Evidence for the Mirror Principle and Morphological Templates in Luganda Affix Ordering

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1. Introduction

The order of affixes has often been claimed to follow from principles external to morphology proper, e.g., semantic scope (Rice 2000) or the order of syntactic operations (Baker 1985). Alsina (1999: 6) has gone so far as to claim that one syntactic principle of affix ordering, Baker's (1985) Mirror Principle, is an 'exceptionless generalization.' However, it has been shown that some of the verbal 'extensions' (derivational suffixes) in Bantu languages have a fixed order that does not follow from these external principles and in some cases violates them (Hyman 2003, Good 2005). This contradiction has been pointed out by a number of different authors (e.g., Hyman 1994, 2003, 2006, Hyman and Inkelas 1997, Alsina 1999, Good 2003, 2005, 2007), and Bantu languages have played a central role in the effort to identify cross-linguistic principles of affix ordering. Surprisingly, however, no comprehensive study of affix order has been done on Luganda, a major Bantu language with over three million speakers (Gordon 2005). In this paper, we seek to fill this gap by presenting the results of our systematic study of the ordering of four verbal extensions in Luganda.

2. Previous discussions of Luganda extension order

Although none of the existing descriptions of Luganda extension ordering is complete, some data do appear in various sources in the Bantu literature (Katamba 1993, Hyman 1990/1994, 2003, Good 2003, 2005, 2007). However, the lack of a comprehensive description has led to conflicting claims about what determines the order of affixes. On the one hand, Katamba (1993) argues that the order of verbal extensions in Luganda follows the Mirror Principle (1).

(1)   The Mirror Principle (Baker 1985): The order of affixes reflects the order in which the associated syntactic 'operations' apply.

On the other hand, Good (2007) argues that affix ordering in Luganda obeys the so-called 'CARP' template that Hyman (2003) reconstructs for Proto-Bantu:

(2)   Causative   Applicative   Reciprocal   Passive
        *-ic-   >   *-id-   >   *-an-   >   *-u-

In this paper, we present the results of our work with three native speakers of Luganda in an effort to determine which of these principles is responsible for the order of verbal extensions. As we show, based on our findings, Katamba's (1993) and Good's (2007) claims are both correct with respect to certain aspects of Luganda affix ordering, but a combination of both types of analysis is necessary to account for all of the facts. In our analysis, the Mirror Principle and the CARP template combine to determine the order of verbal extensions in a constraint-based approach. Our analysis is similar to

Hyman's (2003) account of affix order in Chichewa, but interestingly, the particular pairs of affixes adhering to the Mirror Principle in violation of the CARP template are different in Luganda. As we will discuss, this lends further support to the existence of a CARP template in Proto-Bantu, since different modern Bantu languages seem to have innovated different pairs of affixes that violate the template. Even more striking evidence (in our view) comes from the fact that our Luganda consultants reject some of the examples that have been cited in the literature, and the rejected forms are precisely those that violate the CARP template. This suggests that the CARP template may still be intact in Luganda, at least for some speakers.

3. Verbal extensions in Luganda

Before considering the order of the CARP extensions in Luganda, we will first present the full set of extensions that are attested in our data.[1,2] These are summarized in (3).

(3)	Name	Shape	Example	Gloss
	Causative	/-is-/	n-a-mu-zin-**is**-a	'I made him dance'
	Applicative	/-ir-/	a-n-zin-**ir**-a	'he is dancing for me'
	Reciprocal	/-agan-/	ba-a-kub-**agan**-a	'they hit each other'
	Passive[3]	/-ibu-/	n-a-kub-**ibw**-a	'I was beaten'
	Transitive[4]	/-i-/	y-a-ba-kaab-**y**-a	'she made them cry'
	Stative	/-ik-/	ga-nyw-**ek**-a	'it (water) is drinkable'
	Reversive	/-ulul-/	oku-pang-**ulul**-a	'to unstack (take things off a pile)'

We will focus in this paper on the 'CARP' extensions (i.e., the first four extensions listed in (3)) since these particular extensions were the subject of the conflicting claims in the literature described in §2. Hyman (2003) also discusses the place of the Transitive suffix in an extended version of the CARP template, 'CARTP', but we focus on the CARP extensions except where the Transitive is particularly relevant. For more details about the uses of the individual extensions (both CARP and non-CARP), we refer the reader to McPherson 2008.

