Bantu verb stem morphotactics revisited

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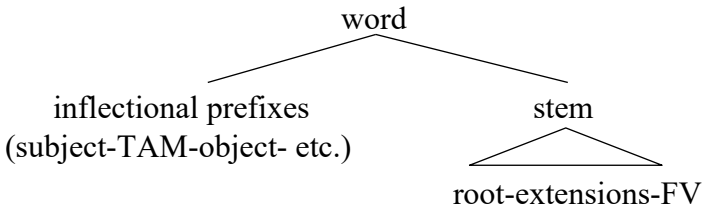
Abstract. In Hyman (2003a), I proposed a default pan-Bantu template to account for a recurrent sequencing of the Causative, Applicative, Reciprocal and Passive (CARP) suffixes, in this order. Divergences from CARP were said to result from language-specific overrides where a suffix earlier in the template has scope over a suffix later in the template. In this paper, I further examine CARP in light of data from additional Bantu languages, especially Ikalanga, Ndebele, Runyankore, Ekegusii, and the Tiania variant of Kimeru. I show, first, that although certain pairs of derivational voice suffixes such as Causative and Applicative overwhelmingly occur in the predicted CA order, others, such as Applicative and Reciprocal, occur as RA in some Bantu languages, systematically violating CARP. I conclude that rather than CARP being a template, the ordering properties need to be stated independently for each pair of suffixes on a language-by-language basis. By analyzing constraints on suffix sequences as bigrams, we can not only produce the CARP effects, when they occur, but also suffix orders that neither follow CARP nor reflect their scope relations.

Keywords. Bantu; affix ordering; templates; scope; cyclicity; causative; applicative; reciprocal; passive

1. Introduction. The goal of this report is to update and expand my comparative study of Bantu verb stem morphotactics, allomorphy, and morphophonemics (Hyman 2003a,b). In the following sections, I reexamine the proposed Causative-Applicative-Reciprocal-Passive (CARP) template, both concerning its generality and how it should be conceptualized. I start by recapitulating the issues surrounding suffix ordering in Bantu and then turn to important exceptions to CARP that have been discovered both by others and in my own recent work.

2. Template vs. scope. I begin by presenting the basic structure of the Bantu verb in (1), where "extensions" refer to CARP derivational voice (and other) suffixes and FV refers to the final vowel or longer tense-aspect-mood (TAM) inflectional suffix.

(1)



In Hyman (2003a), I considered two conflicting explanations for the linear ordering of the derivational causative, applicative, reciprocal, and passive extensions:

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(2) a. compositionality: suffix ordering is determined by semantic scope, which may also determine the order of syntactic operations, specifically by the "mirror principle" of Baker (1985), where each suffix acts on the base (root + possible suffix(es)) to which it is attached, hence A acting on the root of [[[root] A] B] and B acting on the root+A
b. morphotactics: suffix ordering is determined by the CARP template in (3)[1]

(3)

	Causative	**A**pplicative	**R**eciprocal	(causative)	**P**assive
Proto-Bantu	*-ɪc-	*-ɪl-	*-an-	*-i-	*-ɪC-ʊ-
Chichewa	-its-	-il-	-an-	---	-idw-
Ikalanga	-is-	-il-	-an-	---	-(i)w-
Luganda	-is-	-ir-	-agan-	-y-	-(ib)w-
Chibemba	-is-	-il-	-an-	-y-	-w-

As seen, I have added the "short causative" in the boxed column, which, when present, occurs between the reciprocal and passive, thereby defining a more complete CARcP template (see also Good 2003 and below). In previous work, I presented three arguments that the above CARP template is the default, although there can be specific overrides motivated by scope.

2.1. NON-COMPOSITIONAL TEMPLATIC ORDER. The first argument is that certain pairs of suffixes must appear in a fixed surface order independent of scope. Thus, the causative + applicative (CA) must occur in this order (*AC) in Chichewa and many other Bantu languages (cf. Hyman & Mchombo 1992):

(4) a. applicativized causative: lil-its-il- 'cause to cry with' [[[cry] cause] with]
b. causativized applicative: takas-its-il- 'cause to tie with' [[[tie] with] cause]

In the examples in (4), the applicative suffix *-il-* is required to license an instrument. In (4a), the instrument is used for the causation (e.g., use a stick to make the children cry), while in (4b) the instrument is used for tying (e.g., make that the children tie with a rope). The CA order in (4a) is thus consistent both with the CARP template and with scope, while the CA order in (4b) is consistent with the CARP template but violates scope. Hyman (2003a: 260) also shows that the scope differences correspond to the different syntactic properties seen in (5) and (6).

(5) a. ndodo i-ná-líl-its-il-idw-á ána
stick SBJ-TAM-cry-C-A-P-FV children
'a stick was used to make the children cry'
c. ?* aná a-ná-líl-its-il-idw-á ndodo
children SBJ-TAM-cry-C-A-P-FV stick
'the children were made to cry with a stick'

(6) a. ána a-ná-máng-its-il-idw-á chingwe
children SBJ-TAM-tie-C-A-P-FV rope
'children were made to tie with a rope'
b. ?* chingwe chi-ná-máng-its-il-idw-á ána
rope SBJ-TAM-tie-C-A-P-FV children

[1] In citing -iC- suffixes, I ignore vowel height harmony whereby /i/ becomes [e] after /e, o/ in the five vowel /i, e, u, o, a/ languages in (3). In seven vowel /i, ɪ, ɛ, u, ʊ, ɔ, a/ or /i, e, ɛ, u, o, ɔ, a/ languages, the harmony is between the second and third degree vowels.

In (5a), it is fully grammatical for the instrument *ndodo* 'stick' to become the subject of the passivized causative, while the corresponding sentence in (5b) with the causee *ána* 'children' as subject is judged as either fully or marginally ungrammatical. The facts are reversed in (6), where it is the causee *ána* 'children' that is fully grammatical as subject in (6a), while the instrument *chingwe* 'rope' as subject is not.[2] We thus conclude that while both the semantic scope and the syntactic facts suggest different structures, the morphology exceptionlessly requires the templatic order CA. In fact, even when an applicative suffix is lexicalized, e.g., *uk-* 'wake up', *uk-il-* 'rebel against', C must precede A: *uk-its-il-* 'cause to rebel against', **uk-il-its-* (Hyman & Mchombo 1992: 359; Hyman 2003a: 264).

2.2. ASYMMETRIC COMPOSITIONALITY. The second argument for the CARP default template is what I termed "asymmetric compositionality": the atemplatic order that violates CARP is restricted to the reading in which the surface order corresponds to scope, while the templatic order can be employed with either scope relation. Examples involving causative + reciprocal are shown from Chichewa in (7).

(7)	a.	templatic CR:	mang-its-an-	'cause each other to tie'	[[tie] cause e.o.]
				'cause to tie each other'	[[tie e.o.] cause]
	b.	atemplatic RC:	mang-an-its-	'cause to tie each other'	[[tie e.o.] cause]
				* 'cause each other to tie'	

In (7a), templatic CR can have either of the indicated meanings, while atemplatic RC in (7b) can have only the scope reading.[3] Asymmetric compositionality is accounted for by acknowledging that CARP is available as a default order from which only certain suffix pairings can diverge.[4] Thus, a specific scope-based override licenses RC in (7b), while there is no corresponding option concerning the causative and applicative, which, as seen in (4), must be realized CA and not *AC.

