Remarks and Replies

Semantic Similarities and Syntactic Contrasts between Chichewa and English Reciprocals

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Morphosyntactically, the reciprocal construction varies greatly from language to language. The English reciprocal *each other* is a noun phrase filling an argument position of a syntactic predicate, for example, whereas the Chichewa reciprocal *-an-* is an intransitivizing verbal affix. However, the meaning of the reciprocal construction does not vary correspondingly. In English and Chichewa the basic semantic properties of the reciprocal are the same, in spite of syntactic differences. The clustering of semantic properties associated with reciprocals cannot, then, be accounted for on the basis of idiosyncratic properties of the morphosyntax of the reciprocal construction in any particular language. Instead, the wide degree of morphosyntactic variability that is found cross-linguistically must be taken into account. We argue that Heim, Lasnik, and May's (1991) compositional interpretation of English reciprocal sentences cannot explain the fact that they manifest this cluster of semantic properties, since the approach does not predict that Chichewa and other languages exhibit the same cluster.

1 Semantics of Reciprocals

Various authors have observed that the reciprocal construction is distinguished across a wide range of languages by three important semantic features:

(a) Interpretation with respect to members of a specified group
(b) Nonidentity requirements on the reciprocalized argument
(c) Scope effects

These properties hold of the reciprocal construction generally, although the morpho-

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syntactic properties of the reciprocal construction vary widely from language to language.

Reciprocals require a group antecedent that is interpreted with respect to the members of the group. (1) is interpreted relative to members of the group denoted by the reciprocal antecedent *the boys*.

(1) The boys are hitting each other.

NPs not denoting a group are unacceptable reciprocal antecedents:

(2) *The boy is hitting each other.

The same holds for the Chichewa reciprocal construction. The Chichewa reciprocal, represented as the verbal affix *-an-*, requires a group antecedent, and the example is interpreted with respect to members of the group:[1]

(3) Mbîdzi zi-ku-mény-an-a.
10 zebras 10 SM-PRES-hit-RECIP-FV
'The zebras are hitting each other.'

Singular antecedents are unacceptable:

(4) *Mbîdzi i-ku-mény-an-a.
9 zebra 9 SM-PRES-hit-RECIP-FV
'The zebra is hitting each other.'

The reciprocal construction also imposes a nonidentity requirement between the filler of the position linked to the antecedent of the reciprocal and the filler of a position we will refer to as the *reciprocalized argument*. Heim, Lasnik, and May (1991) call this requirement *reciprocation*. In (1) the antecedent of the reciprocal is linked to the agent argument position of *hit*, and the reciprocalized argument position is linked to the reciprocal phrase *each other*. The intended interpretation involves different individuals filling the agent and patient argument slots of *hit*. The same nonidentity requirement holds for the Chichewa reciprocal: the arguments of the reciprocal predicate are interpreted as nonidentical.

The reciprocal behaves like other semantic operators in displaying scope effects. As originally noted by Higginbotham (1980) and discussed by Heim, Lasnik, and May (1991) and others, examples such as (5) are ambiguous, having the two paraphrases in (6).

(5) John and Bill think that they defeated each other.
(6) a. John thinks: John and Bill defeated each other.
Bill thinks: John and Bill defeated each other.

[1] Numbers in the Chichewa glosses indicate noun classes according to the standard system of notation. RECIP = reciprocal affix; REFL = reflexive marker; SM = subject marker; OM = object marker; CAUS = causative marker; APPL = applicative marker; FV = final vowel; NOM = nominalizing marker; HAB = habitual.

b. John thinks: John defeated Bill.
Bill thinks: Bill defeated John.

The reciprocal has narrow scope in interpretation (6a) and wide scope in interpretation (6b).

Scope ambiguities are also found in Chichewa. (7) is ambiguous between the two readings given in (6).

(7) John ndí Bill a-ku-gániz-a kutí a-na-gónj-éts-ăn-a.
John and Bill SM-PRES-think-FV that SM-PAST-lose-CAUS-RECIP-FV
'John and Bill think that they defeated each other.'

In terms of these semantic properties of the reciprocal construction, then, English and Chichewa do not differ.

The reciprocal constructions in English and Chichewa do differ in two respects, however. First, each language constrains the range of possible interpretations of the reciprocal in a different way. In English the reciprocalized argument position is filled by the reciprocal phrase *each other*. The ambiguity of (8) shows that the grammatical function of the reciprocal antecedent is unconstrained.

(8) The men$_i$ introduced the women$_j$ to each other$_{i,j}$.

In Chichewa, on the other hand, both the reciprocal antecedent and the reciprocalized argument are fixed. For noncausativized verbs, the reciprocal antecedent or a pronoun anaphoric to it is the subject of the (intransitivized) verb to which the reciprocal affix is attached, and the reciprocalized argument is the argument that surfaces as the object of the corresponding unreciprocalized verb. The situation with causativized verbs will be discussed in the next section.