4. Combinations of extensions

In the chart below, we give all of the *possible* (though not necessarily attested) pairwise combinations of the CARP extensions. These are the combinations that we attempted to elicit in our study.[5]

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[1] One possibly derivational affix that we do not list here (in part because 'extensions' are suffixes) is the Reflexive prefix /e-/, which often occurs in place of the /-agan-/ suffix in our Reciprocal examples.

[2] Note that we omit tone marking our examples. We have made this decision in order to minimize confusion because two of our important sources of Luganda data (Katamba 1993 and Ashton *et al.* 1954) do not mark tone. Unfortunately we are unable to put our own tone marking on the examples from these sources because in some crucial instances (to be discussed), our consultants reject the published examples altogether.

[3] The Passive also has a *-w-* variant whose distribution is claimed to be phonological: according to Ashton *et al.*, this allomorph occurs on verb stems ending in *-ba,-ma, -pa*, and *-la* (1954: 335).

[4] What we call 'Transitive' is also known elsewhere in the literature as the 'Short Causative' (reconstructed for Proto-Bantu as *-i̧-). Although we give its underlying form as /-i-/ here, the Transitive suffix palatalizes a preceding consonant, while /i/ from any other source does not (for example, /l/ changes to [z] in the Transitive example *o-mu-ogez-a* 'you are making him speak' from /oku-ogel-a/ 'speak'). We therefore analyze the Transitive morpheme as being associated with a special palatalization rule/constraint. See McPherson 2008 for further discussion.

[5] Note that for our present purposes, we are ignoring possible combinations of multiple instances of the same extension since in a sequence of identical affixes it is impossible to discern any ordering relation between the two instances of the affix. We also focus only on combinations of two extensions; combinations of three are difficult to elicit (i.e., speakers tend to reject them), so a systematic study of all of the combinations of three extensions is not feasible.

(4)

	Causative	Applicative	Reciprocal	Passive
Causative		-ir-is-	-agan-is-	-ibu-is-
Applicative	-is-ir-		-agan-ir-	-ibu-ir-
Reciprocal	-is-agan-	-ir-agan-		-ibu-agan-
Passive	-is-ibu-	-ir-ibu-	-agan-ibu-	

Our methodology for eliciting these combinations was as follows. For each combination of extensions given in (4), we devised several English sentences that would be expected to yield the desired combination under the Mirror Principle and/or the Scope Principle (Rice 2000).[6] For instance, for the combination 'Causative-Passive,' we tried sentences such as 'I was made to sing,' since in that example, the logical order of syntactic/semantic operations would be to first causativize the verb ('make sing') and then passivize ('be made to sing'). In cases where repeated attempts to elicit a particular combination of extensions using English examples did not yield the desired combination, we then tested the corresponding Luganda form to see whether it would be accepted by the speakers even if it were not volunteered as the first translation of the English version. For example, when asked for 'I was made to sing,' if the speaker produced a form that did not have both the Causative and Passive extensions (e.g., a form with a periphrastic passive translating literally to 'they made me sing'), then we asked, 'Could you say *nayimbisibwa*?' If the form was accepted, we transcribed the speaker's own pronunciation of the form and counted it as an attested example of the desired combination. Below we present the results of our attempts to elicit each of these combinations.

