RESEARCH

Templatic morphology through syntactic selection: Valency-changing extensions in Kinyarwanda

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The existence of both morphological templates (Hyman 2003) and Mirror Principle (Baker 1985) compliant behaviour in the same language presents an interesting case of grammatical principles at odds. The two principles sometimes predict opposite orderings for the surface form of valency-changing derivational morphology in Bantu languages. In Kinyarwanda, this tension is unresolved, leading to certain forms being unavailable, rather than favouring one principle over the other. Independently available periphrastic forms are used to convey the problematic meanings. This paper presents an alternative to syntactic movement or Optimality Theoretic analyses for templatic morphology that have been proposed in the literature. It argues that syntactic selection by heads can better derive the facts of Kinyarwanda. Independent syntactic properties of the heads that underlie the derivational morphology suggest a particular set of selectional properties for these heads in Kinyarwanda, independent of the data showing their ordering. An analysis based on syntactic selection is sufficient to account both for the orders of the morphemes and their syntactic properties. This result suggests, in line with recent work, that syntactic selection is an alternative mechanism by which seemingly templatic behaviour in the morphology can be realised (Pylkkänen 2008; Harley 2013; Jung 2014).

Keywords: morphology; template; syntax; selection; Bantu

1 Introduction

When given an unlinearised unfused series of functional heads along the clausal spine, how should the corresponding morphemes be realised on the surface? Intuitively, there are two options: either the abstract structure corresponds transparently to the linearised form, or some principle orders the heads in a non-transparent way. Both options have been argued to be used by different languages. The idea that the surface order of derivational morphemes is entirely isomorphic to the syntactic c-command relations between the heads they realise is known as the Mirror Principle (Baker 1985; Rice 2000). In this view, surface order of heads reflects syntactic scope. Combined with a compositional view of semantics like that of Heim & Kratzer (1998), this predicts that surface order should map directly to semantic scope. It has also been noted that derivational suffixes in Bantu languages tend to follow a fixed root-causative-applicative-reciprocal-passive order known as the CARP (Hyman 2003; Good 2005) template. The template is realised to varying degrees in various Bantu languages as a preference for ordering the morphemes instantiating these operations in a specific invariant order.

These two notions could in principle be at odds with one another. The first view predicts that the morphology must reflect the syntactic scope of elements, while the second predicts that surface morphology will be invariant regardless of syntax. Just in case the scopal ordering does not match the template, the two principles would predict opposite

orders for the relevant heads. Investigating the interaction between these two conflicting principles can shed light on the source of morphological templaticity: does it stem from surface level morphological filters or deeper syntactic constraints?

This project seeks to explore this tension through investigating its instantiation in Kinyarwanda. Previous studies have explored the behaviour of Luganda (McPherson & Paster 2009), Chichewa (Zukoff 2017), and Nyakusa and Ndebele (Myler 2017) when faced with the same dilemma. I will argue that the late-derivation constraints proposed to account for CARP in these languages is unsuitable for Kinyarwanda. In particular, a syntactic movement account as proposed for Nyakusa and Ndebele is simply inapplicable to Kinyarwanda based on the data. An optimality theoretic account as proposed for Luganda and Chichewa is able to account for the behaviour of Kinyarwanda, but misses crucial syntactic correlates. I argue that what looks like a CARP template in Kinyarwanda at least should be implemented much earlier in the derivation, namely at the point of selection, to account not only for CARP order, but also independent syntactic properties of the heads in question. This extends the views of Pylkkänen (2008), Harley (2013) and Jung (2014) by presenting a complete analysis for the order of valency-changing affixes in a single language by means of analysing templaticity as selectional restrictions. I will not argue that late-derivation constraints or movement accounts are unsuitable for the languages for which they were developed, but rather propose one further mechanism to derive apparent templates. Investigating the extensibility of such a syntactic account to other studied Bantu language templatic morphology facts will be left for future study.

The rest of the paper is arranged as follows. Section 2 presents some background on Kinyarwanda and templaticity in general. Section 3 presents the data from Kinyarwanda. Section 4 discusses the issues of surface level analysis and proposes a selectional account based on Pylkkänen (2008), showing how it accounts not only for the morpheme ordering data, but also unrelated syntactic facts. Section 5 discusses remaining issues and next steps, and section 6 concludes.

2 Background

This section will present the background on the project. The methods of data collection and the sources of the data are discussed, along with assumptions about how words are built and the expected effects of the Mirror Principle on derivational morphology in Bantu. Finally, some basic facts pertaining to Kinywarwanda will briefly be introduced.

2.1 Method

The data were collected by the author through primary fieldwork with one native speaker from October 2017 to May 2018 and another from January 2019 to May 2019. The speakers are both adult male native speakers of Kinyarwanda living in diaspora populations in North America. One is from Kigali and the other is from Butare.

The judgements reported herein were collected through two types of tasks: translation and felicity judgements. The translation tasks consisted of the consultants being provided with an English prompt in context and asked to translate it into Kinyarwanda. The felicity judgement tasks consisted of the consultants being given a constructed Kinyarwanda utterance in a context (provided in English) and asked for a felicity judgement. If it was judged felicitous, they were asked to repeat the sentence and provide a translation. If it was judged infelicitous, they were asked to offer a correction with a translation.

Unless noted, all judgements are verified by both speakers. Where speakers and sources in the literature disgree, this is marked by %, and footnotes indicate where only one speaker was consulted.

2.2 Word-building

Suppose we have the two morphemes *X* and *Y* to attach to the root, and the semantic scope of the resulting form is $Y(X(\surd))$. That is to say, *X* applies to the root before *Y*. If we adopt a compositional semantics like that of Heim & Kratzer (1998), the Mirror Principle (Baker 1985) indicates at some point in the derivation, the syntactic structure as shown in (1).

(1)
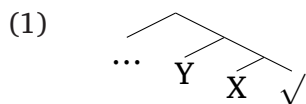
For linearisation, I assume the process of Merger (Marantz 1988) applies to replace syntactic relations with adjacency realtions. Merger is crucially not specified for directionality however, and for that, I assume the Linear Correspondence Axiom (Kayne 1994). Hence, c-command is translated into linear precedence by Merger. Head Movement, which I assume is subject to the Head Movement Constraint (Travis 1984) can bring heads into configurations allowing Merger. Under Kayne's (1994: 15–21) approach, the moved head c-commands the head it adjoins to and thus syntactic head movement always results in left-adjunction.

Thus, once the structure above is linearised, we expect to be able to see one of three options. If no head movement occurs, Merger will linearise higher heads before lower ones, producing $Y - X - \surd$ on the surface. If two instances of head movement occur producing (2a), Merger should produce $\surd - X - Y$. Finally, if only one step of head movement occurs as in (2b), *Y* will linearise to the left of both *X* and the root, but the root will be left-adjoined to *X* producing $Y - \surd - X$.

(2) a.

  b.
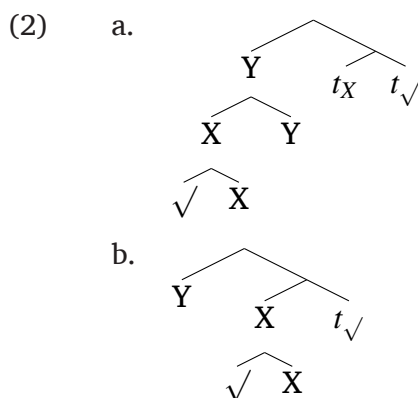
Notice, the order $\surd - Y - X$ is not predicted to be possible to derive by head movement given the Mirror Principle and the Head Movement Constraint (Travis 1984). That is to say the closer head to $\surd$ cannot be separated from it by a head further away.[1] If there were to be a morphological template which required this order, a tension would arise between it and the Mirror Principle. This is exactly the configuration that can be captured with the CARP template in Bantu languages, as will be discussed in the next section.

Let us consider a concrete example to see how the Mirror Principle and CARP template might require opposing orders of surface morphemes. Suppose we wish to express the meaning conveyed by a causativized passive (e.g. CAUS(PSV($\surd$)) for a sentence like 'I will make the food get eaten'). The Mirror Principle requires the passive to be closer to the root

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[1] Though, see Rice (2000) for an apparent case of exactly this happening, analysed by phrasal movement.

than the causative on the surface (√-PSV-CAUS), since it scopes below the causative. Yet the CARP template requires the causative to be closer to the root than the passive (√-CAUS-PSV). There are three ways that the conflict between CARP and the Mirror Principle could be resolved/avoided.

(3)   a.   Compositional order: CARP is violated and the Mirror Principle is obeyed. (√-PSV-CAUS)
           b.   Templatic order: The Mirror Principle is violated and the CARP template is followed. (√-CAUS-PSV)
           c.   Crash: Neither principle can be violated, resulting in a crash of the derivation.

Chichewa permits both compositional and templatic orders for certain pairs, resulting in ambiguity (Hyman 2003). Luganda, Nyakusa, and Ndebele display only templatic order, as shown in McPherson & Paster (2009) and Myler (2017) respectively. In Kinyarwanda however, we see that neither principle is preferred over the other. When CARP and the Mirror Principle are in conflict, a bi-clausal periphrastic form must be used instead. This instantiates the third option, since no morphological form exists to convey the desired meaning.[2] To my knowledge, this option has not been studied in the literature and thus warrants attention. Discussions of the approaches taken to analyse these other cases are briefly discussed in section 4.1.

2.3 Kinyarwanda

Kinyarwanda is an Intralacustrine Bantu language spoken in Rwanda. It is part of the Rwanda-Rundi dialect continuum and has a high degree of mututal intelligibility with Kirundi, spoken in neighbouring Burundi.

Verbs are highly inflected, containing information about agreeing nominals, tense, aspect, mood, and valency-changing derivational morphology which are the focus of this work.

Agreement tracks noun class, of which Kinyarwanda has 16. The numbers in glosses refer not to person, but to noun class. First person is denoted SP for speaker, second person AD for addressee, and third person singular is class 1. Plurals are normally in different classes than singulars, thus the plurals of class 1 are in class 2, the plurals of class 6 nominals are in class 9, and so on.