Second, and most strikingly, the English and Chichewa reciprocal constructions have very little in common morphosyntactically. The marker of reciprocity in English is a morphologically bipartite NP filling an argument position of a syntactic predicate. In Chichewa it is a monomorphemic verbal affix; in section 3 we will provide evidence that it is an arity-reducing affix, signaling intransitivization of the verb to which it attaches. Attempts to derive the semantic properties of the reciprocal construction from its morphosyntactic properties must take this range of morphosyntactic variation into account.

2 Heim, Lasnik, and May's (1991) Account

Heim, Lasnik, and May (1991) propose that the semantics of the reciprocal construction is derivable on the basis of its morphosyntactic properties—that "reciprocal expressions have no properties peculiarly their own and that their meaning instead arises from the compositional interactions of the meanings that their constituent parts have in isolation"

p. 67). They provide the LF representation in (10) for a sentence such as (9) (their (8) nd (7), respectively).

(9) The men saw each other.

(10) [S[NP[NP the men$_1$] each$_2$][S e_2 [VP[NP e_2 other]$_3$ [VP saw e_3]]]]

his structure is a result of LF movement. Key elements of this construction are the roup-denoting antecedent (*the men*), a "distributor" that moves at LF to adjoin to the eciprocal antecedent (*each* of *each other*), and a "reciprocator" (*e other* after move- ent of *each*), which is responsible for the disjointness effects of the reciprocal. Scope mbiguities for the reciprocal are modeled as a difference in where the distributor ttaches; that is, the possibility of different scopes for the reciprocal is modeled as the ossibility of different landing sites for the moved distributor. For example, if it attaches o the NP *John and Bill* in (11) (= (5)), the wide scope reading results; if it attaches to *hey*, the narrow scope reading results.

(11) John and Bill think that they defeated each other.

yntactically, the phrase [*e other*] is an R-expression and must be A-free. The empty ategory *e* left by the movement of *each* is an anaphor and must be bound in its governing ategory. Thus, configurations resulting from movement of the distributor are governed y rules of the binding theory. The basic claim made by Heim, Lasnik, and May is that ne meaning of a sentence containing a reciprocal depends on the meaning of these ndividual elements and is constrained by the anaphoric requirements they obey.

The LF representation in (10) translates to the following logical expression:

(12) $\forall x_2(x_2 \cdot \Pi$ **the men'**$) \forall x_3(x_3 \cdot \Pi$ **the men'** $\wedge x_2 \neq x_3)$ saw(x_2,x_3)

"$\cdot\Pi$" represents the relation *is an atomic subpart of*. The expression

$x_2 \cdot \Pi$ **the men'**

hould, then, be read as "x_2 is an atomic subpart of the group denoted by **the men'**" .e., x_2 is an individual man in the group). The distributor *each* contributes the first of ne two universal quantifiers over members of the group of men. The reciprocator *other* ontributes the requirement $x_2 \neq x_3$, indicating that different individuals are required to articipate in the seeing relation.

One might imagine extending this analysis to account for reciprocals in Chichewa y treating the reciprocal affix as an incorporated argument, similar to the antipassive ffix described by Baker (1988): reciprocalized verbs would be analyzed as transitive erbs with an incorporated object. Scope ambiguities exhibited by the Chichewa recip- ocal necessitate the assumption that the incorporated reciprocal is bipartite (though eemingly monomorphemic), consisting of a distributor and a reciprocator, since scope mbiguities are attributed to movement of the distributor at LF. Like English, Chichewa

requires a relation of locality between the reciprocal expression and the antecedent; (13) is ungrammatical because this requirement is violated.

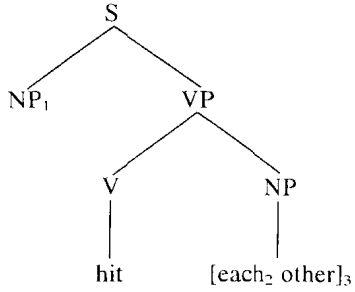
(13) *Anyăni a-ku-gániz-a kutí mkángo u-ku-mény-an-a.
2 baboons SM-PRES-think-FV that 3 lion 3 SM-PRES-hit-RECIP-FV
'The baboons think that the lion is hitting each other.'

The Chichewa reciprocal (or a part of it) would, then, be treated similarly to the English reciprocal, as an anaphor requiring a local binder.

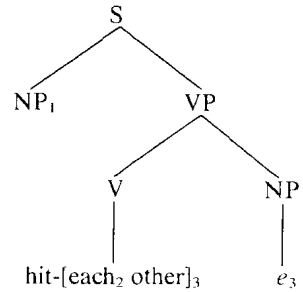
Given these assumptions, at D-Structure and S-Structure a Chichewa sentence such as (14) would have the representations given in (15a) and (15b), respectively.

(14) Mbîdzi zi-ku-mény-an-a.
10 zebras 10 SM-PRES-hit-RECIP-FV
'The zebras are hitting each other.'

(15) a. *D-Structure, (14)*



b. *S-Structure, (14)*



However, principles governing the relation between an anaphor and its binder do not appear to correctly constrain the relation between the Chichewa reciprocal affix *-an-* and the reciprocal antecedent, whether binding theory is stipulated to apply at D-Structure, S-Structure, LF, or more than one of these structures. In fact, as we show in section 3, Chichewa reciprocalized verbs are intransitive; attempts to explain the semantic similarities of Chichewa reciprocals to English ones in syntactic terms are, therefore, ill founded.