4.1. Causative-Applicative

The Causative-Applicative combination (i.e., an applicativized causative) is attested by our speakers, as in the following example.[7]

(5)   n-a-mu-zin-**is-iz**-a=ŋga   mufumbiro
        1sgSubj-past-3sgObj-dance-**Caus-Appl.Trans**-FV=Hab   kitchen
        'I used to make him dance in the kitchen'

Here, the order of affixes is consistent with both the CARP template (since Causative precedes Applicative) and Mirror/Scope (since the location introduced by the Applicative has scope over the Causative). It should be noted that in this example, the Applicative suffix surfaces as [iz] rather than the expected [ir]. We assume (following Hyman 2003 and Good 2005) that the reason for this is that the Transitive suffix is present in this example, and that it is manifested as palatalization of the final /r/ of the Applicative suffix.

4.2. Causative-Reciprocal

The Causative-Reciprocal combination was not attested by any of our speakers, nor in any recent sources that we have been able to find. It is, however, attested in Ashton *et al.* (1954: 356) in the following example.

(6)   -li-**is-agan**-
        eat-**Caus-Recip**-
        'feed each other'

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[6] We will refer to the Mirror Principle and Scope Principle collectively as 'Mirror/Scope' throughout the rest of the paper, as both are principles of affix ordering that are external to the morphology proper and both require a 'compositional' ordering of affixes.

[7] In this and later examples, our interlinear glosses will parse morpheme boundaries for verbs only, not for nouns. This is because our focus is on verbal morphology and we do not wish to distract the reader with debates about, e.g., the status of *mu-* on the noun in (5) as a noun class marker vs. a locative prefix.

This example is consistent with both CARP and Mirror/Scope, but our own consultants rejected this and other forms with the *-is-agan-* combination, volunteering instead forms such as *tweeliisa* 'we are feeding each other' with the *e-* Reflexive prefix instead of the Reciprocal.

4.3. Causative-Passive

The combination Causative-Passive was accepted by our speakers, as in (7).[8]

(7) a. n-a-yimb-**is-ibw**-a
　　　1sgSubj-Past-sing-**Caus-Pass**-FV
　　　'I was made to sing'

　　b. n-a-som-**es-ebw**-a
　　　1sgSubj-Past-read-**Caus-Pass**-FV
　　　'I was made to read'

As shown in (8), a similar example is attested by Katamba (1993: 277), and this example is also accepted by our speakers (note: we have augmented Katamba's interlinear glosses here and below to indicate subject marking on verbs, for consistency with our own examples).

(8)　　abaana　　　　　ba-som-**es-ebw**-a　　　　nnaaki
　　　children　　　　3sgSubj-read-**Caus-Pass**-FV　　Nnaaki
　　　'the children are made to read by Nnaaki'

Each of these examples of the Causative-Passive combination is consistent with both CARP and Mirror/Scope. It should also be noted that the examples with 'read-Caus' have an idiomatic meaning 'teach'. So, for example, the form in (8) also means 'the children are taught by Nnaaki.' This might lead the reader to suspect that [-somes-] in (7)b and (8) is really a lexicalized combination of 'read' plus the Causative suffix that is a separate verb meaning 'teach'. However, the productivity of the Causative-Passive combination is affirmed by the example in (7)a, where a lexicalized verb meaning 'make sing' seems unlikely due to its semantic transparency and probable low frequency.

4.4. Applicative-Causative

The Applicative-Causative combination is not attested in its expected form, i.e., *-ir-is-*. However, we do find forms in our data that have the 'causativized applicative' meaning and may be examples of the Applicative-Causative ordering. One such example is given in (9).

(9)　　ba-ji-tu-mu-fumb-**ir-iz**-a
　　　3sgSubj-9Obj-1plObj-3plFObj-cook-**Appl-Caus?**-FV
　　　'they make us cook it for her'

The reason that the status of this example is unclear is that what we gloss as 'Caus?' here surfaces as [iz] rather than [is]. We do not find examples of the Causative suffix surfacing as [iz] anywhere other than in this combination with the Applicative. However, since we know of no more plausible way to parse the morphemes in (9), we tentatively conclude that this example does include a Causative suffix, and that the Causative has a morphologically conditioned suppletive allomorph /-iz-/ that is conditioned by the presence of the Applicative suffix. Bastin (1986) also claims that Causative has an *-iz-* allomorph, and further support for this analysis comes from Katamba (1993: 297), who provides a similar example and glosses [iz] as a Causative suffix, as shown in (10).

