The Semantics of Reciprocity

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31 July - 4 August, 2023

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What is reciprocity in semantics?

RECIPROCITY: meaning relation between arguments x and y in one predicate, and a collective argument $x+y$ in another

- **Reciprocal alternation** (Levin 1993):
  meet, kiss, talk (to), connect NP (with)
- **Pronominal element**:
  draw/meet/kiss (each other)
- **Verbal clitic**:
  Le ragazze si sono baciate/lavate
  the girls SE AUX kiss-PTC/wash-PTC
  Italian: 'The girls kissed/washed (each other/themselves).'
- **Derivational verbal morphology**:
  Nala na Juma wa-li-sikiliz-an-a
  Nala and Juma 3PL-PST-listen-REC-FV
  Swahili: 'Nala and Juma listened to each other.'

Main problems

I. Meaning of reciprocal operators: *each other*, *-an*.
formal semantics; syntax-semantics interface

II. Origins of lexical reciprocity: *meet* (*with*)
lexical semantics; thematic roles

III. Cross-linguistic connections: lexical/grammatical, reciprocal/reflexive
cross-linguistic semantics

I. Meaning of reciprocity operators

Mary, Sue, (Hillary) and Jane

are staring at each other
are biting each other
follow each other into the room around the bonfire
sit alongside each other
hold hands with each other
gave measles to each other
are standing on each other
descend from each other
contain each other (geometrically)
outrank each other
are looking into the eyes of each other

Proposal: *A reciprocal expression gets the strongest interpretation that does not conflict with the typicality preferences of the predicate in its scope.*

II. Origins of lexical reciprocity

Symmetry:
Sue and Liz dated (are sisters, are similar)
Sue dated Liz $\Leftrightarrow$ Liz dated Sue

Non-symmetry:
Sue and Liz hugged (collided, fell in love)
Sue hugged Liz $\not\Leftrightarrow$ Liz hugged Sue

Three-way thematic distinction:
Sue and Liz fought
Sue fought Liz
Sue fought with Liz

Proposals:
(i) Reciprocity with symmetric binary predicates is logical; (ii) Reciprocity with non-symmetric predicates is fuzzy; (iii) Thematic roles get typicality-based meanings, where symmetry and logical reciprocity are the limiting case.

III. Cross-linguistic connections

Between predicate alternations, and between reciprocity and reflexivity:

Mary e Lisa se abraçaram / admiram
Mary and Lisa SE hug-PST-3P / admire-PRS-3P
Brazilian Portuguese: 'Mary and Lisa hugged/admire (each other/themselves)'

Mary e Lisa abraçaram / *admiram
Mary and Lisa hug-PST-3P / admire-PRS-3P
'Mary and Lisa hugged/*admire'

Mary e Lisa abraçaram / admiram uma a outra
Mary and Lisa hug-PST-3P / admire-PRS-3P one the other
'Mary and Lisa hugged/admire each other'

Proposal: *Romance SE licenses covert logical operators of reciprocity and reflexivity, but these interpretations may also appear without SE by virtue of lexical entries (abraçaram), or overt operators (uma a outra).*

PhD theses


Imke Kruitwagen
(in progress)


Giada Palmieri
(in progress)


Eva Poortman
(2017)

Course plan

Class 1: Reciprocal operators
(Dalrymple et al. 1998, Sabato & Winter 2012)

Class 2: Selecting reciprocal interpretations
(Poortman et al. 2018)

Class 3: Lexical reciprocals and symmetry
(Winter 2018)

Class 4: Lexical reciprocals and non-symmetry
(Kruitwagen et al. 2022)

Class 5: Reciprocity in Romance
(Palmieri et al. 2023)

Class 1

Reciprocal Operators

Reciprocal meanings

Mary, Sue and Jane admire each other

Mary, Sue and Jane:	$\{m, s, j\} \subseteq E$	set of entities in E
admire:	admire $\subseteq E^2$	binary relation over E
each other:	SR	function (strong reciprocity) from sets and relations to truth-values = **reciprocal quantifier**

Reciprocal meaning:

function from subsets of E and binary relations over E to truth-values

= total $\langle 1, 2 \rangle$ quantifier

(Langendoen 1978, Keenan 1987, Peters & Westerståhl 2006)