The order of morphemes in the inflected verb is is shown in (4):

(4)   SUBJ.AGR- TENSE- NONSUBJ.AGR- √ -EXT -ASP -FV

Valency-changing derivational morphology are called extensions, and are marked above as EXT. They appear immediately after the verb root, preceding aspect and a final vowel (FV), which marks mood. The extensions in Kinyarwanda are summarized in Table 1.

Kinyarwanda manifests the CARP template, where valency changing morphemes must obey the order CAUS-APPL-RECP-PSV if more than one is present. The basic uses of each of the extensions is shown below. Surface orthography forms are given in the first line of examples. Predictable phonological processes, including vowel coalescence, glide

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[2] A reviewer points out that periphrasis is not the repair per se for an unresolvable conflict between CARP and the Mirror Principle. Periphrastic biclausal forms are always available, even for CARP and Mirror compliant constructions. When the two principles are in conflict, the result is simply a crash. Periphrasis appears to be a repair since it is used to convey the same meaning. However, it is not a repair for the derivation where CARP and the Mirror Principle are in conflict in the sense that it is not a candidate output for the illicit input structure.

Table 1: Kinyarwanda valency changing morphology.

Morpheme	Realisation	Behaviour
CAUS	-ish	Causative, Instrumental
APPL	-ir(iz)	Benefactive, Locative, Reason
RECP	-an	Reciprocal, Depatientive
PSV	-(b)u	Symmetric

hardening, retroflexion harmony and vowel height harmony are undone in the subsequent line of glosses.

2.3.1 Causative

The causative *-ish* can be used as a causative (5a) or an instrumental (5b).

(5)   a.   Nandikishije Cyuma ibaruwa.
              n-   a-   andik -ish -y -e Cyuma ibaruwa
              SP.SG- PST- write -CAUS -PFV -FV C.   9.letter
              'I made Cyuma write a letter.'

        b.   Nandikishije ibaruwa ikaramu.
              n-   a-   andik -ish -y -e ibaruwa ikaramu
              SP.SG- PST- write -CAUS -PFV -FV 9.letter 6.pen
              'I wrote the letter with the pen.'

While the preferred order of nonsubject arguments in the causative and instrumental constructions is different, Jerro (2017) reports that both orders are in fact possible for both constructions. See his work for a discussion of the relationship between the causative and instrumental uses. I will largely focus on the causative use unless the instrumental is relevant for a particular construction.

2.3.2 Applicative

Kinyarwanda applicatives can introduce beneficiaries as in (6a), locations as in (6b), or reasons as in (6c).

(6)   a.   Naguriye impano Cyuma.
              n-   a-   gur -ir   -y -e impano Cyuma
              SP.SG- PST- buy -APPL -PFV -FV 9.gift   Cyuma
              'I bought a gift for Cyuma.'

        b.   Azatwarira ubwato mu'kiyaga.
              a- za- twar -ir   -a ubwato mu   kiyaga
              1- FUT- drive -APPL -FV 14.boat PREP 7.lake
              'S/he will drive/row the boat on the lake.'

        c.   Kimenyi (1995)
              Umugabo arasomera igitabo matsiko.
              umugabo a- ra-   som -ir   -a igitabo matsiko
              1.man   1- PRES- read -APPL -FV 7.book 6.curiosity
              'The man is reading the book out of curiosity.'

Good (2003) notes based on data from Kimenyi (1980) that the applicative has an allomorph *-iriz* used when the verb bears both applicative and causative marking. See (Good 2003: 160–169) for a discussion of the origin of this allomoprh.

(7)　　Urandikishiriza iyo karamu iki?
　　　u-　　ra-　　andik -ish　-iriz　-a　iyo　　karamu iki
　　　AD.SG- PRES- write -CAUS -APPL -FV 9.DEM 9.pen　　what
　　　'Why are you writing with that pen?'

2.3.3 Reciprocal

The reciprocal morpheme in Kinyarwanda can, in addition to its reciprocal use as shown in (8a), be used as a means of object suppression as in (8b).

(8)　　a.　　Bahoberanye.
　　　　　　ba- a-　　hober -an　　-y　　-e
　　　　　　2-　PST- hug　　-RECP -PFV -FV
　　　　　　'They hugged each other.'

　　　　b.　　Yahoberanye.
　　　　　　a- a-　　hober -an　　-y　　-e
　　　　　　1-　PST- hug　　-RECP -PFV -FV
　　　　　　'S/he went around hugging people.'

Example (8b) shows the depatientive use, where a transitive verb does not have an overt object, instead having multiple arbitrary individuals as the implicit objects. The singular subject ensures that the verb is not interpreted as a reciprocal.

2.3.4 Passive

The form of the passive morpheme in Kinyarwanda is phonologically conditioned. If the stem ends in a vowel, *-bu* is used, otherwise *-u* is used. The passive in Kinyarwanda is symmetric, meaning that for ditransitive verbs, either the direct object or the indirect object can become the subject under passivization. Example (9a) shows the active form, (9b) shows passivization with the direct object promoted, and (9c) shows passivization with the indirect object promoted.

(9)　　a.　　Umunyeshuri yahaye umuconwe umwarimu.
　　　　　　umunyeshuri a- a-　　ha　-y　　-e　umuconwe umwarimu
　　　　　　1.student　　1- PST- give -PFV -FV 3.orange　　1.teacher
　　　　　　'The student gave the teacher the orange.'

　　　　b.　　Umuconwe wahabuye umwarimu.
　　　　　　umuconwe u- a-　　ha　-bu　-y　　-e　umwarimu
　　　　　　3.orange　　3- PST- give -PSV -PFV -FV 1.teacher
　　　　　　'The orange was given to the teacher.'

　　　　c.　　Umwarimu yahabuye umuconwe.
　　　　　　umwarimu a- a-　　ha　-bu　-y　　-e　umuconwe
　　　　　　1.teacher　　1- PST- give -PSV -PFV -FV 3.orange
　　　　　　'The teacher was given the orange.'

3 Data

The verbal extensions represent the four operations of causativization, applicativization, reciprocalization, and passivization. There are a total of six distinct pairs of operations that could be chosen from this set, and each pair has two possible orders of applications. Since the order in which we choose to apply the operations will be encoded in the syntax in terms of scopal relationships, the Mirror Principle predicts that each possible order of operations will correspond to a different order of morphemes marking the operation on

the surface. However, we know that the CARP template reflects some independent restrictions on the possible surface orders that these morphemes can have.

Of these 12 possible surface orders, Kimenyi (1980) presents three in his investigation of Kinyarwanda argument structure: APPL-PSV, CAUS-PSV, RECP-PSV.[3] Kimenyi's (1980) examples will be discussed when they are relevant in the following sections.

For any given pair of operations, one order will be able to satisfy both the Mirror Principle and CARP simultaneously. This order of operations will be the one that will correspond directly to the morphemes on the surface in CARP order. Let us call this the *harmonic* case. The other order however will not be able to satisfy both principles simultaneously, since the Mirror Principle will insist on the morphemes being reversed as compared to the harmonic case, but CARP will insist on them being the same as the harmonic case. Let us call this the *disharmonic* case, where CARP and the Mirror Principle are at odds.

3.1 The straightforward cases

For three of the six pairs of extensions (C + A, C + P, A + R), the data are straightforward. The harmonic case is expressed as expected, and the disharmonic case is not available. Periphrasis is the means to express the desired disharmonic meaning. These are discussed below.

3.1.1 Causative and applicative

The harmonic case is an applicativized causative, shown in (10a). Since applicatives have benefactive uses, it is expected to mean that the causation will benefit the beneficiary rather than the caused event benefiting the beneficiary.[4] The disharmonic case, shown in (10b), is a causatizived applicative. This is expected to mean that an event that is caused will benefit the beneficiary.

(10) a. Nzamuririmbishiriza Ineza.
          n-   za-   mu-   ririmb -ish   -iriz   -a   Ineza
          SP.SG- FUT- AD.SG- sing   -CAUS   -APPL   -FV INEZA
          ✓'For Ineza, I will make him sing.'   [[V C] A]
          ✗'I will make him [sing for Ineza].'   [[V A] C]

      b. *Nzamuririmbir(iz)isha Ineza.
          n-   za-   mu- ririmb -ir(iz) -ish   -a   Ineza
          SP.SG- FUT- 1-   sing   -APPL   -CAUS   -FV I.
          Intended: 'I will have him/her sing for Ineza.'   [[V A] C]

We see that the harmonic applicativized causative is straighforwardly available, whereas the disharmonic causatizived applicative is not available. In order to convey this meaning, a periphrastic form is used, as shown in (11).

(11) Nzamubwira kuririmbira Ineza.
      n-   za-   mu- bwir -a   ku-   ririmb -ir   -a   Ineza
      SP.SG- FUT- 1-   tell -FV INF- sing   -APPL   -FV I.
      'I will tell him/her to sing for Ineza.'

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[3] A fourth surface order is discussed in Kimenyi (1980), however, my consultants do not accept it. It is discussed in the relevant section.

[4] A reviewer correctly points out that benefactives are perhaps not the best test case for the scope of applicatives and causatives, given that it's not obvious that the beneficiary benefits only from the caused event and not from the causation, for example. Although applicatives in Kinyarwanda do have a use that introduces rationale clauses, neither of my consultants is willing to accept that use with the causative for reasons that I do not understand.

In order to allow disharmonic scope for causation and benefaction, in the above example causation is represented not by an extension, but by the matrix verb *tell*. Benefaction is still denoted by the applicative extension, however it is on the embedded verb, resulting in the meaning of a causativized applicative without a CARP-offending causative morpheme outscoping the applicative. This is required precisely because the disharmonic structure results in a crash.

   Kimenyi (1980) presents the same order of affixes CAUS-APPL as having one other interpretation. However the particular construction presented in (Kimenyi 1980: 112) has two peculiarities. Firstly, the causative is used to introduce an instrument rather than a causer. This is generally permitted, however there is no guarantee that the instrumental and causative are the same construction (see Jerro 2017 for discussion). Secondly, the applicative is used to license a posessor, which my consultants do not accept. The example is provided below, with the judgement diacritic noting the disagreement between Kimenyi and my consultants.