(10)　　te-ba-li-gi-tu-mu-fumb-**ir-iz**-a
　　　Neg-3plSubj-Fut-Obj-1plSubj-3plFObj-cook-**Appl-Caus**-FV
　　　'they will not make us cook it for her'

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[8] Note that the *is ~ es* and *ibw ~ ebw* alternations observed in these examples results from a regular vowel harmony process in Luganda in which the underlying /i/ of a suffix lowers to [e] when the preceding vowel is mid.

If this is the correct analysis, then the Applicative-Causative combination may be considered an example of an ordering that adheres to Mirror/Scope while violating the CARP template. However, we are hesitant to describe this as a violation of CARP because it is not necessarily the case that /-iz-/ is an allomorph of the same Causative morpheme as /-is-/. An alternative possibility is that /-iz-/ is an allomorph of the Transitive suffix, which performs a similar function to the Causative.[9] Therefore we cannot assume that the combination *-ir-iz-* constitutes a CARP violation since it could be glossed as Applicative-Transitive rather than Applicative-Causative (and the former is consistent with the extended 'CARTP' template mentioned earlier).[10]

4.5. *Applicative-Reciprocal*

In our data, the Applicative-Reciprocal combination is attested as in the examples in (11).

(11) a. tu-yimb-**ir-agan**-a   b. ba-a-sal-**ir-agan**-a   mubunyiivu
        1plSubj-sing-**Appl-Recip**-FV   3plSubj-cut-**Appl-Recip**-FV   anger
        'we are singing for each other'   'they cut each other out of anger'

We treat such examples as being consistent with both CARP and Mirror/Scope. In (11)a (which is similar to an example attested in Hyman 1990), the scope relation is clear (Reciprocal has scope over Applicative, since the alternative reading would mean '*sing each other for (someone)'), and the order of the suffixes does adhere to Mirror/Scope. However, the example in (11)b is ambiguous. The default reading in English would likely have the Applicative outscoping the Reciprocal (i.e., they cut each other, and the reason for this was anger). However, Katamba (1993: 279) translates a similar sentence in such a way that Reciprocal has scope over Applicative, as shown in (12).

(12)   ba-li-sal-**ir-agan**-a
        3plSubj-Fut-cut-**Appl-Recip**-FV
        'they will cut for a reason/at a place each other'

Our consultants did not distinguish 'they will cut for a reason each other' from 'they will cut each other for a reason'[11]; both of these in English resulted in forms with the Applicative-Reciprocal combination such as in (11)b, and as will be discussed further in §4.8, our speakers rejected forms with the Reciprocal-Applicative ordering.

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[9] Pylkkänen (2002: 108) gives the example *-tambul-i-z-a-* 'make [walk for]' that is claimed to instantiate an Applicative-Causative combination. Since *-i* is not an attested allomorph of the Applicative elsewhere, we would gloss this example as *-tambul-iz-a-* from /-tambul-ir-i-a-/; i.e., an Applicative inside the Transitive, not the Causative. This example does suggest (though not conclusively) that our *-ir-iz-* examples above may indeed be Applicative-Causative combinations rather than Applicative-Transitive, since (at least in the context represented by Pylkkänen's example) the Applicative-Transitive comes out as *-iz-* rather than *-ir-iz-*.

