</sub>- to the morphology and interfix applicative -il-. Once again the phonological frication process applies, and the applicative interfix -il- becomes -is-.

While such “endocyclicality” may be rare, its motivation is clear. As shown in (9), the advantage of cyclic frication in applicativized causatives is the resulting identity correspondence with the causative base, the immediate input, or “proximate base” (Crosswhite 1996), to applicativization:

(9) Advantage of cyclic frication is surface resemblance to the causative base:

[ root ] ‘be long’	[ [ root ] CAUS ] ‘lengthen’	[ [ [ root ] CAUS ] APP ] ‘lengthen for/at’
leep-	leef- <sub>ɿ</sub> -	leef-es- <sub>ɿ</sub> -

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Many Bantu languages exhibit parallels to the Bemba facts. However, as shown in (10), correspondence with the root, i.e. with the non-causativized form, might also be expected. In this case we would not have cyclic, but rather non-cyclic frication.

(10) Advantage (?) of non-cyclic frication is surface resemblance to base root

[ root ] ‘be long’	[ [ root ] CAUS ] ‘lengthen’	[ [ [ root ] CAUS ] APP ] ‘lengthen for/at’
leep-	leef- <sub>ɿ</sub> -	*leep-es- <sub>ɿ</sub> -

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The data in (11) show that Lomongo might be interpreted as having non-cyclic frication before  $-j-$ :

(11) Non-cyclic frication in Mongo?

	<b>root</b>		<b>root+causative</b>		<b>root+applicative+causative</b>
a.	-kɔt- ‘cut’		-kɔts- $j$ - ‘make cut’		-kɔt- $\epsilon j$ - $j$ - ‘move (tr) for/at’
	-kút- ‘cool’		-kúts- $j$ - ‘make cool’		-kút- $\epsilon j$ - $j$ - ‘make keep for/at’
b.	-kál- ‘dry’		-káj- $j$ - ‘make dry’		-kál- $\epsilon j$ - $j$ - ‘make dry for/at’
	-kɛl- ‘flow’		-kɛj- $j$ - ‘make flow’		-kɛl- $\epsilon j$ - $j$ - ‘make flow for/at’
c.	-kɛnd- ‘go’		-kɛnj- $j$ - ‘make go’		-kɛnd- $\epsilon j$ - $j$ - ‘make go for/at’
	-kínd- ‘eat one’s fill’		-kínj- $j$ - ‘make eat one’s fill’		-kínd- $\epsilon j$ - $j$ - ‘make eat for/at’
				e.g. /-kínd- $\epsilon l$ - $j$ -/	kínd- $\epsilon j$ - $j$ -

In (11a) the causative suffix  $-j$ - changes final /t/ to *ts*. In (11b) final /l/ becomes *j*, and in (11c) final /nd/ becomes *nj*. However, as seen in the rightmost column, when applicative  $-\epsilon l-$  is interfixed, it becomes  $-\epsilon j-$ , but the root is realized in its non-fricated form. The non-cyclic interpretation is shown by means of the derivation at the bottom right of (11).

Again, other Bantu languages provide parallels to the Lomongo facts. BUT are these non-cyclic languages really non-cyclic? Consider the parallel facts from Nyamwezi (Maganga & Schadeberg 1992) in (12).

(12) Frication (here, palatalization) before causative  $-j$ - in Nyamwezi

i.	consonants palatalizing before $-j$ -		ii.	consonants not palatalizing before $-j$ -		
a.	k	č		p	t	h
	s	š		β	d	
	n	ɲ		mb	nd	
b.	l, g	j		m		
	nz, ɲg	ɲj		mh		
	nh, ɲh	ɲh				

In (12i.a.) we see that /k/, /s/ and /n/ palatalize to č, š, and ɲ, respectively. In (12b), /l/ and /g/ neutralize to j, /nz/ and /ɲg/ neutralize to ɲj, and /nh/ and /ɲh/ neutralize to ɲh. The consonants in (12ii) do not palatalize.

Now consider the forms in (13).