(12)   %Umuhungu yandikishirije umukobwa ibaruwa ikaramu.
         umuhugu a- a-   andik -ish -ir   -y   -e umukobwa ibaruwa ikaramu
         1.boy   1- PST- write -CAUS -APPL -PFV -FV 1.girl   9.letter 6.pen
         Intended: 'The boy wrote the letter with the girl's pen.'

3.1.2 Causative and passive

Since the causer behaves like the subject of a causativized construction, we expect the harmonic passivized causative in (13a) to result in a construction where the causer is demoted by the passive, and the causee is raised to subject position. The disharmonic causativized passive in (13b) should result in a supressed agent, since the causer will not yet have been introduced by the time the passive applies.

(13)   a.   Rama azubakishwa igikinisho na Cyuma.
               Rama a- za- ubak -ish   -u -a igikinisho na Cyuma
               R.   1- FUT- build -CAUS -PSV -FV 7.toy   by C.
               ✓'Rama will be made to build the toy by Cyuma.'   [[V C] P]
               ✘'Rama will cause the toy to be built by Cyuma.'   [[V P] C]
         b.   *Ineza azubakwisha igikinisho na Keza.
               Ineza a- za- ubak -u -ish   -a igikinisho na Keza
               I.   1- FUT- build -PSV -CAUS -FV 7.toy   by K.
               Intended: 'Ineza will cause the toy to be built by Keza.'   [[V P] C]

Once again we see the harmonic case surfaces straightforwardly, and the disharmonic case is ungrammatical. The meaning of the disharmonic case can again be expressed periphrastically as shown in (14).

(14)   Ineza azakora ukwashoboye igikinisho kizubakwe kwa Keza.
         Ineza a- za- kor -a ukwashoboye igikinisho ki- za- ubak -u   -e
         I.   1- FUT- do -FV 15.possible   7.toy   7- FUT- build -PSV -FV
         kwa Keza
         PREP K.
         'Ineza will do what she can such that the toy is built by Keza.'

Like the previous disharmonic case, the causative component of the meaning is made to outscope the other by using a biclausal structure. This is accomplished through the phrase *do the possible* followed by an embedded subjunctive. Thus, as before, the harmonic form

surfaces with two extensions following both CARP and Mirror Principle, but the disharmonic meaning requires periphrasis to express.

The harmonic construction is attested in (Kimenyi 1980: 80), however the disharmonic construction is not discussed.

3.1.3 Applicative and reciprocal

The verb *kubeshya* 'lie to' takes as an object the person being lied to. An applicative introduces the entity being lied about.

(15)   Rama yabeshyeye Cyuma Ineza.
        Rama a- a-   beshy -er   -y   -e Cyuma Ineza
        Rama 1- PST- lie.to -APPL -PFV -FV Cyuma Ineza
        'Rama lied about Cyuma to Ineza.'

The harmonic case involving an applicative and a reciprocal is a reciprocalized applicative, and should allow a meaning where the entity being lied about (introduced by the applicative) is reciprocally bound by the subject, as shown in (16a). Conversely, a disharmonic applicativized reciprocal in (16) should not allow this interpretation, since the applied argument would be introduced after the reciprocal binds the only available argument. As the reciprocal scopes below the applicative, the only argument available to be reciprocally bound in the disharmonic construction should be the direct object.

(16)   a.   Babeshyeranye Ineza.
              ba- a-   beshy -ir   -an   -y   -e Ineza
              1- PST- lie.to -APPL -RECP -PFV -FV Ineza
              ✔'They lied about each other to Ineza.'   [[V A] R]
              ✖'They lied to each other about Ineza.'   [[V R] A]
    b.   *Babeshyaniye Ineza.
              ba- a-   beshy -an   -ir   -y   -e Ineza
              2- PST- lie.to -RECP -APPL -PFV -FV Ineza
              'They lied to each other about Ineza.'   [[V R] A]

Yet again, we see that while the harmonic form is available, the disharmonic is not. As before, periphrasis can be used to convey the desired meaning.

(17)   Babeshyanye wenda Ineza.
        ba- a-   beshy -an   -y   -e wenda Ineza
        2- PST- lie.to -RECP -PFV -FV about Ineza
        'They lied to each other about Ineza.'

In (17), a preposition *about* conveys the argument that would be introduced by the applicative. This allows it to outscope the main-clause reciprocal, as shown above.

3.2 The not-so-straightforward cases

For the remaining three pairs of extensions, the results are not so straightforward. For two pairs, independent facts about the nature of the valency-changing operations leads to the disharmonic meaning being subsumed by the harmonic meaning. Thus we expect no conflict to arise in these cases. Hence, apparent Mirror Principle violations can in fact be explained by attending to other facts about these structures that are independently evident. This follows the general idea put forth in Myler (2016), which discusses the case of an applicative that scopes apparently too low in Quechua. Myler (2016) argues that

this unexpected order can be analysed as the result of movement, once other syntactic and semantics facts about the applicative are understood. Similarly, we shall see that in Kinyarwanda, some unexpected orders are in fact expected when other properties of the extensions are taken into account.

For the final unexpected result, in one case neither the harmonic nor the disharmonic option is grammatical, leading to a different kind of puzzle that will be addressed in section 4.2.3.

3.2.1 Causative and reciprocal

Before beginning a discussion of the interaction between a causative and a reciprocal, some properties of the reciprocal in trivalent structures needs to be discussed. And before we can discuss the behaviour of reciprocals in trivalent structures, we need to learn something about trivalent structures in Kinyarwanda generally. So let us begin by establishing the structural c-command relation between the indirect and direct objects of a ditransitive verb.

(18)   a.   Nasiguriye   buri shusho   mwene wayo.
              1.PST.describe each 9.painting 1.owner 1.GEN + 9.POSS
              'I described every painting to its owner.'

     b.   Nasiguriye   buri munyeshuri mushinga   we.
              1.PST.describe each 1.student   3.assignment 3.GEN + 1.POSS
              'I described his/her assignment to every student.'

Example (18a) shows that a pronoun in indirect object position can be bound by a quantifier in the direct object. We can conclude from this that the indirect object is c-commanded by the direct object in Kinyarwanda. Example (18b) shows the opposite c-command relationship also holds, suggesting objects of ditransitives symmetrically c-command one another. However, reciprocalization of ditransitives shows unexpected asymmetries.

Consider the possible interpretations of (19), where we attempt to reciprocalize a trivalent structure. In theory, three interpretations should be available: The subject could bind (i) the indirect object, (ii) the indirect object, or (iii) the direct object binding the indirect object.

(19)   Tuzaberekana.
         tu-   za-   ba-   erek   -an   -a
         SP.PL- FUT- 2-   show   -RECP   -FV
         ✓(i) 'We will introduce them$_i$ to each other$_i$.'
         ✓(ii) 'We$_j$ will introduce them to each other$_j$.'
         ✗(iii) 'We$_k$ will introduce each other$_k$ to them.'

Notice however, that only two options exist. The direct object cannot be bound by the subject. The indirect object, which we know is c-commanded by both the subject and the direct object, can be reciprocally bound by either.

I do not speculate on why this may be the case, simply noting that this will have an effect on the expected interpretations of a reciprocalized causative, since causatives of ditransitives create trivalent structures.[5]

Since a causative introduces an argument higher in the tree than either of the two arguments of the transitive verb, a reciprocalized causative has two possible candidates to

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[5] It may be argued that causatives do not create ditransitive structures, but rather bi-clausal structures. However there does not appear to be evidence for this conclusion in Kinyarwanda. The causative of a verb contains a single root and agrees with the causer as the subject, and the causee and object through object agreement if the normal conditions of object agreement in Kinyarwanda are met.

reciprocally bind the object of the transitive verb: the causer or the causee. However, a causativized reciprocal only has one candidate: the causee which was the only argument c-commanding the direct object when the reciprocal was applied.

(20) a. [[V C] R] could mean:
        i.   *X cause Y to verb X*
        ii. *X cause Y to verb Y*

      b. [[V R] C] could only mean: *X cause Y to verb Y*

The reciprocalized causative is the harmonic structure, and the disharmonic structure would have one of the two possible meanings that the harmonic structure can. Assuming that CARP is implemented as a pressure somewhere in the grammar, the exact location of which will be determined later, absent a conflicting pressure from the Mirror Principle when trying to convey a meaning, we expect there to be no need to violate CARP. Thus we expect there to not be a situation in which the disharmonic structure would ever need to be used in this case. This of course does not block it from being generated. The means by which this is blocked will be discussed in section 4. Simply, that we do not have any independent expectation of conflict between CARP and the Mirror Principle in this case, and thus the causative-reciprocal pair does not provide a suitable testing ground for conflicting ordering principles.

(21) a. Nabahobereshanye.
          n-   a-   ba- hober -ish   -an   -y   -e
          SP.SG- PST- 2-   hug   -CAUS -RECP -PFV -FV
          'I made them hug each other.'

      b. Twamuhobereshanye.
          tu-   a-   mu- hober -ish   -an   -y   -e
          SP.PL- PST- 1-   hug   -CAUS -RECP -PFV -FV
          ✓'We made him/her hug us.'
          ✘'We made each other hug him/her.'

By manipulating the number of the causer and causee arguments, we can direct the reciprocal to target as binder either the causer as in (21a) or the subject as in (21b). And we see above that the same order of morphemes, which is harmonic, is capable of expressing both meanings that would be possible by combining these two morphemes.

  For posterity, I note that the CARP-violating order of morphemes, which would have the same meaning as (21a) is unavailable as well as unnecessary.

(22) *Nabahoberanishije.
      n-   a-   ba- hober -an   -ish   -y   -e
      SP.SG- PST- 2-   hug   -RECP -CAUS -PFV -FV
      Intended: 'I made them hug each other.'

In order to bind the causee, a periphrastic construction is used as shown below. However, this is not expected to be possible without periphrasis in any case, given that the reciprocal was unable to bind the direct object of a ditransitive in example (19).