[10] We also wish to point out that if Luganda does not in fact allow true Applicative-Causative combinations, this fact will not be explained by the same syntactic proposal that Pylkkänen (2002) makes to explain the lack of Applicative-Causative combinations in other Bantu languages. Pylkkänen (2002: 115-116) claims that under her model, '…the morpheme order APPL-CAUSE should be impossible whenever the applicative is high and the causative is unable to embed external arguments, i.e. the causative is either root or verb-selecting.' This explanation will not apply to Luganda because, contrary to Pylkkänen's apparent claim (2002: 24, 33-34) that Luganda has only high applicatives, Luganda also has 'low' applicatives (e.g., *n-a-mu-gul-idd-e olugoye* 'I bought her a dress') in which the applied object does not relate semantically to the verb but rather from the direct object, and we do not have any clear cases of the Applicative extension in these low applicative examples occurring inside the Causative either.

[11] A reviewer expresses skepticism regarding (12), suggesting that 'each other' has simply been moved to the right edge in the English translation without any change in the scope relation between the Reciprocal and Applicative. Since Katamba's example omits the arguments introduced by the Reciprocal and Applicative extensions, we agree it is not possible to verify the claim that Reciprocal scopes over Applicative in this example.

4.6. Applicative-Passive

In our data, we also find instances of the Applicative-Passive combination, as in (13).

(13)   omwaana   y-a-fuumb-**ir**-idd-**w**-a   emmele
        child   3sgSubj-Past-cook-**Appl**-Perf-**Pass**-FV   food
        'food was cooked for the child' (lit., 'the child was cooked food')

We do not find any examples of the Applicative with the Passive *-ibw-*; only *-w-* is attested in our data in combination with the Applicative. We also do not have examples with only the Applicative and Passive; in (13) the Perfective *-idd-* intervenes between the Applicative and Passive. However, Hyman (2003: 276-277) makes reference to examples meaning 'child was cooked food' and 'food was cooked child,' both requiring *-ir-w-* (the actual Luganda examples are not given).

4.7. Reciprocal-Causative

In our data, the combination Reciprocal-Causative is unattested. For our consultants, forms such as 'he makes them hit (bite/hug/kiss/greet) each other' have either a Reflexive prefix in place of the Reciprocal suffix, or a periphrastic Causative (e.g., 'he tells them to hit each other'). Forms such as **y-a-kub-**agan**-**is**-a* 'he makes them hit each other' are explicitly rejected. One of our speakers accepted the form in (14) from Hyman (1994: 24), but this is an instance of Reciprocal-Transitive rather than Reciprocal-Causative.

(14)   -lóot-**agan-i̧**-   → [-lóos-agan-i̧-]
        -dream-**Recip-Trans**-
        'cause each other to dream'

Similarly, Pylkkänen (2002: 108) gives an example *-laba-ga-za-* 'make see each other' that is claimed to have a Reciprocal inside a Causative. We believe that the proper parsing of this example is probably *-lab-agaz-a* from /-lab-agan-i-a/; i.e., a Reciprocal inside the Transitive rather than the Causative.

To our knowledge, the combination *-agan-is-* is not attested in any source, and since we were unable to elicit it from our consultants, we conclude that this combination is ungrammatical in Luganda.

4.8. Reciprocal-Applicative

Examples of the Reciprocal-Applicative combination are attested in the literature. For instance, Katamba (1993: 278) gives the example in (15).

(15)   ba-li-sal-**agan-ir**-a
        3plSubj-Fut-cut-**Recip-Appl**-FV
        'they will cut each other for/at' (for a reason/at a place)

Similarly, Hyman (1990) cites the example in (16).

