

Cyclicity and Suffix Doubling in the Bantu Verb Stem

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As in Luganda, the ordering of *-ir-* and *-an-* is first determined by scope. However, in case scope produces an *-an-ir-* sequence, *-an-* is doubled after *-ir-*, thereby revealing the same *-ir-an-* preference as in Kinande.

Finally, the role of phonology in determining suffix order should not be overlooked. In this regard, Meeussen (1959:58) notes that "...un suffixe monophone -y- [-i-] ou -w- [-u-] tend à être représenté après tout autre suffixe". In (8) we see that causative *-i-* must follow reciprocal *-an-* in Kinande.

- (8) a.    *-tsap-*            'get wet' (intr.)  
           *-tsap-i-*        'wet [something]' (=cause to get wet)  
           *-tsap-an-i-*    'wet each other'
- b.    \**-song-*  
           *-song-i-*        'gather' (tr.)  
           *-song-an-i-*    'gather each other'

In (8a) causative *-i-* must be added first, since *-an-* cannot reciprocalize an intransitive verb. In (8b), *-i-* is presumably lexicalized with the root *-song-*, since the latter does not occur independently. If we assume a derivation of (8a) by scope, *-an-* must not be suffixed outside *-tsap-i-*, as in (9a), but rather between *-tsap-* and *-i-*, as shown in (9b).

- (9) a.    *-tsap-*        →    *-tsap-i-*        →    \**-tsap-i-an-*    [[ [ tsap ] i ] an ]  
           'get wet'        'wet (tr.)'        'wet each other'
- b.    *-tsap-*        →    *-tsap-i-*        →    *-tsap-an-i-*  
           'get wet'        'wet (tr.)'        'wet each other'

One might thus conclude that the *-V-* suffixes occur after *-VC-* suffixes (followed only by the *FV*) because of their phonological shape, i.e. there is a tendency to pile up "monophone" suffixes at the end of the verb stem. In any case, there is a clear need for *internal* suffixation, as in (9b), a conclusion that is further documented in the following sections on Cibemba and Luganda.

## §2. Cibemba

In this section we shall present the case for cyclicity and suffix doubling in Cibemba. We begin by considering the interaction of the causative *-i-* and reciprocal *-an-* suffixes in (10).

- (10) a.    *-fúm-*        →    *-fúm-i-*        →    *-fúm-i-an-i-*    [-fúm-y-aan-y-]<sup>3</sup>  
           'go out'        'take out'        'take each other out'
- b.    *-kóm-*        →    *-kóm-i-*        →    *-kóm-i-an-i-*    [-kóm-y-aan-y-]  
           'reach, relate to'   'touch'        'touch each other'

As seen, we first transitive the verb roots in (10) with the *-i-* suffix and then reciprocalize the resulting forms by adding *-an-*. Substantiating Meeussen's observation that *-V-* suffixes tend to occur after *-VC-* suffixes, Cibemba requires that the causative suffix *-i-* be doubled after reciprocal *-an-*, as shown. This doubling of *-i-* is extremely pervasive in Cibemba. In order to appreciate this fact, we note the following (lexical) process of consonant mutation (CM) that conditions the following alternations before causative *-i-*.<sup>4</sup>

- (11) a.    p, b            →    f  
       b.    t, d, l, k, g   →    s

Except for CM, the derivations in (12) are completely parallel to those in (10).

- (12) a. -lub- → -luf-j- → -luf-j-an-j- [-luf-y-aan-y-]  
 'be lost' 'lose' 'lose each other'<sup>5</sup>
- b. -lil- → -lis-j- → -lis-j-an-j- [liš-(y)-aan-y-]<sup>6</sup>  
 'cry' 'make cry' 'make each other cry'

Doubling of -j- is thus firmly established.