The same facts hold in cases where an atemplatic AB order is reinforced by a templatic respellout of A, producing an A-B-A sequence. The applicative + reciprocal illustrate this, again from Chichewa, where scope-based atemplatic RA is ungrammatical without a re-spellout of R (**mang-an-il-*):[5]

(8)	a.	templatic AR:	mang-il-an-	'tie (s.o./sth.) for each other'	[[tie] for e.o.]
				'tie each other for (s.o.)'	[[tie e.o.] for]
	b.	atemplatic RA:	mang-an-il-an-	'tie each other for (s.o.)'	[[tie e.o.] for]
			(realized RAR)	*'tie (s.o./sth.) for each other'	

2.3. EXCEPTIONLESS CARP. A third argument for CARP is that there is at least one language, Chimwiini, that only allows the CARP order:

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[2] (6b) would be grammatical if the rope were used for the causation rather than the tying, making the sentence parallel to (5a).

[3] Several other Bantu languages show asymmetric compositionality of the same extensons, e.g., Ndebele *sik-is-an-,* which can mean 'cause each other to cut' or 'cause to cut each other', while *sik-an-is-* can only have the latter meaning (Sibanda 2004: 62).

[4] Hyman & Mchombo (1992) earlier assumed instead that scope was the default, with various fixes designed to account for asymmetric compositionality and non-scope orders. While that assumption is problematic, the article can be consulted for a more complete description of suffix ordering in Chichewa.

[5] Other Bantu languages have been reported with the same RAR realization, e.g., Ndebele *sik-an-el-an-* 'cut each other for/at' (Sibanda 2004: 80).

> In Chimwi:ni, unlike some other Bantu languages, the order of the extensions is restricted. The following ordering of the extensions mentioned above is as follows: - Verb Stem - Causative - Applied - Reciprocal - Passive. It is not possible to put these extensions in an other order. (Abasheikh 1978: 28)

It is significant that no Bantu language allows verb extensions to be freely ordered by scope. All scope-motivated orders concern only a subset of suffix pairs, as we have seen in Chichewa. Thus, all Bantu languages fix some, if not most, suffix pairs according to CARP.

The above summarizes the reasons I proposed the CARP template. Up to now, the only violations of CARP have been scope "overrides" specific to certain suffix pairs. In the next section, we will see that there are other situations where CARP is violated.

3. Problems for CARP. In this section, I consider examples that pose problems for the CARP template. This will lead to the discussion of whether CARP is a template or whether it is just shorthand for a class of bigrams (CA, AR, etc.). I begin in (9) by listing six predictions made by my previous claim that CARP is a pan-Bantu default template.

(9) a. CARP is the only Bantu template
b. CARP is always possible, even if scope motivates an anti-CARP order
c. fixed orders will always obey CARP
d. anti-CARP alternants are always scope overrides
e. in an A-B-A sequence, A-B will be atemplatic, while B-A is templatic
f. the same suffix should not be able to iterate

I now take up each of these in turn, with each discussion ending with a brief summary.

3.1. CARP IS NOT THE ONLY BANTU TEMPLATE. In a 2005 mini-course I gave on morphology-phonology interfaces in Bantu in Tromsø, I was informed that Kitharaka reverses the order of the applicative and reciprocal, thus producing the default order CRAP (cf. Muriungi 2009). In subsequent work with Mwaambi G. Mbûûi in 2021-2022, we discovered the same fixed RA order in nearby Tiania, an understudied variant of Kimeru. Given that Kikuyu also has the RA order (Mugane 1997: 60), I suspect that RA is a consistent divergence from CARP in the Central Kenya Bantu group to which both languages belong. The order of Tiania verb extensions is given in (10).

(10)

{ Sociative Causative, Reciprocal }	Applicative	Causative	Passive
{ -eth-, -an- }	-er-	-i-	-w-

Several things should be noted. First, the sociative causative (SoC) extension *-eth-* [-eð-] obligatorily co-occurs with the short causative suffix *-i-* and is the reflex of the *-ɪc- causative suffix that we have seen as *-its-* (Chichewa) and *-is-* (elsewhere). It indicates indirect causation or aid in carrying out an action vs. direct causation or transitivization which is expressed by *-i-*, e.g., *thét-* 'quarrel', *thét-ɛth-i-* 'facilitate or be the reason for quarreling', *thét-i-* 'argue s.o.'.[6] Crucially, the RA order is completely general: *-kúndek-an-er-* 'tie for each other'. Thus, while the verb *-nenk-*

[6] In looking at 62 CVC- verb roots, we found that 27 take *-eth-i-,* 18 take *-i-*, nine take both *-eth-i-* and *-i-*, and eight accepted neither. Another example of a verb that falls in the third group is *-thamb-* 'bathe (intr.)': *-thamb-i* 'bathe (tr.)', *-thamb-eth-i-* 'bring about to be washed' (e.g., a car at a carwash, not washed by oneself).

er- ‘to give (to)’ has a frozen applicative suffix *-er*- (*-*nenk*-), adding the reciprocal requires RA: *-nenk-an-er*- ‘give each other, pass on something’.[7]

Another divergence from CARP is found in Ekegusii in Maho’s (2009: 62) Logooli-Kuria group in Kenya, whose ordering of suffixes in (11) shows a more striking divergence from CARP:

(11)	Applicative	Reciprocal	Sociative	Causative	Causative	Passive
	-er-	-an-	-es-		-i-	-w-

As in Tiania, the reflex of *-ɪc-, here *-es*-, expresses a sociative causative and is always followed by the short causative suffix *-i*-. However, it does not come first in the suffix order, but rather third. Relevant examples are seen in (12) with the infinitive prefix /ko-/ (→ *go*- by voicing dissimilation) and the inflectional final vowel (FV) *-a*:[8]

(12)		go-sib-a	‘to tie’
	A	go-to-sib-er-a	‘to tie for us’
	ASoC	go-to-sib-er-es-i-a	‘to help tie for us’
	AC	ko-ye-sib-er-i-a	‘to make tie with it’
	AP	go-sib-er-w-a	‘to be tied for/with’
	RSoC	go-sib-an-es-i-a	‘to help each other tie’ (*to help tie each other)
	RC	(go-sib-an-i-a)	‘to make each other tie’
	AP	(go-sib-er-w-a)	‘to be tied with’

As seen, the SoC suffix *-es*- follows both the applicative and the reciprocal. This is clearly a restructuring that is not predictable from scope. This is particularly clear in the case of RSoC *go-sib-an-is-i-a* ‘to help each other tie’ which cannot mean ‘to help tie each other’. Its internal structure [[[tie] help] e.o.] would predict the unacceptable SoCR order **go-sib-es-an-i-a*.[9]

Summary: If (10) is a template, then we must allow for CRAP instead of CARP in some Bantu languages. In addition, we must allow for sociative C to be fixed in a later position in Ekegusii.

3.2. CARP IS ALWAYS POSSIBLE, EVEN IF SCOPE MOTIVATES AN ANTI-CARP ORDER. The second problem for CARP is that it should always be a possible alternate to express any scope relation. However, a clear counterexample reported from Chichewa concerns the applicative *-il*- and passive *-idw*-, whose ordering depends on the function of the applicative. As seen in (13), only AP

[7] Although I show the Tiania SoC and R as variably ordered, the actual situation is more complex. With many verb roots, the two suffixes cannot be combined. Thus, both **-thamb-an-eth-i*- and **-thamb-eth-an-i*- are ungrammatical (intended meaning: ‘bring about washing of each other’). In other cases where both are possible, CR and RC may appear with different meanings. Thus, from *-wátan*- ‘be glued, stick together’ (probably from *-wáat*- ‘to catch, grasp’) we find CR *-wát-eth-an-i*- ‘make come together, reconcile, join together’ and RC *-wát-an-eth-i*- ‘glue something together’, where *-an*- is lexicalized with the root.