(16)   -kub-**agan-ir**-
        -hit-**Recip-Appl**-
        'hit each other at [place] (or for [reason])'

These examples are significant in that to this point, we have not seen any clear cases of a combination of extensions that violates the CARP template. The order Reciprocal-Applicative constitutes the first such example. However, our consultants explicitly reject the forms in (15) and (16) as well as more complete versions of these with the 'place' or 'reason' filled in, e.g., 'hit each other in

the kitchen' or 'hit each other out of anger', in different tenses (i.e., past and future), and using different verbs (cut/hug/see/kiss/greet). In every instance, whenever a form was supplied that contained both the Applicative and Reciprocal suffixes, the order was -*ir-agan*-, e.g., *ba-a-sal*-**ir-agan**-*a mubunyiivu* 'they cut each other out of anger'. Note that this form was already discussed above in §4.5, since the same form was supplied when the intended reading was 'they cut out of anger each other'. The fact that, for our consultants, the Applicative-Reciprocal ordering corresponds to both scope readings and the Reciprocal-Applicative order is never attested, suggests that at least for these speakers there is a fixed order for these two suffixes. Our speakers are relatively young people (in their 20s and 30s), so we speculate that the differences between their judgments and what is reported in the literature may be generational. Notably, the forms that they reject would violate the CARP template.

4.9. Reciprocal-Passive

The combination Reciprocal-Passive is not attested in our data or anywhere else in the literature that we are aware of. Hypothetical forms that would yield this combination based on Mirror/Scope include **ba-a-kub-**agan**-**ibw**-a* 'they were hit (greeted/touched/hugged/cut) by each other.' All such forms are rejected.

4.10. Passive-Causative

Passive-Causative is also unattested. Based on Mirror/Scope, the Passive-Causative combination should occur in examples meaning, e.g., 'he made me be washed'. However, the expected form **y-a-n-naaz-**ibw**- **is**-a* is deemed ungrammatical by our consultants. In all cases, the ordering is Causative-Passive, as in (17).

(17)   y-a-n-naaz-**is-ibw**-a
         3sgSubj-Past-1sgObj-wash-**Caus-Pass**-FV
         'he made me be washed'

This example constitutes a Mirror/Scope violation since the logical reading is that Causative has scope over Passive, i.e. [make [be washed]], and therefore the Causative should come outside the Passive. The violation of Mirror/Scope can be attributed to the CARP template, which requires Causative to precede Passive regardless of scope.

4.11. Passive-Applicative

Another unattested combination is Passive-Applicative. Hyman (2003) claims that this combination does not exist in Luganda, and we were unable to elicit it. Based on Mirror/Scope, we would expect this combination in forms such as 'food was cooked for a child,' but the corresponding Luganda examples, e.g., **emmele y-a-fumb-**ibw**-**ir**-a omwaana* were rejected by our consultants. Forms with this meaning (in cases where we were able to elicit them with both the Passive and Applicative extensions, rather than the alternative passive form with a generic 3pl subject) invariably have the ordering Applicative-Passive as in the examples described in §4.6 above. Hence, the Passive-Applicative ordering appears to be ruled out, in violation of Mirror/Scope.

4.12. Passive-Reciprocal

The last of our twelve possible pairwise combinations, Passive-Reciprocal, is also unattested. Larry Hyman [p.c.] reports that the Passive-Reciprocal order is possible in some languages in examples such as 'the books were given to each other' (although the English translation is infelicitous, in theory it should be possible to passivize and then reciprocalize the verb with 'each other' being co-referential not with 'books' but with the underlying 3pl subject). However, the corresponding Luganda forms such as **ebitabo ba-a-w-**ew**-**agan**-a* are rejected. To our knowledge, no examples with this

combination are attested elsewhere in the literature on Luganda, so we conclude that the Passive-Reciprocal combination is ungrammatical.

4.13. Generalizations based on the data

In (18), we reproduce the possible pairwise combinations of the CARP extensions that were first presented in (4). Here, however, we indicate which combinations are actually attested. Those indicated in bold are combinations that are accepted by our speakers, while those in italics are attested in other sources but not accepted by any of our three speakers. Unattested combinations are in plain text, and the Causative-Applicative combination is in parentheses due to the complications described in §4.4.

