

Verbal Reciprocals and the Interpretation of 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 initial /h/, 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 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.

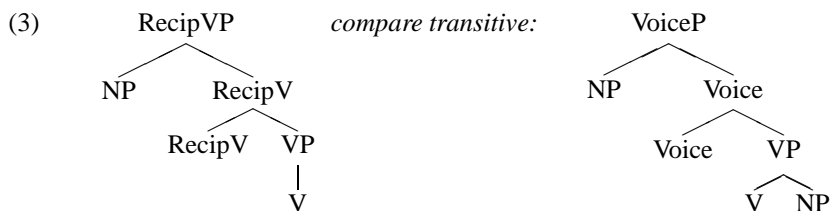
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¹The reciprocal morpheme is underlying /-(o)ti/. Stem-final *-i* regularly changes to *-u* before *w* in third person inflections. Letters have their usual values in Passamaquoddy transcriptions except that **o** = schwa, **q** = [k^w], **c** = alveopalatal affricate, **'** = initial *h* (phonetic effect initially 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** = obviative 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; **Ref** = reflexive.

²This prefix is historically /w/, which became devoiced and for most current speakers is reflected only in its effect on the following consonant. It is then not quite accurate to say that it deletes before sonorants; it just has no discernible effect on a following 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'.

Here I propose a syntax and semantics for these reciprocal morphemes, 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:



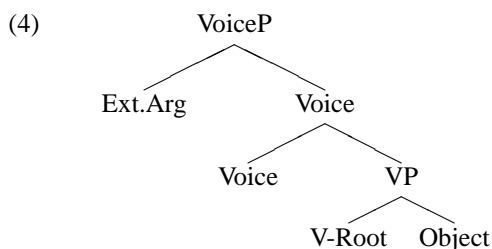
Normally V projects its internal argument inside VP, and Voice combines with VP as a predicate of events. Recip(rocal)V(oice), however, is a higher-order predicate that takes a VP with an unsaturated individual argument as its argument. It then introduces reciprocal semantics, stating that the argument 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.

Finally, Section 5 investigates the possible meanings of reciprocals cross-linguistically and shows that there are three different meanings in every language so far investigated. All three readings can be captured in a simple way in the theory of verbal reciprocals presented here.

2 External Arguments

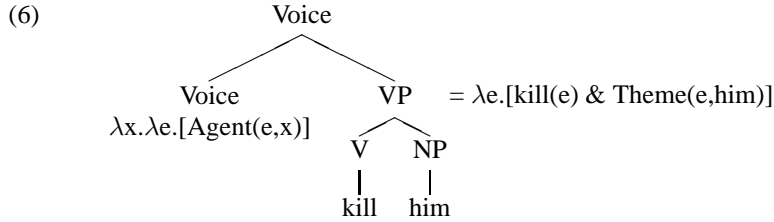
Recent research on the nature of external arguments has concluded that they are not actually arguments of the verb, but arguments of some higher projection (this idea goes back at least to Marantz 1984). Kratzer (1996) and Chomsky (1995, 1998) suggest that the external argument is not an argument of 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:³



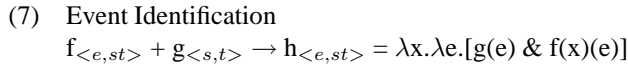
The way this works semantically in Kratzer’s system is that the verb is a two-place predicate taking an individual argument (type $\langle e \rangle$) and an event argument (type $\langle s \rangle$), as in (5). It combines with its internal argument to produce a one-place predicate of events, as shown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

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

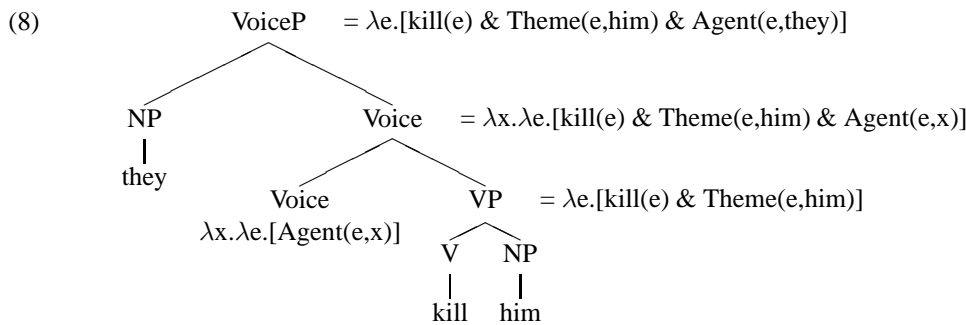
³Marantz (1997) further argues that the Voice head is responsible for turning a category-less root into a verb, with various consequences for derivational morphology. This function of the Voice head will not be important here, although questions do arise in analyzing particular languages. For instance, 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 Voice head combines with the VP via the operation of Event Identification:



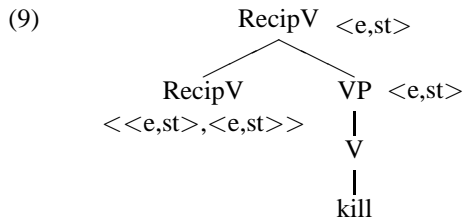
Event Identification takes two predicates of events, one of which also takes an individual argument, and turns them into a single predicate of events taking a type $\langle e \rangle$ argument, basically by conjoining them. The full derivation is shown below:



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.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:

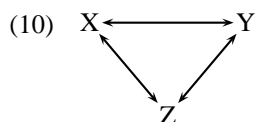


That is, normally a verb will project its type $\langle e \rangle$ argument within VP, leaving only a predicate of events, type $\langle s,t \rangle$. The RecipV head, however, selects a VP with an unsaturated individual argument, meaning that no internal argument is projected. Thus, the verb becomes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

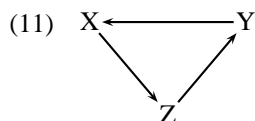
⁴Transitive verbs generally come in pairs in Algonquian languages: one form for animate objects (TA, for Transitive Animate), another for inanimate objects (TI, for Transitive Inanimate). What is referred to as the *final* encodes the animacy of the object. Thus, corresponding to *nehpah-*, ‘kill (TA)’, 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 3.

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 (see Dalrymple *et al.* 1998b and references there, and Section 5), and this seems to be true in for verbal reciprocals as well. However, I show in Section 5 that reciprocals in the languages I have investigated so far, including English, are limited to three distinct interpretations. (Previous 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.) I will show in Section 5 how to capture these three readings in the theory of verbal reciprocals developed here. For the moment, as a starting point, I will limit the denotation of the reciprocal morpheme to Two-Way Weak Reciprocity.

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 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 (see Section 5) 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:



I will argue in Section 5 that this two-way requirement is the strongest requirement that holds of eventive reciprocals; hence I will formulate the meaning of the verbal reciprocal in terms of Two-Way Weak Reciprocity rather than Strong Reciprocity.

The strong interpretation is easily available for a Passamaquoddy sentence like the following, and a similar English example in (13):

- (12) 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)

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

It is easy to interpret a sentence like (13) 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.

There are other forms of reciprocal meanings that appear with different predicates, but, as already indicated, I will delay discussion of them to Section 5. For the moment, I will simply use the Two-Way Weak Reciprocity illustrated in (11). Borrowing the semantics from Langendoen (1978), the denotation of the reciprocal morpheme that I propose is the following:⁵

⁵Keenan 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) Recip(p)(A) = True if and only if for all distinct x,y in A, p(y)(x) = True

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

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

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:

- (15)
- | | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RecipVP | |
| / \ | |
| they RecipV | $= \lambda z: z \geq 2 . \lambda e . [\forall x \in z . \exists y, q \in z . (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [\text{hunt}(e') \ \& \ \text{Th}(e', y) \ \& \ \text{Ag}(e', x) \ \& \ e' \leq e] \ \& \ \exists e'' [\text{hunt}(e'') \ \& \ \text{Th}(e'', x) \ \& \ \text{Ag}(e'', q) \ \& \ e'' \leq e])])]$ |
| / \ | |
| RecipV VP | |
| | |
| hunt | $= \lambda x . \lambda e . [\text{hunt}(e) \ \& \ \text{Th}(e, x)]$ |

Thus the denotation of RecipVP in (12), *'-kotunol-oti-ni-ya*, 'they hunt each other', will be the following:

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

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 Passamaquoddy⁶ (and the corresponding one in English).

3.1 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.)

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:

- (17) (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.' |

⁶Passamaquoddy 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.

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

- (18) ?* *Kodomo-ga ashi-o futa-ri keri-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.

3.2 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:

- (19) *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 (35b). 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.):

- (20) * *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.⁷ Hence (20) is ill-formed.

3.3 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:⁸

- (21) *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.'

⁷Reciprocal morphology can appear on unaccusative verbs that can be coerced into unergativity. In that case they act like unergatives rather than unaccusatives.

⁸Bantu abbreviations (regularized from the various authors): **SM** = subject marker; **FV** = final vowel; **Hab** = habitual; **Pres** = present tense; **Pass** = passive; number = noun class.

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 (15) 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:

- (22) 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 7 below. On reciprocals in the Bantu languages, see Mchombo 1991, 1999, and Mchombo and Ngunga 1994.)

3.4 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):

- (23) 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 (23a), the reciprocal has scope only in the lower clause, while in (23b), 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):

- (24) 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.

- (25) 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):

- (26) 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:

- (27) 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):

- (28) 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.

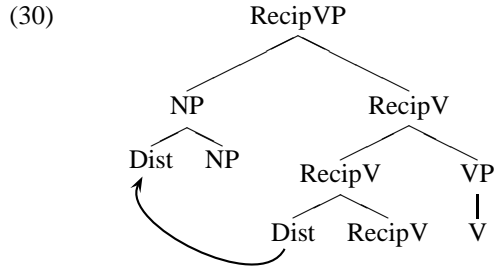
In addition, it appears that higher scope disappears when the reciprocal verb is embedded in a syntactic island, just as it does with English *each other*:⁹

- (29) 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.

⁹This 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.

- 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):



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.

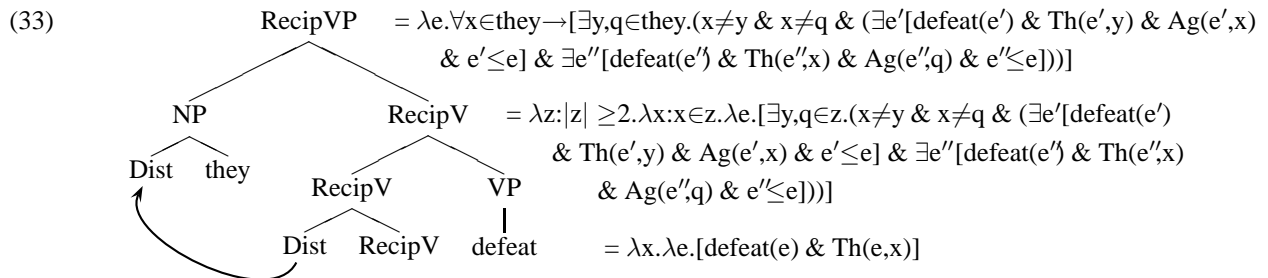
The denotations I propose for these two elements are the following:

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

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

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.