Visualization:

set of directed graphs

nodes = elements of plural argument

edges = pairs in binary relation described by main predicate

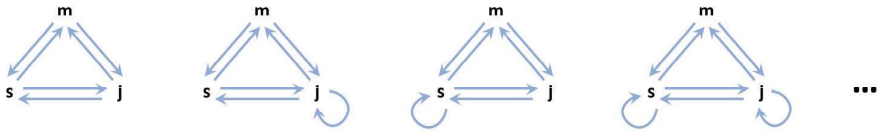
Example: strong reciprocity

Mary, Sue and Jane admire each other

$$\mathrm{SR}(\{m, s, j\}, \mathrm{admire}) = 1 \;\Leftrightarrow\; \forall x, y \in \{m, s, j\}. x \neq y \rightarrow \mathrm{admire}(x, y)$$

In general:

$$\mathrm{SR}(A, R) = 1 \;\Leftrightarrow\; \forall x, y \in A\, [x \neq y \rightarrow R(x, y)]$$



When reciprocity is weaker than SR

Mary, Sue and Jane are standing on each other

$$\forall x, y \in \{m, s, j\}. x \neq y \rightarrow \mathrm{stand\_on}(x, y)$$

???

Langendoen (1978), Dalrymple et al. (1998):

Reciprocals have a fairly large variety of reciprocal meanings

Variety of reciprocal meanings – Dalrymple et al. (1)

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

One-way Weak Reciprocity (OWR): the graph that R describes on A has at least one (non-loop) outgoing edge from every node.

(2) Five Boston pitchers sat alongside each other.

Intermediate Reciprocity (IR): R describes a *strongly connected graph* on A – a graph that has a directed path between any two different nodes.

Variety of reciprocal meanings – Dalrymple et al. (2)

(3) The third-grade students in Mrs. Smith's class gave each other measles.

Intermediate Alternative Reciprocity (IAR): R describes a *weakly connected graph* on A – a graph that has an undirected path between any two different nodes.

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

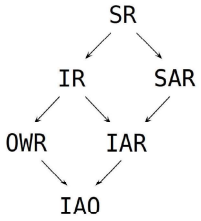
Inclusive Alternative Ordering (IAO): the graph that R describes on A has at least one (non-loop) outgoing or incoming edge for every node.

Strong Alternative Reciprocity (SAR): the graph that R describes on A has a complete underlying (undirected) graph, possibly with loops.

Reciprocal strength

Reciprocal meaning Π_1 is **stronger** than Π_2 if for every $A \subseteq E$ and $R \subseteq E^2$:

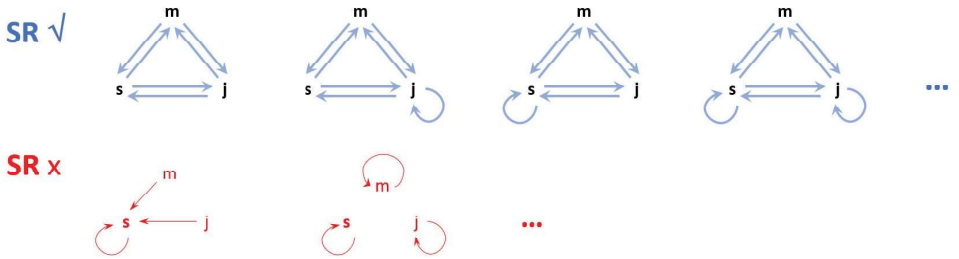
$\Pi_1(A, R) \leqslant \Pi_2(A, R)$.



