

The Morphosyntax and Semantics of Verbal Reciprocals*

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1 Introduction

Numerous languages of the world form reciprocals through verbal morphology rather than using reciprocal nominals as English does. The following example, from Passamaquoddy, an Algonquian language, illustrates the phenomenon. A transitive verb, shown in (1a), is suffixed with a reciprocal morpheme that has the effect of turning the verb into an intransitive in (1b). The sole argument, which must be plural, is interpreted as both the external and internal arguments, in the usual manner of a reciprocal (see below):¹

- (1) a. (ʔ)-**Nehpah-a-wa-l** tan wot meson-a-t.
3-kill-Dir-3P-Obv Quant this.An IC.catch-Dir-3Conj
'They'll kill the one that wins her.' (Mitchell 1921/1976b, line 40)
- b. Neqt wespasahkiwik Apistanewc naka Tiyam qin te koti **nehpuh-utu-wok**.
once in.morning Apistanewc and Tiyam really Emph Fut kill-Recip-3P
'One morning Apistanewc and Tiyam are really going to kill each other.' (Francis and Leavitt 1995, line 77)

In Passamaquoddy, transitive verbs agree with both arguments in a prefix (here an initial segment, written <'>, which has no phonetic reflex before sonorants²) and a series of suffixes: the Direct marker indicates that the argument that agrees with the prefix and immediately following suffix (/wa/, indicating person and number) is the subject, while the argument that agrees with the final suffix (/-(o)l/, indicating obviation and

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¹The reciprocal morpheme is underlyingly /-(o)ti/. Stem-final *-i* regularly changes to *-u* before *w* in third person inflections, while the first vowel often deletes or harmonizes to the vowel of the stem. Letters have their usual values in Passamaquoddy transcriptions except that **o** = schwa, **q** = [k^w], **c** = alveopalatal affricate, **'** = abstract initial segment whose phonetic effect is aspiration of the following stop or tensing of *s*. Obstruents are voiced in many environments. Pitch accent is not marked.

Passamaquoddy abbreviations: **3** = proximate third person; **3P** = proximate third person plural; **An** = animate; **Appl** = applicative morpheme; **Conj** = Conjunct inflection (relative clauses, wh-questions); **Dir** = Direct voice; **Emph** = emphatic particle; **Fut** = future; **IC** = Initial Change (ablaut); **Inan** = inanimate; **Inv** = Inverse voice; **Obv** = obviate third person; **N** = morpheme with several distinct functions; **P** = plural; **Part** = participle agreement (head of relative clause or wh-phrase); **Perf** = preverb that usually has perfective or past tense interpretation; **Plural** = stem marker of plural subject; **Quant** = Quantificational particle that appears in free relatives and certain wh-questions; **Recip** = reciprocal; **Refl** = reflexive.

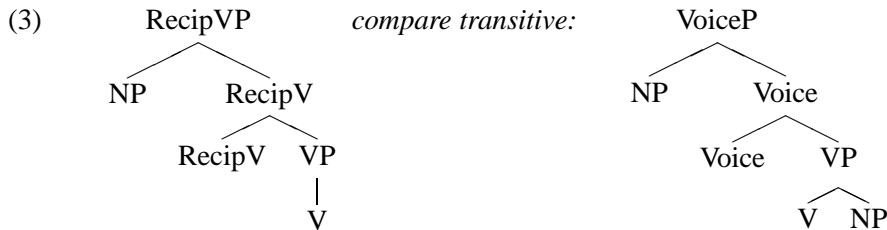
²This prefix is historically /w/, which became devoiced and for most current speakers is reflected only in its effect on the following consonant; there is no discernible effect on a sonorant. However, Phil LeSourd reminds me that some of the oldest speakers will still produce a voiceless /w/ before sonorants, as in *w-mani-m*, 3-money-Poss, 'his/her money'.

number) is the object. Third person subjects of intransitives, in contrast, agree only in the final suffix, just like objects of transitives (schwa, orthographic <o>, is regularly deleted):

- (2) a. opuw-**ok** b. n-tokom-a-**k**
 sit-**3P** 1-hit-Dir-**3P**
 ‘they sit’ ‘I hit them’

Therefore it is clear that the derived reciprocal in (1b) is intransitive.

Here I propose a syntax and semantics for these reciprocal morphemes,³ building on recent analyses of external-argument-introducing morphology (Kratzer 1996) and applied-argument-introducing morphology (Pylkkänen 2000b). The basic idea will be to treat the reciprocal morpheme as a type of Voice head (Kratzer 1996) that combines with an open predicate:



Normally V projects its internal argument inside VP, and Voice combines with VP as a predicate of events. Recip(rocal)V(oice), however, is a higher-order predicate that takes a VP with an unsaturated individual argument as its argument. It then introduces reciprocal semantics, stating that the argument it projects in Spec-RecipVP is both the agent and the unsaturated internal argument of its sister. The analysis is spelled out in detail in Section 3.

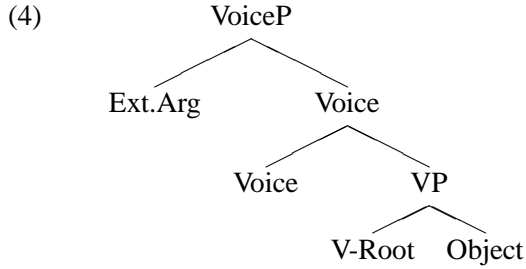
I then show in Section 4 that this analysis can nicely account for various combinations of reciprocal morphemes and other types of valence-changing morphology, such as causatives and applicatives. It also leads to a conception of all of these types of morphology as a generalized voice system. In addition, it crucially relies on viewing morphological word formation as a syntactic process; to the extent that it succeeds in explaining properties of these constructions, as I argue below, it therefore supports syntactic accounts of (verbal) word formation and a particular version of Baker’s (1985) Mirror Principle, and argues against recent hypotheses of a lexicon-syntax split (Reinhart and Siloni 2005).

2 External Arguments

Recent research on the nature of external arguments has concluded that they are not actually arguments of the verb, but arguments of some higher projection (this idea goes back at least to Marantz 1984). Kratzer (1996) and Chomsky (1995, 2000) suggest that the external argument is not an argument of any projection of the verb, but is instead introduced by a higher functional head. Kratzer calls this head Voice; Chomsky calls it *v*. I will use Kratzer’s notation here, as well as her semantics. The idea is diagrammed in (4) below:⁴

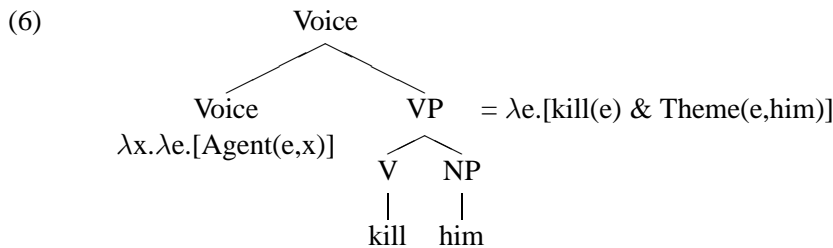
³I explicitly exclude from this discussion the so-called “reciprocal verbs” discussed by Siloni (2001, 2005) and Reinhart and Siloni (2005) in Hebrew and various European languages; these are not exclusively reciprocal, as the same morphology is used to derive reflexives, unaccusatives, middles, and others. These reciprocal expressions pattern quite differently from the true verbal reciprocals discussed here, which are dedicated reciprocals. See sections 5 and 6.

⁴Marantz (1997) further argues that the Voice head is responsible for turning a category-less root into a verb, with various consequences for derivational morphology. This function of the Voice head will not be important here, although questions do arise in analyzing particular languages. For instance, in Passamaquoddy the reciprocal morpheme attaches to what is already a transitive verb, and not to a bare root. I think that we should probably separate the category-specifying function of Voice from the external-argument introducing function, and have them encoded by separate verbal heads. Thus the trees in (3) should actually have another verbal head between the verbal root and RecipV, and between the verbal root and Voice.



The way this works semantically in Kratzer's system is that the verb is a two-place predicate taking an individual argument (type $\langle e \rangle$) and an event argument (type $\langle s \rangle$), as in (5). It combines with its internal argument to produce a one-place predicate of events, as shown in (6). The Voice head is also a two-place predicate taking an individual and an event argument.

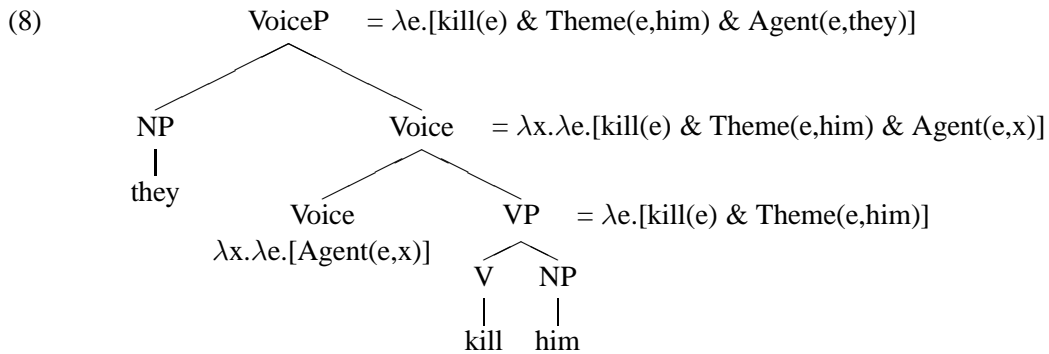
(5) $\llbracket \text{kill} \rrbracket = \lambda x. \lambda e. [\text{kill}(e) \ \& \ \text{Theme}(e, x)]$



The Voice head combines with the VP via the operation of Event Identification:

(7) Event Identification
 $f_{\langle e, st \rangle} + g_{\langle s, t \rangle} \rightarrow h_{\langle e, st \rangle} = \lambda x. \lambda e. [g(e) \ \& \ f(x)(e)]$

Event Identification takes two predicates of events, one of which also takes an individual argument, and turns them into a single predicate of events taking a type $\langle e \rangle$ argument, basically by conjoining them. The full derivation is shown below:

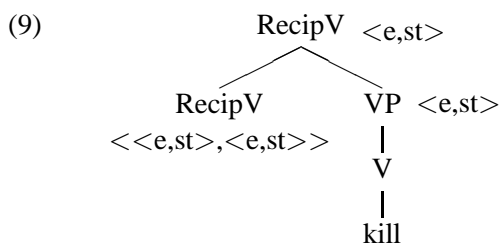


Along with Kratzer, I assume that the verb moves to adjoin to Voice in the syntax, creating the complex head V+Voice. The Voice head may or may not be spelled out as a suffix (or even a prefix) on the verb, depending on the language. Thus, the verb *nehpah-*, 'kill', in Passamaquoddy in (1a) is a spellout of the verbal root *nehpV-* and Voice.⁵

⁵Transitive verbs generally come in pairs in Algonquian languages: one form for animate objects (TA, for Transitive Animate), another for inanimate objects (TI, for Transitive Inanimate). What is referred to as the *final* encodes the animacy of the object. Thus, corresponding to *nehpa-h-*, 'kill (TA)', there is *nehpa-ht-*, 'kill (TI)'. I do not identify the final with Voice, for the simple reason that the reciprocal morpheme, which I take to be a version of Voice combining with VP, attaches to a root plus TA final and not to a bare root. Instead I identify the final with the verbalizing head mentioned in footnote 4.

3 Verbal Reciprocals

Let us see how we might account for verbal reciprocals in this system. Recall that what a verbal reciprocal does is detransitivize the verb and state that the subject is both the agent and the theme (I will be more precise about this below). I suggest that the reciprocal morpheme is a variety of Voice that, like Voice, combines with VP. Instead of being a two-place predicate with an individual argument and an event argument, however, I propose that it is a higher-order predicate that takes an open VP predicate (type $\langle e, st \rangle$) as its first argument and returns a predicate of the same type:

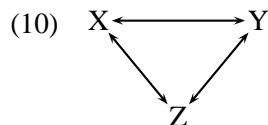


That is, normally a verb will project its type $\langle e \rangle$ argument within VP, leaving only a predicate of events, type $\langle s, t \rangle$. The RecipV head, however, selects a VP with an unsaturated individual argument, meaning that no internal argument is projected. Thus, the verb becomes intransitive.

3.1 Semantics

In formulating the semantics of RecipV, I will use a reciprocal meaning from Langendoen (1978) that he calls *Weak Reciprocity*. I will refer to this as *Two-Way Weak Reciprocity* to distinguish it from other weak forms of reciprocity. It is well-known that reciprocals can have a variety of interpretations (e.g., Fiengo and Lasnik 1973, Langendoen 1978, Heim, Lasnik, and May 1991, Dalrymple *et al.* 1998b, Beck 2001, Schein 2001), and this seems to be true for verbal reciprocals as well.⁶ However, I show elsewhere (Bruening 2005) that reciprocals in all of the languages I have investigated so far, including English, are limited to three distinct interpretations—that is, all of the meanings given in the literature reduce to these three. Moreover, contra most of the literature on reciprocals, what is called *Strong Reciprocity* is not the basic meaning of eventive reciprocals, but is only the meaning of stative reciprocals. The basic meaning of eventive reciprocals is *Two-Way Weak Reciprocity*, which can be weakened in certain contexts to *One-Way Weak Reciprocity*. I will provide here a brief justification for taking the basic meaning of eventive reciprocals to be *Two-Way Weak* rather than *Strong*, and return to the *One-Way Weak* reading in section 7. As most of my data involving verbal reciprocals use eventive verbs, I will not address stative reciprocals here.

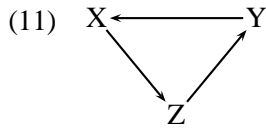
The strongest form of reciprocity, usually referred to as *Strong Reciprocity* (see Dalrymple *et al.* 1998b and Fiengo and Lasnik 1973), is that in which each member of the plural NP argument is acted upon by each of the other members. For instance, if Xavier, Yves, and Zoltan kill each other, the following killer→killee relations must all hold:



That is, Xavier must kill both Yves and Zoltan, Yves must kill both Xavier and Zoltan, and Zoltan must kill both Xavier and Yves. Clearly this is not the most likely interpretation of *Xavier, Yves, and Zoltan killed*

⁶Previous work on the interpretations of verbal reciprocals include van de Kerke 1992 on Bolivian Quechua and Dalrymple, Mchombo, and Peters 1994 on Chichewa, both of which conclude that verbal reciprocals do not differ from English nominal reciprocals.