[8] Work on Ekegusii is based on the speech of Hildah Kemunto Nyamwaro, who was born in Itiiti (a village East of Marani), where she lived until she was 21 years old. Hildah served as the linguistic consultant in an undergraduate field methods course at UC Berkeley in Spring 2021, which we followed up together through Spring 2022. The two forms in parentheses have been extrapolated based on equivalent forms elicited with other verbs. For more on suffix ordering in Ekegusii, see also Choti (2022).

[9] This fact does not detract from the possibility that the order A-R-SoC-P evolved because SoC tends to have scope over both A and R. Since the notion of “facilitation” or “helping” in bringing about an action typically applies to the agent, this would seem to be a motivated move. I have also noted that the SoC suffix is resistant to lexicalization. Out of 2,272 verbs in Bosire & Machugu (2013), only five are entered with final *-esia*.

-il-idw- is possible if the applicative licenses a benefactive ('for s.o.'), recipient ('to s.o.') or instrument ('with sth.'), while PA *-idw-il-* is required if the applicative licenses a circumstance ('because of, for some reason'). The AP order in (13a) thus occurs when the applicative licenses an argument, while the PA order in (13b) occurs when it licenses an adjunct. Locatives fall in between and accept both orders without any discernable syntactic or semantic difference (Hyman & Mchombo 1992: 358–359; Hyman 2003a: 252).

(13) a. AP -il-idw- : *benefactive recipient instrument locative*
b. PA -idw-il- : *locative circumstance*

Summary: The PA order required of circumstance applicatives clearly shows that CARP is not always available as a default override. The PA order of productive passive and applicative suffixes is extremely rare in Bantu, almost unique to Chichewa. Rather than the usual shape *-w-*, Chichewa's *-idw-* derives from /il-w-/, which becomes [idw] by a regular phonological rule of the language. While other Bantu languages have a longer passive *-ibw-* or *-igw-* besides plain *-w-*, the [d] suggests a frozen morph *-il-*, homophonous with the applicative. (Compare also the Ciyao "stabilizer" *-il-* in (27) below.)

3.3. FIXED ORDERS WILL ALWAYS OBEY CARP. Concerning the prediction that fixed orders will always obey CARP, the problem of Kitharaka and Tiania CRAP has already been mentioned in (10). If a template, the fixed A-R-SoC-c-P order in Ekegusii would also establish that CARP is not universal in Bantu. Such fixed orders thus more seriously affect the CARP proposal than cases where two suffixes can occur in both orders. The PA order required of circumstance applicatives in Chichewa, for instance, is fixed by scope rather than CARP. A similar example concerning the applicative and reciprocal comes from Chilungu (Bickmore 2007: 39), shown in (14).

(14) a. templatic AR: ful-il-an- 'wash for each other'
b. atemplatic RA: ful-an-il- 'wash each other because of'

In (14a), the applicative licenses the benefactive reciprocal [[[wash] for] e.o.] and the expected AR order obtains. In (14b), where the applicative licenses a circumstance [[[wash] e.o.] because of], the atemplatic RA order is observed.

Summary: Although fixed CARP suffix ordering is more common than fixed anti-CARP suffix ordering, fixed ordering based on scope also exists.

3.4. ANTI-CARP ALTERNANTS ARE ALWAYS SCOPE OVERRIDES. There also appear to be cases where an anti-CARP ordering of two suffixes is not a scope override of CARP. One such instance concerns the applicative+reciprocal in Kindendeule (Ngoyani 2005: 167).

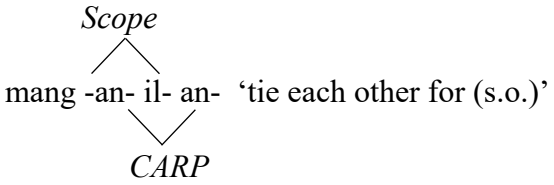
(15) a. templatic AR: tímul-il-an- 'ruffle for each other'
b. atemplatic RA: tímul-an-il- 'ruffle for each other with'

The templatic AR order in (15a) is straightforward, realizing [[[ruffle] for] e.o.]. The atemplatic RA order in (15b) expresses the more complex structure [[[[ruffle] for] e.o.] with]. The RA realization thus appears to be a secondary development reflecting an avoidance of an ARA *-il-an-il-* sequence, where the first *-il-* licenses the benefactive and the second *-il-* licences an instrument. Such sequences appear in other languages, e.g., Ikalanga *lim-il-an-il-* 'cultivate for each other at [some place]', where the second *-il-* licenses a locative (Mathangwane 2001: 401). In (15b), the longer sequence is avoided by omitting the inner scope benefactive *-il-*.

Summary: Although mostly due to scope overrides, there are secondary developments that produce unexpected anti-CARP ordering. (The same would be true of anti-CRAP orders in languages where the default order is CRAP.) There are, however, more puzzling anti-CARP cases that are truly hard to explain (see section 4.4 below).

3.5. IN AN A-B-A SEQUENCE, A-B WILL BE ATEMPLATIC, WHILE B-A IS TEMPLATIC. Recall from (8b) that Chichewa allows atemplatic RA only if the applicative is followed by another reciprocal morph, i.e., RAR *mang-an-il-an-* 'tie each other for (s.o.)'. As schematized in (16), the *-an-il-* sequence is a scope override of CARP, while the template is satisfied by *-il-an-*:

(16)

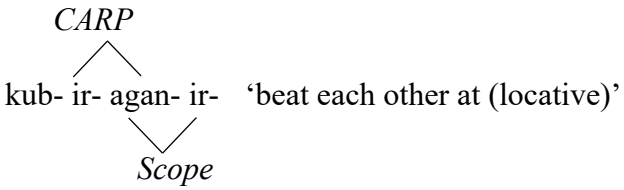


Where CARP is in effect, the claim made by Hyman (2003a) is that one should not be able to get a double spell-out like ARA **-il-an-il-*, within which the inner sequence *-il-an-* satisfies CARP, and the outer sequence *-an-il-* is the scope override.[10] While this largely holds up, an exception arises in Lusoga, the Bantu language most closely related to Luganda. As seen in (17), Lusoga allows three applicative *-ir-* + reciprocal *-agan-* orders, all meaning 'where do they beat each other?' (Hyman et al. 2017: 178–179):[11]

(17) a. AR bà-kùb-ír-ágán-á=wà (CARP)
b. RA bà-kùb-ágán-ír-á=wà (scope)
c. ARA bà-kùb-ír-ágán-ír-á=wà (CARP, then scope, violating (9e))

The AR and RA orders in (17a,b) show that either templatic CARP or a scope override of CARP may be employed to express a locative applicative occurring with the reciprocal. However, ARA (17c) is unexpected, since satisfaction of CARP is already obtained with *-ir-agan-* (cf. (17a)). While the order of the suffixes reflected "scope then CARP" in (16), (18) shows the reverse "CARP then scope" in Lusoga:

(18)



That a scope override is necessarily involved is seen in the following corresponding sentences with the meaning 'they (*bá-*, class 2) count them (*bì-*, class 8) for each other':

[10] Thanks to Peter Jenks and Edward Keenan, who point out that in order for this to hold, the relevant property is one of precedence: when both A and R are present, there must be an A that precedes R. If the property were one of subsequence, i.e., when both A and R are present, there must be an R that follows A, atemplatic RA could be repaired as RAR. While I was not able to find any ARA examples in Muriungi (2009), I was informed in Tromsø that Kitharaka's CRAP template does not allow *AR, but does allow ARA, the CRAP parallel of Chichewa RAR.
[11] My thanks to our co-author, Fr. Fred Jenga, on whose speech all of my work on Lusoga has been based.