(23) Twabwiranye tumuhobeye.
      tu-   a-   bwir -an   -y   -e tu-   mu- hober -e
      SP.PL- PST- tell -RECP -PFV -FV SP.PL- 1-   HUG   -FV
      'We told each other to hug him/her.'

3.2.2 Applicative and passive

Applicatives introduce arguments that have non-subject properties. For example, they do not control subject agreement, and when not pronounced in the *v*P are co-indexed on the verb with non-subject agreement like objects, as shown in (24).

(24)   Nzakugisomera.
        n-   za-   ku-   ki- som -ir   -a
        SP.SG-   FUT-   AD.SG-   7- read -APPL -FV
        'I will read it to you.'

Kinyarwanda also has symmetric passives of ditransitives, as shown in example (9). Since applicatives introduce arguments that are non-subject-like, we might expect passives of applicatives to show similar symmetry. Indeed they do, as shown below.

(25)   a.   Uzatekerwa ibyokurya.
              u-   za-   tek -ir   -u   -a   ibyokurya
              AD.SG-   FUT-   cook -APPL -PSV -FV 8.food
              'You will be cooked food.'

        b.   Ibyokurya bizagutekerwa.
              ibyokurya bi- za-   ku-   tek- ir   -u   -a
              8.food   8- FUT- AD.SG-   cook -APPL -PSV -FV
              'Food will be [cooked for you].'

The harmonic passivized applicative has the option to either promote the beneficiary as in (25a), or the underlying object as in (25b), given the symmetric nature of the passive. However the disharmonic applicativized passive would involve passivizing a transitive beofre adding a beneficiary. Hence, only the object of the verb could be promoted to subject. Since the harmonic case could structurally create the same configuration as the disharmonic case, there is no tension between CARP and the Mirror Principle. Thus we do not expect the disharmonic case to ever arise. Once agan, for posterity, I show in (26) that the CARP-violating order of morphemes in unavailable as well as unnecessary.

(26)   *Ibyokurya bizagutekwera.
        ibyokurya bi- za-   ku-   tek -u   -ir   -a
        8.food   8- FUT- AD.SG-   cook -PSV -APPL -FV
        Intended: '[Food will be cooked] for you.'

Kimenyi (1980: 59) also presents and example of the harmonic construction, illustrating that any of the non-subject arguments can be promoted under passivization. The disharmonic order of morphemes is not shown.

3.2.3 Reciprocal and passive

It is reasonable to assume that a suppressed argument cannot reciprocally bind an expressed argument. Fortunately, ditransitives in Kinyarwanda provide us with a way to still test the compatibility of reciprocals and passives. Recall that the indirect object of a ditransitive could be reciprocally bound by the direct object as shown in example (19). Furthermore, recall that passives are symmetric, and thus the direct object of a transitive can be promoted to subject under passivization.

These two operations seem like they should commute. Passivization should not be sensitive to whether the promoted argument is a binder yet, and reciprocalization is not sensitive to whether the indirect object is being bound by a direct object or a subject. Thus we would

predict that both a passivized reciprocal and a reciprocalized passive should be available. However, it turns out neither order of morphemes is allowed.

(27)   Attempt at a passivized reciprocal
    a.   Nzerekana abanyeshuri.
        n-   za- erek -an   -a abanyeshuri
        SP.SG- FUT- show -RECP -FV 2.student
        'I will introduce the students to each other.'

    b. *Abanyeshuri bazerekanwa.
        abanyeshuri ba- za-   erek -an   -u   -a
        2.student   2- FUT- show -RECP -PSV -FV
        Intended: 'The students will be introduced to each other.'

(28)   Attempt at a reciprocalized passive
    a.   Abanyeshuri bazerekwa Cyuma.
        abanyeshuri ba- za-   erek -u   -a Cyuma
        2.student   2- FUT- show -PSV -FV C.
        'The students will be introduced to Cyuma.'

    b. *Abaneyshuri bazerekwana.
        abanyeshuri ba- za-   erek -u   -an   -a
        2.student   2- FUT- show -PSV -RECP -FV
        Intended: 'The students will be introduced to each other.'

Neither order of morphemes is available, including the CARP compliant one in (27b). It appears that the reciprocal and the passive are incompatible with one another, regardless of order. As a result, the form offered by the consultants, shown in (29), is a non-passive reciprocal with object fronting, called a functional passive by van der Wal (2015).

(29)   Abanyeshuri nzazerkana.
        abanyeshuri n-   za- zi- erek -an   -a
        2.student   SP.SG- FUT- 10- show -RECP -FV
        'The students, I will introduce them to each other.'

This result directly conflicts with Kimenyi (1980) who presents an example where a reciprocal and a passive co-occur. The reciprocal has a comitative meaning in Kimenyi's (1980) example, which my consultants do not accept. Both the passive and active versions of the example in Kimenyi (1980: 85) are shown here, with the judgement diacritic reflecting the disagreement between my consultants and Kimenyi.

(30)   a. %Umugabo arasomana ibaruwa ibyishimo.
          umugabo a- ra-   som -an   -a ibaruwa ibyishimo
          1.man   1- PRES- read -RECP -FV 9.letter 8.joy
          Intended: 'The man read the letter with joy.'

    b. %Ibaruwa birasomanwa ibyishimo n'umugabo.
          ibaruwa bi- ra-   som -an   -u   -a ibyishimo na umugabo
          9.letter 9- PRES- read -RECP -PSV -FV 8.joy   by 1.man
          Intended: 'The letter was read with joy by the man.'

I do not understand the difference between the grammars of my consultants and that of Kimenyi and as such I cannot explain the difference in judgements for this construc-

tion. Given that the remainder of the data comes from the judgements provided by my consultants, I will set aside this reported case of RECP-PSV and assume that it is unavailable as indicated by my consultants.

3.3 Summary

We see that in Kinyarwanda the CARP-violating order of morphemes is never used. Of the six pairs of verbal extensions, in two cases the harmonic construction subsumed the meaning of the disharmonic construction, thus the Mirror Principle and CARP (however it may be implemented) are not in conflict. Absent the pressure to violate CARP in order to obey the Mirror Principle, the CARP-violating order would not be expected. In one case, neither order is available. In the three remaining cases the harmonic meaning is conveyed straightforwardly with the morphemes in an order that complies with both CARP and the Mirror Principle. The disharmonic meanings require periphrasis to express, given that the disharmonic constructions are ungrammatical. In each case, the disharmonic scope is achieved with a bi-clausal construction with the lower scoping CARP morpheme and a periphrastic element outscoping it to give the desired interpretation. This behaviour is summarized in Table 2. The table is intended to be read as follows. The columns mark the first operation that occurs to the root (and is thus expected by the Mirror Principle to be reflected by the innermost affix), and the rows the second operation (i.e. the outer affix). Each cell contains the form that is used to express this meaning.

The cells in the triangle below the centreline represent the harmonic meanings, where it is possible to satisfy both CARP and the Mirror Principle simultaneously. We see that with the exception of the reciprocalized passive, which we will return to, all the rest are available and expressed in the CARP and Mirror Principle compliant way we expect. Above the centreline we see the disharmonic meanings, where CARP and the Mirror Principle are in conflict with one another. We see two meanings that are not expressed periphrastically: a reciprocalized causative, and a passivized applicative, marked with asterisks in Table 2. Recall that we noted however that the harmonic counterparts are expected to subsume the disharmonic meanings due to particular properties of the reciprocal and applicative. The reciprocal forces reciprocalization of the lowest argument, and thus we expect that with a causative, the theme, not the causee will be reciprocally bound. Passives are symmetric, and so any non-subject can be raised as a result of passivization making the harmonic and disharmonic cases indistinguishable.

Thus, in every case, both CARP and the Mirror Principle are in fact obeyed. In the two cases where the disharmonic meaning is subsumed by the harmonic form, the Mirror Principle is not being disobeyed. Kinyarwanda robustly obeys both the Mirror Principle and the CARP template. When both cannot be jointly satisfied, the resulting form is ungrammatical, and the desired meaning is conveyed periphrastically.

Table 2: Realisation of derivational processes.

	Causativized	Applicativized	Reciprocalized	Passivized
Causative	–	periphrasis	*CAUS-RECP*	periphrasis
Applicative	CAUS-APPL	–	periphrasis	*APPL-PSV*
Reciprocal	CAUS-RECP	APPL-RECP	–	unavailable
Passive	CAUS-PSV	APPL-PSV	unavailable	–

4 Analysis

Previous accounts of templatic morphology in Bantu languages in a minimalist framework have either been optimality theoretic (Prince & Smolensky 2004) or based on syntactic movement. I argue that the syntactic movement accounts are not applicable to Kinyarwanda, and that an optimality theoretic account, while successful at capturing the behaviour of Kinyarwanda extensions, is not illuminating. I propose a selectional account based on Harley (2008; 2017) and especially Pylkkänen (2008) which not only captures the order of extensions, but also fits with other syntactic facts about the behaviour of the morphemes.

4.1 Previous analyses

Myler (2017) presents a syntactic movement account of templatic order in Nyakusa and Ndebele. In Nyakusa, the long causative (also called transitive by Good 2005) causes spirantization of the root. The morpheme template requires the long causative to be after the reciprocal. However, we see that the reciprocalized transitive in (31b) still shows spirantization on the root, unlike a transitivized reciprocal (31a).

(31)   *Nyakusa* (Myler 2017: 105)[6]
    a.   sob-an-i
         lose-RECP-TRANS
         'get each other lost'

    b.   sof-an-i
         lose-RECP-TRANS
         'lose each other'

Myler takes this spriantization as evidence that the reciprocalized causative underlyingly involved a causative adjacent to the root at some point in the derivation. Once the final structure is interpreted in the morphophonology, this step in the derivation where adjacency held leads to realisation of the root as its spirantized form (/sob/ → [sof]). Facts from reduplication in Ndebele lead to a similar conclusion. The disharmonic case has greater options for the reduplicant than the harmonic case does, despite the root having the same form in both. This suggests that at some point in the derivation of the disharmonic case, a distinct base was available for the reduplicant to copy, once again suggesting movement. However, these analyses are only relevant in cases where there is fixed order with ambiguity. Kinyarwanda shows two such cases: causatives with reciprocals and applicatives with passives. Yet we noted that in both cases, independent properties of the extensions lead us to expect ambiguity. Movement is not required to account for them. For the remaining cases, the CARP-compliant form is not ambiguous. Thus approaches that seek to derive ambiguity are simply inapplicable to Kinyarwanda.