(13) C<sub>2</sub> consonant in C<sub>1</sub>VC<sub>2</sub>-il-*j*- is never palatalized (Recall: -il-*j*- -ij-*j*-, as in Lomongo)

	<b>-root-</b>		<b>-root- <i>j</i> -</b>		<b>-root-il-<i>j</i>-</b>
a.	-βak-	‘shine, burn (intr.)’	-βac- <i>j</i> -	‘light’	-βak- <i>ij</i> - <i>j</i> -
	-og-	‘bathe intr.’	-oj- <i>j</i> -	‘bathe (s.o.)’	-og- <i>ij</i> - <i>j</i> -
	-zeɛŋg-	‘build’	-zeɛŋj- <i>j</i> -	‘have built’	-zeɛŋg- <i>ij</i> - <i>j</i> -
	-nyɥŋh-	‘smell’	-nyɥŋh- <i>j</i> -	‘make smell’	-nyɥŋh- <i>ij</i> - <i>j</i> -
b.	-β <sub>ɪ</sub> s-	‘hide’	-β <sub>ɪ</sub> š- <i>j</i> -	‘make hide’	-β <sub>ɪ</sub> s- <i>ij</i> - <i>j</i> -
	-βon-	‘see’	-βon- <i>j</i> -	‘make see’	-βon- <i>ij</i> - <i>j</i> -
c.	-gul-	‘buy’	-guj- <i>j</i> -	‘sell’	-gug- <i>ij</i> - <i>j</i> -
	-kaánz-	‘wash’	-kaánj- <i>j</i> -	‘have washed’	-kaánŋ- <i>ij</i> - <i>j</i> -
	-buúnh-	‘swim’	-buúnh- <i>j</i> -	‘make swim’	-buúŋh- <i>ij</i> - <i>j</i> -

In (13a), the root-final velar consonants palatalize before -*j*-, but appear non-palatalized in the right column where applicative -il- intervenes, itself becoming -*ij*-.<sup>7</sup> In (13b) the root-final alveolar consonants /s/ and /n/ palatalize to š and ŋ before -*j*-, but not when -*ij*- intervenes. This much is consistent with a non-cyclic interpretation, where only the /l/ of applicative -il- becomes palatalized. However, note the forms in (13c). The root-final alveolars palatalize before causative -*j*-. However, in the boxed forms, when -*ij*- intervenes, these same roots end in velars.

The question we must now address is: If Nyamwezi is non-cyclic, why are the alveolar consonants “restored” with velars in the box in (13c)? I would like to suggest that palatalization in Nyamwezi is in fact cyclic. For clarity, a full morphology-phonology interleaving account is provided in (14).

(14) Cyclicity + Non-neutralizing (de)palatalization in Nyamwezi

	<b>UR</b>	<b>Morphology1</b>	<b>Phonology1</b>	<b>Morphology2</b>	<b>Phonology2</b>	
a.	-β <sub>ɪ</sub> s-	-β <sub>ɪ</sub> s- <i>j</i> -	-β <sub>ɪ</sub> š- <i>j</i> -	-β <sub>ɪ</sub> š- <i>il</i> - <i>j</i> -	-β <sub>ɪ</sub> š- <i>il</i> - <i>j</i> -	-β <sub>ɪ</sub> s- <i>ij</i> - <i>j</i> -
	-βon-	-βon- <i>j</i> -	-βon- <i>j</i> -	-βon- <i>él</i> - <i>j</i> -	-βon- <i>él</i> - <i>j</i> -	-βon- <i>éj</i> - <i>j</i> -
b.	-βak-	-βak- <i>j</i> -	-βac- <i>j</i> -	-βac- <i>il</i> - <i>j</i> -	-βac- <i>il</i> - <i>j</i> -	-βak- <i>ij</i> - <i>j</i> -

First, the morphology adds causative -*j*-, which then conditions palatalization. The morphology then interfixes applicative -il-/-el-, which then undergoes the second cycle of frication, to become -*ij*-/-*ej*-. If we stopped here, we would have the same cyclic frication as in Bemba in (8). However, Nyamwezi does not allow palatal consonants in successive syllables, a constraint which I refer to as \*JVJ. As a consequence, the first column of the Phonology2 forms must undergo an additional dissimilatory process, “depalatalization” (Maganga & Schadeberg 1992).

<sup>7</sup>To bring these forms to the surface, again a final vowel is required, e.g. -a, causative -*j* glides to y, which is then absorbed into the preceding palatal, e.g. -βak-*ij*-*j*-a -βak-*ij*-y-a -βak-*ij*-a ‘make shine for/at’. Maganga & Schadeberg suggest that when /l/ may first become z before -*j*- and then palatalize as a result of the glide y, i.e. zy → j. Maganga & Schadeberg also note that velars palatalize before the y that results also from lax /i/, e.g. /i-ki-o/ → ico ‘this’ (class 7).