Now consider the interaction of causative -j- with the applicative suffix. As seen in (13),

- (13) a. -lub- → -lub-il- c. -lob- → -lob-el-  
 'be lost' 'be lost at/for' 'be exterminated' 'be exterminated at/for'
- b. -lil- → -lil-il- d. -end- → -end-el-  
 'cry' 'cry at/for' 'walk (intr.)' 'walk at/for'

the applicative is realized as -il- when the preceding vowel is /i/ or /u/ (or /a/, though not shown), and as -el- when the preceding vowel is /e/ or /o/. In (14) we see how the verb roots in (13) are realized when they are first causativized and then applicativized:

- (14) a. -lub- → -luf-j- → -luf-il-j- → -luf-is-j- [-luf-iš-(y)-]  
 'be lost' 'lose' 'lose at/for'
- b. -lil- → -lis-j- → -lis-il-j- → -lis-is-j- [-liš-iš-(y)-]  
 'cry' 'make cry' 'make cry at/for'
- c. -lob- → -lof-j- → -lof-el-j- → -lof-es-j- [lof-eš-(y)-]  
 'be exterminated' 'exterminate' 'exterminate at/for'
- d. -end- → -ens-j- → -ens-el-j- → -ens-es-j- [eṅ-eš-(y)-]  
 'walk' 'make walk' 'make walk at/for'

In these examples we see that both the final root consonant *and* the /l/ of the applicative suffix have undergone CM. Unlike the derivations in (10) and (12), there are two reasons why we cannot propose a doubling of -j-: First, the -j-il- sequence of a putative intermediate form such as -luf-j-il-j- for (14a) would result in a surface long vowel by the regular rules of Cibemba phonology (cf. (12b)). As seen, however, the post-radical vowel is short in all the examples in (14). A second argument comes from the (postlexical) rule of s-palatalization in (15).

- (15) s-Palatalization: s → š / \_\_\_\_ {j, i}

As stated, /s/ palatalizes to [š] before both mutating /j/ and non-mutating /i/. Crucially, s-palatalization does not apply before [e]. As seen in the output of (14d), the /d/ of -end- 'walk' mutates to [s] but does not palatalize to [š]. From this we safely conclude that it could not derive from intermediate -ens-j-el-j-, i.e. with doubling of -j-.

The means by which we propose that CM applies both to final C of the verb roots and to the [l] of the applied suffix in (14) is cyclically: Causative -j- is first added, triggering CM. This is followed by internal suffixation of applicative -il-/el- before the causative suffix, which then mutates the /l/ to [s]. Finally, s-palatalization applies to the -is-j- and -es-j- sequences, deriving -iš-j- and -eš-j- (and also to the verb root in (14b) to derive -liš-iš-j-).

While cyclicity in itself is not a surprising discovery, given its special role in lexical phonology, internal suffixation may be of some concern.<sup>7</sup> We thus now consider two alternatives to cyclicity that might seem plausible. The first is to attempt a non-cyclic, iterative application of CM. As illustrated in (16),

- (16) a. -lub-il-*j*- → -lub-is-*j*- → -luf-is-*j*- 'lose at/for'  
 b. -lil-il-*j*- → -lil-is-*j*- → -lis-is-*j*- 'make cry at/for'

affixation here is non-cyclic, after which CM applies right-to-left, first hitting the applicative suffix, then the final consonant of the verb root.<sup>8</sup> Though the correct outputs are derived in (16), this non-cyclic account cannot be generalized to forms such as in (17).

- (17) a. -punk- → -punk-an- → -punk-an-*j*- (\*-puns-an-*j*-)  
 'bump into' 'bump into e.o.' 'cause to bump into e.o.'  
 b. -táluk- → -táluk-*j*- → -tálus-*j*- [-táluš-y-] (\*-tásus-*j*-)  
 'be apart' 'make apart' (= -tál-uk-*j*-?)  
 c. -kak- → -kak-uk- → -kak-ul-*j*- → -kak-us-*j*- (\*-kas-us-*j*-)  
 'tie' 'become untied' 'cause to become untied'  
 d. -sek- → -sek-es-*j*- [-sek-eš-y-] (\*-ses-eš-y-)  
 'laugh' 'make laugh'