Note: we can also think of 'strength' as logical entailment between formulas with a symbolic rendering of Π_1 and Π_2

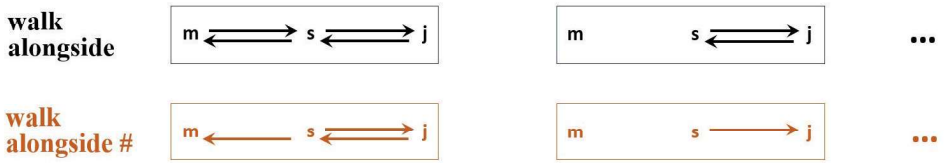
Unrestricted binary predicates

- Reciprocal meanings are total functions operating on *all* subsets of E and binary relations over E.
- **Unrestricted binary predicates**: binary predicates in natural language that may denote any binary relation over a certain domain (e.g. of animate objects).
- *Mary, Sue and Jane admire each other*



Restricted binary predicates

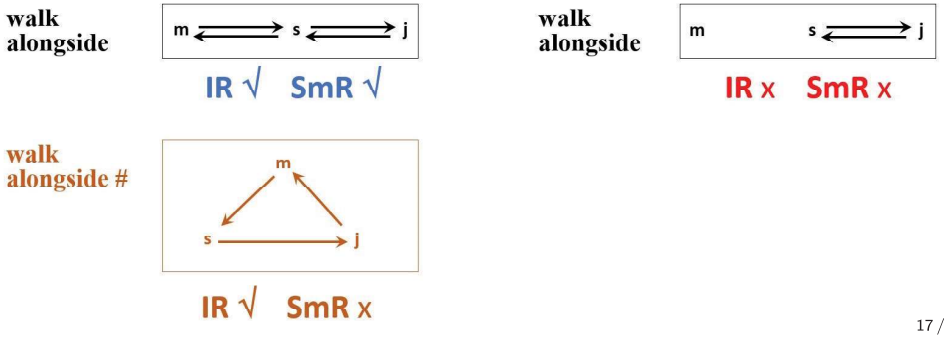
Binary predicates that have certain logical restrictions on the binary relations they may denote.



Risks of totality

- *Mary, Sue and Jane are walking alongside each other*
- **Symmetric Reciprocity** (SmR): the graph that R describes on A has at least one (non-loop) bi-directional edge for every node (Langendoen 1978)

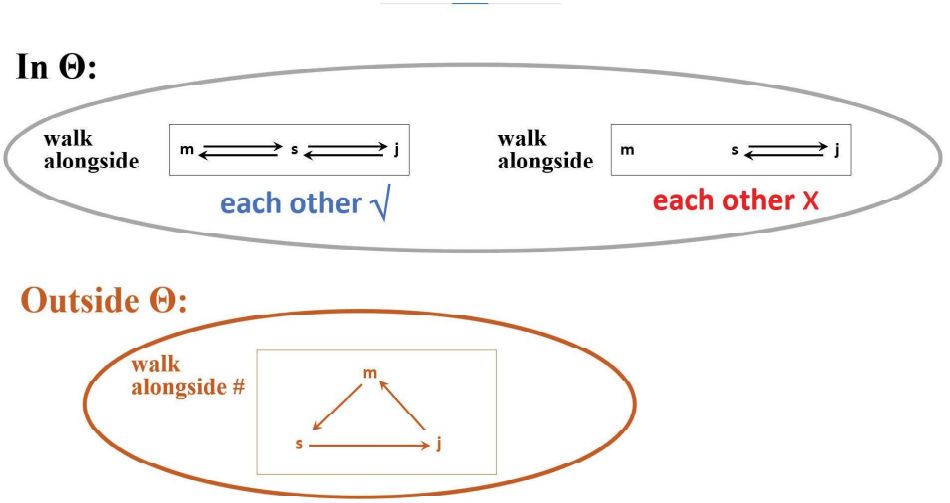
  Intermediate Reciprocity (IR): R describes a *strongly connected graph* on A – a graph that has a directed path between any two different nodes.
- On *walk alongside* relations it is impossible to distinguish IR from SmR.



Going partial (1)

- **Reciprocal meaning**:
  a function from subsets of E and binary relations over E to truth-values
  = total $\langle 1, 2 \rangle$ quantifier over E
- **Relational domain**:
  a set $\Theta \subseteq \wp(E^2)$ of binary relations over E
- **Reciprocal interpretation over rel. domain**:
  function from subsets of E and binary relations in $\Theta \subseteq \wp(E^2)$ to truth-values
  = partial $\langle 1, 2 \rangle$ quantifier over E (Sabato & Winter 2012)
- **Claim**: For any R in the domain Θ of *walk alongside*:
  $\mathrm{IR}(R) = \mathrm{SmR}(R)$

Example



Going partial (2)

Sabato & Winter's message:
We're only interested in describing reciprocal interpretations – cases where a reciprocal sentence is true/false given the restrictions on the predicate – not in unearthing more total reciprocal quantifiers.