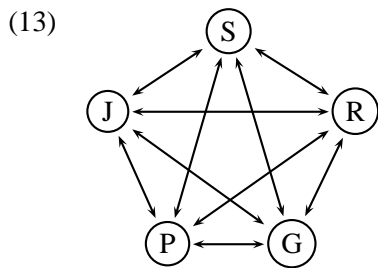
each other, since it is hard for one person to be killed twice. Instead a weaker form will be taken to be meant, in which each one is killed by one of the others. Intuitions for English, Japanese, Turkish, and Chinese, at least, indicate that the requirement is that each member of the set kill some other member of the set, and that each member is killed by some other member (hence, “Two-Way”). This is depicted in the following diagram:



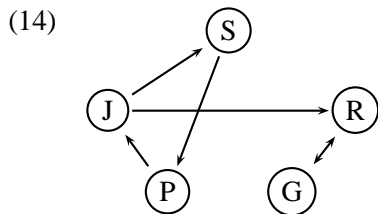
Most researchers investigating reciprocal expressions consider the weakening that takes place in examples like the above to arise from world knowledge, like the fact that people cannot be killed twice. In general, it is said, Strong Reciprocity is required if the predicate is compatible with it. However, consider a sentence like the following (Dalrymple *et al.*'s example 33):

(12) John, Paul, George, Ringo and Stu were hitting each other.

Dalrymple *et al.* state that this is interpreted as Strong Reciprocity, with each of the five hitting each of the other five, as in the following diagram:

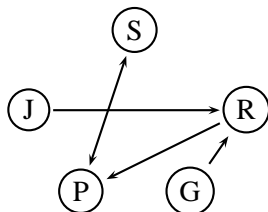


However, no person that I have talked to, of any language background, has the intuition that a sentence like this has such strong truth conditions. Everyone agrees that the only requirement is that each of the five be hitting at least one of the other five, and is being hit by at least one of the other five; this is Two-Way Weak Reciprocity. Thus the following situation could be described by this same sentence:



Hit is unlike *kill* in that it is compatible with Strong Reciprocity: people can hit more than one person and can be hit more than once. Hence, given the theory that Strong Reciprocity can only be weakened by world knowledge, the sentence should be unable to characterize a situation like that in (14). Yet everyone I have asked allows it as a possible situation for the sentence, and most people comment that what is required is that each person hit at least one other person and be hit at least once. Thus, we all have the intuition that this sentence would be false in a scenario like the following (One-Way Weak Reciprocity; see section 7), where everyone hits someone but some people (John and George) are not hit:

(15)



Hence, the truth conditions of Strong Reciprocity are too strong, but those of One-Way Weak Reciprocity, which requires only that everyone be an actor in the action (as in 15), are too weak. It follows that the meaning of a reciprocal like this is actually Two-Way Weak Reciprocity.

Dalrymple *et al.* state that in such cases as (14) we are using Strong Reciprocity *loosely*, allowing some exceptions to the requirement that everyone be hitting everyone else, and that Two-Way Weak Reciprocity is not needed as a meaning of reciprocals. But note that the situation in (14) is very far from everyone hitting everyone else; each person is only hitting one of the other four. If this is a “loose” interpretation, it is very loose indeed. Yet everyone I have asked permits the situation in (14) as a meaning of *John, Paul, George, Ringo, and Stu were hitting each other*. Not only that, speakers of Chinese, Japanese, Turkish, and Indonesian voice exactly the same intuitions for equivalent reciprocal expressions in their languages (see Bruening 2005).

Because cross-linguistic intuitions all point to the interpretation being Two-Way Weak rather than Strong, and on the basis of other arguments in Bruening (2005), I conclude that Strong Reciprocity is never required with eventive reciprocals (it *is* required with statives, and in fact cannot be weakened with statives; see Bruening 2005). The basic meaning of an eventive reciprocal is Two-Way Weak Reciprocity.

Although what is *required* is only Two-Way Weak Reciprocity, many predicates are compatible with the strongest interpretation, and can be interpreted that way. The strong interpretation is easily available for a Passamaquoddy sentence like the following, and a similar English example in (17):

- (16) Nit te na ’-kotunol-**oti**-ni-ya.
 then Emph also 3-hunt-**Recip**-N-3P
 ‘So they go after each other.’ (Francis and Leavitt 1995, line 68)

- (17) Xavier, Yves, and Zoltan went after each other.

It is easy to interpret a sentence like (17) as meaning that Xavier went after Yves and Zoltan, Yves went after Xavier and Zoltan, and Zoltan went after Xavier and Yves, as diagrammed in (10). However, it is also possible to interpret the same sentence in the way depicted in diagram (11), meaning that Strong Reciprocity is not actually required, only Two-Way Weak Reciprocity is.

3.2 Semantics of RecipV

Borrowing the semantics from Langendoen (1978), the denotation of the reciprocal morpheme that I propose is the following:⁷

- (18) $\llbracket \text{RecipV} \rrbracket = \lambda f_{\langle e, st \rangle} . \lambda z : |z| \geq 2 . \lambda e . [\forall x \in z . \exists y, q \in z . (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [f(e', y) \ \& \ \text{Agent}(e', x) \ \& \ e' \leq e] \ \& \ \exists e'' [f(e'', x) \ \& \ \text{Agent}(e'', q) \ \& \ e'' \leq e])])]$

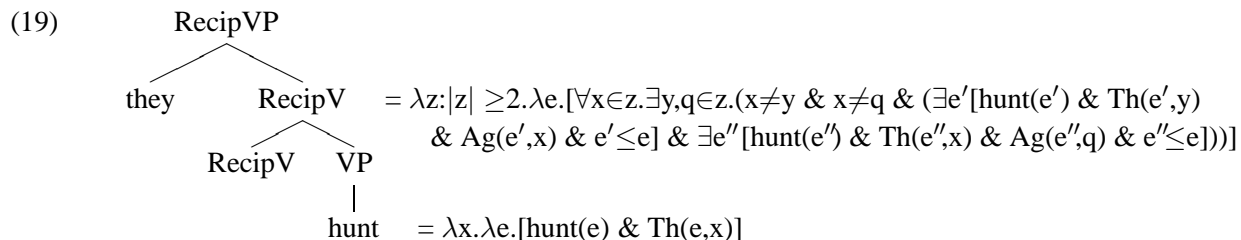
⁷Keenan and Razafimamonjy 2004, a work I ran across only after writing the first draft of this paper, presents a very similar analysis of the reciprocal morpheme in Malagasy, but using Strong Reciprocity. The denotation that they give is the following, where A (the subject) is a set with at least two elements and p is a two-place predicate denotation:

- (1) $\text{Recip}(p)(A) = \text{True}$ if and only if for all distinct x, y in A, $p(y)(x) = \text{True}$

This denotation is similar to the one given here, except that it is the strongest interpretation.

After combining with an open VP (type $\langle e, st \rangle$), RecipV takes a plural individual argument. It then denotes a set of eventualities with multiple sub-events, at minimum two—two for each member of the subject NP. In each pair of sub-events, each member x of the subject NP is the agent of an event where some other member of the subject NP is the theme, and x is the theme of an event where some other member of the subject NP is agent. This holds for *all* individuals in the denotation of the subject, giving us Two-Way Weak Reciprocity. (If there are only two individuals in the subject set, Two-Way Weak is equivalent to Strong Reciprocity.)

The reciprocal morpheme will combine with a verb in the following way:



Thus the denotation of RecipVP in (16), *'-kotunol-oti-ni-ya*, ‘they hunt each other’, will be the following:

(20) $[[\text{'-kotunol-oti-ni-ya}]] = \lambda e. [\forall x \in \text{they}. \exists y, q \in \text{they}. (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\text{hunt}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e] \ \& \ \exists e'' [\text{hunt}(e'') \ \& \ \text{Th}(e'', x) \ \& \ \text{Agent}(e'', q) \ \& \ e'' \leq e]))]$

That is, for each member x of the set denoted by the pronoun *they*, x is after some other member of the set and some other member of the set is after x . This is compatible with both of the diagrams in (10) and (11), and seems to capture the interpretation of this verb phrase in Passamaquoddy⁸ (and the corresponding one in English).

3.3 Unergatives

An argument that this is the right way to treat verbal reciprocals comes from Japanese. In the theory outlined above, verbal reciprocals are essentially unergatives. They are transitive verbs that have lost their internal argument. Alec Marantz (p.c.) suggests an unaccusative alternative: reciprocal morphology suppresses the external argument rather than the internal one, but otherwise the semantics are the same. The internal argument of the verb will then move to the surface subject position, exactly as in an unaccusative. (This analysis is similar to the analysis of the reflexive clitic in Romance languages in Marantz 1984 and Kayne 1988; see Reinhart and Siloni 2005 for arguments that reflexive verbs in those languages are also unergatives. Baker 1996 also presents an unaccusative analysis of reflexive and reciprocal morphology.)

In Japanese, however, verbal reciprocals pattern with unergatives rather than unaccusatives in the acceptability of floated numeral quantifiers. Various authors (e.g., Miyagawa 1989, Tsujimura 1991) have shown that floated numeral quantifiers may be associated with the subject of an unaccusative verb, but not with the subject of an unergative verb:

⁸Passamaquoddy actually distinguishes dual from plural subjects of intransitive verbs. The two reciprocal verbs given above, ‘kill’ and ‘hunt’, are both dual, as they lack a plural marker. Thus the issue of the Strong interpretation as opposed to the Two-Way Weak interpretation does not arise; both propositions are true if and only if X killed/hunted Y and Y killed/hunted X. A plural reciprocal is illustrated below:

- (i) ali-skuwim-t-ultuw-ok
 around-talk.about-Recip-Plural-3P
 ‘they tell stories about each other’

One interpretation of a verb phrase like this one is most certainly Two-Way Weak Reciprocity as diagrammed in (11). I believe the Strong interpretation is also possible, but that is compatible with Two-Way Weak as the basic meaning.

- (21) (Miyagawa 1989, 43–44)
- a. Kyaku-ga rokyan-ni **2-ri** tuita.
 guests-Nom inn-to 2-CL arrived
 ‘Two guests arrived at the inn.’
 - b. *Kodomo-ga geragera-to **2-ri** waratta.
 children-Nom loudly 2-CL laughed
 ‘Two children laughed loudly.’

Verbal reciprocals pattern with unergatives in the unacceptability of a floated numeral quantifier (S. Tomioka, Y. Hara, p.c.):

- (22) ?* Kodomo-ga ashi-o **futa-ri** keru-**at**-ta.
 children-Nom leg-Acc 2-CL kick-Recip-Past
 ‘Two children kicked each other on the legs.’

I take this to indicate that the structure and interpretation of verbal reciprocals proposed above is correct: RecipV is a function that takes an unsaturated VP as its first argument, meaning that the internal argument is suppressed, creating an unergative.

3.4 Restrictions on Verbal Reciprocals

The analysis of verbal reciprocals proposed here can also account for certain restrictions on the verbs that reciprocals are compatible with. First, notice that this analysis treats the verbal reciprocal as a piece of external-argument-introducing morphology. It follows that this morphology should be incompatible with verbs that are incompatible with external arguments, such as unaccusatives.

This seems to be true in Japanese. In general, reciprocal morphology may combine with an intransitive verb, but in doing so it adds an internal argument. I take this to be made possible through the addition of a null applicative morpheme (see below). Consider the following example:

- (23) Kodomo-ga odori-**at**-ta.
 children-Nom dance-Recip-Past
 ‘The children danced against each other.’

The interpretation of a reciprocal attached to an unergative is some kind of competition, where each child dances to show that he or she can do it too, or do it better than the other children.

The structure I propose for this type of sentence is similar to that described below for applicatives; see the tree in (39b). Essentially the extended verb phrase will have an additional internal argument, interpreted as something like a malefactive; it is this argument that will be unsaturated and that will figure in the semantics of the reciprocal (see below on the combination of reciprocal morphology with applicative morphology). What is important here is that this type of interpretation is restricted to unergatives. The reciprocal morpheme may not combine with an unaccusative (S. Kotani, p.c.):

- (24) *Kodomo-ga ki-**at**-ta.
 children-Nom come-Recip-Past
 ‘The children came (against each other).’

This restriction follows from the proposed analysis. An unaccusative verb like ‘come’ may not have an external argument; it either lacks Voice completely or has a Voice head that does not project an argument. Adding an internal argument will make the verb a ditransitive unaccusative; it will still be unable to combine

with an external argument. Since RecipV is a type of external-argument-introducing head, it will not be able to combine with this type of verb.⁹ Hence (24) is ill-formed.

3.5 Strict and Sloppy Readings

A third argument that this is the right way to treat verbal reciprocals comes from Chichewa (Bantu). Mchombo (1993) provides and discusses the following example:¹⁰

- (25) Alenje á-ma-nyoz-**án**-á kupósá asodzi.
 2.hunters 2SM-Hab-despise-**Recip**-FV exceeding 2.fishermen
 ‘The hunters despise each other more than the fishermen.’

Mchombo states that this sentence has only a sloppy identity reading: the hunters despise each other more than the fishermen despise each other. It does not have the strict reading where the fishermen despise the hunters. The theory of verbal reciprocals given above explains this fact. The predicate predicated of the hunters is that of reciprocal-hating (see the function in (19) that will take the subject as its argument). If this same predicate is applied to the fishermen, they necessarily hate each other, and not the hunters. There is simply no way to get the strict reading given the meaning of the predicate in this theory (see Reinhart 1999 and the references there on the difference between strict and sloppy readings). Moreover, the lack of strict readings seems to be true of verbal reciprocals cross-linguistically; Keenan and Razafimamonjy (2004) show that the verbal reciprocal only permits sloppy readings in Malagasy, as well, and Ishii (1989) presents similar data from Japanese.

In Chichewa, crucially, Mchombo shows that verbal reflexives do allow the strict reading, in addition to the sloppy:

- (26) Alenje á-ma-**dzi**-nyóz-á kupósá asodzi.
 2.hunters 2SM-Hab-**Refl**-despise-FV exceeding 2.fishermen
 ‘The hunters despise themselves more than the fishermen.’

This sentence can mean either that the hunters despise themselves more than the fishermen despise themselves, or that the hunters despise themselves more than the fishermen despise the hunters. Thus, it is not the case that reflexives and reciprocals are necessarily variables and can only give rise to sloppy readings. (Compare also the relative acceptability of English *The hunters despise each other and I do too*, which could only have the strict reading.)

The difference between the verbal reflexive and the verbal reciprocal, as Mchombo shows, is that the reciprocal is a piece of derivational, valence-changing morphology, as in the theory here. The reflexive, in contrast, appears in the position of incorporated object pronouns and acts as though it is an incorporated pronoun. (On numerous differences between verbal reflexives and verbal reciprocals in the languages of the world, see section 5 below. On reciprocals in the Bantu languages, see Mchombo 1991, 1999, and Mchombo and Ngunga 1994.)