Optimality theoretic accounts generally split each of CARP and Mirror Principle into bigram constraints (Ryan 2010) in order to leverage factorial typology to be able to describe both the pairs of extensions that show compositional order and the pairs that show fixed order at the same time. Bigram constraints are those that reference the order between two extensions. Two examples are given below.

(32)   Bigram constraints
    a.   MAP(CAUS,APPL): one violation if CAUS and APPL do not comply with the Mirror Principle (Zukoff 2017)
    b. *PSV-APPL: one violation if PSV linearly precedes APPL

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[6] Glosses are adapted for uniformity.

Accounts along these lines include McPherson & Paster (2009) for Luganda and Hyman (2003) and Zukoff (2017) for Chichewa. In the case of Kinyarwanda however, we do not need to split either the Mirror Principle or CARP, given that both are always obeyed. In addition, we need a constraint to force ungrammaticality in the case where both constraint cannot be obeyed. The constraints needed are listed below.

(33)   Constraints
    a.   CARP: one violation for each pair of morphemes disobeying the CARP template
    b.   MIRROR: one violation for each pair of morphemes not compliant with the Mirror Principle
    c.   M-PARSE: one violation for the null parse candidate

Orginally designed to account for paradigm gaps, M-PARSE penalises the non-realisation of morphological structure (Prince & Smolensky 2004). By ranking a constraint above M-PARSE, non-realisation will be preferred to any candidate that violates the higher ranked constraint. Consider the tableau shown in 3.

With this ranking, it is imperative that both CARP and the Mirror Principle be simultaneously satisfied if the form is to be realised. If it is not possible to do so, not realising either form is the preferred option. If both can be jointly satisfied, violations of M-Parse will be fatal, as shown in the tableau in 4.

While this is able to predict that a form with both extensions cannot surface if the CARP template and the Mirror Principle are not both satisfied, it does not capture why the harmonic passivized reciprocal is unavailable. Nor does it capture other properties of the extensions, such as the availability of causative unaccusatives, the relation between the applied argument and the event, etc. All of these properties would require independent syntactic explanations. In the following section, I show that when these syntactic properties are analysed independently, a selectional account of the CARP template arises that simultaneously captures both the templatic morphological behaviour, and the syntactic behaviour of the individual heads, without the need for an Optimality theoretic analysis for ordering.

It is important to note that the conclusion argued for is not that a syntactic selection account is generally superior to the alternatives in accounting for all cases of templatic morphology, but rather that it is better suited to account for the facts in Kinyarwanda. Given that the ordering facts in Nyakusa, Ndebele, Chichewa, and Luganda are rather more complex than in Kinyarwanda, it is well within the realm of possibility that they require alternative explanations such as the ones described in this section. This paper seeks only to demonstrate that syntactic selection is a viable mechanism to account for

Table 3: An Optimality Theoretic account of periphrasis.

[[V PSV] CAUS]	CARP	MIRROR	M-PARSE
a. V-CAUS-PSV		*!	
b. V-PSV-CAUS	*!		
c. ☞ ∅			*

Table 4: CARP and Mirror both obeyed.

[[V CAUS] PSV]	CARP	MIRROR	M-PARSE
a. ☞ V-CAUS-PSV			
b. V-PSV-CAUS	*!	*	
c. ∅			*!

morphological templaticity in some cases, and hopefully inspire future work investigating the extensibility of this means of analysis to other cases of templaticity.

4.2 A selectional account

In this section I show that an account based on selectional restrictions is more successful at accounting for the behaviour of Kinyarwanda. Following Harley (2008; 2017) and Key (2013) on causatives, Pylkkänen (2008) and McGinnis (2001) on applicatives, and Ndayiragije (2003) on reciprocals, independent syntactic facts about the valency changing morphemes lead to the conclusion that their scopal order is syntactically fixed. The order of morphemes is rigid because each functional head is limited in terms of which phrases it can select in its complement. But due to this restriction, there is no ambiguity: the order is both fixed and transparent at the same time. This account extends ideas introduced in Pylkkänen (2008) and argued for in Harley (2013) and Jung (2014) that templatic behaviour can be captured syntactically.

Let us go through each extension individually and determine its relevant properties for such an account. I assume as a starting point the split verb view from Kratzer (1996), wherein the external argument of the verb is introduced by a higher Voice° head. I also adopt the view from Pylkkänen (2008) argued for by Harley (2017) that there is a distinction between the role of Voice°, which introduces external arguments and checks accusative case, and *v*, which introduces agentive semantics and creates a predicate of events from a verb root. I remain neutral on the status of roots, and will denote them as √, but this is not meant to commit to a view of roots as acategorial (Marantz 1997). Following (Harley 2017: 4), I assume that the basic spine looks as follows.

(34)   Harley (2017)
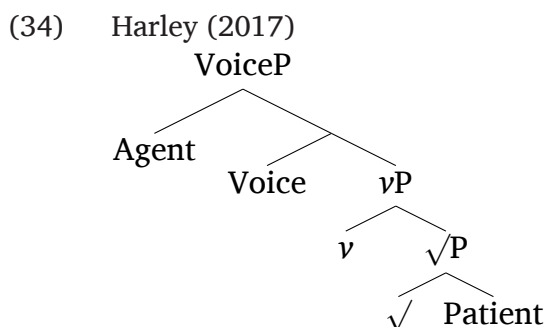
4.2.1 Causative

The syntax and semantics of causatives has received much attention in the literature. I adopt the general view of Pylkkänen (2008) as a starting point to determine the nature of the Kinyarwanda causative. Causatives can vary along several parameters. Firstly, it must be determined whether Caus° is a type of Voice°, a type of *v*°, or something distinct. If it is a distinct head, its position must be determined.

If Caus° is a type of Voice°, we expect the causative and other Voice° flavours to be in complementary distribution as per Harley (2017). This will be the case so long as clauses do not allow multiple Voice heads, something which Pylkkänen (2008) notes is the case, but leaves for future investigation to explain. I will not explain it here, but simply note that a variant of Kratzer (1996) may suffice. Since the domain of existential closure of events is no lower than VoiceP, Kratzer (1996) tentatively suggests it may be at T. However, if we propose that it is Voice itself that existentially closes the event after introducing an agent and a runtime interval for aspect to manipulate, the lack of iteration would be captured. Since Voice would take a predicate of events as in Kratzer (1996) but return a predicate of times, it could not iterate.

We have seen in section 3.1.2, passive morphology can co-occur with Caus°. As Harley (2017) argues, this is an indication that Caus° and Voice° are distinct heads.

(35)　a.　Cyuma azubakisha Rama igikinisho.
　　　　　Cyuma a- za- ubak -ish　-a　Rama igikinisho
　　　　　C.　　1- FUT- build -CAUS -FV R.　　7.toy
　　　　　'Cyuma will make Rama build the toy.'

　　　b.　Rama azubakishwa igikinisho na Cyuma.
　　　　　Rama a- za- ubak -ish　-u　-a　igikinisho na Cyuma
　　　　　R.　　1- FUT- build -CAUS -PSV -FV 7.toy　　by C.
　　　　　'Rama will be made to build the toy.'

Let us now turn to determining the relation between Caus° and $v°$. Since the role of $v°$ is to create a predicate of events, the number of events involved in a causative is expected to depend on whether Caus° is itself the $v°$ head. If Caus° exists in place of $v°$ in causative constructions, we expect there to only be a single event: the causation of a result state. If however Caus° is independent of $v°$, we expect the causative to be bieventive, since $v°$ would introduce one event, and Caus° would introduce another event which causes the first. This is the distinction between lexical and productive causatives that Pylkkänen (2008) discusses. The prediction is that causatives that spell out $v°$ should not allow modification of the caused event by any adverbs, since there is no distinct caused event in the structure. Kinyarwanda *-ish* causatives create bieventive structures, and thus, we can conclude that the head that introduces them is distinct from $v°$. We see this in the following example, where it is possible to modify the embedded building event with the adverb 'quickly'.[7]

(36)　Namubakishije igikinisho vuba.
　　　n-　　a-　mu- ubak -ish　-y　-e　igikinisho vuba
　　　SP.SG- PST- 1-　build -CAUS -PFV -FV 7.toy　　quickly
　　　✓'I made him/her [build the toy quickly].'
　　　✘'I quickly made him/her build the toy.'

Having established that the causative in Kinyarwanda is not bundled with either Voice° or $v°$, we can next turn to determining its position. Recall the tree in (34). Since the causative takes an event as its complement and $v°$ is where the event variable is introduced, we can conclude that the causative is at least as high as $v°$. This gives us two possible positions that it may be located at: either above Voice° or just below it.

Harley (2008) proposes that productive causatives are verbal, and take VoiceP complements. If this is so, causative constructions should be biclausal, since there are two verbs: the main verb and the causative. This is indeed the case in Japanese, as Harley (2008) shows with binding domains and adverbial control tests. However, in Kinyarwanda, as in Turkish as per Key (2013), causatives do not seem biclausal.
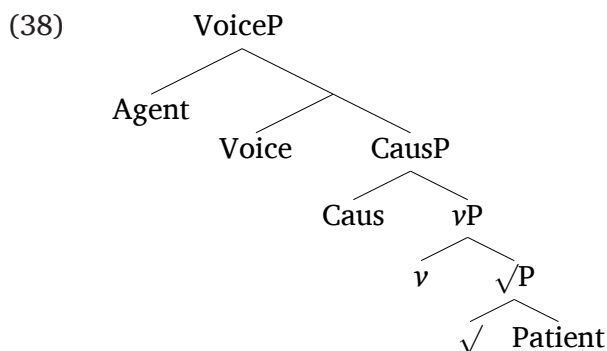
(37)　a.　Cyuma yamututse.
　　　　　Cyuma$_i$ a- a-　mu$_{j/*i}$- tuk　-y　-e
　　　　　C.　　1- PST- 1-　　insult -PFV -FV
　　　　　'Cyuma insulted him/her/*himself.'