- How do we select the correct reciprocal interpretation? Class 2...
- But we can already state some general desiderata.

Admissibility of reciprocal interpretations

A reciprocal interpretation f over Θ is **admissible** if:

f is CONSERVATIVE if for every $A \subseteq E$, for all $R_1, R_2 \in \Theta$:
$A^2 \cap R_1 = A^2 \cap R_2 \quad \Rightarrow \quad f(A, R_1) = f(A, R_2)$.

f is NEUTRAL TO IDENTITIES if for all $A \subseteq E$, for all $R_1, R_2 \in \Theta$:
$R_1 - I = R_2 - I \quad \Rightarrow \quad f(A, R_1) = f(A, R_2)$.

f is R-MONOTONIC if for all $A \subseteq E$, for all $R_1, R_2 \in \Theta$:
$R_1 \subseteq R_2 \quad \Rightarrow \quad f(A, R_1) \leqslant f(A, R_2)$.

Mary, Sue and Jane are pinching each other

- We only care about Mary, Sue and Jane, not about other entities that might be pinching something.
- We don't care if any of Mary, Sue and Jane is pinching herself or not.
- If in a given situation Mary, Sue and Jane are pinching each other, then adding pinches between them wouldn't change that.

Class 2

Selecting Reciprocal Interpretations

Cont. on PPT...

Class 2

Selecting Reciprocal Meanings

In collaboration with

Eva Poortman

Sivan Sabato

Nir Kerem

Marijn Struiksma

Naama Friedmann

Variety of reciprocal interpretations

Two extremes:

(1) Mary, Sue and Jane *admire* each other.

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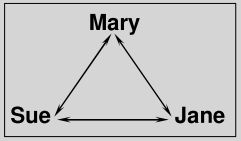

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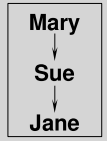

(2) Mary, Sue and Jane *are standing on* each other.

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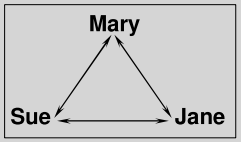

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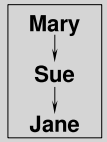

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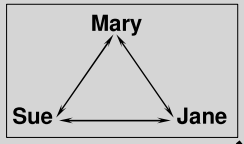
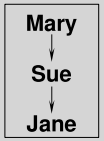


strong

?



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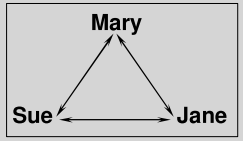

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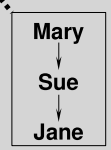


"weak"

Variety of reciprocal interpretations

Between the two extremes:

Mary, Sue, (Hillary) and Jane

are staring at each other
are biting each other
follow each other into the room/around the bonfire
sit alongside each other
hold hands with each other
gave measles to each other
are standing on each other
descend from each other
contain each other (geometrically)
outrank each other
are looking into the eyes of each other

Three approaches to reciprocals

A One meaning

B Many meanings + selection

C Adaptive meaning

Approach A : One meaning

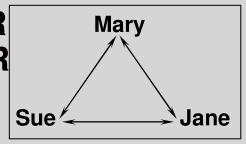
Mary, Jane and Sue admire each other

1. **Strongest Meaning:**
   each of the three women admires the other
   Heim, Lasnik & May 1991
   Problem: *how do we get weaker readings?*
2. **Weakest Meaning:**
   for each person there is/are some admiration relation(s)
   Pragmatics (strengthening):
   there are more admiration relations, up to all relations
   Problems: - *no consensus on weakest meaning*
   - *how precisely is strengthening achieved?*
   Fiengo & Lasnik 1973, Langendoen 1978, Roberts 1987, Schwarzschild 1996, Dalrymple et al 1998, Sternefeld 1998, Beck 2001, Sabato & Winter 2012, Mari 2013

Approach B Many meanings + selection

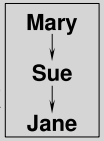
(1) Mary, Sue and Jane *admire* each other.