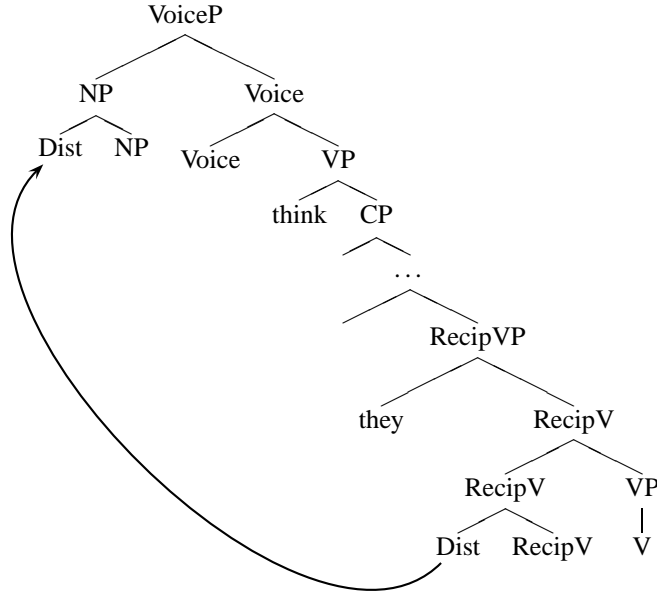
After Dist moves and adjoins to the external argument, the computation will work as shown below:



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:

(34)



In order to interpret this we need to make a few additional assumptions and hypotheses, one of which relies on the theory presented in Section 5. For that reason I will postpone to Section 6 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 (14). 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.¹⁰

¹⁰One 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 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-3PConj-PartObv
 ‘Who are Mary and *t* going around with each other?’

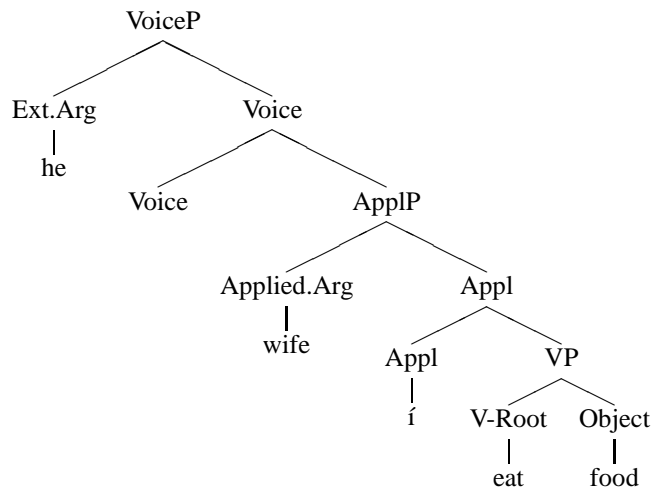
4 Reciprocals Plus Other Verbal Morphology

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:¹¹

- (35) 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.’
- b.



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

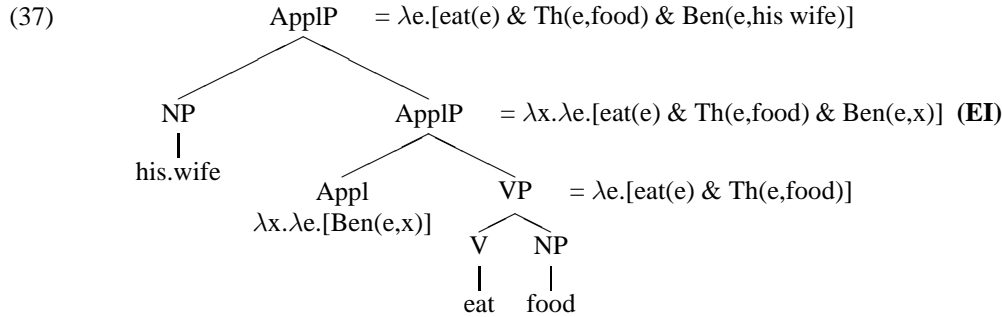
- (36) $[[\text{Appl}]] = \lambda x. \lambda e. [\text{Benefactive}(e, x)]$

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):

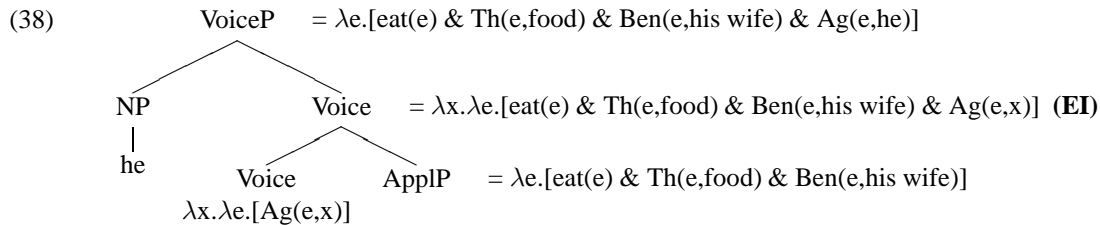
- (ii) Susehp apolahsatpih-ik Piyel-ol.
 S. be.bald-3P P.-Obv
 ‘Susehp and Piyel are bald.’

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.)

¹¹Bresnan and Moshi actually gloss (35a) 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.



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



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

Pylkkänen 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 (Pylkkänen’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 $\lambda x.\lambda e.\text{Affect}(e,x)$. 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 Pylkkänen’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:¹²

- (39) a. Píl **'-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. Píl **'-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,

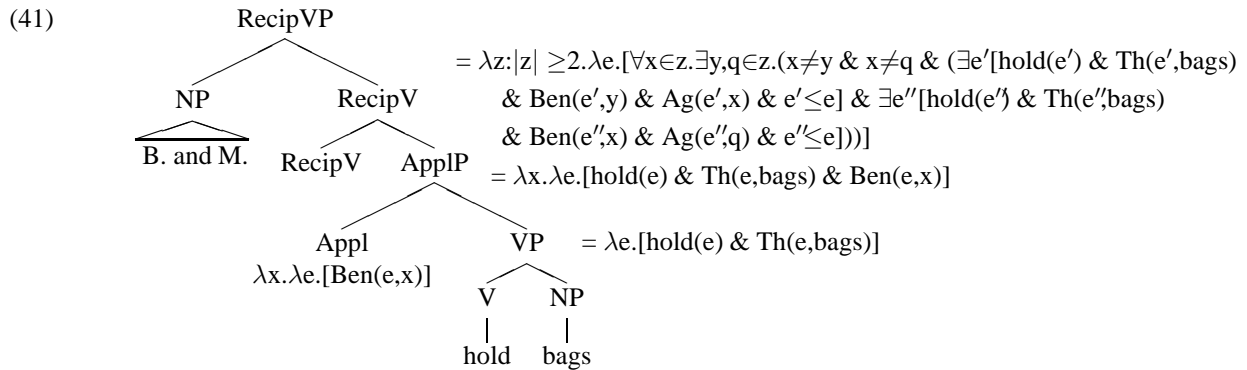
¹²Note that the stem to which the applicative attaches is not the TA stem, *-onuw-* in (39a), but the TI stem, *-onuhmo-* (the /w/ is epenthetic and schwa changes to /u/ before /w/ in 39b). This holds generally, even when the lowest argument is animate, as in (39b). This follows, I believe, from the TI stem being the default. (Additionally, the verb meaning ‘want’ in (39) 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.)

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 Pylkkänen 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:¹³

- (40) 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 $\langle e \rangle$ argument:



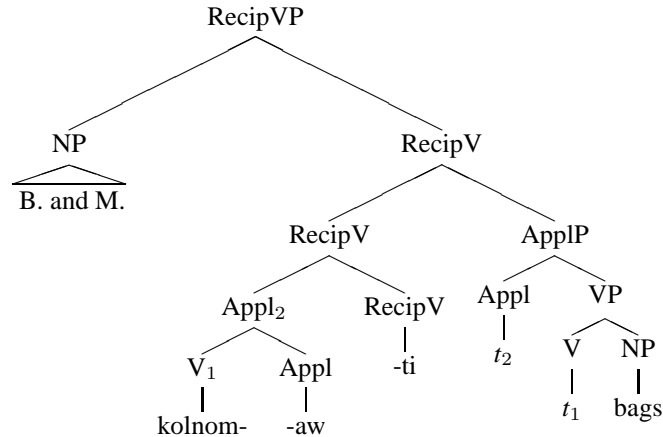
Because the reciprocal morpheme takes an open predicate f and relates its argument to the open argument of f , when it applies to an open ApplP the reciprocal arguments will be the agent and the benefactive, and never the agent and the theme. The theme role has been saturated within VP, and cannot therefore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

¹³As mentioned above, (40b) can also be interpreted as possessor raising: 'Bill and Mary are holding each other's bags.'

(42)



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:

- (43) 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.):¹⁴

(44) 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.

¹⁴Example (44c) can be interpreted as 'Taroo and *pro* gave each other slaves', if 'slaves' is marked accusative. This is again the predicted interpretation. Example (44d) 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.

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:¹⁵

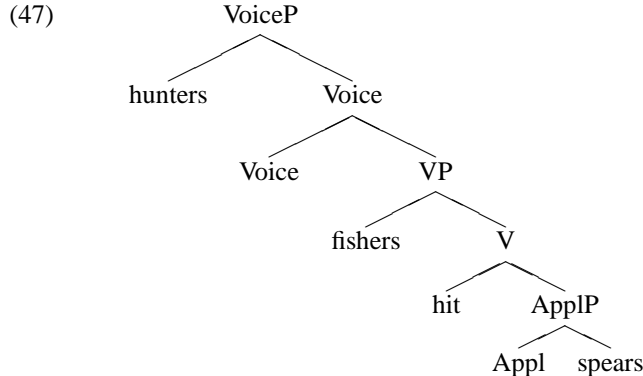
- (45) John-ga Mary-to Nancy-ni **otagai-o** syookaisi-ta.
 J.-Nom M.-and N.-Dat each.other-Acc introduce-Past
 ‘John introduced Mary and Nancy to each other.’ (Ishii 1989, note 2)

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:

- (46) Chichewa (Bresnan and Moshi 1990)
- 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 (48, 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):

- (48) Ana a-na-mény-**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.’

¹⁵In 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.

This follows because benefactive applicatives have the structure shown in (41), 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 Pylkkänen 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 (49a); but benefactive reciprocals unexpectedly allow an interpretation where the agent and theme are reciprocal, leaving out the benefactive (49b):

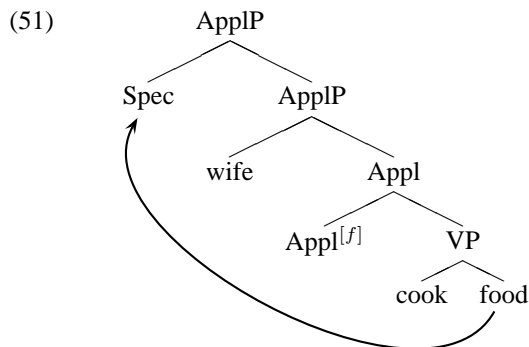
- (49) Kichaga (Bresnan and Moshi 1990)
- a. Wà-chàkà wǎ-ĩ-kòr-í-àn-à shí-mũ.
2-Chaga 2SM-Pres-burn-Appl-Recip-FV 8-firebrand
‘The Chagas are burning each other with firebrands.’
 - b. Wà-chàkà wá-í-w’ágh-ì-àn-à màngì.
2-Chaga 2SM-Pres-kill-Appl-Recip-FV 1.chief
‘The Chagas are killing each other for 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 (50b) are ungrammatical:

- (50) Kichaga
- a. M-kà n-ǎ-ĩ-lyì-í-ò k-èlyâ.
1-wife Foc-1SM-Pres-eat-Appl-Pass 7-food
‘The wife is being benefited/adversely affected by someone eating the food.’
 - b. K-èlyâ k-ĩ-lyì-í-ò m-kà.
7-food Foc-7SM-Pres-eat-Appl-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:

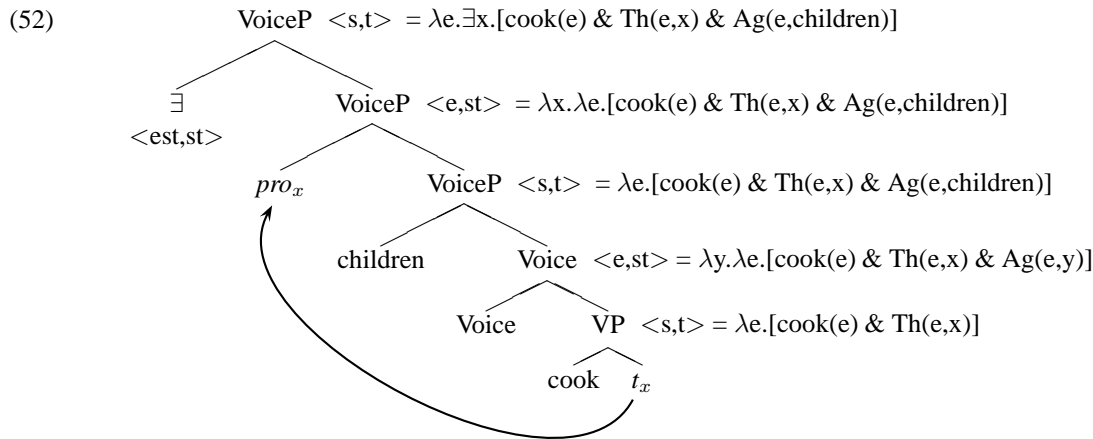


In this theory, NPs that are merged directly into the specifier of a head cannot satisfy the featural requirements of that head. Therefore, if Appl has a feature that must be checked, only an NP in its complement can move to check that feature; the applied argument, *wife*, may not. By moving and merging 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 (51), 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):



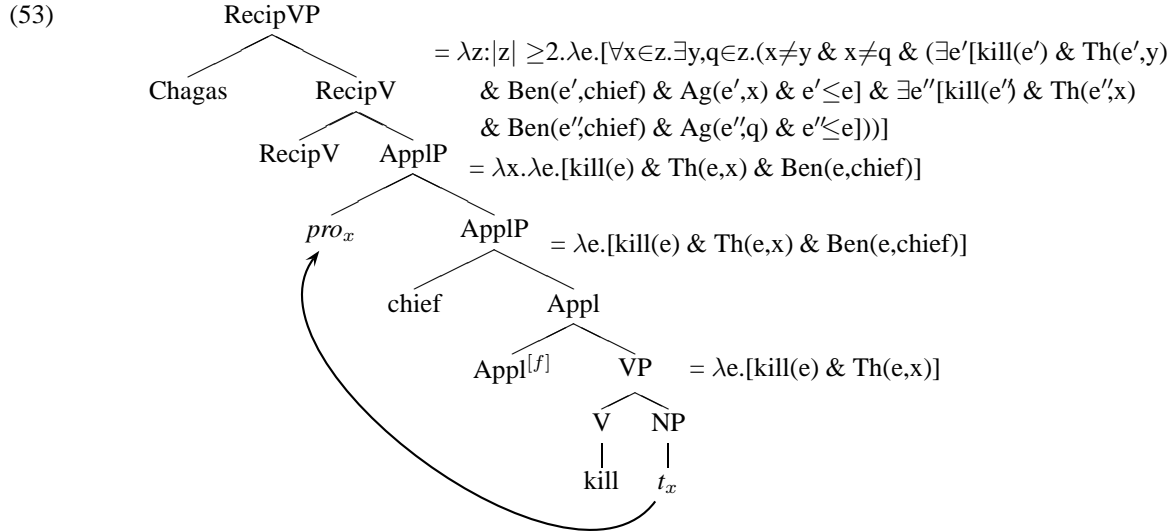
I follow Heim and Kratzer 1998, among others, in assuming that movement of the null pronoun leaves a trace of type $\langle e \rangle$, and movement abstracts over the adjoined-to structure, creating a node of type $\langle e, st \rangle$.¹⁶ This node is the appropriate type for combination with the 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 (i.e., unspecified object deletion) in the presence of an applied argument.¹⁷ 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 (51). 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:

¹⁶I assume that the only position that is available for movement is VoiceP, following Chomsky (1998), and not VP, though this does not materially affect the analysis. See also Bruening 2001a on quantifier raising to this position in ditransitives.

¹⁷Even 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.



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 a Japanese example of a causative, like the following:

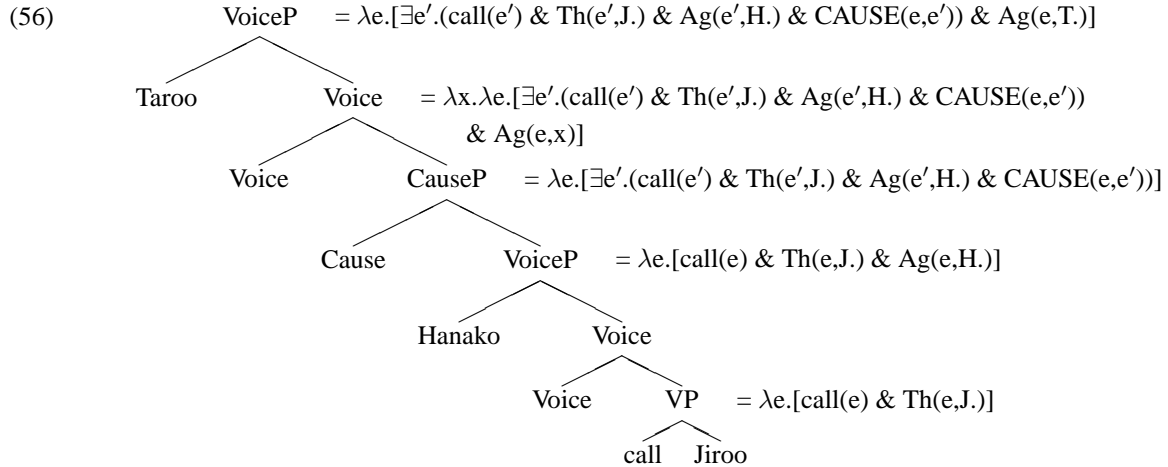
- (54) Taroo-ga Hanako-ni Jiroo-o yob-**ase**-ta.
 T.-Nom H.-Dat J.-Acc call-Cause-Past
 ‘Taroo made Hanako call Jiroo.’

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 $\langle s,t \rangle$:

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

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.¹⁸

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:

- (57) Japanese (Yurie Hara, p.c.)
- 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:

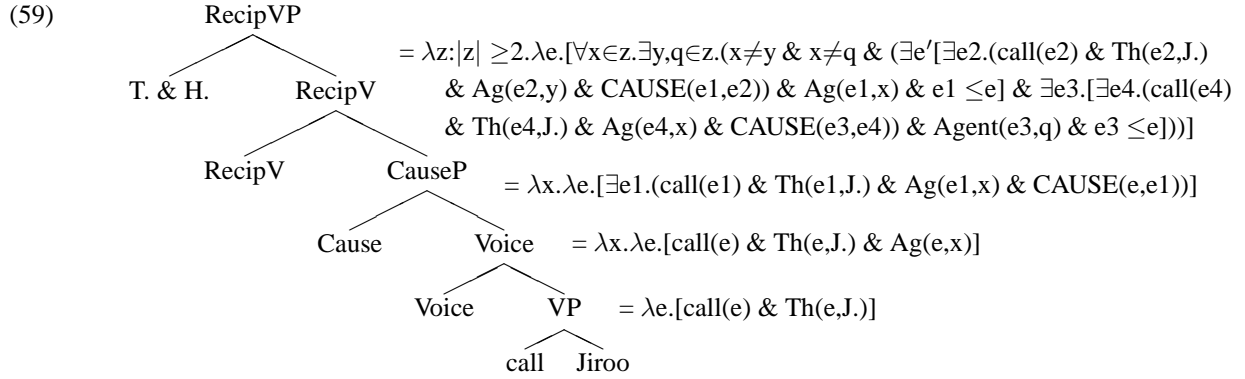
$$(58) \llbracket \text{Cause} \rrbracket = \lambda P_{\langle e, st \rangle} . \lambda x . \lambda e . [(\exists e')(P(e', x) \& \text{CAUSE}(e, e'))]$$

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 (55) to that in (58), although a more satisfying theory would provide a single denotation that allowed the first argument to vary in type.¹⁹

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:

¹⁸I have actually not adopted Pykkänen'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 Pykkänen 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).

¹⁹One 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.



So RecipVP, that is, the sentence in (57a), will end up meaning:

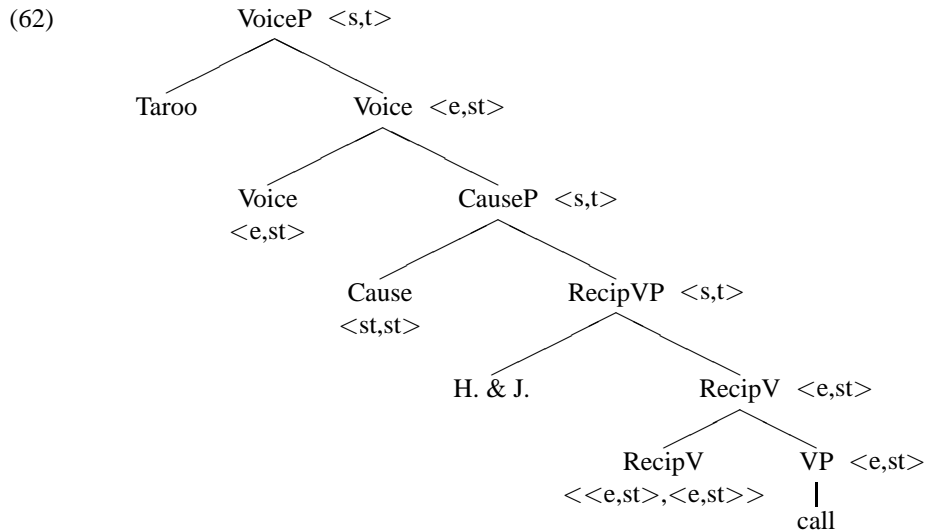
(60) $\llbracket(57a)\rrbracket = \lambda e. [\forall x \in T. \& H. \exists y, q \in T. \& H. (x \neq y \& x \neq q \& (\exists e' [\exists e2. (\text{call}(e2) \& \text{Th}(e2, J.) \& \text{Ag}(e2, y) \& \text{CAUSE}(e1, e2)) \& \text{Ag}(e1, x) \& e1 \leq e] \& \exists e3. [\exists e4. (\text{call}(e4) \& \text{Th}(e4, J.) \& \text{Ag}(e4, x) \& \text{CAUSE}(e3, e4)) \& \text{Ag}(e3, q) \& e3 \leq e]))]$

To paraphrase, RecipVP is a predicate of events, where the event it is predicated of includes four sub-events: x agent of $e1$ causing $e2$ where y calls Jiroo; and q agent of $e3$ causing $e4$ where x calls Jiroo. Taking Taroo 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:

- (61) Taroo-ga Hanako-to Jiroo-ni yobi-**au-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 $\langle s, t \rangle$:

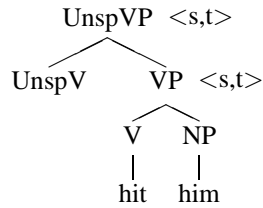


This structure will end up meaning that Taroo is the agent of an event causing another event with sub-events of Hanako calling Jiroo and Jiroo calling Hanako, which seems correct. The interpretation is given formally below:

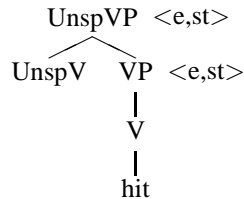
(63) $\llbracket(61)\rrbracket = \lambda e. [\exists e3. (\forall x \in H. \& J. \exists y, q \in H. \& J. (x \neq y \& x \neq q \& (\exists e1. [\text{call}(e1) \& \text{Th}(e1, y) \& \text{Agent}(e1, x) \& e1 \leq e3] \& \exists e2. [\text{call}(e2) \& \text{Th}(e2, x) \& \text{Ag}(e2, q) \& e2 \leq e3])))] \& \text{CAUSE}(e, e3)) \& \text{Ag}(e, \text{Taroo})]$

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

(67) 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 (65). 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.²²

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):

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

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

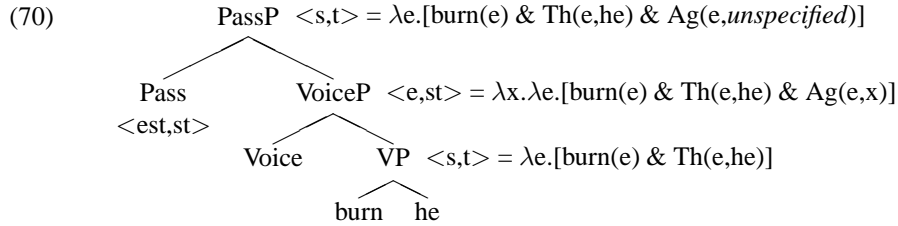
²²Quechua presents another type of potential counterexample. As described in Muysken (1981), reciprocals plus causatives in Huanca Quechua behave as expected when the reciprocal morpheme appears either before or after the causative morpheme:

- (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):

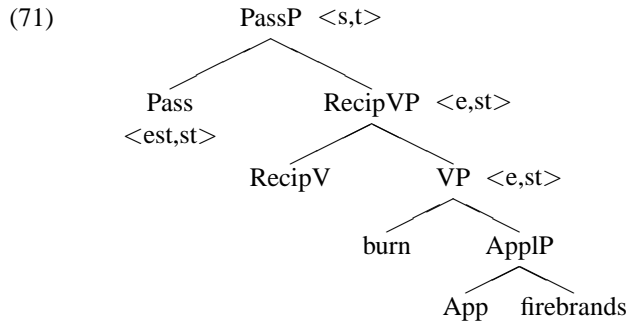
- (1) Wamla-kuna-kag lika-**na-chi-ku**-n Albirtu-wan.
 girl-Pl-Def see-**NA-Cause-Refl**-3 Alberto-Instr
 ‘The girls let Alberto see them.’

