# AGAINST PARTITIONED READINGS OF RECIPROCALS

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In this paper we examine partitioned interpretations of sentences with reciprocal expressions. We study the availability of partitioned readings with definite subjects and proper name conjunctions, and show new evidence that partitioned interpretations of simple reciprocal sentences are independent of the semantics of the reciprocal expression, and are exclusively determined by the interpretation of the subject.

## 1. Partitioned Interpretations of Reciprocal Sentences

A well-known property of some sentences with reciprocal expressions is their "partitioned" interpretation. A reciprocal sentence has a partitioned interpretation if it may be evaluated as true in a situation where the antecedent set of the reciprocal is partitioned to subsets that are disjoint with respect to the predicate in the scope of the reciprocal. For example, sentence (1), from Fiengo and Lasnik 1973, has a partitioned interpretation because it is acceptable in the situation depicted in figure 1[1].
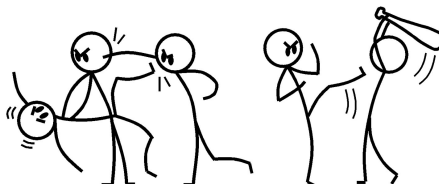
(1) The men are hitting each other.

Figure 1: The men are hitting each other

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[1] I am grateful to Tali Ore for creating this figure.

Another example of a partitioned interpretation is exemplified by sentence (2) below, from Dalrymple et al. 1998. This sentence is evaluated as true when there are several disjoint stacks of planks, each stack connected using the relation denoted by *stack atop*.

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

In the literature about reciprocals there is disagreement concerning the origin of such partitioned interpretations. The partitioning effect may result from the semantics of the reciprocal itself, but it may also follow from distribution of the antecedent set into disjoint subsets, due to independent mechanisms unrelated to reciprocal expressions.

For sentence (1), many works (see Schwarzschild 1996, Dalrymple et al. 1998, Beck 2001) agree that its partitioned interpretation arises from a partitioning of the subject NP, such that for each of the subsets Strong Reciprocity is required[2]. The operator that is assumed to create this partition in all of these works is the *cover* mechanism suggested (among others) in Schwarzschild 1996. This mechanism distributes a set denoted by a plural NP into contextually salient subsets, such that the union of the subsets equals the original set.

There is less agreement about the origin of the partitioned interpretation in other cases, as in the case of sentence (2) above. Dalrymple et al. 1998 (henceforth DKKMP) propose a system for the semantics of reciprocal expressions based on the principle they term the Strongest Meaning Hypothesis (SMH). This system includes a list of available readings, such that in each reciprocal sentence the logically strongest reading that is consistent with relevant contextual information is chosen as the interpretation of that sentence.

The partitioned interpretation of (2) is derived in DKKMP by assuming that 'unpartitioned' readings available in their system are precluded because it is impossible for 'scores' of planks to form a single stack. The SMH therefore chooses Inclusive Alternative Ordering (IAO), the weakest reading in DKKMP's system, as the one that matches this sentence. Let $A$ be the set denoted by the subject NP in the reciprocal sentence, and let $R$ be the relation denoted by the predicate in the scope of the reciprocal. Then the IAO reading of reciprocals, first proposed by Kański 1987, requires that each individual in $A$ be in a pair in $R$ with at least one other individual in $A$, as either the first or the second argument. This definition allows partitioned interpretations for sentences where the antecedent set includes more than two individuals.

Another view on this kind of example is offered in Beck 2001, where all partitioned interpretations are attributed to a general semantic process with plurals, using

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[2]Strong Reciprocity requires that each of the individuals in the set be in the relation with each of the other individuals in the set.

the cover mechanism of Schwarzschild 1996. In Beck's system IAO is not generated as one of the possible meanings of reciprocal expressions.

However, the following minimal pair points to a different analysis from both DKKMP's and Beck's:

(3)  The planks are stacked atop each other.

(4)  Planks 1, 2, 3, and 4 are stacked atop each other.

Suppose there are two stacks of two planks each. Then sentence (3) is true although four planks could form one stack, but sentence (4) is false. This minimal pair shows that the type of the subject NP affects the availability of the partitioned interpretation: changing it from a definite plural NP to a proper name conjunction, without changing its denotation, eliminates the partitioned interpretation. The SMH mechanism cannot account for the contrast between sentences (2) and (3), in which partitioning is available, and sentence (4), in which it is not. Nor can Schwarzschild's cover mechanism, where no difference is assumed between partitioning effects of different types of plural NPs.

## 2.  A New Explanation of Partitioned Interpretations

We suggest a new explanation, based on an observation made in Winter 2000, where it is shown that while definite plural NPs allow distribution to contextually salient subsets, proper name conjunction NPs resist such distribution. The following example, adapted from Winter 2000, exemplifies this contrast.

(5)  The committee will commission operas to be written by teams of two composers.

      a.  The composers will earn $100,000.

      b.  Lloyds Webber, Penderecki, and Stockhausen will earn $100,000.