~~SR~~
IAR



(2) Mary, Sue and Jane are *standing on* each other.

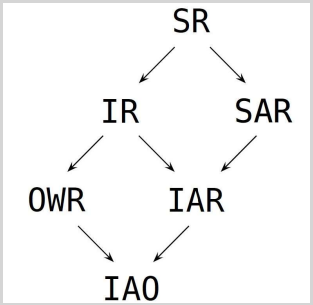
~~SR~~
IAR



Dalrymple et al (1998) – reciprocal ambiguity
SR: graph is *complete*
IAR: graph is *weakly connected* = non-directed path between any two nodes

in (1): *SR strongest possible* ➔ *SR allowed* ➔ *IAR disallowed*
in (2): *IAR strongest possible* ➔ *SR disallowed* ➔ *IAR allowed*

Approach B - Dalrymple et al.'s meanings



Strongest Meaning Hypothesis (SMH):
A reciprocal expression denotes the strongest meaning consistent with the context.

Problems: - *what justifies these specific meanings?*
- *what is 'context' and how do we use it?*
- *cases without a single strongest meaning*

Approach C One adaptive meaning

Winter (2001), Sabato & Winter (2012), Poortman et al. (2018) :

- **no ambiguity** of reciprocals

- one reciprocal meaning adapted to **context** by a **maximality principle**

What is the relevant context?

Binary concept (*admire*, *stand on*…)

What maximality principle?

In terms of typicality for concept

The Maximal Typicality Principle

The basic interpretation of a reciprocal is the one that attains a **maximal configuration** of relations within those configurations that attain **maximal typicality**.

Aim:

Test the MTH while:
- avoiding pragmatic garbage cans
- avoiding pragmatic introspection

Experimental Semantics/ Pragmatics

Ultimately: better theory of meaning/use, especially concept composition

Note on large numbers

Mary, Sue and Jane admire each other.
Mary, Sue and Jane are standing on each other.

These scholars here admire each other.
These trapeze artists are standing on each other.

- **Weaker interpretations may always appear with large numbers**
- **We set this problem aside**

Experiments with Maximal Typicality Hypothesis

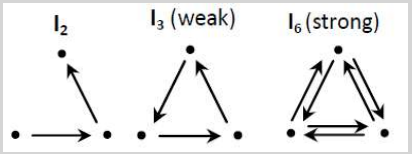
Patient Cardinality Preferences

Meaning = logical operator in sentence analysis

Interpretation = acceptable situation in sentence use

Testing MTH: are acceptability judgements on *interpretations* based on judgements about *typicality*?

Reciprocal Interpretations:

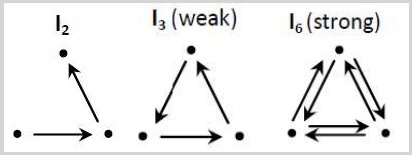


Patient cardinality:

By introspection:

	know	bite	pinch
I_2	-	-	-
I_3	?	+	+
I_6	+	?	+
1	+	+	+
2	+	??	?

Patient Cardinality Preferences

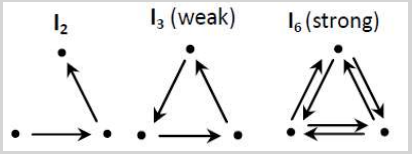


	know	bite	pinch
I_2	-	-	-
I_3	?	+	+
I_6	+	?	+
1	+	+	+
2	+	??	?

Reciprocity (R) factor: prefer interpretations with more pairs.

Typicality (T) factor: prefer interpretations that are more typical for the concept.

The R-factor and the T-factor



	R	R+T	R+T
	know	bite	pinch
I_2	-	-	-
I_3	?	+	+
I_6	+	?	?
1	+	+	+
2	+	?	?

Reciprocity (R) factor: prefer interpretations with more pairs.

Typicality (T) factor: prefer interpretations that are more typical for the concept.