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[7] Why the high reading of the adverb is not available here is mysterious, as a reviewer pointed out. I have no explanation for why this is the case, but can only note that both my consultants require the adverb to be clause-initial in order to interpret it high. Doing so eliminates the low reading however.

      b.   Cyuma yamutukishije Rama.[8]

Cyuma$_i$	a-	a-	mu$_{k/*i/*j}$-	tuk	-ish	-y	-e	Rama$_j$
C.	1-	PST-	1-	insult	-CAUS	-PFV	-FV	R.

          'Cyuma$_i$ made Rama$_j$ insult him/her$_{k/*i/*j}$.'

Example (37a) shows that the object agreement marker *mu-* behaves like a pronoun in that it cannot be locally bound in a monoclausal construction. Example (37b) shows that when a causative is introduced, the object agreement marker cannot be bound either by the causer or the agent, but must refer to a third person. This shows that the causative construction in Kinyarwanda delineates a single binding domain.

    Furthermore, as noted earlier it is possible to passivize a causative and suppress the causer. This indicates that that Voice° is located in a position where it can licence or antilicense causers, and thus must be above the causative. However, it is not possible to causativize a passive, suggesting that the causative cannot be located above Voice°. I thus follow Key (2013) in his proposal for the Turkish productive causative, and adopt the view that the Caus° is a head located between Voice° and *v*° in Kinyarwanda.

(38)

```
                VoiceP
               /      \
         Agent
               \      /    \
              Voice      CausP
                        /      \
                     Caus       vP
                               /   \
                              v     √P
                                   /   \
                                  √   Patient
```

This of course raises the question about where the causer and causee are introduced. Recall that passivizing a causative suppresses the causer, not the causee. Since passive suppresses the argument in the specifier of Voice°, we can conclude from this that the causer must be located in Spec-VoiceP. The causee appears post-verbally, in the same field as objects, and thus must be lower than Voice°. Key (2013) proposes that in Turkish the causee is in fact an optional adjunct to CausP, and not an argument. Evidence for the same conclusion exists in Kinyarwanda. Recall that as shown in section 2.3.1 the argument introduced by the causative need not be a causee, but can be an instrument. This suggests that the theta role assigned to the causee is not fixed. In fact the same morpheme can be used in a permissive construction as well, where the causee becomes the agent of the embedded verb, showing yet more variation in the argument introduced by Caus°.
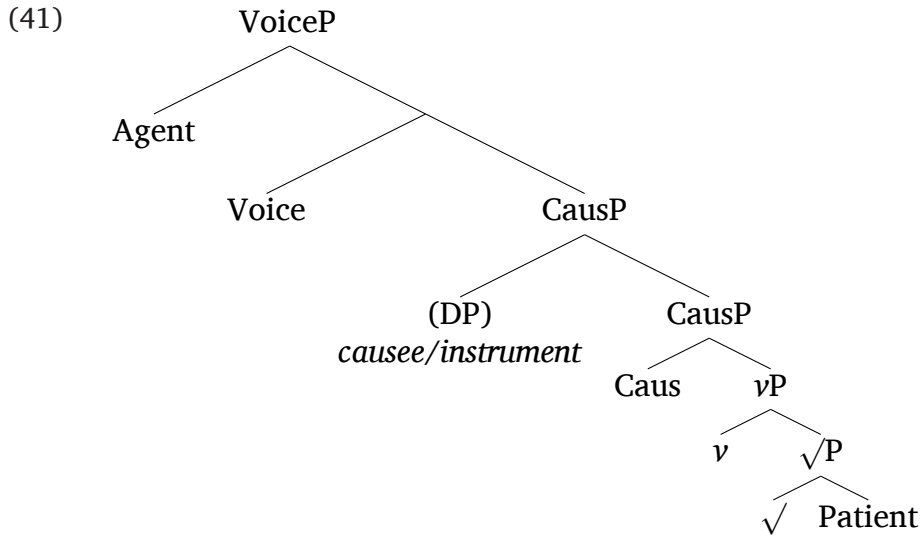
(39)   Namurishije ishokola kubera yayishatse.

n-	a-	mu-	ri	-ish	-y	-e	ishokola	kubera	a-	a-	yi-	shak
SP.SG-	PST-	1-	eat	-CAUS	-PFV	-FV	9.chocolate	because	1-	PST-	9-	want

-y	-e
-PFV	-FV

          'I let him/her eat chocolate because s/he wanted it.'

Furthermore, as noted by Alsina (1992), the causee need not be overtly expressed in a causative construction at all, as shown in (40). This is also the case for the Turkish causatives investigated by Key (2013).

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[8] Both parts of this example were provided by one consultant only.

(40)   Nasomesheje iki gitabo.
        n-   a-   som -ish -y -e iki   gitabo
        SP.SG- PST- read -CAUS -PFV -FV 7.DEM 7.book
        'I had this book (proof)read.'[9]

Since the argument introduced by Caus° can be an agent, an instrument, or missing altogether, I follow Key's (2013) proposal for Turkish, and claim that the introduced argument is an adjunct to CausP. Thus the causative in Kinyarwanda is a *v*P selecting causative which introduces a causation event. This makes causatives bieventive, but not biclausal, since CausP is located below VoiceP. The spine as it stands then looks as follows.

(41)

```
                    VoiceP
                   /      \
              Agent        \
                     \      \
                    Voice    CausP
                            /     \
                        (DP)       CausP
                   causee/instrument  /    \
                                  Caus      vP
                                           /  \
                                          v    √P
                                              /  \
                                             √    Patient
```

4.2.2 Applicative

Applicatives are used to introduce extra non-agent arguments. These vary along two parameters as per Pylkkänen (2008): position and relation introduced. Applicatives may be located low in the structure, before the verbalizing head creates a predicate of events, or they may be located high in the structure, taking a predicate of events as their complement. The relation parameter is linked to the position parameter. Low applicatives come in two flavours as per Pylkkänen (2008), depending on which theta role they discharge to their introduced argument.[10] Since they enter the derivation before *v* has created a predicate of events, they must relate the argument they introduce directly to the direct object of the verb as no event variable exists yet. Either they can indicate that the applied argument is the source of the direct object's action, or the recipient of the action. High applicatives, on the other hand attach above the verbalizing head and introduce an argument that bears some relation not with the direct object, but rather the event itself. This gives high applicatives a great deal of variability in uses, allowing them to introduce beneficiaries, maleficiaries, locations, and reasons.

   Since low applicatives must relate the introduced argument to the direct object, it should be incompatible with unergative verbs. If the applicative is available with unergative verbs, it must be a high applicative. We see in Kinyarwanda that unergative applicatives are indeed allowed.

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[9] This example was provided by one consultant only.

[10] Cuervo (2003) proposes a pure possessor low applicative as well. However, as noted in section 3.1.1, my consultants do not permit the use of the applicative to introduce posessors. Thus, I will not consider this option further.

(42) a. Arakubyinira.
          a- ra- ku-   byin -ir -a
          1- PRES- AD.SG- dance -APPL -FV
          'S/he is dancing for you.'

      b. Arakuririmbira.
          a- ra- ku-   ririmb -ir -a
          1- PRES- AD.SG- sing   -APPL -FV
          'S/he is singing for you.'

Verb semantics are also relevant to distinguishing high and low applicatives because low applicatives crucially require a transfer of possession to occur. If a transitive verb does not describe a transfer of possession, yet is compatible with an applicative, this is another indication that the applicative is high. This is the case in Kinyarwanda, where the applicative can be used with the stative transitive verb 'hold' as shown in (43).[11]

(43) Nzakigukwatira.
      n-   za- ki- ku-   kwat -ir   -a
      SP.SG- FUT- 7- AD.SG- hold -APPL -FV
      'I will hold it for you.'

Finally, we already know that the relation between the applied argument and the event is variable. It need not be a beneficiary, but can also be a location, or a reason, as shown in (6b) and (6c), partially repeated below, in addition to maleficiaries.

(44) a. Azatwarira ubwato mu'kiyaga.
          a- za- twar -ir   -a ubwato mu   kiyaga
          1- FUT- drive -APPL -FV 14.boat PREP 7.lake
          'S/he will drive/row the boat on the lake.'

      b. Kimenyi (1995)
          Umugabo arasomera igitabo amatsiko.
          umugabo a- ra- som -ir   -a igitabo amatsiko
          1.man   1- PRES- read -APPL -FV 7.book 6.curiosity
          'The man is reading the book out of curiosity.'

      c. Inshimusi izanshimutira inka zanjye.
          inshimusi i- za- n-   shimut -ir   -a inka   zanjye
          9.thief   9- FUT- SP.SG- steal   -APPL -FV 10.cow 10.mine
          'The thief will steal my cows to hurt me.'[12]

The availability of applied arguments that bear no relation to the direct object, but rather to the event itself, indicate that the applicative in Kinyarwanda is a high applicative. High applicatives select a predicate of events (as evidenced by their ability to introduce arguments with varied thematic relation to the event and not the direct object), and must return a predicate of events as well in order to compose with Voice.

    Unfortunately determining the structure of the spine cannot be done with semantic types alone. Recall that the causative head selects a predicate of type $\langle v,t \rangle$ and returns a predicate of the same type. If the applicative head does the same, we have no explanation on the basis of semantic type composition for why the causative and applicative heads cannot be freely re-ordered. We predict no issues with composing an applicative with the event first, and then composing a causative above that. Yet this is not possible, as was shown in Section 3.