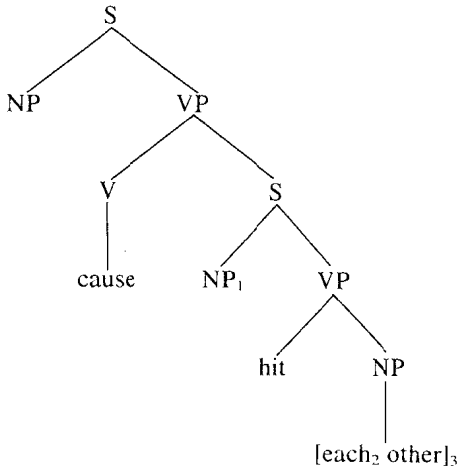
Counterevidence to the possibility that the Chichewa reciprocal affix *-an-* contains or is itself an anaphor comes from the interaction of reciprocals and causatives. Reciprocalized Chichewa verbs can be causativized, as (16) shows.

(16) Mfûmu i-na-mény-án-its-á anyăni.
9 chief 9 SM-PAST-hit-RECIP-CAUS-FV 2 baboons
'The chief made the baboons hit each other.'

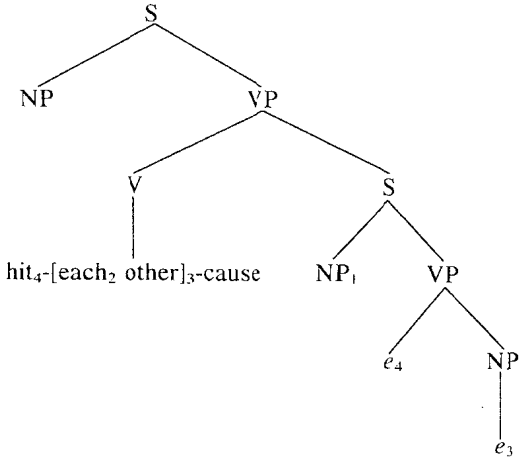
Current incorporational treatments of the causative suffix (Baker 1988, Li 1990) analyze

he causative affix as a verb with a clausal complement.[2] The complement verb moves rom its D-Structure position to incorporate into the causative suffix. For (16), the D-Structure and S-Structure representations would be (17a) and (17b), respectively.

(17) a. *D-Structure, (16)*



b. *S-Structure, (16)*



[2] For arguments against an account of Chichewa causatives involving incorporation and an alternative account based on argument structure, see Alsina 1992.

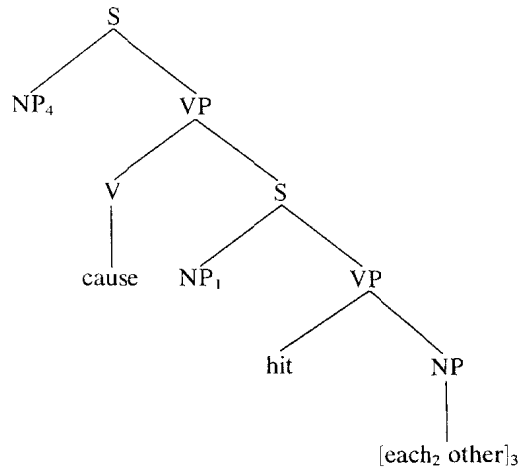
The reciprocal antecedent is NP_1. As pointed out by Alsina (1993) and an anonymous reviewer, NP_1 does not bind the incorporated reciprocal or any part of it at S-Structure, so the assumption that the reciprocal is an anaphor that must be bound at S-Structure cannot be maintained.

If the binding theory is assumed to hold at D-Structure rather than S-Structure, another problem arises, as Alsina (1993) shows. (18) involves reciprocalization of a causativized verb.

(18) Alenje a-na-mény-ets-an-a (kwá mbûzi).
2 hunters 2 SM-PAST-hit-CAUS-RECIP-FV (by 10 goats)
'The hunters got each other hit (by the goats).'

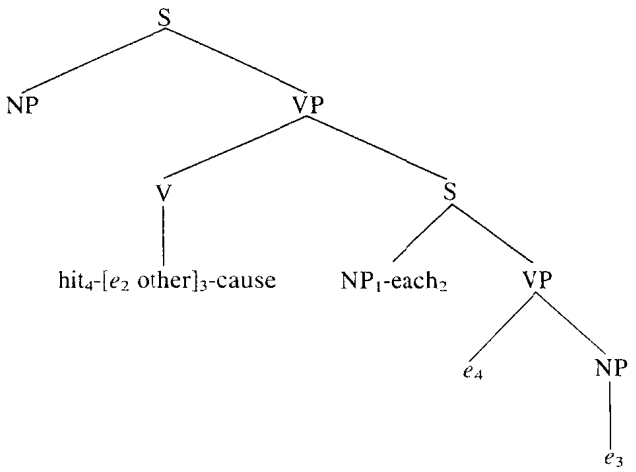
The D-Structure representation for (18) is given in (19). The reciprocal antecedent, NP_4, does not properly bind the reciprocal at this level.