(19) a. AR bà-bì-bál-ír-ágán-á (CARP = scope)
b. RA bà-bì-bál-ágán-ír-á (atemplatic, anti-scope)
c. ARA ??bà-bì-bál-ír-ágán-ír-á (CARP = scope, then anti-scope)

As indicated, the AR order in (19a) satisfies CARP as well as the scope relation of [[[count] for] e.o.]. It is thus surprising that the RA order is possible in (19b), since *-agan-ir-* is unmotivated, being atemplatic and not reflecting the scope. Interestingly, (19c) is marked ?? to indicate that it was judged questionable, if not unacceptable (although more speakers might be consulted). Differing from (17c), in this case *-ír-agan-* satisfies both CARP and scope, hence there should be no need for an additional *-ir-*. It is clear that there is something unusual going on with Lusoga reciprocal *-agan-*. Hyman et al. (2017) show that there is an ongoing reanalysis whereby *-agan-* (historically pluractional *-ag-* plus reciprocal *-an-*) is reparsed as *-a* plus *-gan-*, as shown with the stem 'count each other' in (20).

(20) a. inherited: bal-agan-a (verb base + suffixes)
b. reanalyzed: bal-a # gan-a (two bases, compounded, each + suffixes)

Evidence comes from the alternate double spell-out of inflectional endings, which occurs only if *-agan-* is present. This is shown with the subjunctive final vowel *-e* (cf. *tù-bál-è* 'let's count'):

(21) a. inherited: tù-bàl-ágàn-é 'let's count each other'
b. innovated: tù-bàl-é-gàn-é (idem)

As seen, the historical analysis in (21a) consists of the verb root *-bal-* 'count' followed by the reciprocal and subjunctive suffixes. In (21b), the subjunctive ending *-e* appears both on *bal-* and again on *-gan-*. The perfective ending /-i-e/ < **il-e* shows similar variation. The sentences in (22) both mean 'we sent each other'.

(22) a. inherited: tù-tùm-agan-i-é → tù-tùm-àgàìn-é
b. innovated: tù-tùm-i-e-gan-i-é → tù-tùm-y-è-gàìn-é

Perhaps this reinterpretation contributed to the ordering of the applicative. See Hyman et al. (2017) for more examples and discussion.

Summary. Generalizations concerning A-B-A double spellouts may require a subtler dependency or analogy specifically concerning the reciprocal **-(ag)-an-* and the different argument vs. adjunct distinctions, e.g., benefactive and recipient vs. locative and circumstance functions of the applicative.

3.6. THE SAME SUFFIX SHOULD NOT BE ABLE TO ITERATE. One of the properties that might be expected of a true template is that there would be exactly one "filler" for each "slot". If CARP is a template, the expected interpretation is that it should therefore not be possible to have two successive spell-outs of the same suffix. For example, quite a number of Bantu languages do not allow a causativized verb to immediately undergo another causative spell-out, which would produce a sequence *-its-its-* or *-is-is-*.[12] While this might be attributed to the Repeated Morph Constraint (Menn & MacWhinney 1984), there are cases where a single spell-out involves

[12] This is true in Ikalanga, for instance (**dábil-is-is-* 'cause to cause to answer'), which, however, allows doubling of certain lexicalized or "frozen" causatives, e.g., *téng-* 'buy', *téng-es-* 'sell', *téng-es-es-* 'cause to sell' (Mathangwane 2001: 405).

reduplicative -*itsits*- or -*isis*-. In Chichewa and Ikalanga, the intensive suffix is homophonous with the causative, except that it is spelled out as double when it is following by another extension.[13]

(23) a. Chichewa -mang-ITS- 'tie well' (Hyman & Mchombo 1992: 351)
-mang-ITSITS-an- 'tie each other well'
b. Ikalanga -dabil-IS- 'answer a lot' (Mathangwane 2001: 398)
-dabil-ISIS-an- 'answer e.o. a lot'

Since only one spellout is involved, such reduplicative allomorphy is compatible with a templatic interpretation of CARP. The fact that the causative and intensive cannot cooccur, whether the intensive is reduplicated or not, is likely due to the Repeated Morph Constraint, which can target specific morphemes.

Turning to the successive spell-out of the other CARP extensions, it is clear that this will not be possible with either the reciprocal or the passive, both of which are detransitivizers.[14] This leaves the applicative, which, recall from Chichewa in (13), can license a benefactive, dative, instrument, locative, or circumstance. In this case, it is logically possible for a verb to occur with more than one of the above complements. In many Bantu languages *-*il-il*- is disallowed and a single -*il*- will suffice, as with Ndebele applicative -*el*- (Sibanda 2004: 75):

(24) a. umama u-sik-a insinkwa
'mother is cutting some bread'
b. umama u-sik-el-a umntwana isinkwa
'mother is cutting the child some bread'
c. umama u-sik-el-a insinkwa etafuleni
'mother is cutting some bread on the table'
d. umama u-sik-el-a umntwana isinkwa etafuleni
'mother is cutting the child some bread on the table'
e. *umana u-sik-el-el-a umntwana isinkwa etafuleni

The only time applicative -*el*- can be added to another -*el*- is if the first -*el*- is lexicalized, as in (25a), or frozen, as in (25b).[15]

(25) a. land-a 'fetch'-
land-el-a 'follow/pursue'
land-el-el-a 'follow/pursue for'
b. *sab-a
sab-el-a 'answer to a call'
sab-el-el-a 'answer to a call for/at'

[13] In (23), I put the intensive morphs in small caps to keep distinct from the homophonous causative. In Chichewa, the intensive extension also assigns a high tone to the verb stem, which the causative does not do. Interestingly, the intensive extensive is always -*ISIS*- in Ndebele (Sibanda 2004: 51): *sik-ISIS*- 'cut really well, really cut'.
[14] While this might be possible in cases where reciprocal -*an*- and passive -*w*- occur in lexicalized transitive verbs, this is quite rare. In fact, in many Bantu languages post-root -*anan*- is rare. Thus, among 1,653 verb entries in the Bukusu lexicon created as part of the CBOLD project at Berkeley, only one such verb occurs: *xú-xw-aakanan-a* 'to meet, go out to meet, collect a person', where /xú-xu-/ is the infinitive augment + prefix sequence.
[15] Lexicalized forms also sometimes allow anti-CARP sequences that do not otherwise occur. Thus, while AC is almost universally ruled out, -*el-is*- occurs in the following example: *val*- 'close, shut', *val-el*- 'shut in/out, exclude', *val-el-is*- 'say good-bye to' (Sibanda 2004: 93).

While such cases of are restricted in Ndebele, there are other languages, such as Runyankore, that regularly tolerate multiple spell-outs of the applicative:[16]

(26) a. a-ka-gamb-a ‘s/he spoke’ (= incomplete)
b. a-ka-gamb-a nábo ‘s/he spoke to them’ (lit. with them)
c. a-ka-bá-gamb-ir-a ‘s/he told them’ (lit. spoke to them)
d. a-ka-ba-tú-gamb-ir-ir-a ‘s/he told them for us’
e. a-ka-bá-gamb-ir-ir-an-a ‘s/he told them for each other’

As seen in (26a), the general verb for ‘to say, speak (e.g., a language)’ is *gamb-*, to which something usually has to be added, e.g., the prepositional *nábo* ‘with them’ in (26b). In (26c) the recipient *-bá-* ‘(to) them’ is licensed by the applicative *-ir-*. The sentences in (26d) and (26e) show that when a benefactive object *-tú-* ‘(for) us’ or the reciprocal extension *-an-* ‘(for) each other’ is added, a second applicative *-ir-* occurs. In this case, it would be odd to think of Runyankore and other such Bantu languages that allow successive spell-outs of the applicative as filling the same A “slot”. This should not be surprising as the literature shows that multiple non-local spell-outs are also possible, as in Ndebele *sik-el-an-el-* ‘cut for each other at/for (place/reason)’. Sibanda (2004: 369) notes that *sik-el-an-el-* can also mean ‘cut each other at/for (place/reason)’. This makes sense, since scope-transparent **sik-an-el-el-* is not possible.