Depalatalization “restores” an alveolar in (14a), since *š* and *ɲ* unambiguously derive from /s/ and /n/, respectively. It restores a velar in (14b), since *c* unambiguously derives from /k/.

Now compare the derivations in (15).

(15) Cyclicity + neutralizing (de)palatalization in Nyamwezi

	UR	Morphology1	Phonology1	Morphology2	Phonology2	
a.	-og-	-og-ɿ-	-oj-ɿ-	-oj-el-ɿ-	-oj-ej-ɿ-	-og-ej-ɿ-
b.	-gul-	-gul-ɿ-	-guj-ɿ-	-guj-il-ɿ-	-guj-ij-ɿ-	-gug-ij-ɿ-

The only difference in these examples is that palatalization leads to neutralization, i.e. both /g/ and /l/ palatalize as *j*. Thus, when depalatalization applies to the boxed forms, the first palatal of the JVJ sequence is undone as a velar. As seen, the resulting [g] is etymological in (15a), but non-etymological in (15b).

Even though a non-cyclic derivation would work in the case of non-neutralizing (de)palatalization in (14), it is neutralizing examples such as in (15b) which tell us that a cyclic interpretation is the correct one.

This example brings me to the main point of this paper: It is clear in Nyamwezi that we are not dealing with a cyclicity that seeks to make derived forms resemble other forms within the paradigm, since /-gul-/ ‘buy’ does not otherwise have a -gug- allomorph. The question, therefore, is whether the root-final velar of forms such as -gug-ij-ɿ- could be seen as somehow preserving identity with the root-final palatal of the causative verb form, e.g. -guj-ɿ-. The idea is that the roots in the boxed forms in (13c) “want” to correspond to the *j*, *ɲj*, and *ɲh* of “intermediate” causative base forms (as in multiple frication languages like Bemba). The unrealized target would thus involve two palatals, e.g. \*guj-ij-ɿ-. Such outputs must be modified, however, because the palatality of root-final *j*, *ɲj*, and *ɲh* in applicativized causatives would be ill-formed for three reasons. First, as I have mentioned, Nyamwezi has a constraint \*JVJ which prohibits palatal consonants in successive syllables.<sup>8</sup> Second, these three consonants should in principle only occur directly before a derived -y- plus vowel sequence, e.g. before the causative morpheme -ɿ- plus final vowel (cf. note 7). If allowed to occur in forms such as \*guj-ij-ɿ-, the first *j* would appear instead before the vowel [i] (or before an [e] in forms where the suffix vowel undergoes height harmony to a preceding mid vowel root). Finally, unlike *c* and *š*, these same three palatals must be followed by a long vowel. Maganga & Schadeberg (1992:22) propose in fact that *j*, *ɲj*, and *ɲh* can be analyzed as \*gy, \*ɲgy, and \*ɲhy.

<sup>8</sup>There are five counterexamples to this generalization to be found in Maganga and Schadeberg’s lexicon of 2005 entries: *šoša* ‘answer (v.)’, *i-šoša* ‘answer (n.)’ *šijja* ‘twin’, *šijná* ‘play (v.)’, *čija* = causative of *čilwa* ‘hate’. As seen, two of these involve the same root. In addition, all involve palatals in the first two syllables of the stem. I attribute this to the inability of depalatalization to affect a stem-initial consonant. It should also be noted that the palatals *c* and *š* have a freer distribution than some of the other palatals, e.g. *j*, in that they may occur after a short vowel.

It should therefore be no mystery that the phonology of Nyamwezi enforces a process of depalatalization. However, why do the boxed forms depalatalize as velars?

I can think of two reasons. One explanation might be simply historical: Perhaps velar palatalization occurred earlier than alveolar palatalization, as judged by the fact that velars (but not alveolars) also palatalize before a *y* that is derived from lax \**i* (in addition to tense \**i̥*). So, if the *g/j* pattern is an older one than *l/j*, when \**l* would have become *j* (through an intermediate *z* stage), speakers might have simply generalized the transparent depalatalization process *j* → *g*, which preexisted.

The second explanation would be a phonetic one: Perhaps the velar depalatalizations are more phonetically similar to the palatal inputs than are the corresponding alveolars. Recall the neutralizations from (12b): *l* and *g* neutralize as *j*; *nz* and *ŋg* as *ɲj*; and *nh* and *ŋh* as *ɲh*. Since some speakers pronounce *j* as a non-anterior stop (“gy”), not as an alveopalatal affricate, perhaps this could explain why *g* and *ŋg* are preferred depalatalizations to *l* and *nz*. However, what would explain why *ɲh* is depalatalized to *ŋh* rather than *nh*? Why should *ɲh* lose its coronality rather than its dorsality?