All of these examples have in common that the causative suffix *-j*- is unambiguously added at the end of the derivation (i.e. on what would be the last cycle in a cyclic analysis). As seen, *-j*- conditions CM only on the immediately preceding consonant—not on any earlier consonant: In (17a) we have a causativized reciprocal; in (17b) a bisyllabic verb base that might be monomorphemic; in (17c) a causativized reverse; and in (17d) a "long causative" which, as pointed out in (3c), requires an *-j*- to accompany the *-is-* formative. In no instance is there "long distance" CM. Of course, one might seek individual explanations for the non-iteration of CM in each example: Perhaps the [k] in (17a) is not affected because the non-mutating nasal of reciprocal *-an-* effectively blocks CM. Or perhaps the non-mutation of [l] in (17b) is accounted for on the basis of its not being at the end of a morpheme. (17c,d) would require this latter explanation to be extended in possibly ad hoc ways: The root-final [k] might be exempt from CM in (17c) because (for some unknown reason) the morpheme break in *-kak-uk-* is not visible when *-j*- is added.<sup>9</sup> Similarly, the [k] in (17d) is exempt, because the morpheme break in *-es-*j*-* is not visible, and hence *-j*- cannot have its long-distance effect. Whether one finds these individual "explanations" convincing or not, the examples such in (17) and many others like them, taken together, would be much more straightforwardly accounted for if we assumed that CM is non-iterative, instead applying cyclically, as we saw in (14).

A second alternative possibly worth pursuing would require CM to reference either of two parallel representations: a morphosyntactic representation (indicating the scope of each suffix) vs. a phonological representation (indicating the *surface* order of the individual formatives or morphs). The applicativized causative in (14a), for example, would have the morphosyntactic representation in (18a) and the phonological representation in (18b).<sup>10</sup>

- (18) a. [ [ lub ] CAUS ] APP ]      b. [ lub - il - i - ]      (= 'lose at/for')

With these two representations distinguished, one could establish CM as an allomorphy rule conditioned either by morphosyntactic adjacency to the feature CAUS or by phonological adjacency to the formative *-i-*. A re-examination of the forms in (17) reveals that in each case the same consonant is adjacent both to CAUS and to *-i-*. Thus, the form in (17c) would be represented as in (19).

- (19) a. [[ kak ] REV ] CAUS ]      b. [ kak - u<sub>k</sub> - i - ]      (= 'cause become untied')

As a result, only the [k] of the reversive suffix *-uk-* can mutate. While such a dual representation is independently motivated, it is not clear whether phonological rules or statements of allomorphy should be allowed to be indifferent as to which of the two environments conditions them. One important issue would be to evaluate the possibly different predictions global references such as (18a) may have from cyclic rule application. Pending future research, we simply note this alternative means of encoding cyclic effects such as the ones we have just seen in Cibemba—and will now observe in Luganda as well.

### §3. Luganda

We begin our discussion of Luganda by showing the same doubling of causative *-i-*, when reciprocalized (here, by *-agan-*) as was observed in Cibemba. Thus, compare the forms in (20) with those seen earlier in (10).

- (20) a. *-lim-* → *-lim-i-* → *-lim-i-agan-i-*      [-lim-y-agan(y)-]<sup>11</sup>  
           'cultivate'    'cause to cultivate'    'cause e.o. to cultivate'  
       b. *-kúb-* → *-kúb-i-* → *-kúb-i-agan-i-*      [-kúb-y-agan(y)-]  
           'hit'            'cause to hit'            'cause e.o. to hit'

The data in (21) show the same doubling along with the by now familiar CM effects:

- (21) a. *-sek-* → *-sek-i-* → *-ses-i-agan-i-*      [-ses(y)-agan(y)-]<sup>12</sup>  
           'laugh'            'cause to laugh'            'cause e.o. to laugh'  
       b. *-léet-* → *-léet-i-* → *-léés-i-agan-i-*      [-léés(y)-agan(y)-]  
           'bring'            'cause to bring'            'cause e.o. to bring'

As summarized in (22), CM again applies before causative *-i-*, though the details differ:<sup>13</sup>

- (22) a.    t, c, k      →    s  
       b.    d, l, j, g    →    z  
       c.    n            →    ŋ  
       d.    w            →    y<sup>14</sup>

Since /n/ also mutates in Luganda, we see two applications of CM in (21): one to the final consonant of the verb root, one to the /n/ of the reciprocal suffix *-agan-*. Now consider the data in (23), which are similar to the Cibemba forms in (14).