Finally, let us take note of the so-called “stabilizer” morph *-il-*, which some Bantu languages require before extensions added to the small number of CV- roots. This is seen in the following Ciyao examples (Ngunga 2000: 138, 176), where /l/ is realized [d] before /i/:

(27) a. /li-/ di- ‘eat’
b. /li-il-il-/ di-id-il- ‘eat for’
c. /li-il-IS-I-/ di-id-IS-I- ‘eat a lot’

To the extent that this *-il-* is identified with the applicative, two things should be noted. First, as seen in (27b), the stabilizer does not block the spell-out of the applicative. Second, as seen in (27c), the exceptional non-CARP order of intensive *-il-IS-i-* is acceptable if *-il-* is the stabilizer. This thus provides more evidence that spell-out restrictions and suffix morphotactics have to be suffix-specific.

Summary: Successive spell-outs of the same suffix, whether local or non-local, are inconsistent with CARP being a slot-filler type template.

4. Four cases in Ikalanga. In section 3, we saw that there are serious problems with CARP as a template, as well as with certain of the generalizations in Hyman (2003a). Since I have jumped around from one Bantu language to another in exposing some of the issues, in this section I summarize a subset of facts from a single language, Ikalanga, which shows four different situations with respect to CARP (Mathangwane 2001).

4.1. SITUATION #1: FIXED CARP SUFFIX ORDER CA. The first situation is one we have already seen: following CARP, the causative and applicative can only directly combine in the order CA (Mathangwane 2001: 404):

(28) a. templatic CA: dabíl-is-il- ‘cause to answer for/at’
b. atemplatic AC: *dabíl-il-is-

[16] The data in (25) are based on the speech of Dr. Daphine Namara, a Runyankore speaker of the pastoralist Bahima group from Kamushoko Parish in Mbarara District of Uganda, with whom I worked from 2019-2022.

4.2. SITUATION #2: BOTH CARP AND ANTI-CARP ORDERS AR AND RA. The second situation consists of the applicative and reciprocal occurring in both compositional orders (Mathangwane 2001: 399):

(29) a. templatic AR: dabíl-il-an- 'answer for each other' [[[answer] for] e.o.]
b. atemplatic RA: dabíl-an-il- 'answer each other for/at' [[[answer] e.o.] for/at]

While AR is templatic in (29a), RA in (29b) is a scope-licensed CARP override.

4.3. SITUATION #3: BOTH CARP AND ANTI-CARP ORDERS RP, PR USED INTERCHANGEABLY. While many, if not most Bantu languages cannot directly sequence the reciprocal and passive extensions, both of which are detransitivizing, Ikalanga allows both templatic reciprocal-passive RP and atemplatic passive-reciprocal PR with the same meaning (Mathangwane 2001: 398):

(30) a. templatic RP: dabíl-an-w- 'be answered by each other' [dabíl-aŋ-w-]
b. atemplatic PR: dabíl-w-an- (idem) [dabíg-w-an-]

Although we have not seen completely free ordering like this in any of the other examples, these last two suffixes of CARP show disregard for the fixed RP order of the template.

4.4. SITUATION #4: TWO ORDERS, CR AND RC, BOTH NON-COMPOSITIONAL. The last situation concerns the causative and reciprocal which occur in both orders CR and RC, with both, however, being non-compositional (Mathangwane 2001: 398):

(31) a. templatic CR: dabíl-is-an- 'cause to answer each other'
[[[answer] e.o.] cause]
b. atemplatic RC: dabíl-an-is- 'cause each other to answer'
[[[answer] cause] e.o.]

This last case represents a highly unexpected (and, for many frameworks, troublesome) situation where the inner suffix of the two orders has scope over the outer suffix: "… I call this hypothetical phenomenon SCOPAL METATHESIS, in the sense that the two suffixes always surface in counterscopal order. No such language is attested" (Ryan 2010: 779). Given how unusual situation #4 is, I personally contacted Dr. Mathangwane, who then checked with several other Ikalanga speakers, who agreed that (31) is accurate. As seen in (32), when applicative *-il-* is added, RC *-an-is-* is used for both scopes:[17]

(32) a. templatic AR, dabíl-il-an-is- 'cause to answer for each other'
atemplatic RC [[[[answer] for] e.o.] cause] (Mathangwane 2001: 404)
b. templatic CA, dabíl-an-is-il- 'cause each other to answer for'
atemplatic RC [[[answer] for] cause] e.o.] (Mathangwane 2001: 398)

The output in (32a) is now fully compositional. A compositional spell-out of (32b) would have been **dabíl-il-is-an-,* which violates the obligatory CA *-is-il-* templatic order seen in (28a). Still, there seems to be a preference of the atemplatic RC *-an-is-* order. On the other hand, *-is-an-* would be expected if the verb root is intransitive, or if the reciprocal is not an appropriate direct

[17] Unfortunately Mathangwane (2001) doesn't indicate if the templatic order CAR *-is-il-an-* is attested, and if so, with what meaning. Although I have not verified this, I would expect it to occur with a lexicalized causative, e.g., *j-á* 'eat', *j-ís-a* 'feed' (lit. cause to eat) → (?) *j-ís-il-an-a* 'feed for each other'.

object, as in *lim-is-an-* 'help each other to cultivate', where *-is-* has a sociative causative interpretation (Mathangwane 2001: 398).

5. CARP is not a template. In the previous sections we have seen that although there is a tendency for the four verb suffixes to appear in a CARP order, there are important exceptions concerning specific suffixes and suffix combinations. Instead of maintaining the CARP template, I thus will now accept suggestions which were made to me in personal communications cited in Hyman (2003a) and assume that both fixed (a.k.a. "templatic") and scope constraints are not indicative of a template, but rather of restrictions on specific bigrams:[18]

> Although I have not seen an empirical need to do so, both Mark Baker and Andrew Spencer (pers. comm.) have suggested the possibility of exploding TEMPLATE into six atomic constraints on individual pairs of morphemes CA, CR, CP, AR, AP, RP)… (Hyman 2003a: 276, fn. 8)

Sharon Inkelas (pers. comm.) has suggested the following definitions, illustrated by CAUS and REC:

> License-T: If {C} and {R} occur in the input (either scope), then there must be an *-its-an-* sequence in the output
> License-M: If R] C occurs in the input, then there must be an *-an-its-* sequence in the output. (Hyman 2003a: 276, fn. 7)

In fact, it should have been clear from several of the examples cited in my previous work that the restrictions on suffix combinations are strictly local. Thus, Hyman & Mchombo (1992: 352) cite the following example from Chichewa:

(33) mang-ir-an-its- 'cause to tie for each other'
A-R-C

In this example, *-ir-an-* is both templatic and compositional, while *-an-its-* is a scope override of CARP. The effect of the latter, however, is to create a non-local AC *-ir-* … *-its-* violation of CARP. If suffix ordering were truly templatic, there would have been only one slot for C, and it would have been directly after the verb root. To derive (33) and other such examples, what is needed is a cyclic mapping from a bracketed input representing scope to the observed output bigrams representing linear ordering.[19] In cases where the linear ordering does not directly reflect the bracketing (scope), it will be necessary to have strict morphological determination.