3.6 Reciprocal Scope

Dalrymple, Mchombo, and Peters (1994) state that an embedded reciprocal verb in Chichewa can have two readings, illustrated below (see also Mchombo 1999):

⁹Reciprocal morphology can appear on unaccusative verbs that can be coerced into unergativity. In that case they act like unergatives rather than unaccusatives.

¹⁰Bantu abbreviations (regularized from the various authors): **SM** = subject marker; **FV** = final vowel; **Hab** = habitual; **Pres** = present tense; **Pass** = passive; number = noun class.

- (27) John ndí Bill a-ku-gáníz-a kutí a-na-gónj-éts-ǎn-a.
 J. and B. SM-Pres-think-FV that SM-Past-lose-Cause-**Recip**-FV
 ‘John and Bill think that they defeated each other.’
- a. John and Bill think: John defeated Bill and Bill defeated John.
 b. John thinks John defeated Bill and Bill thinks Bill defeated John.

This sentence is modeled after the English translation, which certainly can have these two readings. Heim, Lasnik, and May (1991), and Dalrymple, Mchombo, and Peters (1994) following them, argue that this is a scope ambiguity: in the reading in (27a), the reciprocal has scope only in the lower clause, while in (27b), the reciprocal has scope over the matrix clause. In the analysis of Heim, Lasnik, and May (1991), high scope is derived by movement of *each* into the higher clause at LF.

Clearly no analogous operation is possible in the analysis proposed here. The reciprocal morpheme introduces the external argument and relates it to the open argument of the verb that it attaches to. There is simply no way for this morpheme to achieve higher scope and keep thematic relations intact. Hence, if verbal reciprocals *could* have higher scope, as Dalrymple, Mchombo, and Peters (1994) claim for Chichewa, it would be a real problem for this analysis.

Things are much more complicated, however. It turns out that the head-final languages with verbal reciprocals that I have investigated, Japanese and Turkish, do not allow a high scope reading for the verbal reciprocal. For instance, Japanese speakers disallow higher scope for the verbal reciprocal, though they allow it for the nominal reciprocal (data from S. Kotani, Y. Hara, S. Tomioka; see also Nishigauchi 1992):

- (28) Ken-to Sachie-wa [aisi-**at**-teir-u to] omotteir-u.
 K.-and S.-Top love-**Recip**-Prog-Pres Comp think-Pres
 ‘Ken and Sachie think that they love each other.’
- a. Ken and Sachie think that Ken and Sachie love each other.
 b. * Ken thinks that Ken loves Sachie and Sachie thinks that Sachie loves Ken.
- (29) Ken-to Sachie-wa [**otagai-o** aisi-teir-u to] omotteir-u.
 K.-and S.-Top **each.other-Acc** love-Prog-Pres Comp think-Pres
 ‘Ken and Sachie think that they love each other.’
- a. Ken and Sachie think that Ken and Sachie love each other.
 b. Ken thinks that Ken loves Sachie and Sachie thinks that Sachie loves Ken.

Similarly, Turkish verbal reciprocals disallow higher scope (data from O. Ozturk):

- (30) Ahmet ve Mehmet [yen-**is**-tik-lerin-i] düşün-uyor-lar.
 A.Nom and M.Nom defeat-**Recip**-Past-Gen-Acc think-Tense-3Pl
 ‘Ahmet and Mehmet think they defeated each other.’
- a. Ahmet and Mehmet think: Ahmet defeated Mehmet and Mehmet defeated Ahmet.
 b. * Ahmet thinks Ahmet defeated Mehmet and Mehmet thinks Mehmet defeated Ahmet.

Japanese and Turkish, then, act as the analysis so far presented here would lead one to expect. The analysis has no way of divorcing thematic relations from scope, and hence has no way to achieve higher scope for a verbal reciprocal.

What are we to make of Chichewa, then? It turns out that the other non-head-final language I have investigated, Passamaquoddy, also permits higher scope for a verbal reciprocal. Passamaquoddy speakers (as well as speakers of the mutually intelligible language Maliseet), unlike the Japanese and Turkish speakers I have consulted, allow a higher scope reading in a sentence like the following:

- (31) Piyel naka Susehp toqi=te litahasuw-ok kisi-tomh-**utu**-wok.
 P. and Jos. both=Emph think-3P Perf-defeat-**Recip**-3P
 ‘Peter and Joseph both think that they defeated each other.’

- a. Peter and Joseph both think: Peter defeated Joseph and Joseph defeated Peter.
 b. Peter thinks Peter defeated Joseph and Joseph thinks Joseph defeated Peter.

Furthermore, a preliminary investigation indicates that this is a genuine scope ambiguity where high scope is probably attained through movement of some kind of quantificational element, as in the analysis of Heim, Lasnik and May (1991). Two possible alternatives are that ‘think’ is appositive in this sentence, something like ‘Peter and Joseph—they think—defeated each other’; and that ‘think’ as a Neg-raising type of verb might exceptionally permit the whole lower verb to scope over it. Leaving aside the question of whether either of these alternatives would lead to the right semantics, they are both ruled out by the following sentence using the verb ‘deny’. This verb cannot be appositive and also does not allow anything like Neg-raising. Nevertheless it does permit a higher scope reading, as indicated (this sentence comes from a speaker of Maliseet):

- (32) Piyel naka Susehp ’t-ikonewatom-oni-ya pquatuh-**utu**-wok.
 P. and Jos. 3-deny-N-3P give.licking-Recip-3P
 ‘Peter and Joseph denied that they gave each other a licking.’

- a. Peter and Joseph both deny the following: Peter gave Joseph a licking and Joseph gave Peter a licking.
 b. Peter denied that Peter gave Joseph a licking and Joseph denied that Joseph gave Peter a licking.

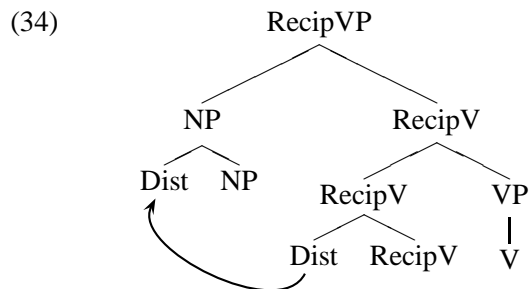
In addition, it appears that higher scope disappears when the reciprocal verb is embedded in a syntactic island, just as it does with English *each other*:¹¹

- (33) Piyel naka Susehp oc ’-tapwotehl-a-wa-l putaya-l [kistoh-uti-htit].
 P. and Jos. Fut 3-open.Dir-3P-Obv bottle-Obv defeat-Recip-3PConj
 ‘Peter and Joseph will open a bottle if they beat each other.’

- a. Peter and Joseph will open a bottle if Peter beats Joseph and Joseph beats Peter.
 b. * Peter will open a bottle if Peter beats Joseph and Joseph will open a bottle if Joseph beats Peter.

It follows that this analysis of verbal reciprocals must be modified to allow movement of some kind of operator for higher scope, at least in some languages. I will spell out one way of doing this here. It involves splitting the function of the reciprocal morpheme into two separate functions, each of which is located in a different syntactic element. The scope analysis will follow that of Heim, Lasnik, and May (1991), in which a distributive operator moves and adjoins to the NP it distributes over. Syntactically, I suggest that the reciprocal morpheme consists of two pieces that are inserted into the syntactic derivation together, RecipV and Dist (a distributive operator):

¹¹This example is also from a speaker of Maliseet, and I cannot say with certainty that the judgement is as indicated. However, his reaction was such that I feel justified in reporting this judgement, though it must of course be confirmed with other speakers. Note, however, that island effects like this are problematic for accounts of reciprocal scope that do not use movement, such as that of Dimitriadis (1999). All of the conditions of that account are met for the high-scope reading, but it still does not exist.



Dist will not be interpretable in its base position as sister to RecipV, as its first argument must be an NP type, and so it will move and adjoin to the external argument, as shown. Its trace will be semantically vacuous.

The denotations I propose for these two elements are the following:

(35) $[[\text{RecipV}]] = \lambda f_{\langle e, st \rangle} . \lambda z: |z| \geq 2. \lambda x: x \in z. \lambda e. [\exists y, q \in z. (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [f(e', y) \ \& \ \text{Agent}(e', x) \ \& \ e' \leq e]) \ \& \ (\exists e'' [f(e'', x) \ \& \ \text{Agent}(e'', q) \ \& \ e'' \leq e]))]]$

(36) $[[\text{Dist}]] = \lambda x. \lambda f. \lambda e. [\forall y \in x \rightarrow f(x)(y)(e)]$

RecipV turns the predicate into a reciprocal, asserting that subparts of the external argument are both agent and theme of the reciprocal, as before. It no longer includes universal quantification over parts of the external argument; that comes from Dist, which as a distributor distributes over the NP it adjoins to.

After Dist moves and adjoins to the external argument, the computation will work as shown below:

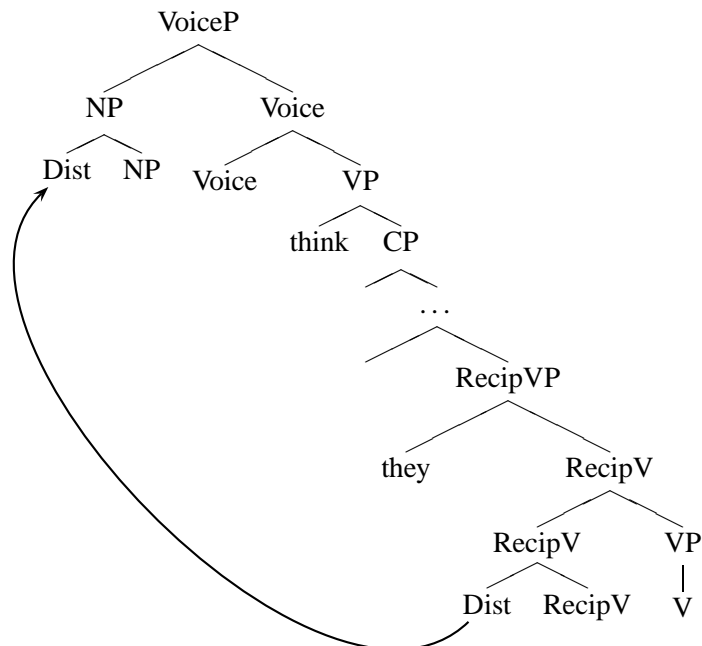
(37)

$\text{RecipVP} = \lambda e. \forall x \in \text{they} \rightarrow [\exists y, q \in \text{they}. (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\text{defeat}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e]) \ \& \ \exists e'' [\text{defeat}(e'') \ \& \ \text{Th}(e'', x) \ \& \ \text{Ag}(e'', q) \ \& \ e'' \leq e]))]$
 $\text{NP} = \lambda z: |z| \geq 2. \lambda x: x \in z. \lambda e. [\exists y, q \in z. (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\text{defeat}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e]) \ \& \ \exists e'' [\text{defeat}(e'') \ \& \ \text{Th}(e'', x) \ \& \ \text{Ag}(e'', q) \ \& \ e'' \leq e]))]$
 $\text{VP} = \lambda x. \lambda e. [\text{defeat}(e) \ \& \ \text{Th}(e, x)]$

What we end up with is equivalent to the previous denotation of RecipVP. But now we have the possibility of higher scope.

In the high-scope reading, Dist will move and adjoin not to the most local NP, but to the NP in the higher clause:

(38)



In order to interpret this we need to make a few additional assumptions and hypotheses. For that reason I will postpone to Section 7 the demonstration that the output of this movement can be interpreted and that it leads to the right interpretation. What is important here is that by splitting the function of the reciprocal head into two morphemes, one of them a quantificational Dist operator that can undergo movement, we can obtain the higher scope reading by following the theory of Heim, Lasnik, and May (1991). We also explain why higher scope is sensitive to island boundaries.

Now, the question that remains is, of course, why Passamaquoddy and Chichewa verbal reciprocals allow a higher-scope reading, but Japanese and Turkish verbal reciprocals do not. I suggest that there is a difference in the bundling of the two morphemes in the two types of languages. In Japanese and Turkish, Dist and RecipV are bundled into a single head, exactly as in the theory presented before this section of the paper. That RecipV morpheme has the denotation proposed above in (18). In contrast, in Passamaquoddy and Chichewa the RecipV head is split into two distinct morphemes, as just shown. Why this difference? At this point I have nothing to offer, except to point to two independent differences between the two sets of languages. Japanese and Turkish are both head-final languages, but Chichewa and Passamaquoddy are not. If it turns out that other head-final languages with verbal reciprocals also forbid the high-scope reading, then we will need a theory that derives the bundling of the two morphemes into a single head in head-final languages, but not in head-medial/initial languages. The other difference is that Japanese and Turkish are *wh*-in-situ languages, but Passamaquoddy and Chichewa are *wh*-movement languages. It is also conceivable that this may have something to do with the difference, though at this point the difference in headedness appears more promising.

In any event, in Japanese and Turkish the reciprocal morpheme and the distributive operator are bundled together as a single head, while in Passamaquoddy and Chichewa they are separable, resulting in the distributive operator being able to move to a higher scope position. Ultimately it will be important to understand why there is this difference between languages, but I leave that to future research.

Although the theory that I am now proposing involves these two elements, RecipV and Dist, in what follows I will combine them together, as in the preliminary theory sketched above and as I have hypothesized for Japanese and Turkish. Since scope is not relevant to the rest of this paper, this can be done safely with no loss of coverage or misleading computation.¹²

¹²One further point that should be addressed before moving on is that, as has been pointed out by numerous researchers, verbal reciprocals in many languages can take different kinds of split antecedents. In Japanese, for instance, the subject can

4 Reciprocals Plus Other Verbal Morphology

One advantage of this approach to verbal reciprocals is that it can generalize to cases where reciprocal morphemes appear in combination with other types of valence-changing morphology, such as applicatives and causatives. I begin by outlining the approach to applicatives advocated by Pylkkänen (2000b). This approach views applicative morphemes as similar in many respects to Kratzer’s Voice head. I then show how reciprocals may combine with applicative morphemes in various ways in different languages, and show how my account can capture all of them, even the problematic Bantu “symmetric object languages” (Bresnan and Moshi 1990). I then turn to causatives, where reciprocals can appear above or below the causative morpheme in numerous languages, with concomitant differences in meaning. Finally, I show how passives can combine with reciprocals in some languages.