Even if a phonetic account could be extended to cover all three non-etymological velars that result from depalatalization, similar data from other Bantu languages suggest that such “phonetic approximation” is not universal. In both Shi and Luganda, /*l*/ and /*g*/ merge as *z* before causative -*ɨ*-. As summarized in (16), fricated *z* is “undone” as *l* in Luganda, but as *g* in Shi (Polak 1975),

(16) Non-etymological defrication of root-final *z* in two languages

	<b>root</b>	<b>root-ɨ-</b>	<b>root-il-ɨ-</b>	
a.	<i>l, g</i>	<i>z</i>	<i>l</i>	in Ganda pseudo-causatives
b.	<i>l, g</i>	<i>z</i>	<i>g</i>	in Shi pseudo-causatives

In both cases the data pertain particularly to so-called pseudo-causatives, i.e. lexicalized causative verbs of the structure -CVC-*ɨ*- for which there is no corresponding synchronic -CVC- root. Thus, compare the reflexes of Proto-Bantu \*-*jog*- ‘bathe (intr.)’ in (17).

(17) Reflexes of PB \*-*jog*- ‘bathe (intr.)’ in Haya and Luganda

	<b>Haya</b>		<b>Luganda</b>	
a.	-og-	[og-a]	---	‘bathe (intr.)’
b.	-og-ɨ-	[og-y-a]	-oz-ɨ-	‘wash (tr.)’
c.	-og-ez-ɨ-	[og-ez-a]	-ol-ez-ɨ-	‘wash (tr.) for/at’
d.			cf. ky-og-er-o	‘earthware washbasin for baby’

As seen, the velar of Proto-Bantu \*-*jog*- ‘wash’ is realized in all environments in Haya, in which frication is limited to coronal consonants. Luganda does not have the intransitive verb root, but the transitive verb -oz-ɨ- exists as a pseudo-causative. When the applicative is added to -oz-ɨ- in Luganda in (17c), the *z* is undone as *l*, i.e. differently from the etymological \**g*. Not only do we



have evidence of this \*g from Proto-Bantu and from nearby Haya, but Luganda itself has the related lexicalized noun derivative *ky-og-er-o* in (17d), which still shows the original velar consonant.<sup>9</sup> What we have here, therefore, is  $g \leftarrow z \leftarrow l$ .

The defrication of  $z$  to  $l$  might, of course, be argued for on phonetic grounds: like  $z$ ,  $l$  is voiced, coronal, and continuant. On the other hand,  $g$  has no feature in common with  $z$  other than the fact that both are voiced obstruents. However, now compare the quite different defrication of  $z$  in the Shi pseudo-causatives in (18).

(18) Defrication of  $s$  and  $z$  in Shi pseudo-causatives (Polak 1975)

a.	<i>doos-ɿ-</i>	‘ask (questions)’	<i>dook-ez-ɿ-</i>	‘ask (questions) for/at’
	<i>yuus-ɿ-</i>	‘finish’	<i>yuuk-iz-ɿ-</i>	‘finish for/at’
b.	<i>shuz-ɿ-</i>	‘answer’	<i>shug-iz-ɿ-</i>	‘answer for/at’
	<i>loonz-ɿ-</i>	‘want, intend’	<i>loong-ez-ɿ-</i>	‘want, intend for/at’
c.	<i>hoz-ɿ-</i>	‘lend, borrow’	<i>hog-ez-ɿ-</i>	‘lend, borrow for/at’
d.			cf. <i>holool-</i>	‘give back what one has borrowed’

As seen in (18a), when the applicative is added, the root-final  $s$  of a pseudo-causative verb will be defricated as  $k$ , while in (18b) a root-final  $z$  is defricated as  $g$ . The undoing of  $s$ ,  $z$  as velars is observed even in cases such as (18c), where the root-final consonant was historically alveolar. Thus, compare the related verb in (18d). While there is no independent root *\*-hol-* or *\*-hog-*, (18c,d) clearly establish a two-step  $l \leftarrow z \leftarrow g$  process, i.e. just the opposite of that in Luganda in (17c,d).<sup>10</sup>

To conclude thus far, I claim that all applicativized causatives are produced cyclically, including Lomongo, where frication does not neutralize consonants, and therefore defrication is etymological. The derivation proceeds stepwise, as I claimed for Bemba: root → causative root-ɿ- → applicativized causative root-il-ɿ-. The defrication (depalatalization) cases we have considered are motivated by phonological constraints: in Nyawezi there is a constraint against successive palatalis, \*JVJ, whereas in both Haya and Luganda, the constraint is \*zVz. We have seen some evidence that the choice of consonants in defrication (depalatalization) is not determined phonetically, but may simply be an historical artefact, some languages preferring  $z \leftarrow l$ , others  $z \leftarrow g$ .