However, there are at least two problems for cyclic spell-outs. The first, which has been seen, is that some bigrams do not reflect the bracketing. In this case, something like Sharon Inkelas's above-cited License-T is needed to be assessed globally for the entire verb+extension complex. We saw this with the common CA fixed order which can represent an applicativized causative or a causativized applicative. One might ask if CA isn't a case of what Stump (2017: 85) terms "affix conflation" whereby Chichewa *-its-il-* would be a single spellout of a causative-applicative "amalgam" without regard to the relative scope of the morphosyntactic properties [caus] and [app]. There are many such cases in Bantu where two suffixes function as one (see Bostoen & Guérois 2022). A particularly striking example concerns the tripartite ARc sequence *-er-an-i-* in

[18] For more discussion of what is expected of "templatic morphology", see Manova & Aronoff (2010: esp. 113). Applying their generalizations convinces me even more that CARP is not a template.
[19] For specific implementations of suffix ordering, see Aronoff & Xu (2010), Ryan (2010), Manova (2011), and Inkelas (2016), among others.

Ekegusii, where "c" is the short causative suffix *-i-*. As seen in the following examples, the three suffixes function together with the meaning 'in addition to':

(34)	a.	Root:	go-sib-a	'to tie'
	b.	A	go-sib-er-a	'to tie for/at'
	c.	R	go-sib-an-a	'to tie each other'
	d.	c	go-sib-i-a	'to cause to tie'
	e.	ARc	go-sib-er-an-i-a	'to tie in addition to, besides'

While each of the suffixes A, R and c has the expected semantic and grammatical effects in (34b-d), (34e) is used to indicate tying in addition to doing something else or tying something in addition to tying something else. Use of *-er-an-i-* is quite productive. Thus, Bosire & Machogu (2013) provide *-er-an-i-* forms for 1,330 of the 2,272 verbs in their dictionary – and I freely created more such examples with my consultant. Finally note that *-er-an-i-* respects the CARcP template, which tends to be the general case for such fixed sequences that spell out a single "feature".

The second problem for cyclicity is related to the existence of such amalgams, but adds a phonological dimension. I take this up in the next section.

6. Phonological cyclicity. The preceding section ended with a brief introduction to suffixal amalgams where a single spell-out can be morphologically complex. In many Bantu languages, the short causative *-i-* produces a situation where it potentially "conflates" with a preceding applicative, in such cases triggering important cyclic phonological effects. Thus consider the Chibemba forms in (35) (Hyman 1994: 85, 2003b: 61):

		root gloss	*root*	*applicative*	*causative*	*appl. + caus.*
(35)	a.	'be long'	leep-	leep-el-	leef-i-	leef-es-i
		'be lost'	lub-	lub-il-	luf-i-	luf-is-i-
	b.	'be dark'	fiit-	fiit-il-	fiis-i-	fiis-is-i-
		'be slim'	ond-	ond-el-	ons-i-	ons-is-i-
		'cry'	lil-	lil-il-	lis-i-	lis-is-i-
		'get up'	buuk-	buuk-il-	buus-i-	buus-is-i-
		'hunt'	lúng-	lúng-il-	lúns-i-	lúns-is-i-

Chibemba is one of many Bantu languages that have merged Proto-Bantu *i and *ɪ as [i], but where [i] deriving from *i "fricates" oral consonants, which are realized as strident fricatives or affricates. The short causative suffix **-i-* is one such trigger. Thus in the fourth column, /p, b/ → f in (35a) and /t, d, l, k, g/ → s in (35b).[20] Given the CARcP suffix order, when these causatives are applicativized in the last column, the applicative must occur before *-i-*. This, however, raises two problems, one morphological, one phonological, indicated in (36).

[20] The result is a voiceless fricative since Chibemba does not have [v] or [z]. As a separate process, *si* → [ʃi]. Causative *-i-* also glides before another vowel. Thus what I present as *leef-es-i-* in the last column is realized [leef-eʃ-y-a] with the inflectional final vowel morpheme *-a*. As also seen, the applicative suffix *-il-/-el-* undergoes vowel height harmony, but does not trigger frication. As can be observed in the last column, causative *-i-* converts applicative *-il-/-el-* to *-is-/-es-*, thereby making it homophonous with the causative suffix that we have seen elsewhere, and which also occurs in Chibemba.

(36) a. morphological: the *-il-i-* suffix order does not reflect the semantic scope of the affixes: *leep-* 'be long' → *leef-i-* 'lengthen' → *leef-es-i-* 'lengthen for/at'
b. phonological: *-i-* conditions frication of the root-final consonant, with which it is not contiguous

To account for the above, Hyman (1994, 2003b) proposed a cyclic "interleaving" of morphology and phonology, as in lexical phonology and morphology (Kiparsky 1982 et seq.):[21]

(37)	*UR*	*Morphology*	*Phonology*	*Morphology*	*Phonology*
a.	leep-	leep-i	leef-i-	leef-il-i-	leef-es-i
	'be long'	'lengthen'		'lengthen for/at'	
b.	lil-	lil-i-	lis-i-	lis-il-i	lis-is-i
	'cry'	'make cry'		'make cry for/at'	

As seen, the verb root is first causativized with *-i-*, which then fricates the root-final consonant. After this, the applicative is "interfixed" before *-i-* and fricates the applicative *-il-/-el-* to *-is-/-es-*. The advantage of cyclic frication is that the applicativized causative maintains a surface resemblance with the causativized root, its "proximate base" (Crosswhite 1996).

The cyclic derivation of applicativized causatives looks straightforward, but there is a potential problem when we consider causativized applicatives. As seen in (38), cyclic derivations predict that the two scopes of the causative and applicative should produce two different outputs.

(38) a. applicativized causative: CVk- → CVs-i- → CVs-is-i- (attested)
b. causativized applicative: CVk- → CVk-il- → CVk-is-i- (unattested)

The derivation in (38a) is parallel to what was seen in (37), and is also appropriate to derive the other forms in (35). In (38b), where applicative *-il-* is first spelled out, we only expect the applicative *-il-* to undergo frication. However, as indicated, such a derivation is unattested. While it is less common to find a causativized applicative, such structures do occasionally arise. In (39), I have attempted to produce the causative of a locative goal applicative:

(39) a. fyúk-a mu-ŋandá 'escape from in the house' (*mu-* 'in')
b. fyúʃ-y-a mu-ŋandá 'cause to escape from in the house'
c. fyúk-il-a mu-ŋandá 'escape into the house
d. *fyúk-iʃ-y-a mu-ŋandá + causative *-i-*
e. fyúʃ-iʃ-y-a mu-ŋandá 'cause to escape from/into the house'

(39a) shows that the verb *fyúk-* 'escape' licenses a source locative ('from the house'), and similarly in the corresponding causative in (39b). (39c) shows that with the applicative, *fyúk-il-* now licenses a goal locative ('into the house'). When we attempt to causativize the applicativized verb, the result in (39d) is ungrammatical (Nancy Kula, p.c). Instead, the output must be as in (39e), with the result ambiguous as to whether 'in the house' is the source or the goal. What this means is that the phonological realization of bracket-adjacent causative *-i-* and applicative *-il-/-el-* always reflects the cyclic interleaving seen in (35) – independent of the scope! Thus, in the case of the goal interpretation, there is a "mismatch" between the scope bracketing [[[escape] APPL] CAUS] and the order of the spell-outs [escape CAUS-i] → [escape APPL-il CAUS-i] required to produce the cyclic phonological output in (39e).

[21] Hyman (1994) considers alternative interpretations to cyclicity and shows that they run into problems.