4.1 Applicatives

Pylkkänen (2000b), building on Marantz (1993), suggests that applicative affixes of the type found in Bantu languages can be viewed as a sort of Voice head. An applicative is similar to Voice in that it takes a VP (or bare root plus argument) as its complement and introduces an external argument:¹³

- (39) Kichaga (Bresnan and Moshi 1990)
- a. N-ǎ-í-lyì-í-à m-kà k-élyá.
Foc-1S-Pr-eat-Appl-FV 1-wife 7-food
‘He is eating food for his wife.’

be *NP with NP* rather than *NP and NP* (Ishii 1989), or a singular NP plus understood *pro*; in Passamaquoddy and Malagasy (Keenan and Razafimamonjy 2004) one member of the reciprocal can even be extracted, as in the following Passamaquoddy example:

- (i) Wen-il Mali ali-wiciyew-ti-htic-il?
who-Obv M. around-go.with-Recip-3PCconj-PartObv
‘Who are Mary and *t* going around with each other?’

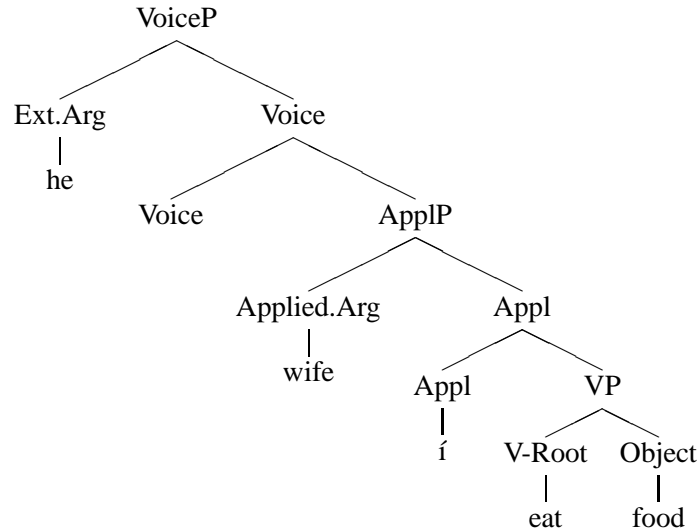
However, these facts are not at all limited to reciprocals, but appear with coordination generally. In Passamaquoddy, for instance, any coordinated subject of an intransitive verb may be split (this split pattern seems to be the one that is extracted from, given the obviation pattern—the postverbal NP is obviative even though it is interpreted on a par with the preverbal NP):

- (ii) Susehp apolahsatpih-ik Piyel-ol.
S. be.bald-3P P.-Obv
‘Susehp and Piyel are bald.’

This type of coordination cries out for an explanation, but it is not at all restricted to reciprocals and appears to be completely unrelated to reciprocals. (On comitative coordination of the Japanese type mentioned above, see Aissen 1989, Camacho 1996, Camacho 2000, Dalrymple, Hayrapetian, and King 1998a, Dyla 1988, McNally 1993; on “verb-coded coordination,” where one member of the coordination is an understood *pro*, see Schwartz 1988.)

¹³Bresnan and Moshi actually gloss (39a) as ‘He is eating food for/on his wife.’ I assume that the Appl head can have a variety of interpretations besides benefactive, including malefactive. See below.

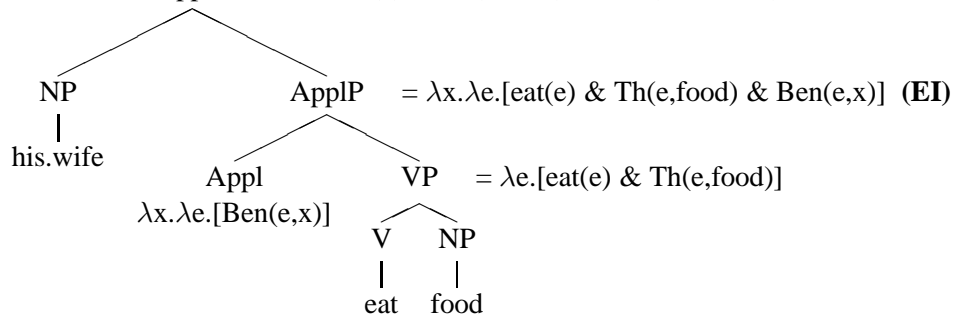
b.



Pyllkkänen suggests that Appl combines with VP via Kratzer’s Event Identification, just like Voice:

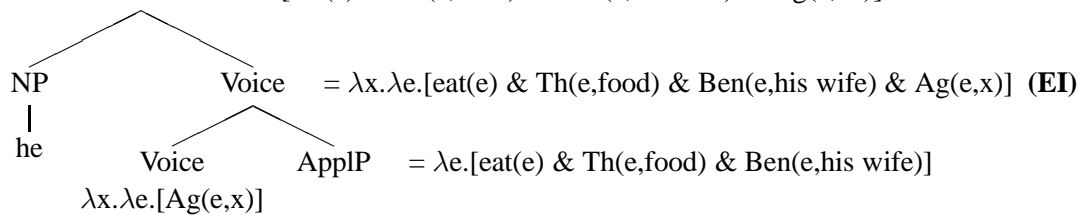
(40) $[[\text{Appl}]] = \lambda x. \lambda e. [\text{Benefactive}(e, x)]$

(41) $\text{ApplP} = \lambda e. [\text{eat}(e) \ \& \ \text{Th}(e, \text{food}) \ \& \ \text{Ben}(e, \text{his wife})]$



Notice that ApplP is now again a predicate of events, type $\langle s, t \rangle$, which is suitable for combining with Voice, again by Event Identification:

(42) $\text{VoiceP} = \lambda e. [\text{eat}(e) \ \& \ \text{Th}(e, \text{food}) \ \& \ \text{Ben}(e, \text{his wife}) \ \& \ \text{Ag}(e, \text{he})]$



The result is just what we want, assuming an event semantics of the sort used by Kratzer (1996).

Pyllkkänen suggests that there are different types of applicatives, with slightly different meanings and a different syntax. I will address some of these when we turn to Bantu languages in section 4.3. In the next subsection all of the applicatives I will be investigating have the semantics of the sort of applicative illustrated above (Pyllkkänen’s “high applicatives”). However, even within this class we find a range of meanings, including benefactives, goals, malefactives, and whatever the semantics of so-called “possessor raising” is (the examples below in Passamaquoddy can have this interpretation). I will ignore these slight differences in interpretation, and assume that they do not affect the syntax or combinatorial semantics. Rather, the exact interpretation of the function $\lambda x. \lambda e. \text{Benefactive}(e, x)$ must actually be something rather

underspecified, which will allow for a variety of interpretations. For convenience I will continue to use “Benefactive,” even where the sense is something different. (A very vague way to capture all of them might be with a function $\lambda x.\lambda e.Affect(e,x)$. This function simply says that the applied argument is affected in some way by the event, either beneficially or adversely. I do not think that this vague notion of affectedness is sufficient, so lacking anything better I will use Pykkänen’s Benefactive function.)

4.2 Applicatives Plus Reciprocals

Let us begin with Passamaquoddy, the language we began our discussion with above. Passamaquoddy has something like an applicative morpheme, which creates ditransitives from transitives:¹⁴

- (43) a. Pil **'-kis-onuw-a-l** olomuss-ol Mali pawato-k-il.
 Bill 3-Perf-buy-Dir-Obv dog-Obv Mary want-3Conj-PartObv
 ‘Bill bought the dog that Mary wants.’
- b. Pil **'-kis-onuhmuw-ew-a-n-ol** Maliw-ol olomuss-ol pawato-k-il.
 Bill 3-Perf-buy-Appl-Dir-N-Obv Mary-Obv dog-Obv want-3Conj-PartObv
 ‘Bill bought Mary the dog that she wants.’

The applied argument, *Mary*, acts like it is higher than the theme in every respect: it, and not the theme, may invert with the external argument in the Inverse construction; it asymmetrically scopes over the theme, as can be seen in scope judgements, the possibility of variable binding, and weak crossover appearing in questions (see Bruening 2001b, chapter 2); and the theme is always obviated by the applied argument. (Since the subject is also third person in this example, both object NPs must be obviative, and it is difficult to see that the theme is obviated by the applied argument. If the subject is first or second person, however, only the applied argument can be proximate, while the theme must be obviative.) Thus I assume that applicatives in Passamaquoddy have the structure hypothesized by Pykkänen above, where the applied argument asymmetrically c-commands the theme.

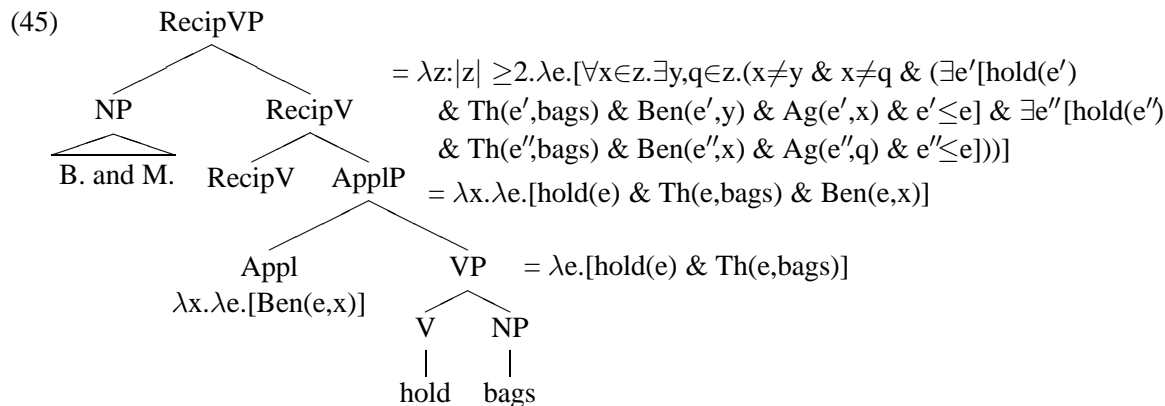
Verbal reciprocals can appear on verbs with an applicative morpheme. When they do, they come outside the applicative morpheme, and de-di-transitivize it; that is, they turn a derived ditransitive back into a transitive. Notice that the arguments that are interpreted reciprocally are the agent and the benefactive; the theme is never interpreted as part of the reciprocal argument:¹⁵

- (44) a. Pil **'-kisi-kolnom-uw-a-n-ol** Maliw-ol (')-motqapiy-il.
 Bill 3-Perf-hold-**Appl**-Dir-N-InanP Mary-Obv 3-bag-InanP
 ‘Bill held Mary’s bags for her.’
- b. Pil naka Mali **'-kolnom-aw-ti-ni-ya-l** (')-motqapiyi-wa-l.
 Bill and Mary 3-hold-**Appl-Recip**-N-3P-InanP 3-bag-3P-InanP
 ‘Bill and Mary are holding their bags for each other.’

This interpretation follows automatically from the hypothesized structure and hypothesized meaning of the verbal reciprocal. Recall that RecipV is a variety of Voice that takes an open two-place predicate of individuals and events as its first argument. Here it will take an unsaturated ApplP complement, that is, one that has not projected its type <e> argument:

¹⁴Note that the stem to which the applicative attaches is not the TA stem, *-onuw-* in (43a), but the TI stem, *-onuhmo-* (the /w/ is epenthetic and schwa changes to /u/ before /w/ in 43b). This holds generally, even when the lowest argument is animate, as in (43b). This follows, I believe, from the TI stem being the default. (Additionally, the verb meaning ‘want’ in (43) is unexpectedly in its TI form, even though ‘dog’ is animate; the expected form would be *pawal-a-c-il*, want.TA-Dir-3Conj-PartObv. I do not know if this is a performance error on the part of this particular speaker, or if this verb can be used both as a TI and a TA.)

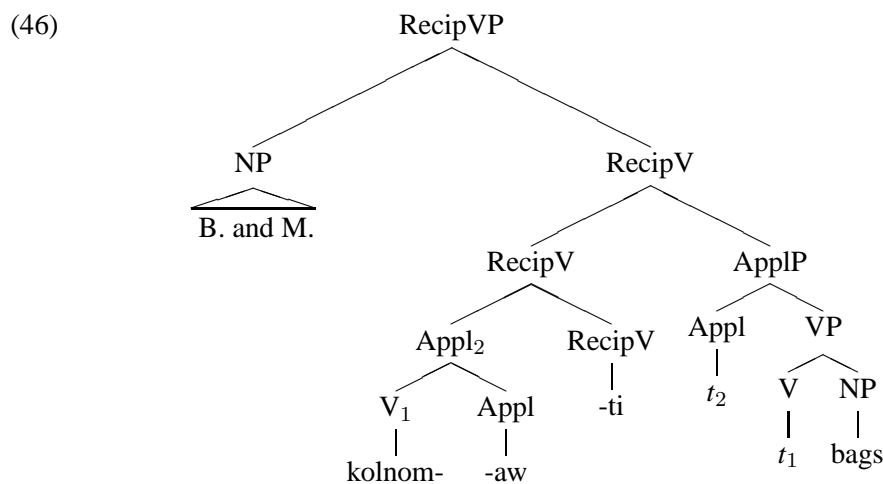
¹⁵As mentioned above, (44b) can also be interpreted as possessor raising: ‘Bill and Mary are holding each other’s bags.’



Because the reciprocal morpheme takes an open predicate f and relates its argument to the open argument of f , when it applies to an open ApplP the reciprocal arguments will be the agent and the benefactive, and never the agent and the theme. The theme role has been saturated within VP, and cannot therefore figure into the reciprocal function.

If we were to leave the theme role unsaturated, as in a reciprocal transitive, above, the applicative would be unable to combine with it. VP would be of type $\langle e, st \rangle$, rather than $\langle s, t \rangle$, and Event Identification would be unable to apply to combine VP and Appl. Thus, we rule out reciprocal ditransitives where it is the agent and the theme that are the reciprocal arguments. We also rule out the benefactive and the theme being the reciprocal arguments; there is simply no way to derive such an interpretation given the meanings of the applicative and reciprocal heads. As far as I am aware this is correct: no language allows the reciprocal arguments to be the benefactive/goal and the theme.

Notice now that the morpheme order in the verbal word is exactly what we expect from head movement of the verbal stem through Appl to RecipV:



Thus, this syntactic approach to verbal morphology explains why it is the agent and the benefactive that are the reciprocal arguments and not the agent and theme or benefactive and theme, and it also explains morpheme order, given usual assumptions about how head movement works (see, e.g., Baker 1988b). Below we will see cases where the reciprocal morpheme can attach in more than one hierarchical position, with exactly the morpheme order and interpretation that would be predicted from this syntactic approach.

