

RECIPROCITY, ASYMMETRY AND AFFECTEDNESS

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The data It is well-known that, with asymmetric predicates (e.g. *the tables are stacked on top of each other*), *each other* can be interpreted as in (1a), giving rise to the so-called Intermediate Alternative Ordering (A is the antecedent set). IAO have been shown irreconcilable with all other schema allowed by non-asymmetric predicates and in particular with Strong (1b) and (One-way) Weak Reciprocity (1c) since the last element of an IAO has no other element of A with which it stands in the relation provided by the predicate (ao. Fiengo and Lašnik, 1973; Langendoen, 1978; Dalrymple et al. 1998; Beck 2001).

- (1) a. Intermediate Alternative Ordering (IAO): $\forall x \in A \exists y \in A (x \neq y \wedge (Rxy \vee Ryx))$
- b. Strong Reciprocity (SR): $\forall x \in A \forall y \in A (x \neq y \rightarrow Rxy)$
- c. One-way Weak Reciprocity (OWR): $\forall x \in A \exists y \in A (x \neq y \wedge Rxy)$

Besides this irreconcilability, a full understanding of IAO should explain the following facts.

1. *Prima facie*, *each other* is not compatible with comparatives ((2a), Beck, 2001). Nonetheless, under attitude reports ((2b), Higginbotham, 1980) or in some particular contexts (2c), the acceptability is restored.

- (2) a. *The skyscrapers are taller than each other for miles
- b. John and Mary think that they are taller than each other
- c. They must be one year younger than each other, but I forgot the order ... www.allisterrock.com/

2. With non comparative linear orderings, large groups are preferred (Beck, *ibid.*). However, in view of the difference between (3b) and (3c), this preference needs further explanation.

- (3) a. ??The three men inherited the shop from each other
- b. The members of the family inherited the shop from each other for generations
- c. *The grandfathers and the grandchildren inherited the shop from each other for generations

3. As noted by Fiengo and Lašnik (1973) and Langendoen (1978), there is a preference in directionality.

- (4) These theories *underlie/are built upon each other

4. For two entities, spatio and spatio-temporal properties allow sequence-like configurations ((5a), Beck, 2001). Crucially, some asymmetric properties do not (5b)-(5c), and others require strong reciprocity (5d).

- (5) a. The two books are stacked on top of each other
- b. *The two men are fathers of each other (predicted acceptable by (1a))
- c. *The two women gave birth to each other (see Sauerland, 1998; Winter, 2001)
- d. The two men criticize each other/pushed each other down

Beck and von Stechow proposal. In the most recent proposal on IAO, Beck and von Stechow (2007) have argued that IAO must be kept apart as a separate meaning of *each other* (see a.o. Langendoen 1978; Sternfeld, 1998), abandoning the idea that its semantics is derived by composition of surface ingredients (Beck, 2001). In linear configurations, *each other* is considered to be a pseudo-reciprocal like the "one ... another" adverbial that aligns the elements of the set denoted by the antecedent NP in a sequence. To explain cases (2)-(5), which all share the same linear configuration, one would have to assume with the authors that IAO are idiomatic.

Proposal. This paper claims that a unified account of *each other* is still possible, brings new elements for the understanding of IAO, and proposes a new view of the semantic-pragmatic interface of *each other*. In a nutshell, it states in terms of alternatives (e.g. à la Kratzer and Shimoyama, 2002) the common view, stemming from Langendoen (1978) and Sternfeld (1998) after him, that reciprocity relies on cumulative predication (eg Beck, 2001; Sauerland, 1998). Our claim is threefold: (i) time-world coordinates are to be taken into account (Thomason, 1984). (ii) We distinguish two cases according as to whether worlds or worlds-and-times have to be considered. (iii). Crucially, the predicate provides the criterion for teasing cases apart (see Winter 2001). The feature relevant for the distinction is not \pm asymmetry, but \pm affectedness (Dowty, 1991).

With Dalrymple et al. (1998) and others after them (eg Winter, 2001) we assume that *each other* is a $\langle 1,2 \rangle$ polyadic quantifier that binds two variables ranging over the restricted domain of quantification.

$$(6) \quad EO(A, R) = 1 \text{ iff } B \in \{X \subseteq A \times A \mid [\exists D_1^{eo}, D_2^{eo}, \dots, D_n^{eo} \in X \text{ s.t. } (D_1^{eo}, D_2^{eo}, \dots, D_n^{eo})^{seo}]\}$$

We assume that D^{eo} are pairs of different elements¹ of A (Heim, Lašnik and May, 1991) and that D^{seo} are sets of pairs that stand in OWR relation. For two elements a and b only $[ab]$ and $[ba]$ are two well-formed D^{eo} and only $\{[ba], [ab]\}$ or $\{[ab], [ba]\}$ are two well-formed D^{seo} .