This last point becomes particularly clear in Bantu languages which limit defrication to a single fixed replacive consonant, e.g.  $k$  in Nyakyusa (Schumann 1899, Meinhof & van Warmelo

<sup>9</sup>In this form, *ky-* is the class 7 noun prefix /ki-/, *-og-* is the verb root, *-er-* is the applicative suffix (which has a locative function here), and *-o* a nominalizing suffix.

<sup>10</sup>Polak points out that younger (“non-traditional”) speakers have innovated cyclic fricated applicatives of pseudo-causatives. Thus, such speakers may also produce the applicatives forms in (19a,b) as *doos-ez-ɿ-*, *yuus-iz-ɿ-*, *shuz-iz-ɿ-* and *loonz-ez-ɿ-*. She states that true causatives never have two such fricated consonants in sequence, but unfortunately does not illustrate the defrication of different root-final consonants.

1932), and Matuumbi (Odden 1996), and *c* (< /k/) in Mwera (Harries 1950) and Yao (Ngunga 2000). The examples in (19) are from Nyakyusa:

(19) Single fixed replacive *k* in Nyakyusa (Schumann 1899)

	<b>root/root-<i>ɨ</i>-</b>		<b>root-il-<i>ɨ</i>-</b>
a.	-sat-	‘be in pain’	
	-sas- <i>ɨ</i> -	‘give pain’	-sak-is- <i>ɨ</i> - ‘give pain for/at’
	-gel-	‘measure’	
	-ges- <i>ɨ</i> -	‘try’	-gek-es- <i>ɨ</i> - ‘try for/at’
	-buj-	‘come back’	
	-bʉs- <i>ɨ</i> -	‘bring back’	-bʉk-is- <i>ɨ</i> - ‘bring back for/at’
	-sok-	‘go out’	
	-sos- <i>ɨ</i> -	‘take out’	-sok-es- <i>ɨ</i> - ‘take out for/at’
	-ag-	‘run out’ [alle werden]	
	-as- <i>ɨ</i> -	‘make run out’	-ak-is- <i>ɨ</i> - ‘make run out for/at’
b.	-kend-	‘go by’	
	-kees- <i>ɨ</i> -	‘make go by’	-keek-es- <i>ɨ</i> - ‘make go by for/at’
	-jong-	‘run away’	
	-joos- <i>ɨ</i> -	‘make run away’	-jook-es- <i>ɨ</i> - ‘make run away for/at’
c.	-tup-	‘become thick’	
	-tuf- <i>ɨ</i> -	‘thicken’	-tuk-if- <i>ɨ</i> - ‘thicken for/at’
	-olob-	‘become rich’	
	-olof- <i>ɨ</i> -	‘make rich’	-olok-ef- <i>ɨ</i> - ‘make rich for/at’

In the left hand column I have given pairs consisting of the bare root on the first line and the causative verb on the second. The applicativized causatives are indicated in the right hand column. In (19a) we see that lingual consonants become *s* before causative -*ɨ*-. (As in Bemba, there is no *z* in Nyakyusa.) However, when applicative -il- or -el- intervenes in the forms to the right, this *s* is undone as *k*. The *l* of applicative -il- (~ -el-) itself undergoes frication, so the result is an applicativized causative of the form CVk-is-*ɨ*-. The same facts are involved in (19b), where the lingual consonant becomes *s* and the preceding nasal is effaced (with compensatory lengthening), i.e. kend-*ɨ*- kens-*ɨ*- kees-*ɨ*-. Again, the forms to the right have a replacive *k*. Finally, in (19c), labials become *f* before causative -*ɨ*-. In this case, in the applicativized causatives, the derived *f* is replaced with *k*, but the *l* of the applicative -il-/-el- is realized as *f*.

The processes involved are informally summarized in (20).