Verbal reciprocals can also appear on verb stems that are inherently ditransitive, and have no overt applicative morpheme:

- (47) Susehp naka Piyel kisi **mil-tuw-ok** sukulis-ol.
 Jos. and P. Perf give-Recip-3P candy-InanP

‘Joseph and Peter gave each other candy.’

I assume that such verbs have an abstract applicative morpheme, as has been hypothesized for English by, among others, Marantz (1993), Pesetsky (1995), Bruening (2001a). Notice that it is the agent and the goal again, and not the agent and theme or goal and theme, that are interpreted as reciprocal. This again follows from the structure, as explained above.

Additionally, some languages have verbal reciprocals, but lack overt applicative morphemes. Nevertheless, when the reciprocal attaches to a ditransitive verb, it is the agent and benefactive/goal that are the reciprocal arguments, not the agent and theme or benefactive/goal and theme. Japanese is one such language (Y. Hara, S. Kotani, p.c.):¹⁶

(48) Japanese

- a. Taroo-ga Sachie-ni hon-o age-ta.
T.-Nom S.-Dat book-Acc give-Past
‘Taroo gave Sachie a book.’
- b. Taroo-to Sachie-ga hon-o age-at-ta.
T.-and S.-Nom book-Acc give-Recip-Past
‘Taroo and Sachie gave each other books.’
- c. * Taroo-ga dorei-ni/o age-at-ta.
T.-Nom slave-Dat/Acc give-Recip-Past
‘Taroo gave the slaves to each other.’
- d. * Dorei-ga Taroo-ni age-at-ta.
slave-Nom T.-Dat give-Recip-Past
‘The slaves gave each other to Taroo.’

Another language with exactly the same pattern is Malagasy (Keenan and Razafimamonjy 2004). Assuming the structure hypothesized above, but with a null applicative head, we again explain these data straightforwardly.

Japanese happens to have a nominal reciprocal, like English, in addition to the verbal reciprocal shown above. There is no similar restriction on the nominal reciprocal, as Ishii (1989) shows; it can serve to make two objects in a ditransitive reciprocal:¹⁷

- (49) John-ga Mary-to Nancy-ni **otagai-o** syookaisi-ta.
J.-Nom M.-and N.-Dat each.other-Acc introduce-Past
‘John introduced Mary and Nancy to each other.’ (Ishii 1989, note 2)

4.3 Bantu Languages

The system outlined above predicts that only the agent and applied argument can be the reciprocal ones. This is not true in many Bantu languages. There we find sentences like the following:

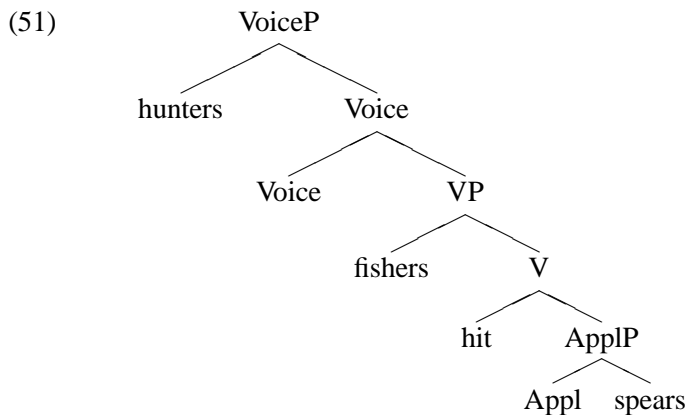
(50) Chichewa (Bresnan and Moshi 1990)

¹⁶Example (48c) can be interpreted as ‘Taroo and *pro* gave each other slaves’, if ‘slaves’ is marked accusative. This is again the predicted interpretation. Example (48d) can be interpreted as ‘The slaves, competing with each other, gave things to Taroo.’ See above on this use of the reciprocal morpheme as implying some kind of competition. Crucially, the interpretation where the agent and the theme are reciprocal is not allowed, nor is the interpretation where the goal and the theme are the reciprocal arguments.

¹⁷In Japanese, a nominal reciprocal can apparently co-occur with a verbal reciprocal. However, Ishii (1989) argues that in these cases the verb is still detransitivized; the nominal reciprocal occurs as some kind of adjunct and is not in argument position.

- a. A-lenje a-na-mény-ér-a a-sodzi mi-kôndo.
 2-hunter 2SB-RecPast-hit-**Appl**-Ind 2-fisher 4-spear
 ‘The hunters hit the fishers with spears.’
- b. A-lenje a-na-mény-ér-an-a mi-kôndo.
 2-hunter 2SB-RecPast-hit-**Appl-Recip**-Ind 4-spear
 ‘The hunters hit each other with spears.’

Here it is the agent and the theme that are the reciprocal arguments. Note, however, that the applied argument is an instrumental rather than a benefactive. Bresnan and Moshi (1990) state that Chichewa-type languages (their “asymmetric object languages”) never allow this with benefactive applicatives (52, below). Marantz (1993), summarizing much work on the difference between various types of applicatives, shows that instrumental and locative applicatives are actually low, lower than the theme. Thus they must have a structure something like the following:



The Appl morpheme will move to V, but, being a suffix, it will adjoin on the right rather than the left ($[_V V\text{-Appl}]$). That whole complex will then move to Voice. If the Voice head is RecipVoice, we derive the correct morpheme order. If this is the right structure for instrumental applicatives, we then predict that RecipV will combine with an open VP rather than an open ApplP, giving us agent and theme as the reciprocal arguments.

Languages like Chichewa only permit the agent and benefactive to be reciprocal when the applicative is a benefactive, just like Japanese and Passamaquoddy (this example is from Baker 1988a, who notes many differences between instrumental/locative applicatives and benefactive applicatives):

- (52) Ana a-na-meny-er-an-a zigawenga.
 children SP-Pres-hit-**Appl-Recip**-Asp ruffians
 ‘The children₁ are beating the ruffians for each other₁.’
 *‘The children are beating each other for the ruffians.’

This follows because benefactive applicatives have the structure shown in (45), where the applied argument is higher than the theme. Thus, independent differences between different types of applicatives result in exactly the predicted semantics when they combine with the reciprocal morpheme. (On high and low applicatives, see also Pykkänen 2000b.)

However, there is another type of Bantu language that is quite problematic for the analysis presented here. This is Bresnan and Moshi’s (1990) “symmetric object language”, represented by Kichaga. In this type of language, instrumental applicatives act just like they do in Chichewa (53a); but benefactive reciprocals unexpectedly allow an interpretation where the agent and theme are reciprocal, leaving out the benefactive (53b):

(53) Kichaga (Bresnan and Moshi 1990)

- a. Wà-chàkà wǎ-í-kòr-í-àn-à shí-mû.
 2-Chaga 2SM-Pres-burn-AppI-Recip-FV 8-firebrand
 ‘The Chagas are burning each other with firebrands.’
- b. Wà-chàkà wá-í-w’ágh-ì-àn-à màngì.
 2-Chaga 2SM-Pres-kill-AppI-Recip-FV 1.chief
 ‘The Chagas are killing each other for the chief.’

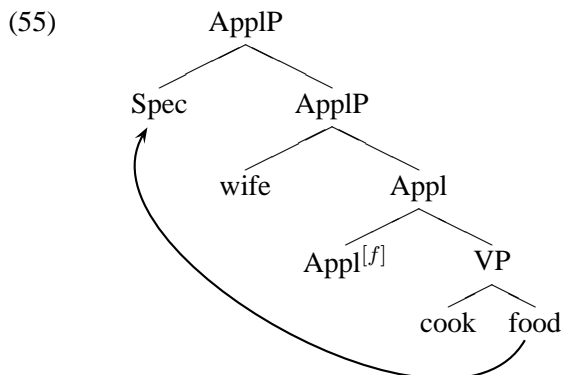
This is not the only way these languages are unusual. Bresnan and Moshi also show that either object may passivize in Kichaga, but only the applied object may in Chichewa; Chichewa examples corresponding to (54b) are ungrammatical:

(54) Kichaga

- a. M-kà n-ǎ-í-lyì-í-ò k-èlyâ.
 1-wife Foc-1SM-Pres-eat-AppI-Pass 7-food
 ‘The wife is being benefited/adversely affected by someone eating the food.’
- b. K-èlyâ k-í-lyì-í-ò m-kà.
 7-food Foc-7SM-Pres-eat-AppI-Pass 1-wife
 ‘The food is being eaten on/for the wife.’

Bresnan and Moshi outline a long list of differences between the two types of languages along these lines: Kichaga allows unspecified object deletion with applicatives, and applicatives plus reciprocals, while Chichewa does not; either or both object(s) may be a prefixed pronoun in Kichaga, but only one may in Chichewa; and so on. Thus, it is not just reciprocals that behave in an unexpected fashion in symmetric object languages.

One recent account of the symmetric object languages involves movement that can violate the locality effect of Relativized Minimality (Rizzi 1990) in a particular way. This is the approach of McGinnis (McGinnis 1998, McGinnis 2004). In this approach movement cannot generally cross another NP that could potentially move. So in passive benefactive applicatives, where the applied argument asymmetrically c-commands the theme, only the applied argument can move to subject position. This explains the asymmetric object languages like Chichewa (and English). What is different about the symmetric object languages like Kichaga is that Appl can optionally possess a feature that attracts a lower NP to a second specifier, as illustrated below:

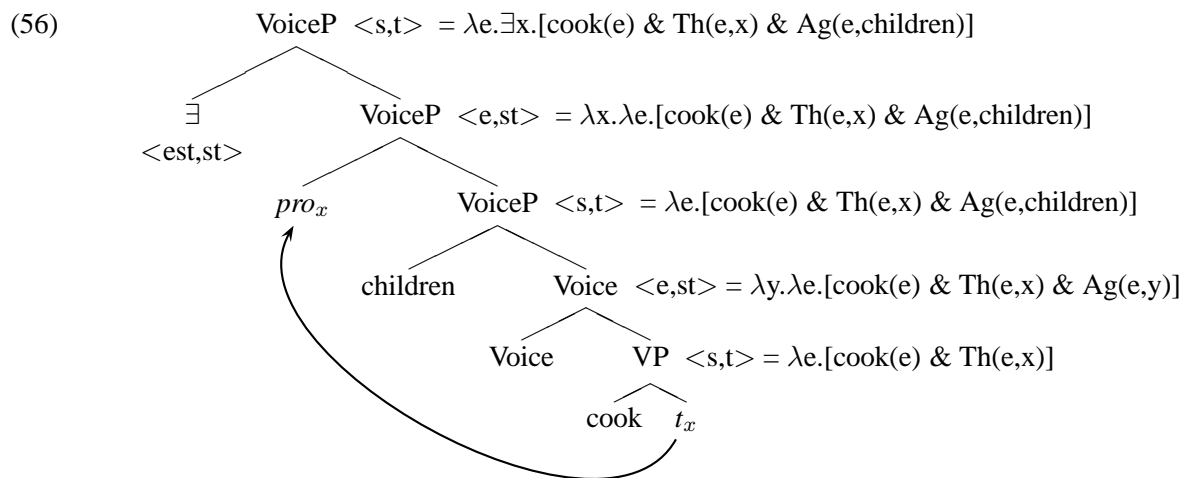


In this theory, NPs that are merged directly into the specifier of a head cannot satisfy the featural requirements of that head. Therefore, if Appl has a feature that must be checked, only an NP in its complement can move to check that feature; the applied argument, *wife*, may not. By moving and merging into a second

specifier of ApplP, the lower NP manages to cross the first, thereby getting around Relativized Minimality for further movement. In the passive, for instance, a higher head will attract an NP to subject position; by Relativized Minimality, in the structure in (55), the highest NP is now the lower object, and so that is the one that will move. See McGinnis (2004) for further details of this movement, and a justification of why only the symmetric object languages permit this feature to appear on Appl.

This theory would explain the unspecified object deletion and object marker facts in a similar way. Alec Marantz (p.c.) suggests that unspecified object deletion involves a null object pronoun, which reduces symmetric object deletion to symmetric object markers. The object markers themselves have been argued by various authors to be incorporated object pronouns (e.g., Bresnan and Mchombo 1986, 1987; Mchombo 1993, citing Mchombo 1986, an unpublished manuscript). If the object pronouns move to their preverbal position, the constraints on this movement will be exactly the same as the constraints on passive movement. Thus it follows in McGinnis’s theory that asymmetric object languages will permit only the applied argument to agree in the object marker, but symmetric object languages will permit either object to.

This theory can also explain the reciprocalization facts within the theory of verbal reciprocals advocated here. The theory of reciprocals requires an unsaturated predicate as complement of RecipV. If it is ApplP that is unsaturated, everything can combine as above, giving us agent and benefactive/goal reciprocals. The problem is having the open argument be the theme. If the theme is simply not projected, Appl cannot combine with VP, and the structure will crash before it ever gets to RecipV. However, there is another possibility given the movement account of symmetric object languages just described. As stated, unspecified object deletion in this theory is movement of a null pronoun. Suppose that this null pronoun is a simple variable semantically, which gets bound by existential closure (Heim 1982):



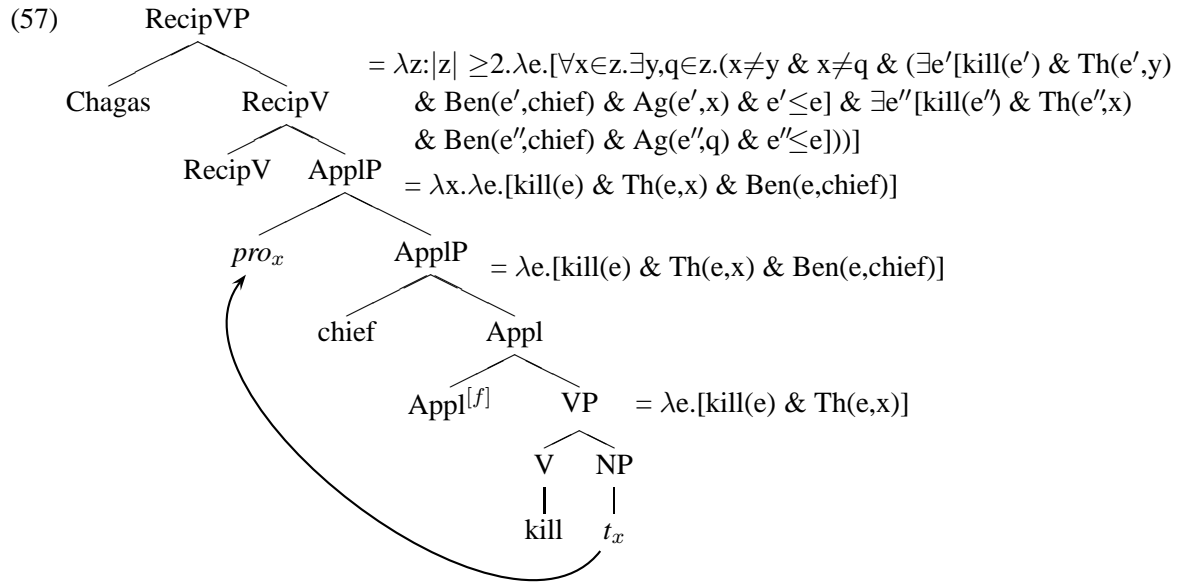
I follow Heim and Kratzer 1998, among others, in assuming that movement of the null pronoun leaves a trace of type $\langle e \rangle$, and movement abstracts over the adjoined-to structure, creating a node of type $\langle e, st \rangle$.¹⁸ This node is the appropriate type for combination with the existential quantifier inserted through existential closure, which I will assume is adjoined to VoiceP. Unspecified object deletion then ends up meaning something like, “there is an x such that the children are cooking x ”; that is, it is essentially equivalent to *the children are cooking something*. (The null pronoun has to be quite restricted, and limited in its range to canonical objects of the verb. See Rizzi (1986) on null objects in Italian, which can only range over people in general.)