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[11] Example (43) was provided by one consultant only.
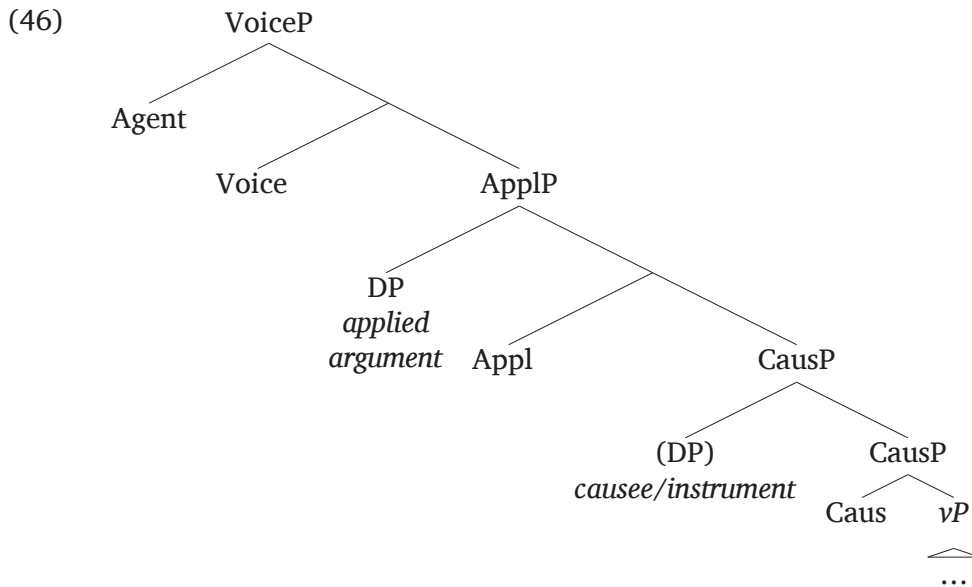[12] This example was provided by one consultant only.

Pylkkänen (2008) makes a syntactic distinction between the causative and the applicative heads, which may be relevant at this point. Following McGinnis (2001), she assumed that while the high applicative head is a phase head, the causative is not. For McGinnis (2001), high, but not low, applicatives are phase heads due to the following property she postulates:

(45)   The sister of VP heads a phase if it assigns a theta-role to a syntactic argument.
        (McGinnis 2001: 5)

This of course must allow for exceptions for when a causative is the sister of a VP. In any case, if high applicative phase heads have an EPP feature and introduce the applied argument as a specifier, they could attract the direct object up to satisfy the EPP and thereby allow it to undergo passive movement subsequently. This is in fact how McGinnis (2001) accounts for symmetric passives in Kinyarwanda itself.[13]

As this is important to determining when to send material to spellout, there must be syntactic diacritics present on the heads aside from their semantics that are visible to the narrow syntax. If we assume that such a diacritic can be used not only by the narrow syntax to determine when to send a phrase to spellout, but also for the purposes of syntactic selection, we have an explanation for the rigid order we see. The causative head selects a non-phasal element of type $\langle v,t \rangle$, and projects the same. The applicative head selects a non-phasal element of type $\langle v,t \rangle$, but projects a phasal one. The result then is that the syntactic selection requirements of the causative make it incompatible with an applicative phrase and hence the applicative must appear outside the causative.[14]

This result is unfortunately not a welcome one under the strong Minimalist hypothesis (Chomsky 1995), which seeks to eliminate syntax-internal filters in favour of interface conditions. However, see Preminger (2018) for arguments that resorting to syntax-specific features may be independently necessary elsewhere in the grammar. If we accept this, then the maximal spine we can now account for is as follows.

(46)

```
                VoiceP
               /      \
          Agent        \
                \       \
              Voice      ApplP
                        /     \
                      DP       \
                   applied      \
                  argument  Appl  CausP
                                  /     \
                               (DP)      CausP
                          causee/instrument  /  \
                                          Caus   vP
                                                 /‾\
                                                 ...
```

_____

[13] McGinnis (2001) spends time arguing that if low applicatives were phasal, incorrect predictions would be made, but so far as I can tell, she does not present evidence that if high applicatives were non-phasal, similar issues would arise. Nonetheless, I will follow this assumption as it is useful for analysing the facts at hand.

[14] A reviewer points out that this predicts that an inability to select VoiceP implies inability to select ApplP. This prediction is problematic since there are counterexamples from causatives in isiXhosa that are able to embed high applicatives (Mali & Myler 2018). In order to account for these facts, the reviewer suggests it is possible to simply assume that the Kinyarwnada causative is specified for not selecting ApplP, while the isiXhosa causative is not specified in this way. This is a description of the facts at hand, rather than an explanation for why they are this way, but perhaps at the moment that is the best we can hope for. Reconciling the causative-applicative interactions in Kinyarwanda with those in isiXhosa is left for the future.

4.2.3 Reciprocal and passive

In order to account for the behaviour of the reciprocal and the passive, some facts about the reciprocal need to be discussed first.

As was noted in section 2, the reciprocal morpheme has depatientive uses. Consider the examples below.

(47)   a.   Yahobeye *(Cyuma).
            a- a-   hober -y   -e   *(Cyuma)
            1- PST- hug   -PFV -FV *(C.)
            'S/he hugged *(Cyuma).'

       b.   Yahoberanye.
            a- a-   hober -an   -y   -e
            1- PST- hug   -RECP -PFV -FV
            'S/he went around hugging people.'

Example (47a) establishes that 'hug' is obligatorily transitive. Example (47b) shows that the reciprocal morpheme can be used to suppress the object even when the subject is singular and thus cannot reciprocally bind the object. The interpretation of the reciprocal in this case is one of iteration, distributed across arbitrary objects.

Note further that the suppressed object can be realised, so long as it has oblique marking as in (48).

(48)   Yahoberanye *(na) Cyuma.
       a- a-   hober -an   -y   -e   *(na)   Cyuma
       1- PST- hug   -RECP -PFV -FV *(CONJ) C.
       'S/he hugged Cyuma.'

Following Halpert's (2015) claim for Zulu, suppose the above example is evidence that Kinyarwanda also has abstract Case, contra claims that Bantu lacks it (Diercks 2012). Then we could leverage the case licensing of the object by the Voice head in order to capture the facts at hand. This is the approach taken by Ndayiragije (2003) for Kirundi, which also has a reciprocal morpheme with depatientive uses.

As per Ndayiragije (2003), the reciprocal/depatientive morpheme in Kirundi is a Voice head that discharges Null Case. Null Case licenses only PRO, not lexical DPs or *pro*, and thus there are only two options for the direct object if it is being assigned Null Case: a bound PRO or an arbitrary PRO. In Ndayiragije's analysis, a bound PRO locally bound by the subject accounts for the reciprocal reading, while an arbitrary PRO accounts for the depatientive reading.

If we adopt Ndayiragije's proposal for Kirundi in Kinyarwanda as well, we can explain the unavailability of both reciprocal and passive in the same clause. Since both the reciprocal and the passive are flavours of the Voice head, it is not possible for them to co-occur within a clause as each clause contains a single Voice head. However, this presents us with a new mystery. If it is the case that the reciprocal has a bound PRO in object position, we would expect that a singular subject with the reciprocal morpheme should result in a reflexive interpretation, but it does not. A separate reflexive marker is required for that interpretation.

(49)   a.   Yahoberanye.
            a- a-   hober -an   -y   -e
            1- PST- hug   -RECP -PFV -FV
            ✓S/he went around hugging people.
            ✘'S/he hugged him/herself.'

      b.   Yayihobeye.
            a- a-   i-   hober -y   -e
            1- PST- REFL- hug   -PFV -FV
            'S/he hugged him/herself.'

I propose that the semantics of the reciprocal itself prevents a reflexive interpretation from being available. Consider the three uses of the reciprocal, shown in (50).

(50)   a.   Bakubitanye.
            ba- a-   kubit -an   -y   -e
            2- PST- hit   -RECP -PFV -FV
            'They hit each other.'
      b.   Yahoberanye.
            a- a-   hober -an   -y   -e
            1- PST- hug   -RECP -PFV -FV
            'S/he went around hugging people.'
      c.   Bagendanye.
            ba- a-   gend -an   -y   -e
            2- PST- walk -RECP -PFV -FV
            'They walked together.'

Examples (50a) and (50b) show the now-familiar reciprocal and depatientive uses. Example (50c) shows a comitative use, where the subjects each performed an action at the same time and place. Indeed the comitative use is in fact compatible with the presence of a reflexive indicating 'alone'.

(51)   a.   Nzibyina.
            n-   za- i-   byin -a
            sp.SG- FUT- REFL- dance -FV
            'I will dance alone.'
      b.   Aba bagore bazibyinana.
            aba   bagore ba- za- i-   byin -an   -a
            2.DEM 2.woman 2-   FUT- REFL- dance -RECP -FV
            'They will dance alone together (at the same time and place).'

What is common in each of the three uses of the reciprocal is distributivity. Occurrences of the event are distributed over varying participants. In the case of the depatientive in (50b), hugging events are distributed over arbitrary patients. In the case of the comitative in (51b), solo-dancing events are distributed over agents. In the case of the reciprocal in (50a), hugging events are distributed over both agents and patients: they switch roles in the various hugging events.

   That distributivity is a crucial part of the semantics of the reciprocal is evident with collective predicates like 'surround'.

(52)   a.   Abasirikare bazengurutse inzu.
            abasirikare ba- a-   zenguruk -y   -e inzu
            2.soldier   2- PST- surround -PFV -FV
            'The soldiers surrounded the house.'

b. *Abasirikare bazengurukanye inzu.
   abasirikare ba- a-   zenguruk -an   -y   -e   inzu
   2.soldier   2- PST- surround -RECP -PFV -FV 9.house
   Intended: 'The soldiers surrounded the house each at the same time.'[15]

Since even the comitative use has distributive semantics, it is incompatible with collective predicates. It is now straightforward why the reciprocal with a bound PRO does not have a reflexive meaning: a reflexive event is not distributed over either agents or patients since the same entity fills both roles and does not vary. Presenting a formal semantics of this morpheme is left for the future, though see Faller (2007) for a decomposition of reciprocity into its constituent parts, and Gluckman (2018) for an application of such a decomposition to apparent polysemy of reciprocal marking in Logoori.