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 7), 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.



(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).²³

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



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.

5 The Interpretation of Reciprocals

There is a huge literature on the interpretation of reciprocals. Some of the more significant references are Fiengo and Lasnik 1973, Langendoen 1978, Heim, Lasnik, and May 1991, and, more recently, Dalrymple *et al.* 1998b, Beck 2001, and Schein 2001. I cannot hope to achieve anything like the coverage that all of these works have given us, but I do believe that cross-linguistic investigations of the sort that occupies this paper can tell us several important things about reciprocals.

Most importantly, I believe that much of the confusion regarding the possible interpretations of reciprocals disappears once we recognize a fundamental distinction between stative and eventive predicates (which was already noted

²³Antipassive could be viewed in this theory as a Pass head that selects VP rather than VoiceP.

by Fiengo and Lasnik 1973). As mentioned above, I argue that eventive reciprocals never have the meaning of Strong Reciprocity, contra Dalrymple *et al.* (1998b) and every other work on reciprocity. Instead, the strongest meaning that they have is the Two-Way Weak Reciprocity that was used in the text above. Once we realize this, all of the various interpretations that have been discussed reduce to either Two-Way Weak Reciprocity, in eventives, or Strong Reciprocity, in statives. Two-Way Weak Reciprocity can therefore be given as the basic meaning of an eventive reciprocal, nominal and verbal alike, and Strong Reciprocity as the meaning of a stative reciprocal. The distinction between statives and eventives appears in every language that I have investigated, both with nominal and verbal reciprocals, and is therefore fundamental.

Another important result that arises from cross-linguistic work is that we have to dispense with theories of reciprocals that rely too heavily on the fact that the English reciprocal is made up of two elements that can appear independently, *each* and *other* (Heim, Lasnik, and May 1991 and theories based on it, such as Beck 2001). None of the languages that I have investigated have this property, yet their reciprocals are interpreted in exactly the same way as English.

It is not my purpose here to argue against previous theories of reciprocal meanings, and so I will leave many points untouched and borrow freely from others where necessary. What I will do is the following. First, I will argue that eventive reciprocals never have a Strong interpretation; their only requirement is the Two-Way Weak one from above. In contrast, stative reciprocals *always* have a Strong interpretation, even in contexts that require weaker readings with eventives (such as downward entailing environments). Second, I will show that this is true in every language that I have investigated (Japanese, Chinese, Turkish, Indonesian). Third, I will try to show that all of the varieties of interpretations that have been proposed or noted in the literature can be reduced to Two-Way Weak Reciprocity in eventives and Strong Reciprocity in statives, once we make some additional observations and assumptions. Nevertheless, in particular syntactic contexts—downward-entailing environments and with high-scope readings of reciprocals—a weaker form of reciprocity is necessary for eventive predicates, One-Way Weak Reciprocity. We are therefore left with three meanings for reciprocals, one for statives and two for eventives. The fourth goal is then to show that these three readings can be built into the denotation of RecipV in a natural way, meaning that reciprocal elements are ambiguous but in a tightly constrained manner. A version of Dalrymple *et al.*'s (1998) Strongest Meaning Hypothesis then tells us which interpretation will obtain. Finally, Section 6 returns to the high-scope reading of reciprocals and shows how it can be computed in the resulting theory.

5.1 Strong Reciprocity

Fiengo and Lasnik (1973) noted that stative predicates require the strongest form of reciprocity, but other predicates allow a weaker interpretation. The following example, from Schein (2001), illustrates this quite nicely:

(72) The family members respected each other, and paid their respects at each other's funerals.

The first part of the sentence can only mean that every family member respects every other family member (Strong Reciprocity), but the second part does not require that every family member go to every other funeral (this would be impossible). Instead, all that is required is that each family member go to some other member's funeral, and some other member go to their funeral. This is Two-Way Weak Reciprocity from above.

Thus, stative predicates like *respect* require Strong Reciprocity, but eventive predicates like *pay respects* only require Two-Way Weak Reciprocity. For the purposes of the discussion in this section, I formalize these two interpretations below in the terms used by Dalrymple *et al.* (1998b), where A is the NP subject of the reciprocal and R is the predicate relation:

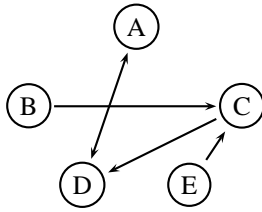
(73) Strong Reciprocity
 $\forall x, y \in A (x \neq y \rightarrow Rxy)$

(74) Two-Way Weak Reciprocity
 $\forall x \in A \exists y, z \in A (x \neq y \ \& \ x \neq z \ \& \ Rxy \ \& \ Rzx)$

Most accounts of reciprocity have started from the position that the strongest meaning is basic, but it can be weakened in context. For instance, Dalrymple *et al.* (1998b) argue that Strong Reciprocity is chosen by default whenever the situation depicted by the reciprocal predicate is compatible with it (this is their “Strongest Meaning Hypothesis”). Incompatibility can arise in a number of ways: through the linguistic meaning of the predicate, or through our knowledge of the world. For instance, Dalrymple *et al.* offer the following example, which they say could characterize the situation depicted in the diagram (Dalrymple *et al.* 1998b, ex. 6):

(75) “The captain!” said the pirates, staring at each other in surprise.

(76)



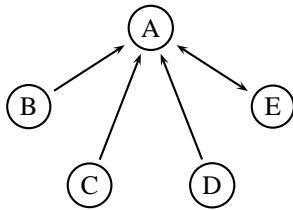
Since it is not possible for one pirate to stare at more than one other pirate at a time, Strong Reciprocity could not hold in this situation. What is required is a weaker form, where for each actor there is some other member of the set that he or she acts upon. Since, according to Dalrymple *et al.*, a sentence like this does not require that every pirate be stared at (as in the diagram, where B and E are not stared at by any pirate), Two-Way Weak Reciprocity is not required either.²⁴ What is needed is what they call One-Way Weak Reciprocity, defined as the following (their ex. 46):

(77) One-Way Weak Reciprocity:

$$|A| \geq 2 \text{ and } \forall x \in A \exists y \in A (x \neq y \ \& \ Rxy)$$

Below I will argue that we do need One-Way Weak Reciprocity, but only in particular syntactic environments. Examples like this one, however, actually do not require One-Way Weak Reciprocity, and One-Way Weak Reciprocity is, in fact, too weak. Beck (2001) points out, and I have confirmed with the intuitions of numerous speakers, that *The pirates stared at each other* could not be used in a situation like the following:

(78)

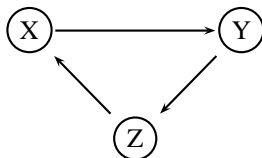


Here all the pirates are staring at Pirate A, and Pirate A is staring at Pirate E. Hence, every pirate is staring at some other pirate, satisfying the conditions on One-Way Weak Reciprocity. However, no one I have consulted would allow this situation for *The pirates stared at each other*. What this means is that One-Way Weak Reciprocity is not the right semantics for an example like this.

Instead, I think that we have Two-Way Weak Reciprocity, but, in a situation like that in (76) that Dalrymple *et al.* provide for this sentence, we allow an exception or two (Beck 2001 argues for essentially the same conclusion). Note that in Dalrymple *et al.*'s diagram in (76), Two-Way Weak Reciprocity is satisfied, *except* that Pirates B and E are not being stared at. If there were any more exceptions, I and others would hesitate to accept the situation for *The pirates stared at each other* (personally I hesitate even with Dalrymple *et al.*'s situation).²⁵ Allowing an exception or two will be important below in reducing all readings to Two-Way Weak Reciprocity.

Note that One-Way Weak Reciprocity and Two-Way Weak Reciprocity are equivalent in examples like *Xavier, Yves, and Zoltan killed each other*. Two-Way Weak requires that everyone kill someone else and that everyone be killed. One-Way Weak requires only that everyone kill someone. But if we add from our real-world knowledge the fact that people cannot be killed more than once, we end up with everyone being killed, as in the following diagram:

(79)



²⁴Personally, the situation that first came to mind upon reading this sentence was one in which the pirates turn from one to another, staring at first one and then another pirate, with the result that Two-Way Weak Reciprocity is necessarily satisfied and Strong Reciprocity almost is (but does not need to be).

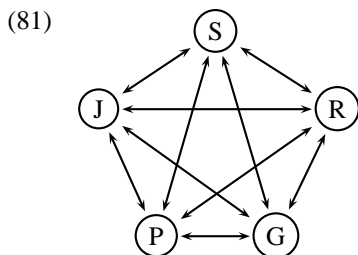
²⁵For some reason the exceptions all have to be in being a theme of the action. We are less willing to accept any exceptions in agenthood, which is probably what led Dalrymple *et al.* to conclude that this is One-Way Weak Reciprocity.

If Xavier were to kill Zoltan in addition to Yves, Yves would be left without anyone to kill, in violation of the requirement that all of them kill someone. Thus One-Way Weak Reciprocity and Two-Way Weak Reciprocity have equivalent truth conditions with a predicate like *kill*.

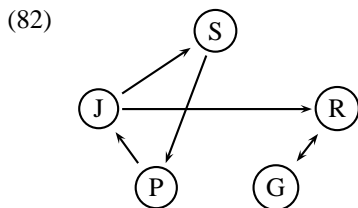
This is usually not the case, however. Consider a sentence like the following (Dalrymple *et al.*'s example 33):

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

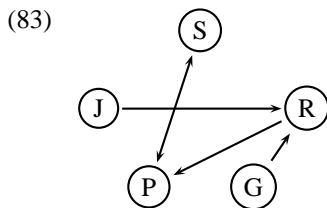
Dalrymple *et al.* state that this is interpreted as Strong Reciprocity, with each of the five hitting each of the other five, as in the following diagram:



However, no person that I have talked to 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 Dalrymple *et al.*'s Strongest Meaning Hypothesis, the sentence should be unable to characterize a situation like that in (82). 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 from above), where everyone hits someone but some people (John and George) are not hit:



(The situation in (78) is also out.) 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, are too weak. It follows that we need Two-Way Weak Reciprocity. (Predicates other than *stare at* do not allow exceptions so easily, for reasons that I do not understand, so that *hit/kill each other* can only be true if everyone is hit/killed. The difference may have to do with affectedness: The object of *stare at* is not affected by the action, and exceptions are permitted, but the object of *hit* or *kill* is affected, and exceptions are not permitted. I feel that exceptions would also be permitted with the *slander* example below, which does not (necessarily) affect the object, and with other non-affecting verbs like *describe*, as in *The suspects described each other.*)

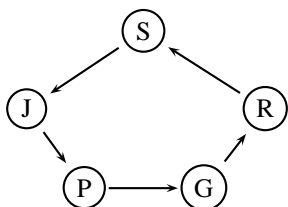
Dalrymple *et al.* state that in such cases as (82) we are using Strong Reciprocity *loosely*, allowing some exceptions to the requirement that everyone be hitting everyone else, and that Two-Way Weak Reciprocity is not needed as a meaning of reciprocals. But note that the situation in (82) is very far 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. This is very different from the pirate example above, where the exceptions are truly exceptional. Yet everyone I have asked permits the situation in (82) 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 below).