(18)

	Causative	Applicative	Reciprocal	Passive
Causative		(*-ir-is-*)	-agan-is-	-ibu-is-
Applicative	**-is-ir-**		*-agan-ir-*	-ibu-ir-
Reciprocal	*-is-agan-*	**-ir-agan-**		-ibu-agan-
Passive	**-is-ibu-**	**-ir-ibu-**	-agan-ibu-	

As can be seen in the chart, Reciprocal and Passive do not combine in either order, suggesting that there is a co-occurrence restriction banning the use of either suffix with the other. Causative-Reciprocal is also absent from our data (though attested elsewhere); otherwise, our consultants produced all of the CARP combinations and none of the non-CARP combinations. Excluding the Applicative-Causative combination, we are left with Reciprocal-Applicative as the only non-CARP ordering attested in any source (and, as discussed in §4.8, our own consultants rejected forms with this combination). The Reciprocal-Applicative combinations that are attested in the literature do appear to adhere to Mirror/Scope, so this exception is principled in the sense that we can account for it as a particular pairwise combination for which Mirror/Scope outweighs the CARP template.

5. Analysis

The tension between the CARP template and Mirror/Scope leads us to a constraint-based analysis in which each of these principles of affix ordering plays a role in the determination of the correct surface forms. Our analysis follows Hyman's (2003) analysis of affix ordering in Chichewa, although as will be discussed, the particular constraints and rankings differ somewhat in Luganda because the attested non-Mirror/Scope orderings differ in the two languages.

The constraints that are relevant to our analysis are presented in (19).

(19)   *RP: Reciprocal and Passive cannot co-occur.
         MIRROR AR: The order of the Applicative and Reciprocal extensions mirrors the
                  order of morphosyntactic operations associated with them.
         CARP: The order of extensions is Causative > Applicative > Reciprocal > Passive.
         MIRROR: The order of affixes mirrors the order of morphosyntactic operations
                  associated with them.

The ranking of these constraints for Luganda is as shown in (20).[12,13]

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[12] An alternative to the CARP constraint would be a set of pairwise ordering constraints, e.g., C>A, C>R, etc. Under such an analysis, instead of using MIRROR AR >> CARP to yield the Reciprocal-Applicative combination, we would instead have the constraint A>R dominated by the general MIRROR constraint, which would in turn be outranked by all of the other pairwise ordering constraints. There is nothing that we know of in our data to differentiate between these two approaches, so we have opted to use a single CARP constraint following Hyman (2003a).

[13] Our analysis is meant to cover all of the examples attested by our consultants and in the literature. An analysis based only on examples provided by our own consultants would differ in that MIRROR AR would not play a role (if present at all, it would be ranked below MIRROR). Therefore the ranking would be *RP, CARP >> MIRROR.

(20)   *RP, Mirror AR >> CARP >> Mirror

Note that *RP and Mirror AR are not ranked with respect to each other, since both are apparently exceptionless. In what follows, we show how our constraints select the proper output forms for combinations of the Reciprocal and Applicative extensions and for other pairs. We do not explicitly show how our constraints rule out combinations of Reciprocal and Passive since the undominated *RP handles this straightforwardly. Henceforth, we omit *RP since it plays no role in any of the forms that we discuss.

    As shown in (21), when the intended form is a reciprocalized applicative, all of our constraints favor the Applicative-Reciprocal ordering.[14] In this example, *-sal-ir-agan-* 'cut for each other,' Mirror AR (and, therefore, Mirror) is satisfied because Reciprocal has scope over Applicative (i.e., the proper reading is [[cut for] each other], not [[cut each other] for]), corresponding to the A>R ordering. This ordering also satisfies CARP.