I tentatively adopt the modified version of Ndayiragije's (2003) proposal for Kirundi that was discussed above for the Kinyarwanda reciprocal. Null Case theories of control have largely fallen out of favour and been replaced with either movement-based theories (Hornstein 1999; Polinsky & Potsdam 2002) or binding-based theories Landau (2015), and thus the specific implementation of how the reciprocal suppresses the object may need to be rethought. The crucial insight we want to carry forward from Ndayiragije (2003) is that the reciprocal is responsible for anti-licensing overt objects. See section 5 for a discussion of why the reciprocal may in fact be more passive-like than proposed by Ndayiragije (2003).

Thus, we can conclude that both the reciprocal/depatientive and the passive are flavours of Voice heads. The passive does not discharge accusative Case and does not introduce an agent. The reciprocal/depatientive does introduce an agent, but discharges null case, licensing only PRO in object position, or perhaps anti-licenses objects by some other means. Both of these types of Voice heads, like the active Voice head, take a predicate of events as its argument and return a predicate of times. As such, they do not co-occur since one Voice head cannot select another VoiceP as its complement due to a type mismatch.

4.2.4 Summary

The previous three sections have explored the syntactic properties of Kinyarwanda derivational morphology with the goal to put together a syntactic selection account of their ordering. Let us now take stock given the analyses provided above.

The causative in Kinyarwanda is productive, bi-eventive, mono-clausal, and non-agent introducing. These four facts together indicate that it must take a predicate of events as an argument and return a predicate of events. It optionally introduces a causee or instrument as an adjunct to CausP. The applicative in Kinyarwanda is high and phasal. This indicates that it takes a predicate of events and returns the same. In order to predict the fact that the applicative and causative are fixed in order, syntactic selection was appealed to. Namely, the diacritic or feature responsible for marking the applicative as a phase head prevents it from being selected as the complement of the causative. The reciprocal and passive are both flavours of Voice, which take a predicate of events as its argument and returns a predicate of times, to be further modified by aspect and tense later in the derivation. This accounts for why the reciprocal or passive cannot occur inside the causative or the applicative.

The spine thus looks as shown in (53).

---

[15] Both of these examples were provided by one consultant only.

(53)

```
              Voice
             /      \
           Appl
          /    \
        Caus    vP
```
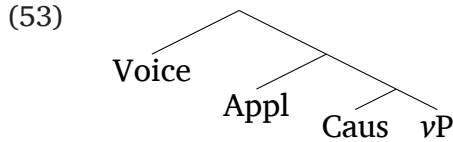
The ordering between the causative and the applicative is unfortunately a stipulative component of the proposal; however, it is no more stipulative than competing non-syntactic accounts for the CARP template which posit a series of universal PF constraints with no obvious markedness notions underlying them, namely the CARP constraints. However, this view does have the added benefit of accounting for unrelated syntactic properties of the extensions, like the incompatibility of reciprocal and passive, or the concessive or causer-less uses of the causative.

The rigidity and lack of ambiguity seen in Kinyarwanda extension ordering is now readily explained. If word-building proceeds by head movement, and left adjunction, then the only possible order of these morphemes will be √-C-A-R/P. The order of extensions is rigid in Kinyarwanda due to selectional restrictions which prevent certain heads from composing in non-CARP orders. There is no ambiguity because the CARP order is not a surface phenomenon. It is reflected in the structure as soon as more than one extension is merged, because it is driven by selectional restrictions. The selectional account not only captures the morpheme ordering data, but is also compatible with the independent syntactic properties of each of the heads explored in this work.

This explanation is of course not immediately transferable to all Bantu languages, since different languages display different ordering restrictions, though see Jung (2014) for a discussion of causatives and applicatives in Chichewa. Extending this account and testing its applicability to other languages is left for future work.

5 Next steps

While the account sketched in the previous section successfully captures the morpheme ordering facts in Kinyarwanda as well as some of the independent properties of the extensions themselves, much work remains to be done on the syntax and semantics of these morphemes individually, and cross-linguistically. In particular, the nature of the reciprocal/depatientive extension requires investigation in Kinyarwanda, as do the transitivizing and stativizing derivational morphemes (-*y* and -*ek* respectively) that were not addressed in this work.

As per the approach in this work, the reciprocal suppresses the object through saturation of PRO. This is crucially different to argument suppression through lack of licensing as is assumed for passive. Whether this is the correct means of argument suppression requires investigation. Kioko (1999) argues that reciprocalization is an instance of suppression and not saturation in Kikamba. Mchombo (1993) and Buell (2005) present similar facts in Chichewa and Zulu respectively, suggesting that in many Bantu languages, reciprocalization is more like the passive than like control.

The arguments used in those languages hold for Kinyarwanda as well. Firstly, non-overt object saturation by *pro* or a bound anaphor results in pre-verbal marking, but reciprocalization result in post-verbal marking.

(54)　　a.　Namubonye, nawubonye, naribonye, nakibonye, nayibonye.
　　　　　　n-　　a-　　mu/wu/ri/ki/yi-　bon　-y　　-e
　　　　　　sp.SG-　PST-　1/3/5/7/9-　　　　see　-PFV　-FV
　　　　　　'I saw him/her/it (person/mountain/money/tree/fish).'

b. Babonanye.
    ba-   a-   bon   -an   -y   -e
    sp.SG- PST- see   -RECP -PFV -FV
    'They saw each other.'

Secondly, the final vowel of imperatives is sensitive to the status of the object. Unergatives like 'run' which lack an object altogether take *-a* as their final vowel in imperatives as shown in (55a), whereas object-saturated transitives take *-e* as shown in (55b). Reciprocalized transitives pattern with unergatives in taking *-a* as their final vowel as shown in (55c), suggesting the lack of an syntactic object slot in a reciprocal construction.[16]

(55) a. Genda!
          gend -a
          run   -A
          'Run!'

      b. i. Mfashe!
              m-   fash -e
              sp.SG- help -e
              'Help me!'

          ii. Ifashe!
              i-   fash -e
              REFL- help -E
              'Help yourself!'

      c. i. Fashana!
              fash -an   -a
              help -RECP -A
              'Help each other!'

          ii. *Fashane!
              fash -an   -e
              help -RECP -E
              'Help each other!'

Rizzi (1986) provides a series of tests for syntactic activity of null arguments, including ability to bind, control, and be modified by small clauses. Performing these tests is the next step and will help determine whether the missing object in the depatientive use for example is syntactically present or not. Furthermore, Landau (2000) notes that PRO in object position is unattested, and that is exactly what has been proposed for Kirundi. Having confirmation or refutation from Kinyarwanda for this claim can help to shed light on both the specific question of object suppression in Kinyarwanda, but also the broader question of the nature of control cross-linguistically.

   If it arises that the reciprocal construction in Kinyarwanda does not bear the hallmarks of control, an antipassive-like analysis of the reciprocal may be in order. Since Voice° is responsible for case-marking the object, a defective flavour of Voice° that fails to do so would anti-license objects. The challenge to such an account is semantically deriving a reciprocal interpretation in the absence of a syntactic position for an object. This is left for the future.

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[16] Ndayiragije (2003) proposes a phonological criteria to determine the final vowel of imperatives in Kirundi to account for this fact. Namely that monosyllabic stems take final *-a* and polysyllabic stems take final *-e*. While the analysis appears to work for Kirundi, it does not for Kinyarwanda since *mfash-e* 'help me' has a monosyllabic stem with an *-e* final vowel.

Beyond the investigation of Kinyarwanda, extending a selectional account like the one presented here to other Bantu languages is another avenue for research. The account sketched herein predicts that if a language has bi-clausal causatives for example, the causative morpheme should be able to freely iterate with the applicative, reciprocal, and passive morphemes in the language. Applying the diagnostics discussed in Pylkkänen (2008), Key (2013), and Harley (2017) to determine the syntactic properties of derivational operations in other Bantu languages is left for the future.

6 Conclusion

This paper investigated the tension between templatic morphology and the Mirror Principle in Kinyarwanda. Unlike previous investigations of other Bantu languages, this paper argued that Kinyarwanda shows a rigid behaviour in which both the Mirror Principle and the CARP template must be jointly satisfied. If they cannot be, periphrasis is used where possible.

Syntactic movement accounts of the interaction between templates and the Mirror Principle were shown to be inapplicable to this case, and Optimality Theoretic analyses, while successful, were argued to not be illuminating. A syntactic account based on selection was argued for instead. The lack of unexpected ambiguity or commutativity of the verbal extensions follows straightforwardly from this account, where each extension instantiates a functional projection with particular requirements on its complement. This result suggests that templatic morphology on the surface can be implemented at a variety of stages of the derivation: from the earliest moments of structure building by means of selection, as argued for in this paper for Kinarwanda, to syntactic movements due to featural attraction, as has been proposed for Nyakusa and Ndebele by Myler (2017), to surface-level morpheme ordering constraints in an Optimality Theoretic framework, as argued for Luganda by McPherson & Paster (2009) and for Chichewa by Hyman (2003) and Zukoff (2017). This supports a view that morpheme templates are not a monolithic phenomenon, but rather a surface-level characterization of behaviour that may underlyingly be driven by a variety of syntactic and linearisation constraints.

Work remains to be done both on broad and narrow topics pertaining to the Bantu verbal extensions and templatic morphology. Narrow questions include those about the semantics and syntax of individual extensions and their similarity and diversity across the Bantu family. Broad questions include those about the feasibility to re-analyse surface-level characterizations of templatic morphology through syntactic accounts, a project which was partially undertaken in this work.

Abbreviations

AD = addressee, AGR = agreement, APPL = applicative, ASP = aspect, CAUS = causative, CONJ = conjunction, DEM = demonstrative, EXT = extension, FV = final vowel, FUT = future, GEN = genitive, INF = infinitive, ITR = intransitive, NONSUBJ = non-subject, PSV = passive, PST = past, PL = plural, POSS = possessor, PRES = present, RECP = reciprocal, REFL = relfexive, ROOT = root, SG = singular, SP = speaker, SUBJ = subject, TENSE = tense, TRANS = transitivizer

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