The same mismatch is found in Bantu languages that do not allow Chibemba-style successive frication. In Nyamwezi, causative *-i-* palatalizes the consonants in (40a) vs. those in (40b) (Maganga & Schadeberg 1992):

(40) a. consonants palatalizing before *-i-*

i.	k	→ c	[tʃ]
	s	→ ʃ	
	n	→ ɲ	
ii.	l, g	→ j	[dʒ]
	nz, ŋg	→ ɲj	[ɲdʒ]
	nh, ŋh	→ ɲh	

b. consonants not palatalizing before *-i-*

p	t	h
β	d	
mb	nd	
m		
mh		

In producing applicativized causatives, the C_2 consonant in C_1VC_2-ɪl-i- is, however, never palatalized, since there is a constraint against successive palatal consonants (*-JVJ-). Instead, we get the outputs in (41), where only the applicative+causative /-ɪl-i-/ undergoes palatalization to *-ɪj-i-* /*-ej-i-*:

(41)

	-root-		*-root-i-*		*-root-il-i-*
a.	-βak-	'shine, burn (intr.)'	-βac-i-	'light'	-βak-íj-i-
	-og-	'bathe intr.'	-oj-i-	'bathe (s.o.)'	-og-éj-i-
	-zeeŋg-	'build'	-zeeɲj-i-	'have built'	-zeeŋg-ej-i-
	-nuuŋh-	'smell'	-nuuɲh-i-	'make smell'	-nuuŋh-ɪj-i-
b.	-βis-	'hide'	-βiš-i-	'make hide'	-βis-íj-i-
	-βon-	'see'	-βoɲ-i-	'make see'	-βon-éj-i-
c.	-gʊl-	'buy'	-gʊj-i-	'sell'	-gʊg-ɪj-i-
	-kaánz-	'wash'	-kaáɲj-i-	'have washed'	-kaáŋ-ɪj-i-
	-bʊónh-	'swim'	-bʊóɲh-i-	'make swim'	-bʊóŋh-ɪj-i-

As seen in the last column of (41a,b), the applicativized causatives appear to maintain the underlying final /k/, /g/, /ŋg/, /ɲh/, /s/ and /n/ as if palatalization applies non-cyclically to the full verb base: /CVC-ɪl-i-/ → CVC-ɪj-i-. That this is not the case is seen in the boxed forms in (41c), where root-final /l/, /nz/ and /nh/ are realized as the velar consonants [g], [ŋ] and [ŋh], respectively. As shown now in (42), a cyclic derivation is required where applicativization conditions depalatalization to the velar place of articulation (Hyman 2003b: 67):[22]

(42)

	UR	*Morphology*	*Phonology*	*Morphology*	*Phonology*
a.	-og-	-og-i-	-oj-i-	-oj-el-i-	-og-ej-i-
b.	-gʊl-	-gʊl-i-	-gʊj-i-	-gʊj-ɪl-i-	-gʊg-ɪj-i-

The boxed pair of forms in (42) provides the evidence: as seen, /g/ and /l/ both palatalize to *j* [dʒ], thereby merging. When the applicative *-el-* or *-ɪl-* is interfixed, depalatalization affects them both similarly, and *j* is replaced by *g*. There thus is no referral to the underlying /g/ vs. /l/, nor can the derivation be non-cyclic. Whereas Chibemba carries the root-final frication forward, producing a sequence of fricatives, Nyamwezi disallows successive palatals and hence depalatalizes.

Despite this difference between the two languages, we see now in (43) that Nyamwezi, like Chibemba, shows a merger of applicativized causatives (which are common) and causativized applicatives (which are uncommon).

[22] Similar facts are found in Kifuliiru (van Otterloo 2011: 345-350).

(43) a. sul- ‘forge’ → suj-i- → sug-ɪj-i- [make with whip [X forge]]
b. → sul-ɪl- →*sul-ɪj-i- [make [X forge with hammer]]

In these examples the applicative licenses an instrument, e.g., ‘whip’ and ‘hammer’, respectively. In (43a) the applicativized causative proceeds as expected: first causative *-i-* is spelled out triggering palatalization, then *-ɪl-* is interfixed, thereby triggering depalatalization and undergoing palatalization (l → j). As shown in (43b), a cyclic derivation would first spell out the applicative *-ɪl-*. This would be followed by the spell-out of causative *-i-*, which should only palatalize the /l/ of the applicative and not that /l/ of the root /sul-/ ‘forge’. However, as indicated, this output is ungrammatical. Instead, the phonologically cyclic output in (43a) actually may refer to an applicativized causative or a causativized application, as we saw also in Chibemba (39e).[23] Thus, (43a) is ambiguous in scope between ‘use a whip to make someone forge’ and ‘make someone use a whip to forge’.

Both the Chibemba and Nyamwezi examples show that although cyclicity predicts two different outputs, only one is possible. It looks like the cyclic effect is another conflation, if not templatic. If a verb undergoes “adjacent” *-i-* causativization and applicativization with either scope, the output is phonologically determined. In Chibemba, the output must have multiple frication, either *f-is-i-/f-es-i-* or *s-is-i-/s-es-i-*.[24] In Nyamwezi, depalatalization is required, which involves a “replacive” velar in cases where palatalization merges alveolars and velars. Such velar replacement is even more extensive in certain other Bantu languages. The Nyakyusa examples in (44a) show that fricativized causativized roots become CVk- with applicative interfixation (Schumann 1899):

(44)

	root/root-i-		*root-il-i-*	
a.	-sat-	‘be in pain’		
	-sas-i-	‘give pain’	-sak-ɪs-i-	‘give pain for/at’
	-gel-	‘measure’		
	-ges-i-	‘try’	-gek-es-i-	‘try for/at’
	-buj-	‘come back’		
	-bus-i-	‘bring back’	-buk-ɪs-i-	‘bring back for/at’
	-sok-	‘go out’		
	-sos-i-	‘take out’	-sok-es-i-	‘take out for/at’
	-ag-	‘run out’ [alle werden]		
	-as-i-	‘make run out’	-ak-ɪs-i-	‘make run out for/at’
b.	-kend-	‘go by’		
	-kees-i-	‘make go by’	-keek-es-i-	‘make go by for/at’
	-jong-	‘run away’		
	-joos-i-	‘make run away’	-jook-es-i-	‘make run away for/at’
c.	-tɒp-	‘become thick’		
	-tɒf-i-	‘thicken’	-tuk-ɪf-i-	‘thicken for/at’
	-olob-	‘become rich’		
	-olof-i-	‘make rich’	-olok-ef-i-	‘make rich for/at’

[23] My thanks to Herman Batibo (p.c.), who confirmed that (43b) is ungrammatical in Sukuma, as northern variants of the Sukuma-Nyamwezi dialect continuum are referred to.
[24] Roots that end in an immutable nasal are exempted by a higher ranked constraint vs. Tonga, which inserts an extra *-is-* (Hyman 2003b: 79).

d. -lɪm- ‘cultivate’
-lɪm-i- ‘make cultivate’ -lɪm-ɪk-ɪs-i ‘make cultivate for/at’
-lʊm- ‘bite’
-lʊm-i- ‘make bite’ -lʊm-ɪk-ɪs-i ‘make bite for/at’

The examples in (44b) involve nasal effacement before fricative [s] with compensatory lengthening (*-kens-i-* → *-kees-i-*, *jons-i-* → *joos-i-*), while the transposition of [f] in (44c) involves an interesting “analogical misanalysis” discussed in Hyman (2003b: 73–76). Finally, note in (44d) that the CVm- roots require an extra *-ɪk-*. Thus, the generalization is that when causativization and applicativization are adjacent in the derivation (with either scope), the output must have a *k-ɪf-i-/k-ef-i-* or *k-ɪs-i-/k-es-i-* sequence in the output (cf. Meinhof 1932: 148–149).