(20)	a.	-CVs-il- <i>ɨ</i> -	b.	-CVf-il- <i>ɨ</i> -
		k s		k f

As seen, there is the same “undoing” of the fricated consonants, *s* and *f*, this time to *k*. While we expect the *l* of the applicative interfix to be fricated to *s* in (20a), its apparent mutation to *f* in

(20b) is quite unusual. To handle this, Schumann (1899) proposes an analysis that infixes *-ki-* (~*-ke-*) before the *s-ɨ* or *f-ɨ-* sequence, e.g. *-tup-* *-tufɨ-* *tu-ki-fɨ-*. Endemann (1900) responds against this analysis and proposes a phonological account involving assimilation of *s* to *f*.<sup>11</sup> Be that as it may, the motivation for (20b) is clearly analogical: In (20a), the fricated root-final consonant *s* is replaced by *k*, while the *l* of applicative *-il-* becomes *s*. While both these changes make sense in the context of what we have seen in Nyamwezi, for instance, speakers apparently drew a different conclusion, namely, that defricated root-final *s* and the newly fricated *s* of the applicative are one and the same. This same misanalysis was then naturally carried over to root-final *f*.

The facts from Nyakyusa appears to be a natural extension of the cyclic effects we have seen in the other Bantu languages cited. The *k* which replaces the fricated consonant *s* or *f* clearly bears no resemblance to these latter consonants—and in most cases will be quite different from the underlying root-final consonant. It would however seem hopeless to see any kind of identity constraint playing a role here.

The conclusions that can be drawn from such facts are thus as follows: First, since the Bantu cases involve applicative interfixes, cyclicity does not always result from the concatenative bracketing of morphs. Second, cyclicity does not always result in increased “base identity”. A more general conclusion is that cyclicity in fact exists: Given the base non-identity found in languages such as Nyamwezi, Nyakyusa etc., cyclic effects cannot always be replaced by identity constraints (see Benua 1995, Kenstowicz 1995, Steriade 1997, Buckely 1999, among others) Rather, what motivates both the Bemba-type and the Nyamwezi type of applicativized causative is the speakers’ desire for each of the stages in (21) to be derivationally transparent:

(21) Two types of transparent cyclic derivation

(a)	(b)	(c)	(d)
CVC-	CVC’-ɨ-	{ CVC’-iz-ɨ-, CVC-iz-ɨ- }	

Just as one can go transparently from the plain root in (21a) to the causativized root in (21b), speakers transparently applicativize the causatives in (21b) by either keeping the frication in (21c) or by undoing it with a replacive consonant or consonants in (21d). I suggest that the replacement of the fricated C’ of (21b) by a “plain” consonant in (21d) is always done transparently, that is, on the basis of the surface fricated C’. In other words there is no need to

<sup>11</sup>My own view is similar to Meinhof & van Warmelo (1932), who assume that *k* has become the mark of the applicativized causative in Nyakyusa. That this is so is seen in the case of non-fricating consonants: The verb *-lum-* ‘bite’ has a causative *-lum-j-*. Since */m/* doesn’t fricate, it presumably cannot be defricated to *k*. Thus, the expected applicativized causative, therefore, should be *\*lum-is-j-*, where the interfix *-il-* has been fricated to *-is-*. This is not the case, however. Instead, the correct form is *lum-ik-is-ɨ-* ‘cause to buy for/at’. Where would this extra *-ik-* come from then? In my view, it is the “long” causative form *-is-*, found more restrictedly in the language. My interpretation is as follows: The applicativized causative requires a *...kis...* or *...kif...* sequence (modula vowel height harmony). Since the non-fricating consonant */m/* cannot be realized as *k*, an input such as *lum-j-* ‘cause to bite’ cannot undergo applicativization and meet the templatic condition *...kis/f...* at the same time. Therefore, the solution is to resort to the longer form of the causative as an input to applicativization: *-lum-is-j-* becomes *-lum-ik-is-ɨ-* by the process(es) schematized in (20a).

know the underlying consonant of the root, for example, if phonetic *z* is derived from underlying /l/ or /g/. The observation that cyclicity usually results in identity among morphologically related words is attributable to two general tendencies: (i) more morphology is prefixal or suffixal than in(ter)fixal; (ii) more phonology is assimilatory, than dissimilatory. Where morphology is non-concatenative, i.e. INTRUSIVE to the base, we need not assume that cyclicity will enforce identity—rather, only that the phonology of complex forms show a tendency to be derived from the outputted phonology of simpler forms. In sum, it is this derivational relationship that motivates all cyclicity, even in the absence of canonical cyclic effects.

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