A consideration of further examples indicates that the truth conditions for situations that are compatible with Strong Reciprocity are really only those of Two-Way Weak Reciprocity. Consider the following example and possible scenario:

(84) John, Paul, George, Ringo, and Stu slandered each other.

(85)



Slander is perfectly compatible with Strong Reciprocity, yet everyone I have asked would allow the type of situation depicted in the diagram, where John slanders Paul, Paul slanders George, George slanders Ringo, Ringo slanders Stu, and Stu slanders John. This, again, is very far from Strong Reciprocity, but it is a possible meaning of *John, Paul, George, Ringo, and Stu slandered each other*. The situation in (78) is not, and that in (83) is only allowed as exceptional, just as with *stare at*. Thus, the truth conditions are correctly captured only by Two-Way Weak Reciprocity.

A further example arguing against Strong Reciprocity (and it being used “loosely”) is the following:

(86) Let’s all help each other.

Recent theories of floated *all* treat it as an element that removes exceptions (e.g., Brisson 1998). For instance, *the children ate dinner* might allow one or two exceptions, even though *the children* is definite, but *the children all ate dinner* removes the possibility of those exceptions. Thus, with a reciprocal, we might expect *all* to remove the purported “loose” interpretation of Strong Reciprocity.²⁶

This is not the case, however. *Let’s all help each other* has only the truth conditions of Two-Way Weak Reciprocity. So long as everyone helps someone else and everyone gets helped, the injunction is satisfied. No one hearing this command would expect that he or she has to help every other member of the group. This is shown by the ability of the speaker to add a follow-up of the following sort:

(87) Let’s all help each other; John, you help Paul; Paul, you help George; George, you help Ringo; Ringo, you help me; and I’ll help John.

Such a follow-up is incompatible with the meaning of Strong Reciprocity, especially if we expect *all* to remove any exceptions. I conclude that the strongest meaning an eventive reciprocal has is Two-Way Weak Reciprocity, and not Strong Reciprocity.

Furthermore, examples that are purported to show that Strong Reciprocity is truth-conditionally necessary actually do not require Strong Reciprocity. Not only that, a consideration of their semantics indicates that Strong Reciprocity actually leads to the wrong truth conditions.

One example from Dalrymple *et al.* (1998b, ex. 2) that is claimed to show that such a strong requirement is needed is the following:

(88) House of Commons etiquette requires legislators to address only the speaker of the House and refer to each other indirectly.

In this example, if a weaker form of reciprocity were all that was forced by the semantics of the reciprocal, legislators might be permitted to refer to other legislators directly, so long as they referred to at least one other legislator indirectly. But the sentence clearly requires that *all* inter-legislator reference be indirect.

However, once we consider the semantics of a sentence like this it becomes clear that Strong Reciprocity is not the correct way to characterize the truth conditions of a sentence like this—in fact it leads to the wrong truth conditions. First I restate the example more simply in (89), and then alter the syntactic context in (90):

²⁶It does seem to remove the exceptions in the examples above; I have the intuition that *The pirates all stared at each other* could not be true in the situation in (83).

- (89) Legislators must refer to each other indirectly.
- (90) If legislators refer to each other, they must do so indirectly.

The two sentences in (89) and (90) are intuitively synonymous. That in (89) has the same form and truth conditions as Dalrymple *et al.*'s example: all legislators must refer to all other legislators indirectly; hence Strong Reciprocity. Yet in (90), where the reciprocal is embedded in a conditional, Strong Reciprocity leads to the wrong truth conditions. It should require that *if every legislator refers to every other legislator (Strong Reciprocity), then they must refer indirectly*. Hence, if a legislator refers to only one other legislator, they should be able to do so directly. But this is not what the sentence means; it actually has the same truth conditions as (89).

Fixing this problem leads to getting rid of Strong Reciprocity. Suppose we were to paraphrase (90) in a situation semantics:

- (91) For all situations s and legislators x such that there is another legislator y that x refers to in s and s is compatible with the rules of conduct, x refers to y indirectly.

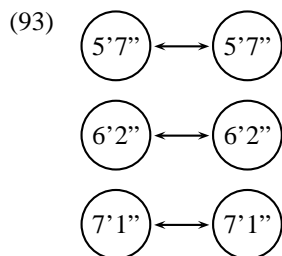
This paraphrase is a fairly suitable one for (90). It is also a fairly suitable one for (89), which contains a modal but not a conditional. Both modal sentences and conditional sentences might be expressed as quantification over situations and individuals, as in the paraphrase above. But note that in this paraphrase there is no $\forall x, y \in \{\text{legislators}\}$; instead there is existential quantification over the second legislator. That is, both of these statements are saying that, for any given legislator x , if x refers to *some other legislator* y , that reference must be indirect. In other words, this is not Strong Reciprocity at all, it is One-Way Weak Reciprocity. All that is required is that for any legislator x , there be some other legislator y that x refers to in the situation under discussion.

Hence, we do not need Strong Reciprocity for the sentence from Dalrymple *et al.* once we translate it into a situation semantics, and using it actually leads to the wrong truth conditions. We only need a weaker form of reciprocity (here, One-Way Weak Reciprocity; Two-Way Weak also leads to the wrong truth conditions). Note that these sentences are very similar to standard donkey sentences like *Every farmer who owns a donkey beats it*, where we straightforwardly have one universal quantifier and one existential quantifier, but end up with exhaustive quantification over farmer-donkey pairs. (See REFS on exhaustivity in donkey anaphora, and Heim 1990 on the utility of situation semantics in capturing their meanings.) I therefore conclude that Strong Reciprocity is not an actual meaning of reciprocal sentences generally. Only weaker forms are necessary.²⁷

However, this conclusion only holds for eventive sentences. It turns out that Strong Reciprocity *is* necessary for statives, as Fiengo and Lasnik (1973) have shown. Some of their examples are the following (their 34, 37, and 39):

- (92) a. The men in the room are the same height as each other.
- b. The men in the room know each other.
- c. The men in the room (can) see each other.

They correctly state that (92a) cannot characterize a situation like the following:



Two-Way Weak Reciprocity is satisfied in (93), since each man in the room is the same height as some other man, and some other man is the same height as him (One-Way Weak Reciprocity is also satisfied). However, the sentence actually requires that the men in the room all be the same height. The same goes for a predicate like *know*: if someone

²⁷Of course, conditional sentences do not argue against Dalrymple *et al.*'s Strongest Meaning Hypothesis, since they are downward-entailing. In a downward-entailing context, the entailment relations for the entire sentence reverse, so that a sentence using the weakest form of reciprocity, One-Way Weak, will entail the same sentence using Strong Reciprocity. However, see below on statives, which must retain the Strong reading even though it leads to weaker entailments. The point here is simply that we do not need Strong Reciprocity once we consider the meaning of these sentences.

asks, “Does everyone know each other?”, the answer must be “no” if there is a single pair of people that do not know each other. Hence statives for some reason require Strong Reciprocity, but eventives only ever require Two-Way Weak Reciprocity as their strongest meaning. At present I do not know why there would be this difference, but it holds cross-linguistically and is of immense importance in sorting out the meanings of reciprocals.

One thing to note is that Strong Reciprocity does not give way to One-Way Weak in a conditional as it does with eventives. Consider the following example:

- (94) If the jockeys are the same weight as each other, we won’t have to make any adjustments.

This sentence has the meaning that there is exactly one scenario in which we will not have to make any adjustments: that in which every jockey is the exact same weight. It does not mean that we will not have to make adjustments if each jockey weighs the same amount as some other jockey (like in the scenario in (93), but changing the heights to weights).²⁸ This is problematic for the Strongest Meaning Hypothesis: in a downward-entailing environment One-Way Weak Reciprocity leads to a stronger meaning than Strong Reciprocity, yet, with statives, the meaning must remain Strong Reciprocity.

Beck (2001) makes the same point with another downward-entailing environment, negation:

- (95) None of them knew each other.

This sentence only means that there is not a single pair of people who knew each other. It does not have the weaker meaning that, for every individual, there is some other person that they do not know.

So far, then, we have three meanings for reciprocals:

- (96) Statives: Strong Reciprocity

- (97) Eventives:

- a. Two-Way Weak Reciprocity
- b. One-Way Weak Reciprocity (downward-entailing environments only)

5.2 Two-Way Weak Reciprocity is Sufficient: Against the *Other*

Other authors have presented numerous examples that show that the basic meaning of an eventive reciprocal is Two-Way Weak Reciprocity and not Strong Reciprocity, although they themselves do not draw this conclusion. One of the reasons is that they also present other examples that seem to require some other type of reading. Some of these examples have been taken to indicate that there is a crucial notion of ‘the other’ in reciprocals, which seems natural in English since the word *other* actually appears as part of the reciprocal. Beck (2001), for instance, argues that we need a set $A - x$, that is, the subject NP set minus each individual that we are evaluating the predicate for. The examples that she claims argues for this are the following (98b comes from Dalrymple *et al.* 1998b):

- (98) a. Our committees are made up of each other.
b. ... [a place where] the gravitational fields of the Earth, the Sun, and the Moon cancel each other out.
c. The forks are propped against each other.

In (98a), the reading is that, for any x among us, x ’s committee consists of the set *us minus x*. In (98b), it is only the combined effects of the other two heavenly bodies that cancels out the gravitational field of each. In (98c), in a situation where there are three forks standing on end, it could only be the other two acting in concert that props up any given fork.

I would argue that Beck and others are misled by our actual knowledge of how the world works into thinking that there is a distinct reading here. Note, first of all, that in (98b–c) the situation described *is* compatible with Two-Way Weak Reciprocity. In (98b), each heavenly body acts on and is acted on by at least one other heavenly body. The same for forks in (98c). Not only that, the description that is given for (98b) is not the only possible one: I would also allow

²⁸As various authors have noted (e.g., Fiengo and Lasnik 1973, Schwarzschild 1992), statives can appear to have weaker meanings when there is a way to subdivide the NP. For instance, the scenario in (93) becomes acceptable for a sentence like *The basketball players are the same height as each other*, if we divide them up by position; then the guards are the same height, the forwards are the same height, and the centers are the same height. I am ignoring this *partition* issue here, and only considering contexts where the most natural way to partition a group is into its atomic members. See Beck (2001) for numerous examples of how partitioning is relevant, and below, where it becomes important in reducing other forms of reciprocity to Two-Way Weak (in eventives) or Strong Reciprocity (in statives).

a place where the Earth cancels out the Sun, the Sun cancels out the Moon, and the Moon cancels out the Earth. Is that possible? I do not know, since I have not studied physics since high school, but the linguistic expression in (98b) allows it. I see no need to posit a distinct reading here; Two-Way Weak Reciprocity suffices.

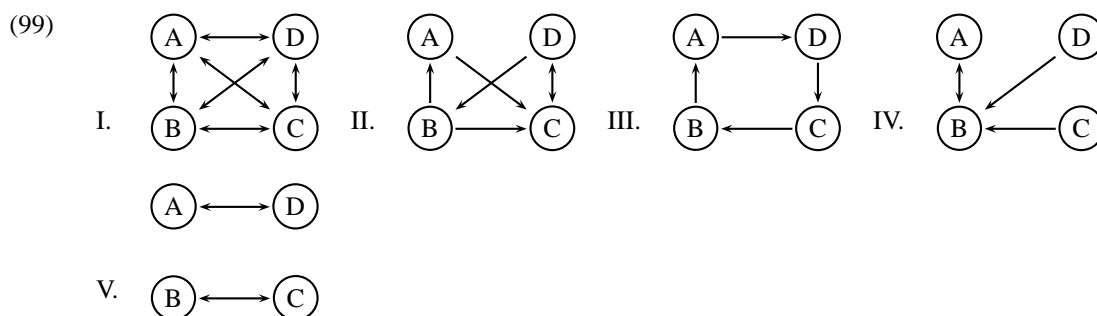
Finally, noting that *made up of* in (98a) is stative automatically accounts for the interpretation of that sentence: it requires Strong Reciprocity. Somehow the antecedent of the reciprocal is interpreted as *us* rather than *our committees*, but, given that, the interpretation is exactly as expected. For each *x* among us, *x*'s committee is made up of every one of the rest of us. This is just Strong Reciprocity; there is no need for anything else.