- (23) a. *-sek-i-* → *-ses-i-* → *-ses-el-i-* → *-ses-ez-i-*      [-ses-ez(y)-]  
           'cause to laugh'      (CM)      'cause to laugh at/for'      (CM)  
       b. *-léet-i-* → *-léés-i-* → *-léés-el-i-* → *-léés-ez-i-*      [-léés-ez(y)-]  
           'cause to bring'      (CM)      'cause to bring at/for'      (CM)

As before, the question is how to get CM to apply both to the final consonant of the verb root and to the [l] of the applicative suffix. As seen in the derivations in (23),

cyclic application of CM works quite well, as would the following iterative right-to-left applications of CM in (24).

- (24) a. -sek-el-*j*- → -sek-ez-*j*- → -ses-ez-*j*- 'cause to laugh at/for'  
 b. -léet-el-*j*- → -léet-ez-*j*- → -léés-ez-*j*- 'cause to bring at/for'

However, the following causativized reciprocals in (25) and (26) show that a non-cyclic right-to-left application of CM cannot be generalized:

- (25) a. -áwuk- → -áwuk-an- → -áwuk-aŋ-*j*- (\*-áwus-aŋ-*j*-)  
 'be different' 'differ from e.o.' 'distinguish from e.o.'  
 b. -túuk- → -túuk-an- → -túuk-aŋ-*j*- (\*-túus-aŋ-*j*-)  
 'arrive, reach' 'meet, be in accord' 'harmonize, put into contact'
- (26) a. -kwáat- → -kwáat-agan- → -kwáat-agan-*j*-  
 'seize, hold' 'seize, hold e.o.' 'unite hands of'  
 b. -kyaaw- → -kyaaw-agan- → -kyaaw-agan-*j*-  
 'hate' 'hate e.o.' 'cause mutual hatred'

These forms, taken from Snoxall (1967), show the causative occurring outside the reciprocal suffixes -an- and -agan-, whose final /n/ undergoes mutation. Crucially, the root-final consonants are not affected. The same absence of cyclic CM is in the causativized reversives in (27).

- (27) a. -wet- → -wet-uk- → -wet-us-*j*- (\*-wes-us-*j*-)  
 'bend (tr.)' 'warp (intr.)' 'warp (tr.)'  
 b. -satt- → -satt-ul- → -satt-uz-*j*- (\*-sass-uz-*j*-)  
 'stitch' 'unstitch' 'cause to unstitch'

As we did for Cibemba, we might again consider an analysis whereby CM would refer indifferently to either to morphosyntactic or phonological adjacency to CAUS or its realization -*j*-. Otherwise, cyclic application seems unavoidable.

In Luganda, unlike Cibemba, there is however one major stumbling block that either means of encoding cyclic effects must overcome. As seen in (28a),

- (28) a. -gul- → -gul-*j*- → -guz-*j*-  
 'buy' 'sell' (=cause to buy)  
 b. -guz-*j*- → -guz-il-*j*- → \*-guz-iz-*j*-  
 'sell' 'sell at/for'  
 c. -gul-il-*j*- → -gul-iz-*j*- 'sell (=cause to buy) at/for' (≠ (23))

the verb 'sell' is derived from -gul- 'buy' plus causative -*j*-, which mutates the preceding [l] to [z]. The problem is that if we proceed in a cyclic fashion to derive the applicative form in (28b), as we have done up to now, we incorrectly derive the starred form. A non-cyclic analysis such as in (28c) appears to be needed whenever the verb root ends in [l]! There is a further relevant complication. While standard sources on Luganda (e.g. Ashton et al 1954) note only forms such as in (23), where more than one mutation has occurred, some Luganda speakers accept the alternants in (29).

- (29) a. -sek-ez-*j*- (cf. (23a))      b. -léet-ez-*j*- (cf. (23b))  
 'cause to laugh at/for'      'cause to bring at/for'

Here, when the verb root ends in a consonant other than [l], a non-cyclic derivation is a viable option (though not in Cibemba!). Starting with the morphosyntactic representation in (30), we propose the two-part spell-out in (31).

(30) [ [ .... C ]<sub>root</sub> CAUS ] APP ]

- (31) a. Non-cyclic spell-out: CAUS + APP  $\Rightarrow$  -il-i-  
 CONDITION: obligatory if C = [l]; otherwise optional  
 b. Cyclic [elsewhere; default] spell-out (as in (23), etc.)