Consider a case where an opera was commissioned by the committee to be written by Lloyds Webber and Penderecki, while another opera was commissioned to be written by Lloyds Webber and Stockhausen. Each pair of composers received a total pay of $100,000 for their opera. In this situation sentence (5)a is evaluated as true, but sentence (5)b is evaluated as false. According to Winter 2000, the partitioning is available for the definite NP in (5)a because of the anaphoric power of the definite, which can combine with implicit quantification to create distribution into subsets. The same mechanism does not operate on proper name conjunctions as in (5)b since they are not anaphoric.

This analysis explains the contrast in (3)-(4), and explains in general partitioning effects with reciprocal expressions and definite antecedents. We conclude that the interpretation of the reciprocal expression itself does not allow partitioning, otherwise

this contrast would not appear. The partitioning effect in (2) follows from a similar effect of 'contextual partitioning' that also applies to plural *in*definites.

The effect of the type of the antecedent NP on the interpretation of reciprocal sentences is clearly exemplified when world knowledge allows only a partitioned interpretation. Consider the following sentences, in a situation where there are four singers:

(6)  In this photo, the singers are looking into each other's eyes.

(7)  #In this photo, John, Paul, George and Ringo are looking into each other's eyes.

Sentence (6) is felicitous, whereas sentence (7) is rather weird. In (7), despite world knowledge, the truth conditions derived from the reciprocal expression are not weakened to allow a partitioned interpretation.[3] If the interpretation of the reciprocal expression allowed partitioning, both sentences should have been equally felicitous. Since this is not the case, we conclude that here as well it is only a partitioning of the subject NP, available in (6) but not in (7), that allows a partitioned interpretation of the sentence.

The above contrasts suggest that there is a lower bound on the SMH-based reciprocal interpretation: it cannot be weakened to allow partitioned readings. We contend that all the cases of reciprocal sentences with partitioned interpretations are the result of an independent partitioning mechanism, while the reciprocal expression itself always has an unpartitioned interpretation.

Examining other previously suggested reciprocal interpretations that allow for partitioned interpretations shows that these partitions are indeed unrelated to the interpretation of the reciprocal expression. Sentence (8) below is brought in DKKMP as an example for One-way Weak Reciprocity (OWR), which requires that each member of the antecedent set participate in the denoted relation with another member of the antecedent set.

(8)  "The captain!" said the pirates, staring at each other in surprise.

In sentence (8), OWR requires that each pirate stare at another pirate. This seems correct, as (8) is true in both figures 2(a) and 2(b). However, consider what happens when we replace the definite subject of (8) by a proper name conjunction, as in the following sentence:

(9)  Morty, Charley, Oswald, Don and Bob are staring at each other.

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[3]Note that a partitioned interpretation *is* available if the partition is syntactically expressed in the conjunction, as in the following variation of sentence (7) in (i) below. In this case, a partition to two pairs of singers is perfectly possible, as expected by compositionality and intersective ("Boolean") analysis of the italicized *and*.

(i)  [John and Paul] *and* [George and Ringo] are looking into each other's eyes.

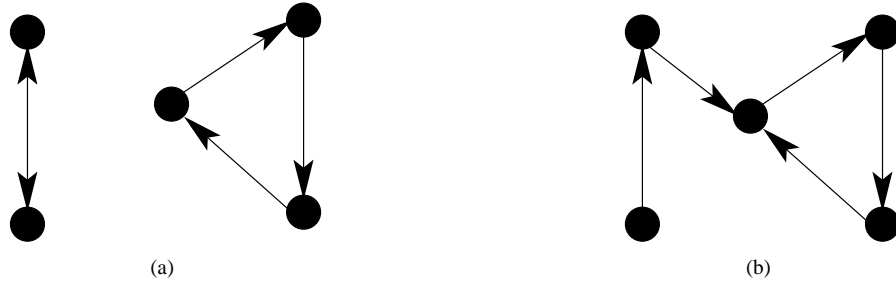(a)                                                     (b)

Figure 2: Two settings of schematic pirates

Here the truth conditions of OWR become too weak: (9) is unacceptable in figure 2(a) even though it is OK in figure 2(b). From this contrast between sentences (8) and (9) we conclude that the actual interpretation of the reciprocal expression with the predicate *stare at* requires connectivity on top of the truth conditions required by OWR. The acceptability of (8) in figure 2(a) is again attributed, as in (3) and (6), to a 'partitioning' mechanism that operates with definites, independently of the interpretation of the reciprocal expression.

To conclude, we have claimed that reciprocal expressions always require connectivity and therefore do not have partitioned interpretations. We have argued that partitioned interpretations of reciprocal sentences are always due to partitioning that is independent of the semantics of the reciprocal. In particular, partitioned interpretations of simple reciprocal sentences are exclusively dependent on the interpretation of the subject.

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