Moreover, the cross-linguistic investigation presented in the next subsection also argues against making too much of the occurrence of *other* in English reciprocals. Other languages do not use such an element, but the interpretations of reciprocals are exactly the same.

5.3 Reciprocal Interpretations are the Same Cross-Linguistically

As a starting point for determining whether the interpretation of reciprocals varies from language to language or is uniform, I presented sentences and situations to speakers of languages that were readily available to me, namely, (Mandarin) Chinese, Japanese, Turkish, and Indonesian. Japanese and Turkish have both nominal and verbal reciprocals, meaning that we can investigate whether there is any difference between nominal forms and reciprocal forms. The answer is that there is not, and speakers of all of these languages give the same judgements as those presented above for English. Indonesian and Chinese use something that appears to be an adverb, and again the judgements are exactly the same as English. (Below we will see that variation does emerge with predicates depicting a linear configuration, but this is exactly what the theory presented below predicts.)

To investigate possible reciprocal situations I constructed the following diagrams (along with two others that will be reported after the next subsection):



I then constructed, with the aid of the native speaker(s), reciprocal sentences with different properties, and asked if they would be true in each of the situations above. The types of sentences I constructed were the following:

- (100) Eventive
- possible self-contained action: *shoot* or similar predicate
 - possible linear configuration: *follow* or similar predicate

- (101) Stative (e.g., *know*)

Every sentence had either a plural subject or four explicitly named conjoined subjects. I will report the results with linear predicates after the next subsection. An example or two from each language appears below:

- (102) Japanese (S. Kotani, Y. Hara, p.c.)
- Otoko-tati-ga uti-**at**-ta.
man-Pl-Nom shoot-Recip-Past
'The men shot each other.'
 - Otoko-tati-ga otagai-o ut-ta.
man-Pl-Nom each.other-Acc shoot-Past
 - Otoko-tati-ga siri-au.
man-Pl-Nom know-**Recip**
'The men know each other.'

- d. Otoko-tati-ga otagai-o siru.
man-PI-Nom each.other-Acc know
- (103) Chinese (Y. Tsai, p.c.)
- a. A, B, C, D huxiang kaijiang.
Recip shoot
'A, B, C, and D shot each other.'
- b. A, B, C, D huxiang renshi.
Recip know
'A, B, C, and D know each other.'
- (104) Turkish (O. Ozturk, p.c.)
- a. Dört adam yen-is-di-ler.
four man win-Recip-Past-3P
'Four men defeated each other.'
- b. Dört adam birbirleri-ni yen-di-ler.
four man each.other-Acc defeat-Past-3P
- c. Tan-is-iyor-lar.
know-Recip-Pres-3P
'They know each other.'
- d. Birbiri-niz-i tani-yor-mu-sumus?
each.other-2P-Acc know-Pres-Q-2P
'Do you (Pl) know each other?'
- (105) Indonesian (Y. Tjung, p.c.)
- a. A, B, C, D saling tembak.
Recip shot
'A, B, C, and D shot each other.'
- b. A, B, C, D saling suka.
Recip like
'A, B, C, and D like each other.'

The results were that speakers of all the languages allowed I, II, and III as possible situations for a sentence like *A, B, C, and D shot each other*, exactly the same as English. The fact that II and, in particular, III are allowed indicates that Strong Reciprocity is not required, only Two-Way Weak Reciprocity is. No speaker allowed IV for such a sentence, indicating that the truth conditions are not those of One-Way Weak Reciprocity. Speakers vary in whether they allow the situation in V; most do, although the Turkish and Indonesian speakers said that they would prefer to express that situation in a different way. (V is allowed by Two-Way Weak Reciprocity.) These results held whether the reciprocal was a nominal or a verbal reciprocal.

If the sentence was stative, such as *A, B, C, and D know each other*, only the situation in I was allowed (Strong Reciprocity). In particular, V was ruled out by everyone. Again, this held whether the reciprocal was nominal, verbal, or adverbial.

The conclusion to be drawn from this admittedly limited investigation is that the interpretation of reciprocals is not subject to cross-linguistic variation, and that verbal reciprocals do not differ from nominal reciprocals. Two-Way Weak Reciprocity is the meaning of an eventive reciprocal (outside the special contexts described above, where One-Way Weak is the meaning), and Strong Reciprocity is the meaning of a stative reciprocal. Furthermore, in none of these languages is the reciprocal anything like the English form, with two pieces, a distributive quantifier *each* and something that requires non-identity, *other*. It follows that theories that base the meaning of the reciprocal on these two pieces in English are on the wrong track. (In Japanese, *otagai* means ??? literally, while the verbal reciprocal means 'face'; a Chinese dictionary says that *huxiang* means 'mutual';²⁹ and I was unable to find out what the reciprocal elements in Turkish and Indonesian were literally, or if they had other uses.)

²⁹Note that the same interpretations arise with *mutual* in English, showing again that the form of English *each other* is not significant. For instance, *a scene of mutual shooting* could describe the circular configuration in diagram III, but *the mobsters' mutual respect* requires the strongest meaning in I.

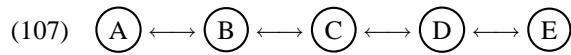
In the next subsection I turn to cases that have motivated postulating additional meanings for reciprocals, all of which depict linear configurations. I will show that we can reduce all of these types of reciprocity to Two-Way Weak Reciprocity, if the predicate is eventive, or Strong Reciprocity, if the predicate is stative. This leaves us with only three types of reciprocity. I will then show how these three types can be represented in the theory of the RecipV head presented above.

5.4 Two-Way Weak Reciprocity is Sufficient: Linear Configurations

Dalrymple *et al.* (1998b), in an exhaustive survey of reciprocal sentences in English, claim that we need an additional three reciprocal meanings besides the ones given above. However, I will argue that all three are adequately represented by Two-Way Weak Reciprocity and Strong Reciprocity.

The first of these three is what they call Intermediate Reciprocity. An example requiring this interpretation is the following (Dalrymple *et al.* 1998b, ex. 4), which refers to a situation like that in the diagram:

(106) ... five Boston pitchers sat alongside each other...



The semantics that Dalrymple *et al.* (1998b) assign to this reading is the following (their ex. 39):

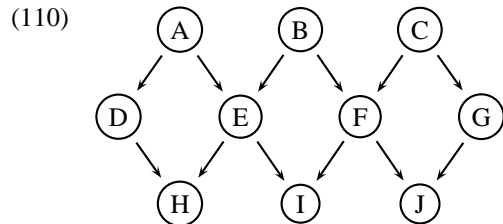
(108) Intermediate Reciprocity

$$|A| \geq 2 \text{ and}$$

$$\forall x, y \in A (x \neq y \rightarrow \text{for some sequence } z_0, \dots, z_m \in A (x = z_0 \& R z_0 z_1 \& \dots \& R z_{m-1} z_m \& z_m = y))$$

The second is Intermediate Alternative Reciprocity. An example of this is the following, characterizing, according to Dalrymple *et al.* (1998b), a situation like that depicted in the diagram (their exx. 47–49):

(109) Instead, countless stones... are arranged on top of each other and are held in place by their own mass and the force of flying buttresses against the walls.



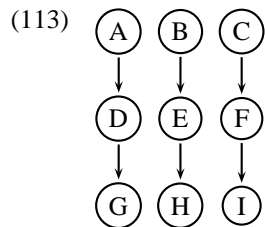
(111) Intermediate Alternative Reciprocity

$$|A| \geq 2 \text{ and}$$

$$\forall x, y \in A (x \neq y \rightarrow \text{for some sequence } z_0, \dots, z_m \in A (x = z_0 \& (R z_0 z_1 \vee R z_1 z_0) \& \dots \& (R z_{m-1} z_m \vee R z_m z_{m-1}) \& z_m = y))$$

Note, however, that this exact same sentence could just as easily characterize the situation depicted in the diagram below, which Dalrymple *et al.* distinguish as a final type of reciprocity, Inclusive Alternative Ordering (their exx. 54–56):

(112) He and scores of other inmates slept on foot-wide wooden planks stacked atop each other...



(114) Inclusive Alternative Ordering

$$|A| \geq 2 \text{ and } \forall x \in A \exists y \in A (x \neq y \& (Rxy \vee Ryx))$$

Thus, we can already reduce Intermediate Alternative Reciprocity to Inclusive Alternative Ordering.

Note, furthermore, that Intermediate Reciprocity, above, is just one of the columns in this diagram, with the sole difference that *sit alongside* is a symmetric relation but *be stacked atop* is not. It seems to me that it would be better to collapse all of these types of reciprocity into a single type, and let the differences come from the nature of the predicate, rather than defining different types of reciprocity.

Note also that Intermediate Alternative Reciprocity and Inclusive Alternative Ordering include an \vee operator. The reason for this is that when we reach the bottom of the planks or stones, the final layer is not actually stacked or arranged on top of any other member of the set. Therefore we have to allow the opposite relation, having something stacked or arranged on top of, in the meaning of the reciprocal as an alternative to being stacked or arranged on top of. This does not arise when the predicate expresses a symmetric relation, as in the example of the baseball players sitting alongside each other, because when we reach the end of the line the final member is still sitting alongside another baseball player. But again, this seems to me to be better characterized as a difference in the predicate, not a difference in the meaning of the reciprocal.

Finally, note that, if it were not for the ends of the lines in these diagrams, these situations would be captured by Two-Way Weak Reciprocity. In all of these diagrams every member of the set is in the relation R with some other member of the set, and some other member of the set is in the relation R with that member, except the endpoints. And when the predicate is symmetric, as in the *sit alongside* example, Two-Way Weak *is* satisfied.

I therefore suggest that we have no need of the three denotations that Dalrymple *et al.* give, and that Two-Way Weak Reciprocity is all that we need. These situations, I suggest, are allowed as instances of Two-Way Weak Reciprocity because we can allow one or two exceptions to the strict requirement that every member of the set be both an agent and a theme of the action. In all of these situations most members of the set are both, but the ends of the lines are only one each. But that appears to be tolerated in evaluating the truth conditions.

As evidence for this, consider the following sentence:

(115) The children followed each other into the schoolhouse.

One scenario that this situation might describe is a single-file line of students running into the schoolhouse. This would be Dalrymple *et al.*'s Inclusive Alternative Ordering. If it is Two-Way Weak Reciprocity, we must be allowing the head of the line and the last student in line as exceptions. I would argue that this is exactly what we are doing. Suppose there are only two children. No speaker that I have consulted would allow the above sentence as a description of them running into the schoolhouse in a line. But all the conditions on Inclusive Alternative Ordering are met: the subject set has two or more members, each of which is either an agent or a theme of *follow*. There is no reason, given this denotation, that speakers would not allow this sentence as a correct description of this situation. There is if the truth conditions are actually those of Two-Way Weak Reciprocity, however. If they are, the head and tail of the line are allowed as exceptions. Hence, they must actually be exceptional, meaning that there must be more students who are all both agents and themes of *follow*. Most people I have consulted would also hesitate to accept the sentence if there are only three students; in fact, acceptability increases with the number of students, something that follows naturally from the theory of Two-Way Weak Reciprocity plus exceptions, but is completely unexpected by a theory where the truth conditions are those of Inclusive Alternative Ordering.³⁰

If this is correct, Two-Way Weak Reciprocity must be able to capture all examples of Intermediate Reciprocity, Intermediate Alternative Reciprocity, and Inclusive Alternative Ordering. I repeat the examples from above, as well as other examples of each type from Dalrymple *et al.* (1998b):

(116) Intermediate Reciprocity

- a. ... five Boston pitchers sat alongside each other. . .
- b. The telephone poles are spaced five hundred feet from each other.