As stated in (31a), the spell-out of (30) will be obligatorily non-cyclic if the root ends in [l], otherwise optional. The most effective way to do this is to consider -il-i- to be a portmanteau form, rather than the compositional sequence it appears to be.<sup>15</sup> Cyclic spell-out is however the default option (and the only one possible in Cibemba).

While (31) works, the question we must address is whether pre-emptive spell-outs such as in (31a) ought to be allowed in morphology. To support our analysis, we now present a different case from Luganda where another phonologically-driven morphological spell-out is required. Consider the forms in (32).

- (32) a. [ [ sib ] CAUS ] REC ]  $\rightarrow$  -sib-i-agan-i- 'cause e.o. to tie (sth.)'  
 b. [ [ sib ] REC ] CAUS ]  $\rightarrow$  -sib-agan-i- 'cause to tie e.o.'

As expected, the reciprocalized causative in (34a) is realized with -i- both preceding and following -agan-: The first -i- is the spell-out of CAUS, while the second -i- is a copy conditioned by the presence of the -agan- suffix. In the causativized reciprocal in (34b), the spell-out is again cyclic, and this time there is only one -i- suffix. What is important for our present purposes is the fact that the features CAUS and REC are generally spelled out in different orders, according to scope.

Now consider the causative and reciprocal forms of a -CV- verb root such as -mo- 'shave' in (33).

- (33) a. [ [ mo ] CAUS ]  $\rightarrow$  -mo-es-i- 'cause to shave' (\*-mo-i-)  
 b. [ [ mo ] REC ]  $\rightarrow$  -mo-aŋŋan- 'shave each other' (\*-mo-agan-)

In Luganda, as in Bantu generally, -CV- verb roots place special requirements on the spell-out of various suffixes that immediately follow them. In (33a) we see that the "long" causative form -es-i- is required, while in (33b), we see that REC is exceptionally spelled out as -aŋŋan- after a -CV- verb root. Important for us is what happens when a -CV- verb root is both causativized and reciprocalized. As seen in (34a), and in contradistinction to (32),

- (34) a. [ [ mo ] CAUS ] REC ]  $\rightarrow$  -mo-es-agan-i- 'cause e.o. to shave' /  
 [ [ mo ] REC ] CAUS ] 'cause to shave e.o.'  
 b. CAUS + REC / REC + CAUS  $\rightarrow$  -is-agan-i-  
 CONDITION: obligatory after a -CV- verb root  
 c. [ [ mo ] REC ] CAUS ]  $\nrightarrow$  \*-mo-aŋŋan-i- / \*-mo-aŋŋan-is-i-

both morphosyntactic representations are realized identically as a result of the pre-emptive spell-out rule in (34b).<sup>16</sup> What is important is that (34b) must block the cyclic spell-out of REC followed by CAUS in (34c). What we suggest is that (34b) is to (32) as (31a) is to (31b). In other words, both cases are instances whereby a

more specific rule spells out a combination of morphosyntactic features (sensitive to a phonological condition) and thereby blocks the default cyclic spell-out.

#### §4. Conclusion

A basic conclusion of this paper, based both on Cibemba and Luganda, is that in these—and other—Bantu languages, the spell-out of derivational verbal morphology is cyclic in the default case, though it can be overridden by phonological conditions on specific combinations of morphosyntactic features. The other major observation we have made is that both of these languages (as well as Chichewa in (7b)) sometimes require the doubling of an earlier suffix to the right of a later suffix, thereby creating sequences such as *-an-ir-an-* and *-i-(ag)an-i-*. The major question we are left with is how to predict when suffix doubling will be required. For this it is necessary to understand its cause. We suggest that suffix doubling is the result of a conflict between two different aspects of concatenative morphology: the default cyclic spell-out that we have established vs. the linear ordering restrictions on specific morphemes. For example, in (7a) the cyclic spell-out of APP followed by REC produces the sequence *-ir-an-* without event, while the cyclic spell-out of REC followed by APP in (7b) produces the problematic sequence *-an-ir-* in Chichewa. The reason why this sequence is problematic is that there is a separate condition according to which *-an-* should follow *-ir-*. In a morph-based approach, this condition might be placed on the *-an-* formative itself, whereas in a realizational view of morphology such as Anderson's (1991) "a-morphous morphology", it could derive from the ordering of the two spell-out rules, with APP-spelling preceding REC-spelling. In the latter case the derivations needed for (7a,b) would proceed as in (35).