Now, if there is an intervening NP, movement of the null pronoun is blocked by Relativized Minimality, as described above. So the asymmetric object languages like Chichewa will not permit a null object pronoun

¹⁸I assume that the only position that is available for movement is VoiceP, following Chomsky (2000), and not VP, though this does not materially affect the analysis. See also Bruening 2001a on quantifier raising to this position in ditransitives.

(i.e., unspecified object deletion) in the presence of an applied argument.¹⁹ However, in the symmetric object languages like Kichaga, Appl can be generated with a feature that will attract the null pronoun to a second specifier, putting it in a position where it is no longer c-commanded by the applied argument, as illustrated above in (55). It can then move on to VoiceP, where it will abstract over VoiceP, and that whole will combine with the existential quantifier (I assume that intermediate traces do not abstract over the adjoined-to node, being semantically vacuous).

Now suppose this same movement were to take place prior to merger of RecipV. Movement of the null pronoun will abstract over ApplP, creating an open predicate that is the appropriate type for RecipV:



The sister of RecipV has an open argument position, as required, only now the open argument position is the lowest one, the theme. RecipV will combine with ApplP as shown, relating the agent and theme in the way described above.

This movement theory, then, proposed specifically for locality-violating passive movement, can extend nicely to unspecified object deletion, object markers, and also to symmetric reciprocals in the symmetric Bantu languages. The theory is by no means an ad-hoc solution to the unexpected reciprocalization pattern, but is a single and simple solution to the whole complex of symmetric object properties. To the extent that it interacts with the theory of verbal reciprocals proposed here to explain exactly the attested facts, both theories are supported.

One final point to note is that even in symmetric object languages, there is no such thing as a reciprocal applicative in which the applied argument and the theme are the reciprocal arguments (*‘I gave the slaves each other’). This follows from the analysis of the reciprocal morpheme given here, where the RecipV head is an agent-introducing Voice head. There simply is no RecipAppl head that could perform the same job with an applied argument. (Keenan and Razafimamonjy 2004 note that the reciprocal morpheme in Malagasy always attaches to the so-called “actor voice” or “agent voice” form of the verb, supporting the idea that RecipV is only an agent-introducing head.)

4.4 Causatives

Another type of valence-changing morphology in the languages of the world is the causative. Passamaquoddy, our language of illustration thus far, does not have morphological causatives, so we will begin by looking at

¹⁹Even if the existential quantifier could bind the pronoun in situ, it could not combine with VoiceP because it requires an open predicate as its sister. That is, I assume that there is no free insertion of index binders.

a Japanese example of a causative, like the following:

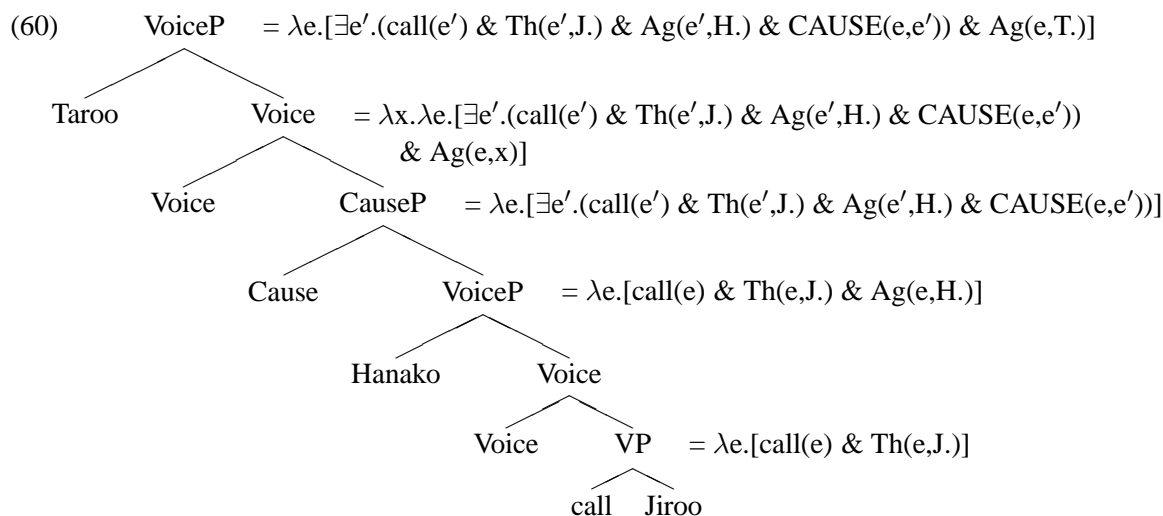
- (58) Taroo-ga Hanako-ni Jiroo-o yob-**ase**-ta.
 T.-Nom H.-Dat J.-Acc call-Cause-Past
 ‘Taroo made Hanako call Jiroo.’

In order to explain how reciprocals interact with causatives, I will again adopt the approach of Pylkkänen, this time her analysis of causatives in Pylkkänen 2000a, 2001. Pylkkänen suggests that a causative head is also a verbal head much like Kratzer’s Voice. What it does is combine with some kind of verbal projection of type $\langle s,t \rangle$, a predicate of events, and return another predicate of events, type $\langle s,t \rangle$:

- (59) $[[\text{Cause}]] = \lambda P_{\langle s,t \rangle} . \lambda e . [(\exists e') (P(e') \ \& \ \text{CAUSE}(e,e'))]$

What the head does is introduce a second event, where that event is the cause of the event that its sister is a predicate of. That is, Cause relates the event of the VP/VoiceP and a causing event.

Notice that there is no mention of a causer in this denotation. Pylkkänen explicitly argues that the causer is not an inherent part of the Cause head, as causatives can appear without causers in languages like Finnish (desiderative causatives) and Japanese (adversity causatives). Where a causer does appear, it is again added by Kratzer’s Voice head, again through Event Identification:



Voice adds an agent to the event just like it does in a non-causative, by Event Identification. Only now, because Cause has introduced a second event, there are two events, each of which has its own agent.²⁰

4.5 Causatives Plus Reciprocals

Japanese can attach a reciprocal morpheme to a causativized verb, resulting in a reciprocal interpretation for the causer and causee (agent of the causing event and agent of the caused event). An interpretation where the causer and the theme are the reciprocal arguments is not available:

- (61) Japanese (Yurie Hara, p.c.)

²⁰I have actually not adopted Pylkkänen’s own analysis of Japanese, but only her analysis of the causative head and its separation from Voice. Her own analysis does not embed a VoiceP under Cause in languages like Japanese. However, this analysis appears to me to be inconsistent with the assumptions of the Kratzerian approach to Voice that Pylkkänen adopts: if Cause can embed an agent, then, by Kratzer’s assumptions, there must be a VoiceP beneath Cause, since nothing else can possibly project an agent (by hypothesis).

- a. Taroo-to Hanako-ga Jiroo-o yob-**ase-at**-ta.
T.-and H.-Nom J.-Acc call-**Cause-Recip-Past**
'Taroo and Hanako made each other call Jiroo.' *'Taroo and Hanako made Jiroo call each other.'
- b. * Taroo-to Hanako-ga Jiroo-ni yob-**ase-at**-ta.
T.-and H.-Nom J.-Dat call-**Cause-Recip-Past**
'Taroo and Hanako made Jiroo call each other.'

The approach to the reciprocal morpheme outlined above can accommodate facts like these quite straightforwardly, so long as we loosen the requirements of the Cause head. Above it was given as type $\langle\langle s,t \rangle, \langle s,t \rangle\rangle$, that is, it takes a predicate of events and returns a predicate of events. In the reciprocal case, we need the lower agent to be unsaturated. That is, we need the complement of Cause to be a VoiceP that has not projected its argument. This would be type $\langle e, st \rangle$. Cause needs to be able to take this as its argument and return a function of the same type, as in the following:

$$(62) \quad \llbracket \text{Cause} \rrbracket = \lambda P_{\langle e, st \rangle} . \lambda x . \lambda e . [(\exists e') (P(e', x) \ \& \ \text{CAUSE}(e, e'))]$$

So Cause takes a predicate of type $\langle z \rangle$, where z is a variable over types, and returns a predicate of type $\langle z \rangle$. I will simply assume that the Cause head can shift its type from that in (59) to that in (62), although a more satisfying theory would provide a single denotation that allowed the first argument to vary in type.²¹

Assuming this, that Cause is not picky about the type of its sister, gives us exactly what we need for the reciprocal head. Recall that its first argument must be a predicate of type $\langle e, st \rangle$. If Cause can take such a predicate as its argument and return a predicate of the same type, the output of combining Cause and an open VoiceP will be exactly the right type for RecipV:

$$(63) \quad \begin{array}{l} \text{RecipVP} \\ \swarrow \quad \searrow \\ \text{T. \& H.} \quad \text{RecipV} \\ \swarrow \quad \searrow \\ \text{RecipV} \quad \text{CauseP} \\ \swarrow \quad \searrow \\ \text{Cause} \quad \text{Voice} \\ \swarrow \quad \searrow \\ \text{Voice} \quad \text{VP} \\ \swarrow \quad \searrow \\ \text{call} \quad \text{Jiroo} \end{array} \quad \begin{array}{l} = \lambda z : |z| \geq 2 . \lambda e . [\forall x \in z . \exists y, q \in z . (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\exists e 2 . (\text{call}(e 2) \ \& \ \text{Th}(e 2, J.) \\ \& \ \text{Ag}(e 2, y) \ \& \ \text{CAUSE}(e 1, e 2)) \ \& \ \text{Ag}(e 1, x) \ \& \ e 1 \leq e] \ \& \ \exists e 3 . [\exists e 4 . (\text{call}(e 4) \\ \& \ \text{Th}(e 4, J.) \ \& \ \text{Ag}(e 4, x) \ \& \ \text{CAUSE}(e 3, e 4)) \ \& \ \text{Agent}(e 3, q) \ \& \ e 3 \leq e])])]] \\ = \lambda x . \lambda e . [\exists e 1 . (\text{call}(e 1) \ \& \ \text{Th}(e 1, J.) \ \& \ \text{Ag}(e 1, x) \ \& \ \text{CAUSE}(e, e 1))] \\ = \lambda x . \lambda e . [\text{call}(e) \ \& \ \text{Th}(e, J.) \ \& \ \text{Ag}(e, x)] \\ = \lambda e . [\text{call}(e) \ \& \ \text{Th}(e, J.)] \end{array}$$

So RecipVP, that is, the sentence in (61a), will end up meaning:

$$(64) \quad \llbracket (61a) \rrbracket = \lambda e . [\forall x \in \text{T. \& H.} . \exists y, q \in \text{T. \& H.} . (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\exists e 2 . (\text{call}(e 2) \ \& \ \text{Th}(e 2, J.) \ \& \ \text{Ag}(e 2, y) \ \& \ \text{CAUSE}(e 1, e 2)) \ \& \ \text{Ag}(e 1, x) \ \& \ e 1 \leq e] \ \& \ \exists e 3 . [\exists e 4 . (\text{call}(e 4) \ \& \ \text{Th}(e 4, J.) \ \& \ \text{Ag}(e 4, x) \ \& \ \text{CAUSE}(e 3, e 4)) \ \& \ \text{Ag}(e 3, q) \ \& \ e 3 \leq e])])]]$$

To paraphrase, RecipVP is a predicate of events, where the event it is predicated of includes four sub-events: x agent of $e 1$ causing $e 2$ where y calls Jiroo; and q agent of $e 3$ causing $e 4$ where x calls Jiroo. Taking Taroo

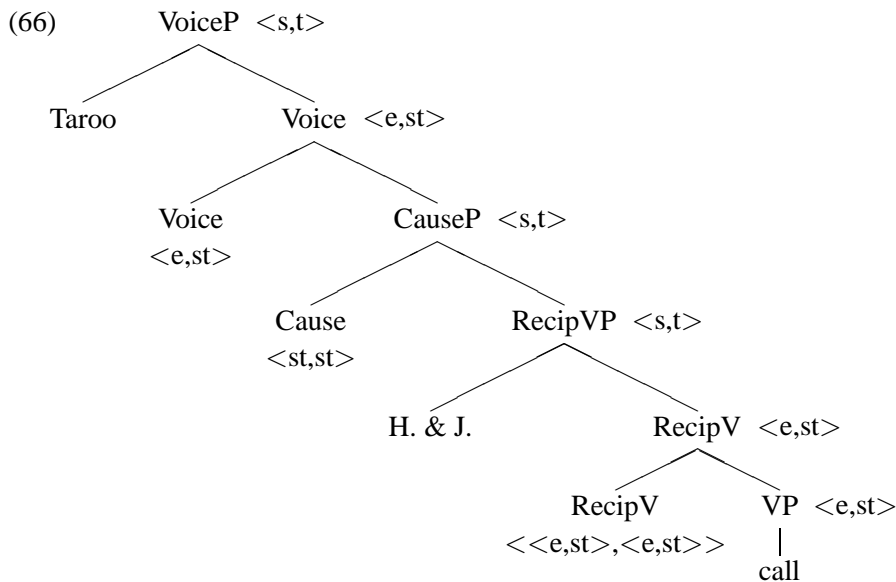
²¹One might object that this is unmotivated in comparison with the Appl head above, where it was crucial that Appl could *not* combine with an open VP. But note that there is a difference between the two cases, in the mode of combination involved: Appl combines by rule (Event Identification), but Cause combines by function application. Type-shifting has often been proposed for elements that need to combine with a sister of possibly different types by function application, but it is probably true that special composition rules like Event Identification are not flexible.

and Hanako as z , Taroo causes Hanako to call Jiroo, and Hanako causes Taroo to call Jiroo. This seems to be the correct semantics.