(19) *D-Structure, (18)*



The remaining possibility is that the Chichewa reciprocal requires a binder at the level of LF, in line with Heim, Lasnik, and May's claim that the trace of LF movement of the distributor *each* is an anaphor and must be A-bound in its governing category. Consider, then, the required LF representation for an example such as (16), which is given in (20).

(20) *LF, (16)*



Here, *each* is required to undergo downward movement to adjoin to the reciprocal antecedent, NP_1. The trace of the movement of *each* incorrectly remains unbound by NP_1, to which *each* has adjoined.

This evidence shows that it is impossible to analyze the Chichewa reciprocal affix *-an-* as an anaphor (or as containing an anaphor) that must be bound at D-Structure, S-Structure, or LF. Alternative treatments of the reciprocal affix as an incorporated argument (for example, treating the trace of movement of *each* not as an anaphor but as a variable that must be Ā-bound at LF) also appear to fail, since such treatments would not predict the ungrammaticality of (13).

A closer examination of the syntax of the Chichewa reciprocal provides evidence that it would in any case be wrong to analyze the Chichewa reciprocal as an incorporated pronoun. The reciprocal affix does not fill a syntactic argument position in Chichewa; the reciprocalized Chichewa verb is syntactically intransitive.

3 Syntax of the Chichewa Reciprocal

Mchombo (1993) shows that the Chichewa reciprocal is not a syntactic argument of the verb it appears with but an intransitivizing morphological device, combining with a transitive verb stem to produce a new intransitive verb stem. Evidence for the intransitivity of reciprocalized verbs comes from nominalizations: nominalizations of reciprocal verbs are possible, though deverbal nominals may not appear with object pronouns or full NP objects. Additionally, evidence from the interpretation of comparatives shows that transitive verbs permit object comparison readings; reciprocalized verbs, like intransitive

verbs, do not allow such readings. The facts regarding the reciprocal stand in contrast to those regarding the Chichewa object reflexive and pronoun, which are also verbal affixes but can be shown to have argument status: they are incorporated pronouns, filling the object argument position of the verb to which they are affixed (Bresnan and Mchombo 1987).

Not surprisingly, deverbal nominals do not take object arguments, either full object NPs or incorporated object pronouns. However, nominalized reciprocal verbs are found. The following examples show that although the verb *sonkh-a* 'contribute' can take an NP object, the nominalization *m-sônkh-o* 'contribution' cannot:

(21) sonkh-a ndalâma
contribute 10 money
'contribute money'

(22) *m-sônkh-o ndalâma
NOM-contribute 10 money
'contribution money'

The nominalization *m-sônkh-o* 'contribution' must be followed not by an NP object, but by the PP *wa ndalâma* 'of money':

(23) m-sônkh-o wa ndalâma
NOM-contribute of 10 money
'contribution of money'

Nominalizations are also incompatible with object markers, whether the object marker precedes or follows the nominalizing affix (here, *m-*). Both (24), in which the object marker precedes the nominalizing affix, and (25), in which the object marker follows it, are ill formed.

(24) *zi-m-sônkh-o
10 OM-NOM-contribute
(intended: 'contribution of it')

(25) *m-zi-sônkh-o
NOM-10 OM-contribute

Nominalizations are also impossible with the reflexive affix, whether it precedes or follows the nominalizing affix, as (28) shows. The reflexive affix may, of course, be used in combination with the verb *phunzíts-a* 'teach', as in (27).

(26) phunzíts-a
'teach'

(27) Dzi-phúnzíts-e.
REFL-teach-SUBJUNCTIVE
'Teach yourself.'

(28) a. *dzi-m-phunzits-i
self-NOM-teach
(intended: 'self-teacher')
b. *m-dzi-phunzits-i
NOM-self-teach

However, nominalizations with reciprocals are perfectly well formed:

(29) a. yanj-a
'suit, agree with'
b. yanj-an-a
agree-RECIP-FV
'agree with each other'
c. chi-yanj-an-o
NOM-agree-RECIP
'agreement'
(30) a. kŏnd-a
'love'
b. kond-ăn-a
love-RECIP-FV
'love each other'
c. chi-kond-an-o
NOM-love-RECIP
'mutual love'

The inability of nominalized verbs to take object arguments contrasts with the possibility of nominalizing reciprocalized verbs, showing that the reciprocal affix does not fill the object argument position of the verb to which it attaches.

Another test for transitivity, first proposed by Zec (1985) and discussed with respect to Chichewa by Bresnan and Mchombo (1985), Sells, Zaenen, and Zec (1987), and Mchombo (1993), provides further evidence that whereas Chichewa verbs with NP objects, object markers, and reflexives are transitive, verbs with reciprocal affixes are intransitive. (31) is ambiguous between a subject comparison reading and an object comparison reading.

(31) Alenje á-ma-nyóz-á mbĭdzi kupósá asodzi.
2 hunters 2 SM-HAB-despise-FV 10 zebras exceeding 2 fishermen
'The hunters despise the zebras more than the fishermen.'
Subject comparison reading: 'The hunters despise the zebras more than the fishermen despise the zebras.'
Object comparison reading: 'The hunters$_i$ despise the zebras more than they$_i$ despise the fishermen.'