- (35) a. [ [ [ *ím*b ] APP ] REC ] 'sing for each other'
- |      |            |
|------|------------|
| -ir- | Cycle 1:   |
| ---  | APP → -ir- |
|      | REC → -an- |
|      | Cycle 2:   |
| ---  | APP → -ir- |
| -an- | REC → -an- |
- b. [ [ [ *meny* ] REC ] APP ] 'hit each other for/at'
- |      |            |
|------|------------|
|      | Cycle 1:   |
| ---  | APP → -ir- |
| -an- | REC → -an- |
|      | Cycle 2:   |
| -ir- | APP → -ir- |
| -an- | REC → -an- |

In (35a) APP is spelled on the first cycle and REC on the second. In (35b), REC is spelled on the first cycle and APP on the second. As seen, because of rule ordering (APP > REC), REC-spelling reapplies on the second cycle. In other words, REC is spelled out first based on the representation [ [ *meny* ] REC ] and then again based on the representation [ [ [ *meny* ] REC ] APP ]. This account is possible only if we assume (a) that the REC feature is visible on the second cycle, and (b) that the same morphosyntactic feature cannot be spelled out twice in a row—or else (35a) would surface as *\*ím*b-ir-ir-an-. This latter assumption is well-founded in Bantu



spell-out. (b) The combination is not possible (i.e. there is no way to “unify” the conflicting requirements). In this case a language may find it impossible to express an applicativized reciprocal. While we have not yet found any Bantu language with this property, this may be because of our rather limited data base (about six Bantu languages we have studied in some depth). On the other hand, there may be reason to believe that the semantic needs figure more importantly in such conflicts. Limited as it is, this paper is intended only as a progress report on our continuing search to discover—and explain—the general phonological and morphological properties of the Bantu verb stem.

### Notes

<sup>1</sup>The Kinande and Chichewa examples in this paper were graciously provided by Drs. Ngesimo Mutaka and Sam Mchombo, respectively, while the Luganda material results from our joint research, supported in part by NSF grant #BNS89-96111. The Cibemba materials were collected by the first author with Mr. Lawrence Mukuka, support by a U.C. Berkeley Faculty Research Grant. We are grateful to the above consultants and to Sharon Inkelas for discussions of the contents of this paper.

<sup>2</sup>Throughout this paper, verb stems are cited without an inflectional FV.

<sup>3</sup>When -j- glides to [y], there is the typical compensatory lengthening of the following vowel; hence, with a FV -a: -fúm-y-aan-y-aa, -tín-y-aan-y-aa. If not followed by an enclitic, the lengthened FV -aa undergoes a rule of final vowel shortening, as in Luganda.

<sup>4</sup>Since not all instances of /l/ trigger CM, the symbol “j” is used to denote those that do, e.g. also the deverbal agentive noun suffix -j (cf. -lind- ‘protect’, mu-lins-i ‘guardian’, which undergoes *s*-palatalization in (15) to become mu-linš-i). Unlike many other Bantu languages, CM does not apply before the perfective ending -il-e, which undergoes height harmony to -el-e when the preceding vowel is mid. Finally, note that nasals do not undergo CM.

<sup>5</sup>This reciprocalized causative may also mean ‘do something wrong’.

<sup>6</sup>The derived [s] of -lis- undergoes the *s*-palatalization rule in (15). One has the impression that [š] is followed by a palatal offglide, i.e. [šʲ], especially when followed by a non-front vowel, e.g. the FV -a. We assume that the absence of this [ʲ] is due to a rule of palatal absorption (cf. the similar situation in Luganda below).

<sup>7</sup>Both Aronoff (1988) and Anderson (1991) accept internal affixation, if the base to which affixation applies is the “head” of the form, e.g. the root or stem, and Anderson as well as McCarthy and Prince (1990) allow for a phonologically conditioned “infixation”. The “interfixing” shown here could be accounted for by marking off a vowel suffix as invisible and then suffixing the applicative to what remains. Since the reciprocal is added *after* causative -j-, this analysis would require that “invisibility” be a property of specific morphemes (or the rules that introduce them), rather than being a property of the domain (as proposed by Inkelas 1989, for instance).

<sup>8</sup>In this case it would work like labial palatalization in Xhosa (Louw 1975-6).