(21)   *-sal-ir-agan-* 'cut for each other'

[[[sal] ir] agan]	Mirror AR	CARP	Mirror
☞ -sal-ir-agan-			
-sal-agan-ir-	*!	*	*

    The tableau in (22) shows what happens when the intended form is an applicativized reciprocal, e.g., *-sal-agan-ir-* 'cut each other for'. Here, the CARP ordering (Applicative-Reciprocal) violates Mirror AR (as well as Mirror) because the intended reading is [[cut each other] for], not [[cut for] each other]. Since Mirror AR outranks CARP, the optimal output form is the candidate with the R>A order, *-sal-agan-ir-*.

(22)   *-sal-agan-ir-* 'cut each other for'

[[[sal] agan] ir]	Mirror AR	CARP	Mirror
-sal-ir-agan-	*!		*
☞ -sal-agan-ir-		*	

    Our rankings also predict the correct output forms for other combinations of affixes to which Mirror AR is not relevant. For example, as shown in (23), we correctly predict the C>P ordering for a passivized causative form. Here, *-nyw-es-ebw-* is the optimal output for 'be made to drink' because it satisfies CARP (since C>P) and Mirror (since the intended reading is [be [made to drink]] rather than [make [be drunk]].

(23)   *-nyw-es-ebw-* 'be made to drink'

[[[nyw] es] ebw]	Mirror AR	CARP	Mirror
☞ -nyw-es-ebw-			
-nyw-ebw-es-		*!	*

    (24) shows how our constraints select the C>P ordering for a causativized passive form. Although the expected Mirror/Scope ordering would be P>C (since the intended reading is [make [be drunk]] rather than [be [made to drink]]), the CARP ordering is selected because CARP outranks Mirror. Hence, the winning candidate, *-nyw-es-ebw-* 'make be drunk' satisfies CARP at the expense of a Mirror violation.

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[14] Note that our input forms have the Mirror/Scope ordering based on the intended meaning of the output form. However, since none of the constraints require faithfulness to the order of affixes in the input, our particular choice of inputs is irrelevant to the determination of the output forms.

(24)   *-nyw-es-ebw-* 'make be drunk'

[[[nyw] ebw] es]	Mirror AR	CARP	Mirror
☞ -nyw-es-ebw-			*
-nyw-ebw-es-		*!	

6. Conclusion

There is an interesting difference between Luganda and Chichewa in terms of the interaction of the template with Mirror/Scope. In our analysis above, the ranking of affix ordering constraints in Luganda is as shown in (25)a (repeated from (20)), while in Hyman's (2003) analysis, the ranking for Chichewa is as in (25)b.

(25)   a. Luganda: *RP, Mirror AR >> CARP >> Mirror
        b. Chichewa: Mirror RC, Mirror AP >> CARP >> Mirror

If we assume Proto-Bantu had an exceptionless CARP template, this means that different pairwise Mirror/Scope-based orderings have been innovated in modern Bantu languages: Reciprocal-Causative and Applicative-Passive in Chichewa, versus Applicative-Reciprocal in Luganda. Perhaps accidental factors in each language led speakers to posit different types of principled exceptions to CARP under pressure from Mirror/Scope, which is claimed to be universal. Strikingly, however, recall that our own consultants rejected the Mirror/Scope-based Reciprocal-Applicative ordering that is attested in the literature. Since our consultants are young people, we suggested that the difference is generational. However, in order for a young generation of speakers to 'retreat' to a language-specific template, we must hypothesize that either (a) the innovation of Mirror AR in Luganda never fully spread throughout the entire speech community, and for some reason the dialect(s) that were more conservative in terms of the Proto-Bantu CARP template won out; or (b) there was a stage in the language at which all speakers would have accepted the Reciprocal-Applicative ordering, but the constraints have been reranked for some speakers such that CARP is undominated, as it is claimed to be in Chimwiini (Hyman 2003, based on Abasheikh 1978).[15] Further research on extension ordering in Bantu (particularly those closely related to Luganda) will help establish a fuller picture of how the ordering in modern Luganda came to be.

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[15] If this is the proper analysis, then it seems to require that CARP be a single constraint rather than a set of pairwise ordering constraints; see footnote 12 above.

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