As Zec points out, the presence of an object comparison reading is the hallmark of a transitive construction; in intransitive constructions the object comparison reading is absent. This is due to the universal requirement that for comparative ellipsis resolution to be successful, the object of comparison as well as its parallel element in the full sentence must be syntactically present. That is, when a sentence contains no verbal object, ellipsis interpretation cannot construct the property of being Verbed by the Subject, as needed for the object comparison interpretation.

(32), involving an object marker, is also two ways ambiguous, having both a subject comparison reading and an object comparison reading.

(32) Alenje á-ma-zi-nyóz-á kupósá asodzi.
2 hunters 2 SM-HAB-10 OM-despise-FV exceeding 2 fishermen
'The hunters$_i$ despise them$_j$ more than the fishermen$_k$.'

With the reflexive, an additional ambiguity is introduced: the subject comparison reading has either a strict or a sloppy reading for the reflexive. The object comparison reading is also available. Thus, a sentence such as (33) with a reflexive object has three readings.

(33) Alenje á-ma-dzi-nyóz-á kupósá asodzi.
2hunters 2 SM-HAB-REFL-despise-FV exceeding 2 fishermen
'The hunters despise themselves more than the fishermen.'
Subject comparison, strict reading: 'The hunters$_i$ despise themselves$_i$ more than the fishermen despise them$_i$.'
Subject comparison, sloppy reading: 'The hunters$_i$ despise themselves$_i$ more than the fishermen$_j$ despise themselves$_j$.'
Object comparison: 'The hunters$_i$ despise themselves$_i$ more than they$_i$ despise the fishermen.'

As above, the presence of the object comparison reading shows that the construction involving the reflexive marker is transitive.

The situation differs, however, for the reciprocal affix. The following example is unambiguous, lacking an object comparison reading:

(34) Alenje á-ma-nyóz-án-á kupósá asodzi.
2hunters 2 SM-HAB-despise-RECIP-FV exceeding 2 fishermen
'The hunters despise each other more than the fishermen.'

This example has only the subject comparison reading. It means only 'The hunters despise each other more than the fishermen despise each other'. There is no object comparison reading; the example cannot mean 'The hunters despise each other more than they despise the fishermen'. Importantly, this lack of ambiguity does not hold in general of sentences with reciprocals: the English sentence *The hunters despise each other more than the fishermen* is two ways ambiguous, having both a subject and an object comparison reading.

Morphological evidence from reduplication also points to the conclusion that the reciprocal is a relation-changing verbal affix, unlike the incorporated object pronouns. As Mchombo (1993) shows, the morphological material that participates in reduplication consists of the bare verb stem, arity-affecting affixes such as the middle, causative, and applicative affixes, and the final vowel. The result of reduplication is a semantic modification of the predicate, usually with an intensifying meaning. The incorporated object pronoun and reflexive do not participate in reduplication; the reciprocal, like the other affixes affecting the arity of the verb, does reduplicate.

Mchombo (1993) also discusses bare imperative formation, which evidences the differing status of the reciprocal affix and the incorporated pronouns. Bare imperatives are formed from the verb stem alone; they cannot be used in the presence of an incorporated pronominal or reflexive object. When an incorporated pronoun is present, the imperative must be formed by the addition of the subjunctive affix. However, bare imperatives can be formed from reciprocalized verbs.

This evidence shows, then, that the Chichewa reciprocal construction is intransitive and involves "reciprocal verbs"—that is, verbs that have been intransitivized by adding the reciprocal affix to a transitive verb stem.

4 A Unified Account

We now show how the cluster of semantic properties English and Chichewa reciprocals share is explained by their meaning alone. Given this semantic uniformity, we then consider what variety of syntactic structures is appropriate to expressing reciprocal propositions. We conjecture that the equally natural fit between the common meaning and the quite different morphosyntax of Chichewa and English reciprocal sentences can be explained by the need to provide particular morphosyntactic forms for expressing the same reciprocal meaning, given a set of linguistic universals constraining how meaning and form can be related.

The meaning of the English and Chichewa sentences (35) and (36)

(35) The boys defeated each other.
(36) Anyamăta a-na-gónj-éts-ăn-a.
2boys SM-PAST-lose-CAUS-RECIP-FV
'The boys defeated each other.'

is the following proposition:

$$\text{RECIP}(\text{BOYS}, \lambda x.\ \lambda y.\ \text{DEFEAT}(x, y))$$

Three facts about the reciprocal relation, RECIP, explain the semantic features (a), (b), and (c) of reciprocals enumerated in section 1. These facts and others stem from one source, namely, the relation RECIP, the meaning of reciprocal expressions including English *each other* and Chichewa *-an-*.[3]

(A) RECIP yields a true proposition only when its first argument is a group of two or more things.
(B) For any group G and two-place relation B, the proposition $\text{RECIP}(G, B)$ is equivalent to the proposition $\text{RECIP}(G, B - \{\langle x, x\rangle | x \in \text{domain}(B)\})$.
(C) RECIP's second argument must be a two-place relation.

