A Null Theory of Long-distance Reciprocity in English

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(1) has a non-contradictory reading (1-b) (called the Long-distance Reciprocity reading, LDR) in which the reciprocal *each other* seems to take the matrix subject as its antecedent, violating Condition A. We propose a novel semantic account of LDR in which reciprocals find their antecedent locally (unlike Heim et al., 1991a,b) without stipulating any extra mechanism for the interpretation of the embedded subject (unlike Dimitriadis, 2000).

We suggest that a cumulative operator can apply to attitude verbs, and that this, in conjunction with standard assumptions about events/situations, can derive the LDR readings without any further assumptions. The possibility of cumulative attitudes is straightforwardly expected, given the independent existence of cumulative readings of other verbs. Following Lewis (1979), *think* takes three arguments: the *res*, a property, and the subject of the attitude verb. It requires that the subject be related by some salient acquaintance relation (identity, hearing, seeing, etc.) to the *res*, and that the subject believe that he is related by the acquaintance relation to something for which the property holds (see example (2)). The cumulative operator (Krifka 1986) is defined in (3). If we apply it to the matrix verb in a sentence like (4), we obtain the formula in (5): 'John and Mary are cumulatively related by some salient acquaintance relation R to themselves and they cumulatively believe that they are related by R to someone who will win.' This accounts for each of the three "readings" of (4) in (4-a)-(4-c), depending on how cumulation is instantiated.

As discussed in Heim et al. (1991a,b) the reading (4-b) can also be derived by postulating a distributive operator in the matrix clause that distributes over the subject and binds the embedded pronoun *they*. But this mechanism cannot account for the reading in (4-c), and they claim that this reading is, in fact, missing. However, the bold-faced sentence in example (6) and others found on the internet is interpreted in the relevant way. We take this to independently motivate the possibility of applying cumulation to attitude verbs.

To account for LDR readings of sentences like (1), we assume that every verb comes with a situation variable that is existentially closed at the sentential level. In sentences like (1) we take it that the res can be a situation that *exemplifies* (see Kratzer (2007)) John and Mary being related to each other by some unspecified relation. Such a situation will have as parts subsituations where John is related to Mary, and where Mary is related to John. They cumulatively ascribe to these subsituations the property of being *taller than* situations.

The resulting account has several empirical and conceptual advantages. **1.** It obviates the need for the complex conditions on binding of free variables that form an essential part of Heim et al. (1991a,b, et sec.). **2.** It can account for the contrast between (1) and (7), i.e. the former, but not the latter can get an LDR construal. On our account, this is because the floated *each* in the matrix clause will block application of cumulation. As we will show, previous accounts of LDR can't adequately account for this contrast. **3.** It can deal with cases like (8), where the long-distance "antecedent" fails to c-command the reciprocal (Dimitriadis 1999). Dimitriadis accounts for this by treating the embedded subject as a (functional) donkey-pronoun, and using a special mechanism to retrieve the range of the function. This incorrectly predicts Donkey-LDR sentences like (9) to be acceptable. Since we don't invoke Dimitriadis' range-retrieval, we avoid that problem. **4.** Finally, the account is fully compatible with a treatment of reciprocals as polyadic quantifiers (Keenan 1992, Dalrymple et al. 1998, Sabato and Winter 2005). Hence the account can incorporate the results of such accounts with respect to the full

range of reciprocal readings, e.g. strong/weak reciprocity, intermediate alternative reciprocity (Dalrymple et al. 1998).

(1) John and Mary think they are taller than each other.

a. #John thinks they are taller than each other, and so does Mary.

b. John thinks he is taller than Mary, and Mary thinks she is taller than John.

(2) John thinks Bill is sick.

a. $(\exists R)(R(John, Bill) \wedge \mathcal{L}^w_{john} \subseteq \{\langle w', y\rangle : sick((\iota u.R(y, u)) \text{ in } w'\})$

b. R=salient cognitive relation
$\mathcal{L}^w_x$=doxastic alternatives of x in w

c. In words: John is related by some cognitively prominent relation R to the res (=Bill), and in all his doxastic alternatives (i.e., all world-individual pairs $\langle w', b\rangle$ s.t. John keeps open the possibility that he is b living in w') he is related by the same R to someone who is sick.

(3) [**R](x)(y)=1 iff
R(x,y)=1 or
$(\exists x_1, x_2, y_1, y_2)(x_1 \oplus x_2 = x \wedge y_1 \oplus y_2 = y \wedge ** R(x_1, y_1) \wedge ** R(x_2, y_2)$

(4) John and Mary think they'll win.

a. John thinks they win and so does Mary.

b. John thinks he'll win while Mary thinks she'll win.

c. John thinks Mary will win while Mary thinks John will win.

(5) $(\exists R)(** R(j \oplus m, j \oplus m) \wedge$
$\mathcal{L}^w_{j\oplus m} ** \subseteq \{\langle w', y\rangle : win((\iota u. **R(y, u)) \text{ in } w'\})$

(6) Take Sam, a twentysomething American I met randomly while traveling. Once **we both discovered we were living in London**, we exchanged numbers in the hopes we'd get together 'with his friends' (his words) sometime.
http://blogs.nypost.com/abroad/archives/2007/12/index.html

(7) #John and Mary **each** think the are taller than each other.

(8) The coaches that train John and Mary think they will defeat each other.
"The coach that trains John thinks he will defeat Mary and the coach that trains Mary thinks she will defeat John."

(9) *If a woman has a husband, she introduces him to each other.