Three Classes of Verbs

Know-type: *know, envy, understand, admire, miss, hate*
(kennen, benijden, begrijpen, bewonderen, missen, haten)

Bite-type: *bite, kiss, dress, kick, lash out, lick*
(bijten, kussen, kleden, schoppen, trappen, likken)

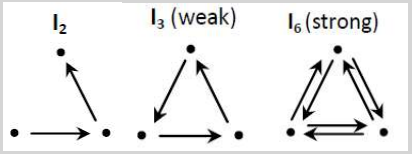
Pinch-type: *pinch, hit, caress, stab, shoot, grab*
(knijpen, slaan, strelen, steken, beschieten, grijpen)

Experiment Poortman et al.

Forced choice task:

--- *R* ---

Which scheme better represents the description?

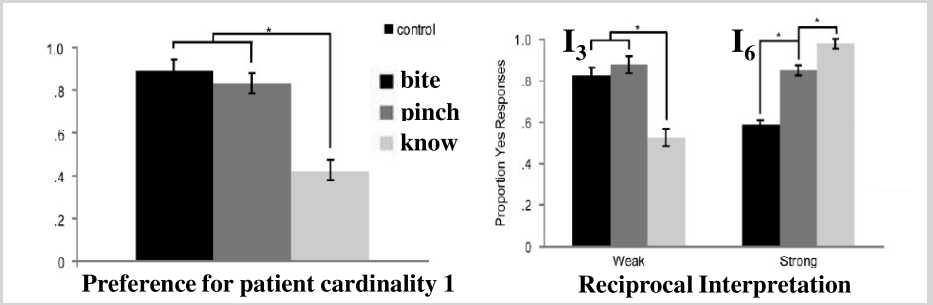


Truth judgment task:

A, B and C -- *R* -- each other

Does the scheme correctly represent the sentence?

Results + Conclusions (1)

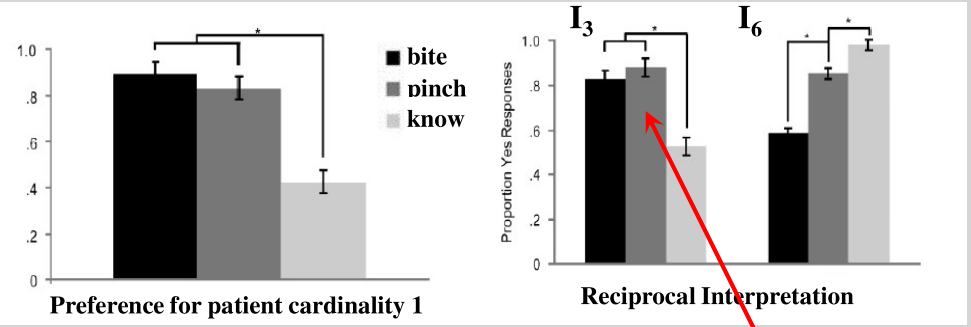


I3 - maximally acceptable when I6 is atypical
- much less acceptable when I6 shows no typicality anomaly

I6 - maximally acceptable when it shows no typicality anomaly
- otherwise: acceptability depends on typicality

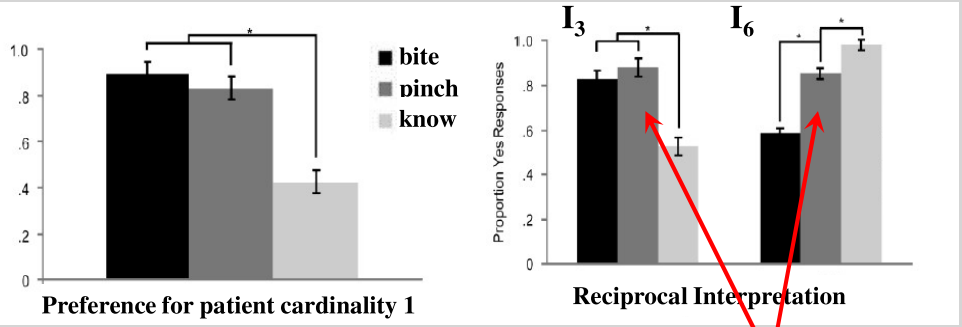
As expected by MTH

Results + Conclusions (2)



Weakest Meaning + strengthening: why difference between *pinch*-type and *know*-type with I_3?