The interpretation of the quantifier makes use of world-time coordinates which allow us to express the fact that certain pairs set the actual history, while other pairs (with which they stand in OWR relation) are in the denotation of the predicate in alternative worlds that would have been equally eligible for setting the actual history. Assuming the following representation of pairs over times (with usual accessibility relations (Thomason, 1984), two possibilities are to be distinguished.

	t_0	t_1	t_2
w_0	D_{w_0, t_0}^{eo}	D_{w_0, t_1}^{eo}	D_{w_0, t_2}^{eo}
w_1	D_{w_1, t_0}^{eo}	D_{w_1, t_1}^{eo}	D_{w_1, t_2}^{eo}
...

Case 1. D^{seo} through worlds. (i) There is a D^{eo} at w_0, t_0 ; (ii) each (*pace* exceptions) member of A is involved in a D^{eo} at some moment in time (moments can overlap); (iii) $(D_{w_0, t_0}^{eo}, D_{w_1, t_0}^{eo})^{seo}$, $(D_{w_0, t_1}^{eo}, D_{w_1, t_1}^{eo})^{seo}$, ...

Case 2. D^{seo} through worlds and times. (i) and (iii) as above; (ii') $(D_{w_0, t_0}^{eo}, D_{w_0, t_1}^{eo}, D_{w_0, t_2}^{eo}, \dots)^{seo}$.

(7) **Affectedness rule:** If the predicate is marked for $-$ aff(ectedness), case 1 applies. If the predicate is marked for $+$ aff(ectedness), case 2 applies.

Crucially, the number of pairs through time is entirely lexically or contextually determined (see Winter, 2001), provided that the constraint brought about by the affectedness feature of the predicate is satisfied.

Deriving the facts. Number of unacceptabilities derive from the fact that the semantics of the relation or the description of the antecedent NP forbid obtaining OWR structured pairs through worlds and/or time.

Fact 4. Since geometrical relations are prototypically marked for $-$ affectedness (Dowty, 1981), case 1 applies for (5a), requiring, for $A = \{a, b\}$, that one of the OWR ordered pairs $\{[ab]_{w_0, t_0}, [ba]_{w_1, t_0}\}$ be chosen at the actual world. (5b) is predicted unacceptable insofar as the relation *be father of* does not allow the speaker to assume the existence of an OWR structured set $\{[ab]_{w_0, t_0}, [ba]_{w_1, t_0}\}$ from which (s)he might choose any pair for setting the actual history. Since *criticize/push down* are marked for $+$ aff., it is predicted that (5d) require SR, and that (5c) is ruled out since SR cannot be satisfied for pragmatic reasons (as required by 'to give birth' ^{$+$ aff).}

Fact 1. The explanation provided for the impossibility of (5b) extends to comparatives (2a). Contexts strongly suggesting ignorance (2c) can rescue the acceptability, explicitly stating that there are different worlds which host different pairs in an OWR relation, but that the order to choose is not *relevant* and no matter which one can be picked. The same result obtains with attitude reports, (2b), where individuals

¹In the paper we show how the distinctness condition can be extended so to capture recent insights concerning superplurals, from Linnebo and Nicolas, *Analysis*, forthcoming.

stand for alternatives (with Stephenson (forthcoming) we consider judges as part of the Kaplanian *index* like worlds).

Fact 2. In a similar vein, the description of the NP also has to leave the speaker free of choosing any pair among the OWR structured ones, which are each assigned to worlds eligible for setting the actual history. Large groups and non-ordering descriptions better fulfill this task. Contrary to the unconstraining description 'be member of a family' (3b), since in (3c), only pairs $[\text{grandchild}_n, \text{grandfather}_n]$ are in the denotation of 'to inherit from', OWR cannot be obtained either across worlds ($\{[\text{gc}_n, \text{gf}_n]_{w0, t0}, *[\text{gf}_n, \text{gc}_n]_{w1, t0}\}$) or times ($\{[\text{gc}_n, \text{gf}_n]_{w0, t0}, *[\text{gf}_n, \text{gc}_n]_{w0, t1}\}$) (see also Schwarzschild, 1996)

Fact 3. Finally, our account shares with other approaches (e.g. Schein, 2003; Beck and von Stechow, 2007) the insight that directionality matters, since the use of orders comes with the assumption that the sequence develop towards an unbounded direction. The meaning of the predicate determines whether this requirement is satisfied.

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