Fact (A) clearly explains feature (a). Fact (B) says the truth-value of a reciprocal proposition does not depend on what things stand in the relation B to themselves. For instance, the reciprocal proposition meant by both (35) and (36) is true or false independent of which boys, if any, defeated themselves. Fact (B) entails that reciprocal statements are about pairs of distinct entities, that is, feature (b).

That reciprocals have scope (feature (c)) corresponds to fact (C). A two-place relation such as is needed for the second argument of RECIP can be obtained by abstracting two variables over an open sentence. This is closely analogous to scoping an ordinary quantifier by abstracting one variable over an open sentence. We return presently to the question of how the structure of a reciprocal sentence is related to the reciprocal's scope, that is, to the two-place relation that is the second argument of RECIP in the proposition the sentence expresses.

Since the cluster of semantic features of reciprocals is explained in a language-independent way by these universal characteristics of the meaning, RECIP, of reciprocal expressions, no derivation of the features on the basis of language-particular properties of reciprocal expressions can constitute an explanation of them.

How then do the different morphosyntactic structures of reciprocal sentences in various languages relate to the shared meaning? We hypothesize that linguistic universals governing the interpretive relation between morphosyntax and meaning explain the naturalness of the quite different forms of expression English and Chichewa choose for reciprocal propositions. Although we lack space here to justify our ideas on this subject (or for more than the briefest sketch of them), let us state that we favor pursuing an approach along roughly the following lines.

[3] The meaning of reciprocal expressions is not as easily definable as is sometimes supposed. Many researchers (Heim, Lasnik, and May 1991, Fiengo and Lasnik 1973, Higginbotham 1980) have, for want of a better notion, assumed strong reciprocity: each member of the group bears the stated relation to every other member. In many cases this requirement is clearly called for. (i) implies that all of the children are the same age, not that they comprise subsets (e.g., twins) whose members are the same age.

(i) The children are the same age as each other.

However, strong reciprocity cannot always be maintained. Strong reciprocity can hold only when the stated relation is symmetric, yet sentences such as (ii) can be true.

(ii) The children gave each other measles.

Working out an empirically satisfactory definition of RECIP is too large a task to tackle here, so we leave it for future work. Whatever the precise definition, however, it will guarantee facts (A), (B), and (C).

Observe that in (35) and (36) each language expresses the reciprocal proposition syntactically by a sentence containing (i) an expression whose meaning is the relation RECIP, (ii) a group-denoting NP that fills the first argument role of the RECIP relation,[4] and (iii) another potential or actual NP complement that is treated specially. This is the position referred to earlier as the "reciprocalized argument." Semantically, the argument role to which this complement is linked is filled by a variable (the variable y in the example above). The role to which the group-denoting NP is linked is filled by another variable (x in the example above). A two-place relation is obtained by abstracting over these two variables, and this relation fills the second argument position of RECIP.

In more detail, compositional interpretation of the English sentence (35) proceeds as follows. The NP *each other*, whose meaning is the relation RECIP, is temporarily interpreted as a variable, y, and track is kept of this variable's association with the meaning RECIP, to be used later in the process of interpretation. The verb *defeat* is interpreted as the relation DEFEAT, and the variable y is filled into the semantic argument role of this relation to which *each other* is linked. The NP *the boys* is temporarily interpreted as a variable, x, which is filled into the semantic argument role to which the NP is linked.

This being the scope of the reciprocal expression, the reciprocal meaning RECIP of which track has been kept is now used to construct the reciprocal proposition. The meaning of the antecedent NP, the group BOYS, is filled into the first semantic argument role of the RECIP relation. The second semantic argument role of this relation is filled with the two-place relation obtained by abstracting over the variables representing the antecedent (x) and the reciprocal expression (y) in the open proposition so far derived, thus scoping the reciprocal. Anaphoric requirements on the reciprocal are met, since the reciprocal expression and its antecedent stand in an appropriate relationship, as do

[4] The antecedent of the reciprocal expression can be a quantificational NP rather than a group-denoting one—for instance, as in (i),

(i) Most philosophers respect each other.

offered by an anonymous reviewer, who also offered this instance of adverbial quantification:

(ii) Philosophers usually respect each other.

The quantifier has scope over the reciprocal, and the meaning of these sentences is composed accordingly out of the open proposition

$$\text{RECIP}(G, \lambda x.\ \lambda y.\ \text{RESPECT}(x, y))$$

The meaning of such sentences is not in general that most groups of philosophers, or that groups of philosophers usually, stand in the reciprocal relation. The claim made by (i) and (ii) is, roughly, that some group of philosophers who respect each other contains a majority of all philosophers. Often such claims are about largest groups of which the reciprocal holds. For instance, consider (iii),

(iii) Very few salespeople were chatting to each other to pass the time.

which claims that no group of salespeople containing more than a few members were chatting to each other.

The semantics of reciprocal sentences with quantified antecedents is complicated enough that we must postpone further discussion to a longer paper. For the present, we merely reiterate that the meaning of these sentences is composed out of propositions that the RECIP relation holds between a group and a binary relation.

the semantic argument roles into which their temporary interpretations x and y were filled during semantic interpretation.