(117) Intermediate Alternative Reciprocity

- a. ... countless stones. . . are arranged on top of each other. . .
- b. They. . . stacked tables on top of each other. . .
- c. The third-grade students in Mrs. Smith's class gave each other measles.

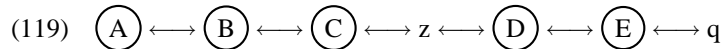
(118) Inclusive Alternative Ordering

³⁰Beck (2001, p.127–128) also notes that the size of the group matters to many predicates, but claims that it does not with predicates like *lie on top of* or *follow*. I and others I have asked disagree, and find her examples in (205a–c) distinctly odd.

- a. He and scores of other inmates slept on foot-wide wooden planks stacked atop each other. . .

All of these have the same character: a linear configuration. (As stated, all cases of Intermediate Alternative Reciprocity are identical to Inclusive Alternative Ordering.³¹) Hence, Two-Way Weak Reciprocity, allowing the ends of the lines as exceptions, does adequately account for their semantics. (Two-Way Weak without exceptions accounts for cases of Intermediate Reciprocity, where the predicates are symmetric.)

If three different notions of reciprocity can all be captured by Two-Way Weak Reciprocity, why then did Dalrymple *et al.* posit three different definitions? In particular, why did two of those definitions include the notion of a sequence? The reason is that there is one situation that is not ruled out by the definition of Two-Way Weak Reciprocity that is ruled out by a definition including a sequence. If I utter the sentence about the Boston pitchers sitting alongside each other, it would be false in a situation like the following, where *z* and *q* are not pitchers:

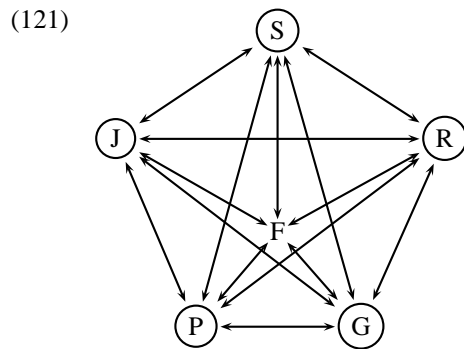


It does not matter that *q* is not a pitcher, since he is at the end of the line of pitchers. It does matter that *z* is not a pitcher, since he disrupts the line of pitchers. This should not matter given the definition of Two-Way Weak Reciprocity, though, because each pitcher is sitting alongside some other pitcher and some other pitcher is sitting alongside him.

However, this is a general problem that arises with all forms of reciprocity, and should not be built into some definitions but not others, as Dalrymple *et al.* do (in their definitions including a sequence, but not the others). To see this, consider Dalrymple *et al.*'s example 33:

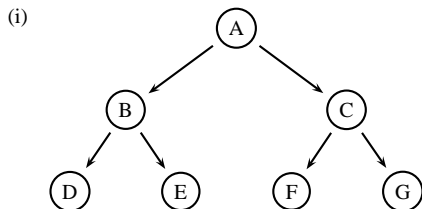
- (120) John, Paul, George, Ringo and Stu were hitting each other.

Dalrymple *et al.* claim that this is interpreted as Strong Reciprocity, with each of the five hitting each of the other five. As stated above, I and others do not share this intuition, and require only Two-Way Weak Reciprocity. Let us ignore this for the moment and interpret the sentence as Strong Reciprocity. On this interpretation, John is hitting and is being hit by Paul, George, Ringo, and Stu, and so on. Now suppose we have the same situation, but a fan (*F*) is also involved in the melee, as in the following diagram:



Here again John is hitting and being hit by Paul, George, Ringo, and Stu, and the fan. Ditto for each of the others, including the fan.

³¹The measles example in (117c) I would argue not to be in this class. I would not allow the situation Dalrymple *et al.* provide for this situation, given below (their ex. 53):



There are too many exceptions here in how many students give measles to someone else. This intuition supports the idea that this is Two-Way Weak Reciprocity, but, given the knowledge that measles cannot erupt spontaneously but must be introduced to a group from outside, we have to allow at least two exceptions (one in themehood, the original source, and one consequently in agenthood).

I and others I have asked have the intuition that the sentence *John, Paul, George, Ringo, and Stu were hitting each other* actually *cannot* be used in this situation. But note that it is true on the definition of Strong Reciprocity in Dalrymple *et al.* (1998b): for every pair x, y in the set {John, Paul, George, Ringo, Stu}, x is hitting y and y is hitting x . It should not matter that there is some non-member also involved.

Moreover, the problem is truth-conditional, and is not a matter of pragmatics. Suppose I am a witness in a courtroom where John, Paul, George, Ringo, and Stu are being tried. I am asked about the situation in (121), which I was a witness to. The prosecutor might ask, “What did you observe John, Paul, George, Ringo, and Stu doing?” I cannot truthfully answer, “They were hitting each other,” given this scenario. I have to answer, “They and a fan were all hitting each other,” or “They were hitting each other and a fan.” If this were just a matter of the Gricean maxims, this courtroom context should render the fan irrelevant. It does, for instance, in a situation in which John, Paul, George, Ringo, Stu, and a fan were seen playing darts. To the exact same question I can truthfully answer, “They were playing darts.” The question picks out John, Paul, George, Ringo, and Stu; the sentence is true if all of them were playing darts, regardless of who else was playing darts. But note that on Dalrymple *et al.*’s definition of Strong Reciprocity, *play darts* and *hit each other* should be equivalent in this respect.³²

The problem is exactly the problem of the non-pitcher disrupting the line of pitchers in (119). My own intuitions, and those of others, seem to be indicating that reciprocal expressions cannot be used when there is some other entity, not a part of the antecedent NP, that is also participating in the action. That is, the reciprocal relation is exclusive, including all *and only* the members of the antecedent NP.

Note that non-reciprocal expressions do not have this requirement. *The pitchers were sitting in a line*, for example, can be true of the situation in (119). Similarly, *John, Paul, George, Ringo, and Stu were brawling* can be said of the situation in (121) (but *John, Paul, George, Ringo, and Stu were brawling with each other* cannot).

What we need, then, is some general condition on reciprocals. Suppose we were to add the following to every definition:

$$(122) \quad \dots \&\neg\exists b \notin A \exists z, w \in A (z \neq w \& Rzb \& Rbw)$$

This condition is comparable to the condition that A be plural: it is simply a general condition on reciprocals, and must be present in the meaning of a reciprocal. It will disallow any non-member of the NP antecedent of the reciprocal from being involved in the reciprocal relation, except peripherally. In (119) above, it will disallow z , since z is sitting alongside two members of the set, but it will allow q , since, although q is sitting next to one member, he is not sitting next to any other member.

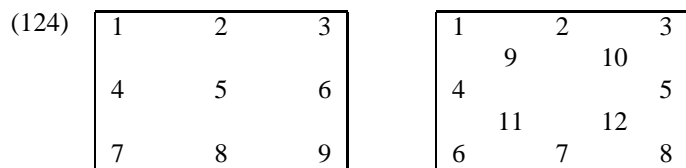
This condition will also rule out the situation in (121), since there is a non-member of the set that is being hit by a member of the set and is hitting a member of the set. It would not rule out a similar situation in which the fan is hitting John, Paul, George, Ringo, and Stu, but they are ignoring him; and this is exactly the intuition: the sentence can be used in such a scenario. In *The pirates are staring at each other*, it will rule out a non-pirate staring at a pirate and being stared at by a pirate, which matches my and others’ intuitions. In the example of the planks being stacked on top of each other (Two-Way Weak Reciprocity plus exceptions for the ends of the line), it will disallow anything other than planks that has a plank on top of it and one underneath it. Again, this is exactly the intuition.

If this condition is indeed needed generally, as I have just argued, we can successfully reduce the above three reciprocal meanings from Dalrymple *et al.* to Two-Way Weak Reciprocity. There is no need to posit three additional meanings for reciprocals.

There is one other problem that must be addressed, however. Beck (2001) points out that Dalrymple *et al.*’s Intermediate Reciprocity is actually too weak. She gives the following example (her 150b), in a situation where we have a plot of land 10 meters by 10 meters:

(123) The trees should be about 5 meters apart from each other.

In this situation, the first diagram below is a valid way to satisfy the 5-meter requirement, but the second is not:



³²The judgement changes if the situation is a general melee, and everyone in the bar is brawling. Then I can truthfully say that John, Paul, George, Ringo, and Stu were hitting each other, even if other people were involved. But in this situation we have carved out the set of John, Paul, George, Ringo, and Stu from the general population and focussed on them, ignoring others. This is difficult to do when there is only one other involved, as in the scenario described in the text.

The problem is that the second diagram satisfies the definition of Intermediate Reciprocity, which only requires that there is some sequence such that adjacent pairs in the sequence are spaced 5 meters from each other. This is also a problem for Two-Way Weak Reciprocity, which only requires that each tree be spaced 5 meters from some other tree, and vice versa.

The solution to this problem comes from noting that predicates like *be spaced 5 meters apart from* are stative, meaning that they actually require Strong Reciprocity. They appear not to satisfy Strong Reciprocity, however, since in the good diagram, or in a linear configuration such as that described by *The freeway exits are spaced five miles from each other*, there are pairs in the subject NP that do not satisfy the predicate, in violation of Strong Reciprocity. Beck (2001) solves this dilemma by noting that plural NPs are subject to partitioning, as in Schwarzschild (1992). For instance, consider the following sentence, from Schwarzschild:

(125) The husbands and wives in the room are similar to each other.

Be similar to is stative, and so Strong Reciprocity should hold. But this sentence does not necessarily assert that everyone in the room is similar; instead, it most naturally has a meaning where each husband is similar to his wife and vice versa, but no other relations of similarity need to obtain. What is going on here is that we partition the subject NP into pairs based on marriage, as is explicitly stated in the form of the NP, and evaluate the predicate within those pairs. Within each pair, Strong Reciprocity is required to hold, and it does. (We can evaluate this with partitions that include more than two members, such as *The couples and their children here are all similar to each other*, which does require that within each nuclear family every member is similar to every other member.)

Beck suggests that this is what is going on in examples of Intermediate Reciprocity. What we are doing is partitioning the subject NP into pairs of *neighbors* or adjacent elements. We naturally do this because the predicate refers to spatial relations, in fact to adjacency. Once we partition the subject NP into pairs, then Strong Reciprocity will need to obtain within each pair. It does for each pair of adjacent trees in the good diagram in (124), but not in the bad one; tree 1 and tree 9, for example, are not at least 5 meters apart.

This also accounts for the situation noted in Schein (2001) for *The freeway exits are spaced five miles from each other*, which he notes would be false if any two exits were not 5 miles apart. Again, looking at adjacent exits, Strong Reciprocity must hold.

If all of this is correct, we can successfully reduce all three of Dalrymple *et al.*'s linear reciprocal relations to Two-Way Weak Reciprocity, with eventives, and Strong Reciprocity, with statives. The theory of exceptions explains why the size of the subject NP matters with predicates like *follow* and hence is independently supported; the exclusivity requirement holds of reciprocal predicates generally and is not limited to linear configurations; and partitioning is necessary for plural NPs generally. It follows that we have no need for any other reciprocal denotation.