<sup>9</sup>The intransitive reversive ‘become un-VERBed’ is expressed by the suffix -uk-, whose corresponding transitive is expressed by the suffix -ul-, e.g. -kak-ul- ‘untie’. In some cases it is possible to causativize the -uk- form, which we have done in (17c).

<sup>10</sup>We have assumed that such a “morphosyntactic representation”, taken from Anderson’s (1991) approach to inflectional morphology, is applicable as well to the expression of argument structure within the derivational morphology of verb forms.

<sup>11</sup>Unlike Cibemba, when the first (immediate-postradical) -j- suffix glides to [y], there is no compensatory lengthening of the following vowel. Within the stem domain (=stratum 1 phonology), such compensatory length deriving from Vi + Vj is observed only when Vj is in either the second- or final-mora position of the verb.

<sup>12</sup>The glided [y] from causative -j- is obligatorily absorbed into a preceding [s], [z] or [ŋ].

<sup>13</sup>Specifically, labial stops do not mutate in Luganda, and the underlying voicing opposition is preserved. (Also, the one nasal /n/ mutates to [ŋ].) CM in Luganda also applies before the deverbal

agentive noun suffix -j, as in Cibemba, and (as is typical of Bantu) before the \*-jd-e perfective ending (aka the “modified base”).

<sup>14</sup>Strictly speaking, [w] becomes [y] before both the mutating /i/ and non-mutating /i/, but is listed here since it is relevant to the example in (26b) below. In Luganda, as in Chichewa, /i/ and /i/ are phonetically identical, though the former conditions CM, while the latter does not.

<sup>15</sup>Perhaps the non-cyclic spell-out can be conditioned by a “readjustment rule” that would combine CAUS + APP into a single suffixal cycle, e.g. by removing the right bracket after CAUS.

<sup>16</sup>In this case it is possible that a -CV- verb root actually requires that CAUS be spelled out first, followed by the spelling of REC. This would produce the form: -mo-es-j-agan-j-, i.e. with an -j- suffix occurring between -es- and -agan- (which then copies to the right of the latter). Since this vowel would glide to [y] and then be absorbed into the preceding [s], there is no way to be sure it is there. With respect to (34b), recall that there is a height harmony that is responsible for the alternation between -is- and -es-.

<sup>17</sup>This is not to be confused with cases of where a single morphosyntactic feature is spelled out with the so-called “augmentative applied suffix -irir- (Ashton et al 1954:332-3). This suffix, frequently used to indicate that an action is extended over time, repeated, or done to completion, even occurs as -iririr-on -CV- roots. Here, however, we would not claim a cyclic spell-out of more than one APP, but rather a double/triple form realizing a single APP feature.

### References

- Anderson, Stephen R. 1986. Disjunctive ordering in inflectional morphology. *Natural Language and Linguistic Theory* 4.1-32.
- Anderson, Stephen R. 1991. *A-morphous morphology*. Ms. Johns Hopkins University.
- Aronoff, Mark. 1988. Head operations and strata in reduplication: a linear treatment”. *Yearbook of Morphology*, 1-15. Dordrecht: Foris Publications.
- Ashton, E.O. et al. 1954. *A Luganda grammar*. London: Longmans.
- Hyman, Larry M. In press. Conceptual issues in the comparative study of the Bantu verb stem. In Salikoko Mufwene, Lioba Moshi, Ben Blount and Deborah Schindwein (eds), *Studies on African Languages: Papers from the Twenty-First Annual Conference on African Linguistics*. Amsterdam: Benjamins.
- Inkelas, Sharon. 1989. *Prosodic constituency in the lexicon*. Ph.D. dissertation, Stanford University.
- Louw, J.A. 1975-6. Palatalization of bilabials in the passive, diminutive and locative in Xhosa and Tsonga. *Afrika und Übersee* 59/4.241-278.
- McCarthy, John J. and Alan Prince. 1990. Foot and word in prosodic morphology: The Arabic broken plural. *Natural Language and Linguistic Theory* 8.209-283.
- Meeussen, A.E. 1959. *Essai de grammaire rundi*. Tervuren: Musée Royal de l’Afrique Centrale.
- Snoxall, R.A. 1967. *Luganda-English dictionary*. London: Oxford University Press.