The interpretive relation between this English construction and its meaning generalizes the relation between quantified NPs and the meaning of sentences containing them. Let us spell out explicitly some similarities between reciprocal propositions

$$\text{RECIP}(G, \lambda x.\ \lambda y.\ S(x, y))$$

and familiar quantificational ones:

$$Q(G, \lambda x.\ S(x))$$

In each case the quantification is restricted, ranging only over members of a group, G. Precisely, this means these propositions are necessarily equivalent to

$$\text{RECIP}(G, (\lambda x.\ \lambda y.\ S(x, y)) \cap (G \times G))$$

and

$$Q(G, (\lambda x.\ S(x)) \cap G)$$

respectively. In each case, also, the quantification has a scope. For reciprocals, two free variables in the scope

$$S(x, y)$$

are bound by the reciprocal variable-binding operator. For familiar quantification, only one free variable in the scope

$$S(x)$$

is bound by the quantificational variable-binding operator.

- English ordinarily employs Det(erminer)s (e.g., *most*) to signify what sort of quantification, Q, is involved in a given quantificational proposition. (Some other languages typically use classifiers or adverbs for this purpose.)
- English ordinarily employs N′s (e.g., *boys*) to signify what group a quantification is restricted to range over; moreover, the quantification so restricted is the one expressed by the Det collocated in an NP with the N′. (Some other languages use NPs for this purpose.)
- English ordinarily employs NPs (e.g., *most boys*) to signify that a free variable is introduced into the scope of a quantification, to be bound by the quantificational variable-binding operator.

Regarding the related case of reciprocals, English employs an NP—*each other* or *one another*—to signify what sort of quantification—RECIP—is involved. English uses another NP to signify what group this quantification is restricted to range over. And it uses both of these NPs to signify that free variables are introduced into the scope of the

quantification, to be bound by the quantificational variable-binding operator. The reciprocal phrase thus behaves somewhat like a Det and also somewhat like an NP: like a Det in expressing a type of quantification, which needs a domain restriction as well as a scope; like a quantified NP in introducing a variable into the scope.

Chichewa, by comparison, uses the affix *-an-* to signify the RECIP sort of quantification. Chichewa uses an NP to signify what group this quantification is restricted to range over. And it uses both a morphological process and an NP to signify that free variables are introduced into the scope of the quantification, to be bound by the quantificational variable-binding operator.

Returning to the Chichewa sentence (36), recall that the suffix *-an-* is not a syntactic argument of the verb *a-na-gónj-éts-ăn-a* 'defeat' linked to some semantic argument role of the relation DEFEAT expressed by that verb. Instead, *-an-* (i) [morphosyntax] prevents its verb from taking an object complement and (ii) [semantics] (a) causes a variable (y in this example) to fill the semantic argument role to which an object NP would have been linked if the verb had not contained *-an-*, simultaneously (b) causing track to be kept of an association between this variable and the meaning RECIP of *-an-* for later use in the interpretation process. The result of these lexical processes of Chichewa is that the intransitive verb *a-na-gónj-éts-ăn-a* receives the same meaning as the English VP *defeat each other*. The compositional interpretation of sentence (36) otherwise proceeds exactly like that of the English sentence (35).

Concerning reciprocal scope ambiguities, it may be a linguistic universal that in complex sentences such as (37) and (38)

(37) The boys think that they defeated each other.

(38) Anyamăta a-ku-gániz-a kutí a-na-gónj-éts-ăn-a.
2boys SM-PRES-think-FV that SM-PAST-lose-CAUS-RECIP-FV
'The boys think that they defeated each other.'

the reciprocal's scope is determined by choice of what we call the antecedent, namely, the group-denoting NP that fills the first argument role of the RECIP relation. The narrow scope reading for these sentences is

THINK(BOYS, RECIP(BOYS, $\lambda x.\ \lambda y.$ DEFEAT(x, y)))

This reading is determined by choosing the English group-denoting pronoun *they* and the Chichewa incorporated subject pronoun *a-* as the reciprocal antecedent, and is obtained by filling the meaning previously derived for *The boys defeated each other* and *Anyamăta a-na-gónj-éts-ăn-a* into the second argument position of *think* and *a-ku-gániz-a*.

The proposition

RECIP(BOYS, $\lambda x.\ \lambda y.$ THINK(x, DEFEAT(x, y))

is the wide scope reading for sentences (37) and (38). It is determined by choosing the group-denoting NPs *the boys* and *anyamăta* as the reciprocal antecedent. In detail, the wide scope reading is obtained as follows. Interpretation of the English VP *defeat each other* and the Chichewa verb *a-na-gónj-éts-ăn-a* proceeds as described above. Both the English pronoun *they* and the Chichewa incorporated subject pronoun *a-* are interpreted as a variable, x, which is filled into the semantic argument role to which the pronoun is linked. The resulting open proposition

DEFEAT(x, y)

fills the semantic argument role of the relation THINK—the meaning of the verb *think* and *a-ku-gániz-a*—to which the embedded clause is linked. The group-denoting NP *the boys* and *anyamăta*, which is the antecedent of *they* and *a-*, is temporarily interpreted as the same variable, x, as the pronoun, and this variable is filled into the semantic argument role to which the NP is linked. The resulting open proposition

THINK(x, DEFEAT(x, y))

constitutes the scope of the reciprocal on the reading under discussion. Accordingly, the reciprocal proposition is constructed as above, scoping the reciprocal meaning, RECIP, which was associated with the variable y to keep track of it during interpretation. The meaning of the antecedent NP fills the first semantic argument role of the RECIP relation, and the second argument role of this relation is filled with the two-place relation obtained by abstracting over x and y in the scope of the reciprocal. Again, anaphoric requirements on the reciprocal are met, since the reciprocal expression and its nearby antecedent stand in an appropriate relationship, as do the semantic argument roles filled by x and y.