Japanese also permits the reciprocal morpheme to attach inside the causative morpheme. In this case the causee and the theme are interpreted as the reciprocal arguments:

- (65) Taroo-ga Hanako-to Jiroo-ni yobi-**aw-ase**-ta.
 T.-Nom H.-and J.-Dat call-**Recip-Cause**-Past
 ‘Taroo made Hanako and Jiroo call each other.’

This interpretation will follow simply from the Cause head combining with a RecipVP, which is a predicate of type $\langle s,t \rangle$:



This structure will end up meaning that Taroo is the agent of an event causing another event with sub-events of Hanako calling Jiroo and Jiroo calling Hanako, which seems correct. The interpretation is given formally below:

- (67) $\llbracket (65) \rrbracket = \lambda e. [\exists e3. (\forall x \in H. \& J. \exists y, q \in H. \& J. (x \neq y \ \& \ x \neq q \ \& \ (\exists e1. [\text{call}(e1) \ \& \ \text{Th}(e1, y) \ \& \ \text{Agent}(e1, x) \ \& \ e1 \leq e3] \ \& \ \exists e2. [\text{call}(e2) \ \& \ \text{Th}(e2, x) \ \& \ \text{Ag}(e2, q) \ \& \ e2 \leq e3])))] \ \& \ \text{CAUSE}(e, e3)) \ \& \ \text{Ag}(e, \text{Taroo})]$

Thus, the semantics and syntax proposed for the reciprocal morpheme as a syntactic head predict exactly the right meanings depending on the order of its combination with other heads. If it attaches outside of the causative, the causer and causee will be interpreted reciprocally; and if it attaches inside the causative, the causee and theme will be interpreted reciprocally. In addition, the order of morphemes in the verbal word will correlate perfectly with the interpretation, which is the case.²²

Bemba (Bantu) shows exactly the same facts (Givón 1976):

- (68) a. Naa-mon-**an-ya** Mwape na Mutumba.
 I-Past-see-**Recip-Cause** M. and M.
 ‘I made Mwape and Mutumba see each other.’

²²Some languages do not permit variation in where the reciprocal can attach. In the Turkic languages, for instance, it can attach only inside the causative (Özge Ozturk, David Harrison, p.c.), with only the lower reciprocal interpretation. Presumably languages can place additional morphological constraints on where these syntactic heads may appear.

- b. Mwape na Chilufya baa-mon-eshy-ana Mutumba.
 M. and Ch. 3pS-see-Cause-Recip M.
 ‘Mwape and Chilufya made each other see Mutumba.’

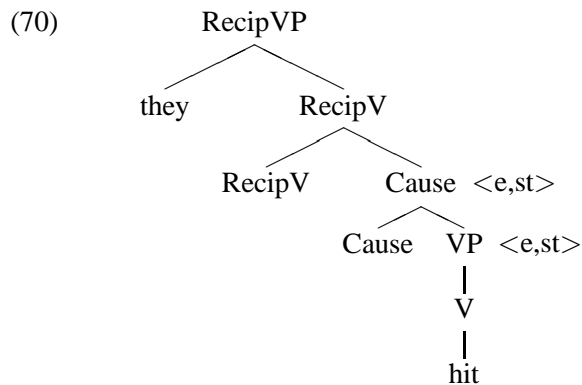
These are exactly the two readings that are predicted to exist, given two possible attachment sites for the reciprocal head. If it attaches to the verb root, the causee and theme will be the reciprocal arguments. If it attaches to a CauseP containing an unsaturated VoiceP, the causer and causee will be the reciprocal arguments. Crucially, it is impossible in this analysis to derive a meaning where the causer and the theme are interpreted reciprocally. This seems to be true: no language that I have found permits the causer and the theme to be interpreted reciprocally.²³

The only apparent counterexample I have found is Chichewa (Dalrymple, Mchombo, and Peters 1994, 151):

- (69) Alenje a-na-mény-ets-an-a (kwá mbûzi).
 2.hunters 2SM-Past-hit-Cause-Recip-FV (by 10.goats)
 ‘The hunters got each other hit (by the goats).’

However, this counterexample is only apparent. The translation makes it clear that the caused event in (69) has an unspecified subject, or is effectively passive; that is, it has also been detransitivized. This means that there really is no external argument of the caused event; the only two arguments are the causer and the theme, and it is these two that are interpreted as reciprocal.

I can see two ways to accommodate this example into the current theory; possibly both are allowed by UG. The first is to simply not project Voice inside Cause in an example like this:

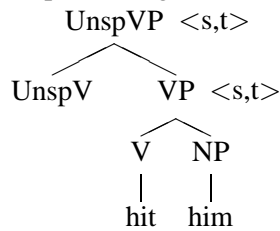


Recall that Cause can combine with an unsaturated phrase (VoiceP or, I assume nothing prevents, VP) and return a function of the same type. This will be the input for RecipV, returning something like ‘they caused hitting of each other’, with no agent of the lower event. (The agent can then be added as an adjunct *by*-phrase.)

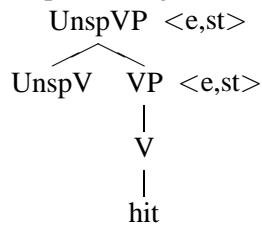
The second is to propose that unspecified subjects are introduced by a type of Voice, and are not just missing. This Unsp(ecified)V(oice) must be like Cause in taking either a function of type <e,st> or type <s,t> and returning a function of the same type:

²³Given the theory of movement outlined above for Bantu symmetric object languages, one might expect that those languages would allow the causer and the theme to be interpreted reciprocally. The theme might be able to move to CauseP and abstract over it, enabling RecipV to combine with a CauseP with an open theme argument. This would result in an interpretation like ‘Mwape and Mutumba made Chilufya see each other.’ However, in the movement theory only certain heads permit movement. Appl was one, but only in the symmetric languages. Cause may not be one, in any language. I have been unable to find out if an interpretation like this is indeed allowed in a Kichaga-type language; none of the references that I have consulted have given any examples combining reciprocals and causatives (Bemba is an asymmetric object language).

(71) a. ‘unspecified agent hit him’



b. ‘unspecified agent hit *x*’



Thus, UnspV passes on the unsaturated internal argument, forming the input to Cause and then RecipV in (69). In this Chichewa example, I would expect that the first option is correct, given the lack of any morphology between the verbal root and the causative morpheme. However, more work will need to be done to see what exactly is going on in example like this.²⁴

4.6 Reciprocals Plus Passives

Related to unspecified subjects are passives. Clearly the passive is a type of Voice (see Kratzer 1996 for her treatment of passives). However, given the data below from Kichaga, passive must be a head that attaches outside Voice; it does not replace it. In Kichaga passive can attach outside the reciprocal morpheme (Bresnan and Moshi 1990):

(72) Shĩ-mĩĩ sh-ĩ-kòr-í-àn-ò (nà wà-chàkà.
 8-firebrands 8S-Pres-burn-**Appl-Recip-Pass** (by) 2-chaga

²⁴Quechua presents another type of potential counterexample. As described in Muysken (1981), reciprocals plus causatives in Huanca Quechua behave as expected when the reciprocal morpheme appears either before or after the causative morpheme:

- (i) a. Ariiti-n-ta lika-**chi-naku**-yka-n.
 earring-3-Acc see-**Cause-Recip**-Dur-3
 ‘They are showing each other (causing each other to see) their earrings.’
 b. Pay-mi taka-**naku-chi**-yka-n walash-kuna-kaq-ta.
 he-Af beat-**Recip-Cause**-Dur-3 boy-Pl-Def-Acc
 ‘He is causing the boys to beat each other.’

But the reciprocal is actually bimorphemic, *na-ku*, where *ku* is the reflexive/medial/mediopassive suffix; when these two morphemes split around the causative, the interpretation is exactly the one that should not be allowed (instrumental is the normal case for the causee, but not for a passive agent):

- (1) Wamla-kuna-kag lika-**na-chi-ku**-n Albirtu-wan.
 girl-Pl-Def see-**NA-Cause-Refl**-3 Alberto-Instr
 ‘The girls let Alberto see them.’

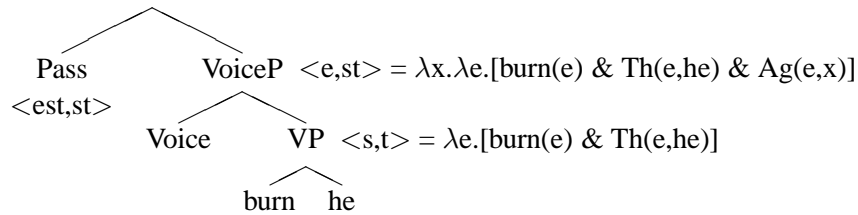
It turns out that this is the normal reading for the reflexive by itself in combination with the causative (‘the girls let Alberto see themselves’). Since there are good reasons to view verbal reflexives as fundamentally different from verbal reciprocals (see section 5), Quechua must be excluded from the languages under consideration here. The reciprocal seems to be built off of the reflexive, and is not RecipV as defined here. Further research is required to build a theory of verbal reflexives, which will hopefully then extend to Quechua reciprocals.

‘Firebrands are being used by the Chagas to burn each other.’

Passive must be a head that, like RecipV, combines with an unsaturated predicate. Pass(ive) will combine with an unsaturated VoiceP in a simple transitive:

(73) $[[\text{Pass}]] = \lambda f_{\langle e, st \rangle} . \lambda e . [f(e, \text{unspecified})]$

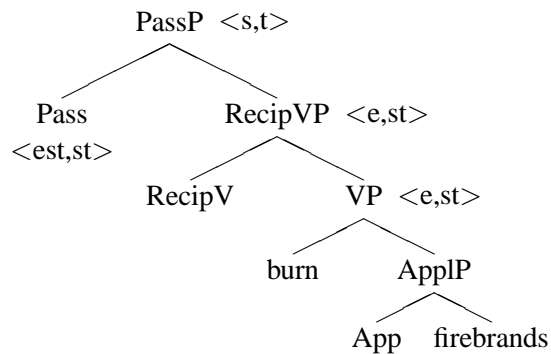
(74) $\text{PassP} \langle s, t \rangle = \lambda e . [\text{burn}(e) \ \& \ \text{Th}(e, \text{he}) \ \& \ \text{Ag}(e, \text{unspecified})]$



(Movement of the object will lead to the sentence ‘He was burned.’) Pass will state that the agent is unspecified, but, given that Voice is present, agentive semantics will be explicitly represented in the denotation of the passive (giving us all the implied agent effects familiar from the literature).²⁵

In the Kichaga example Pass will combine with an unsaturated RecipVP, which itself combined with an unsaturated VP (recall that instrumental applicatives are low):

(75)



Pass will then state that the unspecified agent is the one acting reciprocally ($\lambda e . [\forall x \in \text{unspecified} . \exists y, q \in \text{unspecified} \dots]$).

The proposed denotation thus interacts in predictable ways with other types of verbal morphology, with consequences for the treatment of elements like the passive. Since passive can attach outside of RecipV, which is a type of active Voice, Pass must generally attach to VoiceP. If so, we explain why passive morphology generally appears outside of an active stem in the languages of the world, and why passive includes agentivity (*the ship was sunk* versus *the ship sank*).

4.7 Conclusion

The theory of verbal reciprocals outlined here succeeds at explaining why we see only the patterns that we do in the languages of the world where reciprocal morphology can co-occur with other valence-changing morphology. Given the proposed denotation and syntactic theory of verbal morphology, we explain the interpretations that arise from different combinations of derivational morphemes. The only wrinkle was the Bantu symmetric object languages, but there a locality-avoiding movement process can be used to derive all the symmetric object properties, including the unexpected reciprocalization pattern.

To the extent that a syntactic theory of morphology like this succeeds in explaining the attested patterns (and which patterns are unattested), a syntactic approach to word formation is supported. Something like Baker’s Mirror Principle appears to be correct, as predicted by a syntactic theory.

²⁵ Antipassive could be viewed in this theory as a Pass head that selects VP rather than VoiceP.

5 Verbal Reflexives

If this theory of verbal reciprocals succeeds, we might want to have a similar analysis of verbal reflexives (for quite different theories of verbal reflexives, see Baker 1996, Lidz 2001, Reinhart and Siloni 2005). Two examples from Passamaquoddy appear below:

(76) Passamaquoddy

- a. (‘)-Macaha-n kcihku-k (‘)-naci-nehpuh-**usi**-n.
3-leave-N forest-Loc 3-go.do-kill.TA-Refl-N
‘He goes away into the woods to kill himself.’ (Mitchell 1921/1976a, line 117)
- b. N-komuton-**asi**-n nt-ahsusuwon.
1-rob.of-Refl-N 1-hat
‘I stole my hat from myself.’ (Leavitt 1996)

However, verbal reflexives in most languages differ from verbal reciprocals in several ways, which suggests that we do not actually want to unify them.

First, the verbal reciprocal is completely productive in Passamaquoddy, with a regular reciprocal interpretation. It also preserves the syntactic properties of the predicate it attaches to. The reflexive is not completely productive, and gives rise to idiosyncratic interpretations and a differing syntax. This can be illustrated with examples like the following:

(77) (Bruening 2001b, chapter 4)

- a. Susehp naka Piyel mili-kciciyu-**tuw**-ok eli Lehpit koti-tqon-at.
Jos. and P. varied-know.TA-**Recip**-3P C L. Fut-arrest-3Conj
‘Joseph and Peter know about each other that Lehpit will arrest them.’
- b. Nil n-pehki-kosiciyu-s eli Susehp koti-tqon-at Piyel-ol.
1 1-thoroughly-know.TA-**Refl** C Jos. Fut-arrest-3Conj P.-Obv
‘I know for sure that Joseph is going to arrest Peter.’

The verb meaning ‘know’ is a “raising to object” verb, which agrees with an argument from within its complement clause. It then means something like ‘know about X that...’. With the reciprocal this semantics is preserved, as illustrated in (77a). As with any raising to object verb, the argument that agrees with ‘know’ also has to be represented in the lower clause (see Bruening 2001b). This holds even when the verb is reciprocalized, as in (77a). It does not hold with the reflexive verb in (77b), however. No first person argument needs to be present in the lower clause. Additionally, the verb is not interpreted as ‘I know about myself,’ but, idiosyncratically, as ‘I know for sure/am certain.’ Hence, the reciprocal morpheme preserves the syntax (raising to object) and semantics of the base predicate, but the reflexive preserves neither.