What we have, then, are three types of reciprocals, summarized below using Dalrymple *et al.*'s notation:

(126) Strong Reciprocity (stative predicates only)

$$|A| \geq 2 \text{ and } \forall x, y \in A (x \neq y \rightarrow Rxy)$$

(127) Two-Way Weak Reciprocity

$$|A| \geq 2 \text{ and } \forall x \in A \exists y, z \in A (x \neq y \ \& \ x \neq z \ \& \ Rxy \ \& \ Rzx)$$

(128) One-Way Weak Reciprocity

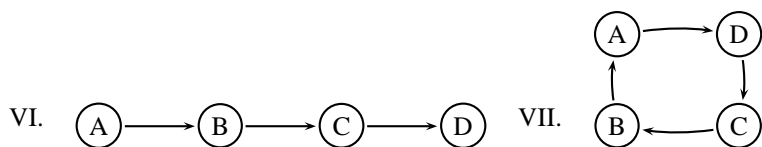
$$|A| \geq 2 \text{ and } \forall x \in A \exists y \in A (x \neq y \ \& \ Rxy)$$

In this summary I have left out the new condition in (122), but I assume it to be present, comparable to the plural requirement. I will similarly leave out this condition in the denotations below, where I translate these meanings into the meaning of the verbal reciprocal, but again I assume it to be present.

5.5 Cross-Linguistic Interpretation of Linear Predicates

I also attempted to test predicates denoting linear configurations in Chinese, Japanese, Turkish, and Indonesian. What I found was some variability, in contrast with the judgements reported above. For the most part I was only able to test eventive predicates like 'follow', although I do have judgements for statives in some languages. In addition to the diagrams given above, I also created the following for judgement by native speakers:

(129)



There was some variability with a verb like *follow*. Japanese speakers did not allow the situation in VI for either the verbal or the nominal reciprocal, but only that in VII (with a PP like *around the pole*), or, in a situation not depicted above, where first A follows B and then B follows A (with a PP like *into the building*). However, stative predicates (which could only use the nominal and not the verbal reciprocal) did allow a linear configuration like that in VI (but with arrows going both ways, since the predicates are symmetric). This variability can be understood in the theory presented above, since it distinguishes eventives from statives. In statives, Strong Reciprocity must hold, but speakers partition the subject NP into pairs of neighbors. Partitioning is, presumably, something speakers of all languages do with plural NPs, and so we expect stative linear predicates to be acceptable. In contrast, eventive predicates require Two-Way Weak Reciprocity, but with two exceptions. Hence we might expect some variability in whether speakers will allow exceptions.

In Chinese, stative predicates again were a natural description of the situation in VI (like ‘be spaced 500 feet from each other’), but, as in Japanese, eventive predicates like ‘chased each other’ or ‘followed each other’ were good descriptions only of VII. Turkish was like English and allowed VI for a nominal eventive reciprocal (‘follow’), but I was unable to find a predicate describing a linear configuration that permitted the verbal reciprocal (verbal reciprocals in Turkish are not fully productive and often have lexicalized meanings that are not exactly reciprocal). I did not test any linear statives in Turkish. In Indonesian, an eventive like ‘follow’ did not allow VI by itself, but VI became acceptable if an adverbial phrase *secar berurutan*, ‘in order’, was added (*A, B, C, D saling kejar secar berurutan*). I did not test statives.

I take these cross-linguistic findings to support the theory presented above. Stative predicates depicting linear configurations always allow a line with reciprocals, since Strong Reciprocity is required to hold but the NP is naturally partitioned into adjacent pairs. Eventive predicates show some variability, which might be expected on the theory that they are Two-Way Weak Reciprocity plus exceptions.

5.6 Parameters in RecipV

If the reduction above is successful, we have exactly three meanings for reciprocals, Strong Reciprocity with statives and Two-Way and One-Way Weak Reciprocity with eventives. The purpose of this subsection is to show how these three readings can be captured in the theory of the verbal reciprocal presented above. I will start with eventives.

First, I repeat the denotation of RecipV from above using Two-Way Weak Reciprocity, and factoring out the Dist element:

$$(130) \quad \begin{array}{c} \text{RecipV} \\ \swarrow \quad \searrow \\ \text{Dist} \quad \text{RecipV} \end{array}$$

$$(131) \quad \llbracket \text{Dist} \rrbracket = \lambda x. \lambda f. \lambda e. [\forall y \in x \rightarrow f(x)(y)(e)]$$

$$(132) \quad \llbracket \text{RecipV} \rrbracket (\textit{Two-Way Weak}) = \lambda f_{\langle e, st \rangle}. \lambda z: |z| \geq 2. \lambda x: x \in z. \lambda e. [\exists y, q \in z. (x \neq y \ \& \ x \neq q \ \& \ (\exists e' [f(e', y) \ \& \ \text{Agent}(e', x) \ \& \ e' \leq e]) \ \& \ (\exists e'' [f(e'', x) \ \& \ \text{Agent}(e'', q) \ \& \ e'' \leq e]))]$$

The denotation for One-Way Weak Reciprocity, which only appears in certain syntactic contexts, will be:

$$(133) \quad \llbracket \text{RecipV} \rrbracket (\textit{One-Way Weak}) = \lambda f_{\langle e, st \rangle}. \lambda z: |z| \geq 2. \lambda x: x \in z. \lambda e. [\exists y \in z. (x \neq y \ \& \ (\exists e' [f(e', y) \ \& \ \text{Agent}(e', x) \ \& \ e' \leq e]))]$$

There are two ways the denotations vary. First, Two-Way Weak has two individual variables ($\exists y, q \in z$), but One-Way Weak only has one. Second, One-Way Weak only has one subevent (e'), but Two-Way Weak has two ($e' \ \& \ e''$). We can regard the first difference as a consequence of the second: if there is only one subevent, there is only room for one individual variable. I therefore hypothesize that with eventives, the verbal reciprocal (and nominal and adverbial reciprocals, which can be given similar meanings) is ambiguous, but in only one way—whether there is one subevent or two. Thus the ambiguity is only in one dimension, and the reciprocal is weakened in downward-entailing contexts simply by deleting one subevent.

Let us now turn to statives. Strong Reciprocity would be represented as the following:

$$(134) \quad \llbracket \text{RecipV} \rrbracket (\textit{Strong}) = \lambda f_{\langle e, st \rangle}. \lambda z: |z| \geq 2. \lambda x: x \in z. \lambda e. [\forall y \in z. (x \neq y \rightarrow (\exists e' [f(e', y) \ \& \ \text{Agent}(e', x) \ \& \ e' \leq e]))]$$

Note that this is just like One-Way Weak in having only one subevent, but it has a universal quantifier instead of an existential quantifier. While it would be desirable to understand *why* statives require this universal quantifier, the most I can do here is propose that there is one further way in which the denotation of RecipV can vary, and that is in having a universal quantifier rather than an existential.

I plot these two parameters of variation in RecipV in the following table:

(135)

	\exists	\forall
e'	1-Way Weak	Strong
e' & e''	2-Way Weak	Strong

If we were to have two subevents with a universal quantifier, the result would be exactly the same as with one subevent (Strong Reciprocity). Hence all possible combinations of the two parameters are realized. The resulting system is a tightly constrained pattern of ambiguity that results in only three distinct readings, one of which is limited to and required by statives. I take the simplicity of this system to be a strong argument in its favor (compare Dalrymple *et al.* 1998b, who first claim there are five possible reciprocal meanings but then give a system of parameters that results in six meanings).

5.7 Choosing a Denotation

In the theory given above, eventive reciprocals are ambiguous, having two different denotations. Yet, as Dalrymple *et al.* (1998b) point out, no reciprocal sentence is ever felt to be ambiguous; speakers have fairly clear intuitions about the truth conditional requirements. Their Strongest Meaning Hypothesis accounts for this fact, and I will simply adopt it within my own theory. Statives are always interpreted as Strong Reciprocity, so there is no question of choosing a denotation there. With eventives, however, there are two different readings. Two-Way Weak Reciprocity entails One-Way Weak Reciprocity. Given the Strongest Meaning Hypothesis, Two-Way Weak Reciprocity will always be chosen, *unless* the reciprocal occurs in a downward-entailing environment, in which case One-Way Weak becomes the strongest meaning. (See below on One-Way Weak in high-scope readings.) This serves very well to account for the facts.

The following table summarizes these results:

(136)

Eventives:	Downward-Entailing Contexts:	One-Way Weak
	Otherwise:	Two-Way Weak
Statives:		Strong Reciprocity

6 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:

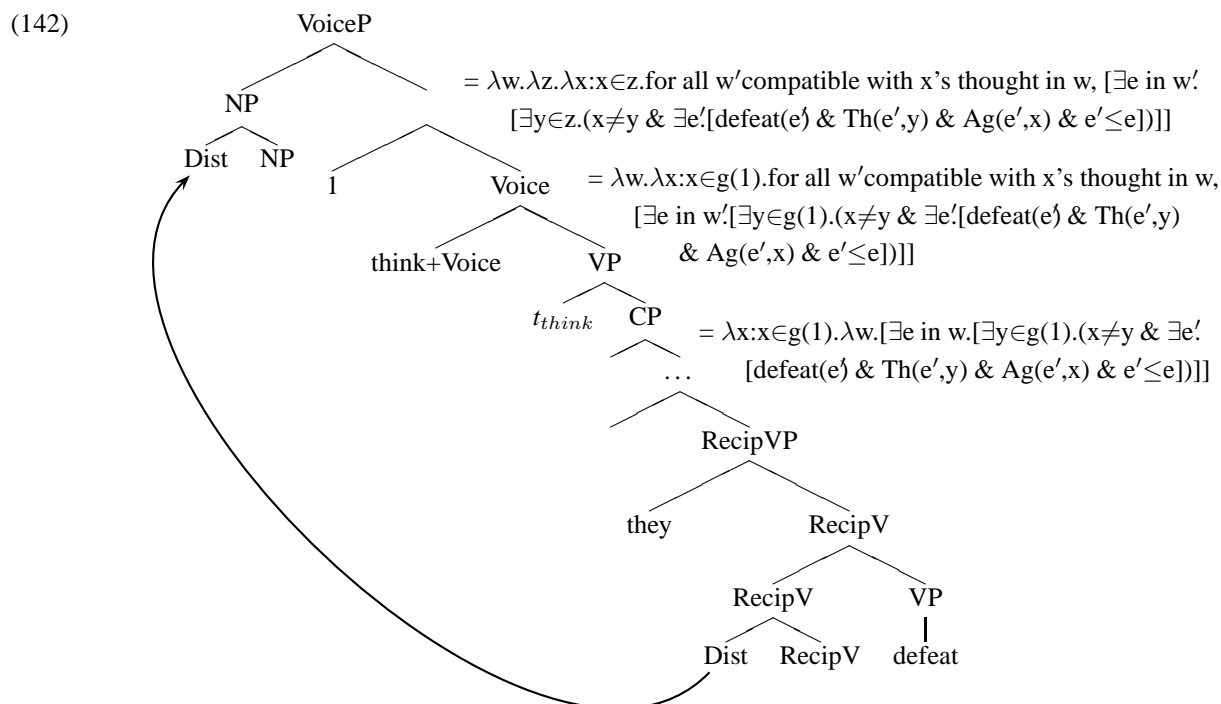
- (137) Piyel naka Susehp toqi=te litahasuw-ok kisi-tomh-**utu**-wok.
 P. and Jos. both=Emph think-3P Perf-defeat-**Recip**-3P
 ‘Peter and Joseph both think that they defeated each other.’

- 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 3.4 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 the theory of Section 5. Now that we have that theory, we can see 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:

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 to the abstracted-over node, the denotation of the higher VoiceP will be the following:

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

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, as stated above, One-Way Weak Reciprocity does appear to be a possible meaning of reciprocal expressions. It is necessary in downward-entailing contexts as well, such as conditional and modal sentences (see above). 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:

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

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 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):

- (145) John and Mary think that the boys like each other.
 (≠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.

7 Verbal Reflexives

If this theory of verbal reciprocals succeeds, we might want to have a similar analysis of verbal reflexives (for one theory of verbal reflexives, see Lidz 2001). Two examples from Passamaquoddy appear below:

- (146) 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:

- (147) (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 (147a). 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 (147a). It does not hold with the reflexive verb in (147b), 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.³⁴ 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.

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³⁴At 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 22, above) builds the reciprocal from the reflexive plus another morpheme. I regard these as outside the theory of reciprocals pursued here.

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