Thus, Chichewa and English illustrate very different morphosyntactic strategies for special treatment of the reciprocalized argument, the second potential or actual NP position pertinent to reciprocal sentences; the position may be either filled with a reciprocal NP, as in English, or suppressed by a reciprocal affix, as in Chichewa. On the analysis of Heim, Lasnik, and May, on the other hand, it is surprising that the same clustering of semantic properties is associated with the reciprocal in any language in which the reciprocal is not morphologically bipartite.[5] Moreover, the Chichewa evidence shows that scope ambiguities do not always require a syntactic account, whether the scope-bearing element is incorporated in a word like the Chichewa reciprocal or is a separate phrase like the English one. Ambiguities of scope can arise from meanings of phrases that are lexically derived rather than syntactically constructed.

[5] Such cases abound: Japanese *-aw-* (Nishigauchi 1992), Spanish *se*, Manam *-e-* (Lichtenberk 1985). All of these reciprocals share the semantic requirement for a plural, distributed reciprocal antecedent and exhibit nonidentity effects for the reciprocalized argument. Scope possibilities vary in these languages, however. The scope of the Japanese reciprocal is fixed, not variable; the reciprocalized argument is a syntactically unexpressed argument within the scope of the reciprocal affix. The Spanish reciprocal *se* shows scope ambiguities (Gerfen 1991, Heim, Lasnik, and May 1991:89). We do not know whether the Manam reciprocal exhibits scope ambiguities.

From our point of view, it is not surprising that languages employ different morphosyntactic means, in some cases dramatically different ones, to express deeply similar meanings, to wit, reciprocal propositions. The form of expression is limited only by universals of morphosyntax and universals of semantic interpretation, which restrict how meanings can be assigned to lexical entries and morphosyntactic structures.

References

Alsina, Alex. 1992. On the argument structure of causatives. *Linguistic Inquiry* 23:517–555.

Alsina, Alex. 1993. Predicate composition: A theory of syntactic function alternations. Doctoral dissertation, Stanford University, Stanford, Calif.

Baker, Mark. 1988. *Incorporation: A theory of grammatical function changing*. Chicago: University of Chicago Press.

Bresnan, Joan, and Sam A. Mchombo. 1985. Agreement and pronominal incorporation in Chichewa. Ms., Stanford University, Stanford, Calif., and San Jose State University, San Jose, Calif.

Bresnan, Joan, and Sam A. Mchombo. 1987. Topic, pronoun, and agreement in Chichewa. *Language* 63:741–782.

Fiengo, Robert, and Howard Lasnik. 1973. The logical structure of reciprocal sentences in English. *Foundations of Language* 9:447–468.

Gerfen, Henry. 1991. Reciprocity in Spanish: A puzzle of scope. In *Proceedings of WECOL 9*, 152–163. Simon Fraser University, Vancouver, B.C.

Heim, Irene, Howard Lasnik, and Robert May. 1991. Reciprocity and plurality. *Linguistic Inquiry* 22:63–101.

Higginbotham, James. 1980. Reciprocal interpretation. *Journal of Linguistic Research* 1:97–117.

Li, Yafei. 1990. X^0-binding and verb incorporation. *Linguistic Inquiry* 21:399–426.

Lichtenberk, Frantisek. 1985. Multiple uses of reciprocal constructions. *Australian Journal of Linguistics* 5:19–41.

Mchombo, Sam A. 1993. On the binding of the reflexive and reciprocal in Chichewa. In *Theoretical aspects of Bantu grammar*, ed. Sam A. Mchombo. CSLI, Stanford University, Stanford, Calif. Distributed by University of Chicago Press, Chicago.

Nishigauchi, Taisuke. 1992. Syntax of reciprocals in Japanese. *Journal of East Asian Linguistics* 1:157–196.

Sells, Peter, Annie Zaenen, and Draga Zec. 1987. Reflexivization variation: Relations between syntax, semantics, and lexical structure. In *Working papers in grammatical theory and discourse structure*, ed. Masayo Iida, Stephen Wechsler, and Draga Zec, 169–238. (CSLI Lecture Notes 11.) CSLI, Stanford University, Stanford, Calif. Distributed by University of Chicago Press, Chicago.

Zec, Draga. 1985. Objects in Serbo-Croatian. In *Proceedings of the Eleventh Annual Meeting of the Berkeley Linguistics Society*, 358–371. Berkeley Linguistics Society, University of California, Berkeley.

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