From the above we note the following two things: (i) a fixed suffix order can also have phonological conditions on it and (ii) these conditions may result in either identity with the proximate base (multiple frication) or non-identity (replacive velar).[25] Taken together, the linear ordering of discrete morphs and fricativizing interfixation suggests an even more marginal role for compositionality (scope, mirror principle). (Recall also the independence of morphology and syntax demonstrated in (5) and (6) above.) There are however recurrent tendencies and motivations. We turn to these in the final section.

7. Conclusion. While we have seen both overlaps and differences in the preceding sections, the inescapable conclusion is that neither the syntactic mirror principle nor semantic scope can account for the impressive range in suffix ordering within the Bantu verb extension system. Instead, the ordering properties need to be stated independently for each pair of suffixes on a language by language basis. While CARP is not a default template in Bantu, we can draw certain generalizations. In (45), I classify the 12 potential bigrams into four categories (choosing common realizations to illustrate):

(45) a. Bigrams that are almost always obligatory (vs. the opposite order)
i. CA -is-il- (5), (6), (28), (32b)
ii. CP -is-w-[26] (fn. 26)
iii. AP -il-w (13)
b. Bigrams that are usually prohibited
i. AC -il-is- (12), (fn. 15)
ii. PC -w-is-
iii. PA -w-il- (13)
c. Bigrams that can be obligatory or are scope variable
i. CR -is-an- (7a), (31a)
ii. RC -an-is- (7b), (31b), (32a,b), (33)
iii. AR -il-an- (8a), (14a), (15a), (17a,c), (19a), (26e), (29a), (32a), (33), (fn. 5)
iv. RA -an-il- (8b), (14b), (15b), (17b,c), (19b), (29b), (fn. 5)

[25] In other Bantu languages the defricativized consonant can be alveolar. Thus, in Luganda (Hyman 2003b: 71), the frozen causative *-oz-i-* ‘wash tr.’ becomes *-ol-ez-i-* ‘wash tr. for/at’, even though the historical consonant was *g, as seen in the related derived nominal *ky-og-er-o* ‘earthware washbasin for baby’ (cf. Haya *-og-* ‘bathe intr.’).
[26] Proto-Bantu causative *-ɪc- was historically accompanied by the short causative *-i-. Languages that maintain the *-is-i-* structure do not allow passive *-ʊ- to immediately follow *-is-*. Instead, a CcP *-ɪc-i-ʊ- is required, often realized as *-is-i-bw-*. However, many Bantu languages have lost the accompanying *-i-*, hence can have *-is-w-* directly, as in Ikalanga *lób-es-w-* ‘be caused to beat’ (Mathangwane 2001: 404). Similarly, CA is realized *-is-an-*in languages that have lost *-i-* and as *-is-i-an-*, *-is-an-i-* or *is-i-an-i-* in languages that maintain *-i-*.

d. Bigrams that are rare due to incompatibility
   i. RP -an-w- (30a)
   ii. PR -w-an- (30b)

In (45a), we note two facts that were originally captured by the CARP proposal: causative *-is-* tends to come first, while passive *-w-* comes last. Thus the bigrams with the opposite orders in (45b) are usually prohibited. We have seen two facts about expressing causation with an applicative that likely are related. First, the long causative *-is-* is ordered before applicative *-il-* (recall CARP) and generally disallowed to directly follow it, as noted in (45b). Second, the short causative *-i-* must follow applicative *-il-*, but even a causativized applicative has the cyclic phonology of an applicativized causative, as we saw in (39) and (43). Both observations are covered by the following morphological generalization: causativize first! (Hyman 2003a: 260). There thus is a tendency for causative morphs to be spelled out prior to the applicative in Bantu, whether the spell-out is *-is-*, which occurs first in the CA sequence or *-i-*, which is spelled out first, but which appears later due to the interfixation of the applicative, as in (37) and (42).[27]

Turning to the group of bigrams in (45c), where both suffix orders CR~RC and AR~RA are attested, we see that the reciprocal is involved in each. Although ordering of R appears to be the most flexible, it combines only marginally with the passive as RP or PR in (45d). This is because both suffixes are detransitivizing. It thus takes a special interpretation or construction for R and P to occur in either sequence. In (33), we saw that Ikalanga *dabíl-an-w-* ~ *dabíl-w-an-* both mean 'be answered by each other', where the reciprocal expresses the agent of the passive. Both RP and PR orders are also possible in Ndebele, but "only if there is a locative or semantically empty subject (usually expressed by 'there' and 'it' in English)" (Sibanda 2004: 66). This is seen in (46), with the noun class 17 locative subject prefix /ku-/:

(46) kw-a-sik-w-an-a ~ kw-a-sik-an-w-a 'there was stabbing of each other'
P R R P

In this case, the reciprocal is the logical object of the verb.

To summarize, we have built on the evidence presented in Hyman (2003a) that the ordering of Bantu derivational voice suffixes may be determined either by the morphology or by specific scope-based overrides. In this study, we have seen problems for CARP that have led us to abandon the CARP template in favor of specific bigrams. Recall that there are no Bantu languages where the four suffixes are exclusively ordered by scope. In addition, there are no suffixes that are completely free to appear in any order before or after other suffixes. In cases where two orders are allowed, it will often be necessary to link the bigram to syntactic-semantic structures to account for what I have termed asymmetric compositionality. With the possible exception of (45d), each of the 12 pairs in (45) will require specific statements like "if adjacent, C must precede A". The "if adjacent" clause is needed, since the bigrams do not necessarily apply when two suffixes are not adjacent. We thus saw in (33) that Chichewa *mang-ir-an-its-* 'cause to tie for each other' allows C to follow A, if there is an intervening R. This is not always the case. Thus, Sibanda (2004: 87) points out that intensive *-ISIS-* can follow the *-w-an-* sequence seen in (46),

[27] As discussed in Hyman (2003b), although the facts may differ in detail, the *-il-* of the perfective inflection ending *-il-e* is also often interfixed between before causative *-i-*. This potentially produces cases where both the applicative and the perfective *-il-* morphs occur between the root and *-i-*, as in Mambwe: *-kuk-a* 'move elsewhere', *-kus-i-a* 'cause to move elsewhere' (k → s), and *kus-iz-i-a* 'cause to move elsewhere for/at' (l → z), which occur with the perfective as *-kus-il-e, kus-iz-i-e*, and *kus-iz-iz-i-e*, respectively (Hyman 2003b: 65, based on Halemba 1994).

but causative *-is-* cannot. He attributes this to the inability of causative *-is-* to follow passive *-w-*, despite C not being adjacent to P in the ungrammatical sequence **-w-an-is-*. Since this requires much more discussion, I will have to leave open for now whether we will need constraints on trigrams. The fact that Ekegusii has the tripartite amalgam *-er-an-i-* in (34e) meaning 'in addition to' shows that the meaning of a trigram is not necessarily equal to the sum of the component bigrams.

Finally, I'd like to emphasize that the facts in (45) are thus far only proposed for Bantu. While we might expect some of (45) to apply to Bantoid and other closely related languages, I have found both similarities in more distant Niger-Congo languages, e.g., CARP *-in-i-and-o* in the Tonko dialect of Limba in Sierra Leone, as well as important differences. Thus, in Moore, a Gur language of Burkina Fasso, the cognate causative suffix *-s* has to follow the *-b, -d, -l* and *-m* suffixes, which includes the applicative suffix *-d* (Canu 1976; Hyman 2007: 158). As an Africanist, I hope that continued comparative work will shed further light both on the determinants of suffix ordering in general, as well as on their historical development and significance within Niger-Congo.

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