Second, the reflexive morpheme has a variety of regular interpretations besides reflexivity in the languages of the world. It appears with passive, intransitive, inchoative, and mediopassive interpretations (Baker 1996 states that this is a property of reflexive morphology in polysynthetic languages generally). The reflexive morpheme is also a lexical part of many intransitive verbs, for instance verbs of thinking in Passamaquoddy.

Third, many languages have a verbal reciprocal but no verbal reflexive, for instance Japanese, numerous Turkic languages (D. Harrison, p.c.), and Malagasy (Keenan and Razafimamonjy 2004, note 2). This asymmetry would be unexpected if they were the same syntactic/semantic type of morpheme.

Fourth, even in languages that have both, the reflexive morpheme may differ considerably from the reciprocal in its syntactic and semantic properties (aside from the types of differences just illustrated in Passamaquoddy). Many of these differences in Bantu languages are documented by Mchombo (1993).

One difference, in strict and sloppy identity, was illustrated above. Mchombo argues that the reciprocal morpheme in Bantu languages is a derivational, valence-changing morpheme as in the theory here, but the reflexive is an incorporated pronoun. (Other works on Bantu also regard the reflexive as a type of pronoun, for instance Givón 1976, 348.)

For all of these reasons, therefore, I do not want to extend this theory of verbal reciprocals to verbal reflexives, at least in any of the languages that I have looked at.²⁶ Ultimately it will be important to understand why this asymmetry between reciprocal and reflexive morphology exists, but at this point I have no suggestions to offer.

6 Syntax or Lexicon?

I have outlined here a syntactic account of a particular type of morphological word formation, and argued that it makes exactly the right predictions for both the syntax and the morphology of verbal reciprocals. To the extent that it is successful, it argues for a purely syntactic approach to word formation, and against theories of lexical derivation of similar verbal morphemes. One recent theory of this sort is the Lexicon-Syntax Parameter of Reinhart and Siloni (2005). Reinhart and Siloni argue that verbal reflexives can be formed either in the lexicon, or in the syntax, with concomitant differences in how the result interacts with other phenomena. This sort of theory crucially requires an operative lexicon, one with rules and operations. In contrast, the theory that I have advanced here can do without an operative lexicon, handling as it does all combinatorics in the syntax.

One argument against an operative lexicon is the fact that verbal reciprocals do not fit neatly into Reinhart and Siloni's "lexicon-syntax" split. On some measures verbal reciprocals must be a lexical process, but on others they must be syntactic, even in the same language. I suspect that the same is true of *every* process (even the ones Reinhart and Siloni discuss), arguing against such a neat split and for a purely syntactic theory.

Some of the criteria that Reinhart and Siloni discuss for reflexives (basically following Wasow 1977) are the following: If reflexivization can apply to an exceptionally case-marked object (ECM), it must be syntactic, not lexical; syntactic reflexivization is completely productive, but lexical reflexivization may be limited in the verbs it can apply to; and lexical but not syntactic reflexivization can feed further derivation, for instance nominalization.

The previous section noted that verbal reciprocals in Passamaquoddy are completely productive, and may apply to any transitive verb. It also showed that the Passamaquoddy equivalent of ECM, raising-to-object, can feed reciprocalization. According to Reinhart and Siloni, then, verbal reciprocals in Passamaquoddy must be syntactic, not lexical. However, verbal reciprocals form the input to further derivation in Passamaquoddy. For instance, they can feed nominalization, as in the following example:

- (78) wolasihka-wotu-wakon
 greet.TA-Recip-Nom
 'greeting'

The suffix *-akon* (the *w* is epenthetic) forms nouns from verbs, as in *epeskom-akon*, 'ball', from the verb meaning 'to play ball'. There are clear criteria (both morphological and syntactic) distinguishing nouns from verbs in Passamaquoddy, so it is abundantly clear that a categorial change has occurred with such nominalizations.

²⁶At least one language, Wikchamni (California Penutian), seems to use the same morpheme as both a reflexive and reciprocal, with ambiguity when the subject is plural (Gamble 1978). Quechua (note 24, above) builds the reciprocal from the reflexive plus another morpheme, as does Mohawk (Baker 1996). I regard these as outside the theory of reciprocals pursued here. Similarly for the so-called "reciprocal verbs" of Hebrew and various European languages discussed by Siloni (2001, 2005) and Reinhart and Siloni (2005); these also include (or are identical with) reflexive morphology.

Productivity and ECM, then, put Passamaquoddy verbal reciprocals on the syntax side, but nominalizations put them on the lexical side. Reinhart and Siloni’s lexicon-syntax parameter is unhelpful in describing or predicting the properties of verbal reciprocals.

Moreover, the difference between verbal reciprocals and verbal reflexives in Passamaquoddy discussed in the last section looks very much like Reinhart and Siloni’s lexicon-syntax split. Reciprocals are productive and may apply to ECM objects, but reflexives are not productive and may not apply to ECM objects. The problem is that, according to Reinhart and Siloni, the lexicon-syntax parameter is set once for a language, and should apply uniformly to both reflexives and reciprocals. Passamaquoddy would have to have one value for reciprocals and another for reflexives. Moreover, reflexives and reciprocals do not differ in their ability to form the input to further derivation in Passamaquoddy, meaning, once again, that the lexicon-syntax parameter is simply unhelpful in describing the difference.

All of this argues against a lexical approach. In general, there are numerous instances of the phenomenon just described for Passamaquoddy, where a process that must be syntactic according to some criteria can easily feed a process that, by the same criteria, must be lexical. See, for instance, Goddard 1988, on such phenomena in Fox. A lexicon-syntax split will only lead to contradictions. Of course, it is incumbent upon a purely syntactic theory to derive what have traditionally been described as “lexical” properties and how they differ from “syntactic” properties, but this is not the place to attempt such a grand undertaking.

7 The High-Scope Reading of Reciprocals

As stated above, verbal reciprocals in embedded clauses could have two readings in Passamaquoddy and Chichewa. A Passamaquoddy example is repeated below:

- (79) Piyel naka Susehp toqi=te litahasuw-ok kisi-tomh-**utu**-wok.
 P. and Jos. both=Emph think-3P Perf-defeat-**Recip**-3P
 ‘Peter and Joseph both think that they defeated each other.’
- a. Peter and Joseph both think: Peter defeated Joseph and Joseph defeated Peter. (low scope)
 - b. Peter thinks Peter defeated Joseph and Joseph thinks Joseph defeated Peter. (high scope)

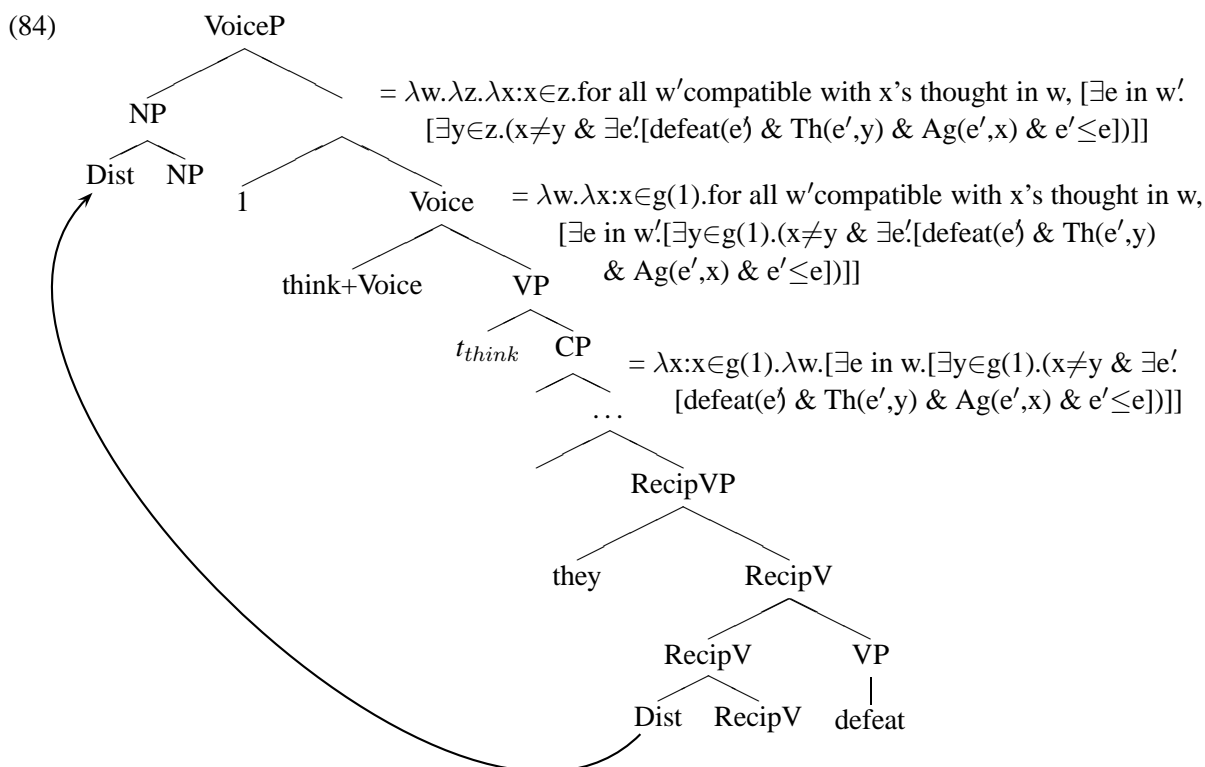
In Section 3.6 I proposed that the reciprocal morpheme is actually composed of two separate pieces, RecipV and a Dist operator, and that the high-scope reading is obtained by moving Dist and adjoining it to the subject of the higher clause. However, I left that computation unillustrated, as it depends on several other notions. In this section I spell out those notions and show how the high-scope reading can be obtained.

Above I showed how the low-scope reading would compute in this theory, with Dist moving and adjoining to the local subject. In the high-scope reading, Dist will move and adjoin not to the most local NP, but to the NP in the higher clause:

What remains to be done is to translate our RecipVP denotation, which includes a predicate of events, into the language of possible worlds. Since the details of this would take us too far afield, I will simply gloss over it and assume that something happens in between the extended VP and the CP level, something like existential quantification over events that relates them to worlds. Ignoring tense, suppose the end result is something like this, where the CP has an open individual argument and an open world argument:

$$(83) \quad \llbracket \text{CP} \rrbracket = \lambda x: x \in g(1). \lambda w. [\exists e \text{ in } w. [\exists y \in g(1). (x \neq y \ \& \ \exists e'. [\text{defeat}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e])]]]$$

Think and its complement CP can now combine, producing a predicate of individuals. I will further assume that when *Dist* moves and adjoins to the higher subject, it abstracts over the sister to the subject, as shown in the following tree. Through predicate abstraction the pronoun *they* becomes bound. This will enable everything to combine as shown:



Once *Dist* combines with the higher NP and then with the abstracted-over node, the denotation of the higher VoiceP will be the following:

$$(85) \quad \llbracket \text{VoiceP} \rrbracket = \lambda w. \forall x \in \text{NP} \rightarrow \text{for all } w' \text{ compatible with } x\text{'s thought in } w, \exists e \text{ in } w'. [\exists y \in \text{NP}. (x \neq y \ \& \ \exists e'. [\text{defeat}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e])]]]$$

If the NP is *Piyel naka Susehp*, as in the above example, then for each member of the set {Peter, Joseph}, that individual thinks that there was a defeating event in which he was the agent and some distinct member of the set {Peter, Joseph} was the theme. Since this set only has two members, Peter thinks he defeated Joseph and Joseph thinks he defeated Peter. This is the correct interpretation of this sentence on its high-scope reading.

One might, of course, object that switching from Two-Way Weak Reciprocity to One-Way Weak Reciprocity is an ad-hoc device, a trick used to get the sentence to compute. However, One-Way Weak Reciprocity does appear to be a possible meaning of reciprocal expressions. It is necessary in downward-entailing

think to take its own argument.

contexts as well, such as conditional and modal sentences (see Bruening 2005). Hence it is not that surprising that it appears here. Moreover, consider what the meaning of the sentence would be if we did use Two-Way Weak Reciprocity. It would be the following:

- (86) $[[\text{VoiceP}]] = \lambda w. \forall x \in \text{NP} \rightarrow \text{for all } w' \text{ compatible with } x\text{'s thought in } w, \exists e \text{ in } w'. [\exists y, z \in \text{NP}. (x \neq y \ \& \ x \neq z \ \& \ (\exists e'. [\text{defeat}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e]) \ \& \ \exists e''. [\text{defeat}(e'') \ \& \ \text{Th}(e'', x) \ \& \ \text{Ag}(e'', z) \ \& \ e'' \leq e])]]]$

If the NP is *Piyel naka Susehp* again, then for each member x of the set {Peter, Joseph}, x thinks that there were two sub-events, one a defeating event in which he was the agent and some distinct member of the set {Peter, Joseph} was the theme, and one in which he was the theme and some distinct member of the set {Peter, Joseph} was the agent. Since this set only has two members, Peter thinks he defeated Joseph and Joseph defeated him, and Joseph thinks he defeated Peter and Peter defeated him. This is exactly the same as the low-scope reading. Therefore, simply as a descriptive fact, the meaning of the reciprocal could not be Two-Way Weak Reciprocity, but only One-Way Weak; therefore we must use One-Way Weak if we are to capture the truth conditions of the high-scope reading, and doing so is not ad-hoc at all.

Of course, why the grammar allows or forces the use of One-Way Weak Reciprocity is another question, but it is not one that can be answered here. We can hypothesize that it is related to the fact that the Two-Way Weak interpretation would be equivalent to the low-scope reading. For instance, one could hypothesize that there would be no point in moving Dist into the higher clause if the denotation of RecipV had to remain Two-Way Weak, and hence, by some kind of economy condition (see, e.g., Fox 1995), Dist could only move if One-Way Weak Reciprocity was allowed to hold. Spelling out such a condition presents numerous difficulties, however, and I therefore leave it to future research.

One final point to note is that, because of the way RecipV works in this theory, there is no way to allow a high-scope reading if the matrix subject does not bind the lower subject. This accounts for the fact, noted by Dimitriadis (1999), that high-scope readings are restricted to cases of dependent plural pronouns. Hence high scope is not allowed in a sentence like the following, from Dimitriadis (1999):

- (87) John and Mary think that the boys like each other.
(\neq John thinks the boys like Mary and Mary thinks the boys like John.)

As noted above, the island facts in Passamaquoddy argue against Dimitriadis's own account of this restriction; only the theory here accounts for both facts.

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