Results + Conclusions (3)



Strongest Meaning Hyp.: why *pinch*-type acceptable with both I_3 and I_6?

Further results (1)

In a forced choice experiment with *pinch*-type concepts, more than 33% of participants preferred I3 to I6.

The boys are *combing* each other

Challenge for both Prag. Strengthening and SMH.

Context allows both interpretations!

Further results (2)

I2 is uniformly rejected for verbs from all three classes.

But I2 is expected in:

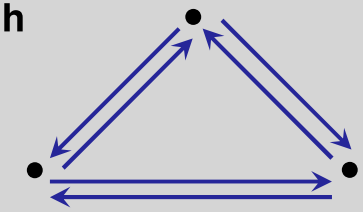
Mary, Sue and Jane *are standing on* each other.

Challenge for Pragmatic Strengthening.

Take home

EACH OTHER =
"add relations until something strange happens"

pinch

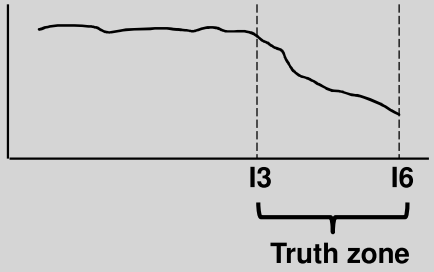


?

OK!

Take home

EACH OTHER =
"add relations until something strange happens"



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Maximal Typicality Interpretation

Relational domain $\Theta : \wp(E^2) \to \{0, 1\}$

Typicality domain $\Theta : \wp(E^2) \to [0, 1]$

we assume that Θ is not trivially 0, i.e. there is $R \subseteq E^2$ s.t. $\Theta(R) > 0$

$$\text{EACH-OTHER}(E, R) = \begin{cases} 1 & \text{for every } R' \subseteq E^2\text{: if } \Theta(R') \geqslant \Theta(R) \text{ then } R' = R \\ 0 & \text{otherwise} \end{cases}$$

Loose ends:

- Why is I_3 judged as 'true' by a (large minority of) speakers with *know*-type predicates?
- Why is I_6 judged as 'false' by a (large minority of) speakers with *bite*-type predicates?

Class 3

Lexical reciprocals and symmetry

Lexical reciprocity

Morpho-semantic relation between:

- **collective-unary** predicate

  Sue and Dan *dated*

- **binary** predicate

  Sue *dated* Dan

More generally: relation between a predicate entry with one collective argument and an alternate with two corresponding arguments.

separate the mother and the child	*mix sugar and milk*
separate the mother from the child	*mix sugar with milk*

Types of predicates

Eventive verbs	*marry*, *meet*, *hug*, *kiss*, *argue*
Stative verbs	*match*, *rhyme*, *be in love*, *intersect*
Nouns	*partner*, *cousin*, *friend*, *enemy*
Adjectives	*similar*, *adjacent*, *equal*, *parallel*

Main proposal

- ±**Symmetry**: a lexical semantic feature of binary predicates
- **Symmetric predicates**:
  - *date*, *cousin*, *parallel*
  - **plain reciprocity**:
    binary entry is logically derived from a collective meaning
- **Non-symmetric predicates**:
  - *hug*, *kiss*, *collide*
  - **preferential reciprocity**:
    binary meaning is preferentially related to collective meaning

Symmetric predicates

A binary predicate R is **symmetric** if for all x, y:

$$R(x, y) \Leftrightarrow R(y, x).$$

- property of binary predicates
- formally unrelated to reciprocity
- **non**-symmetry ≠ **a**symmetry

Familiar facts about lexical reciprocity

- **With symmetric predicates**:

  Sue is Dan's cousin = *Dan is Sue's cousin*
  Sue is dating Dan = *Dan is dating Sue*

- **With non-symmetric predicates**:

  Sue is hugging Dan ≠ *Dan is hugging Sue*
  Sue is hugging the tree ≠ *#the tree is hugging Sue*

  Sue's car collided with mine ≠ *my car collided with Sue's*
  Sue's car collided with the tree ≠ *#the tree collided with Sue's car*

  the terminology "symmetric" for collectives obscures this non-symmetry

- **Symmetry predicts reciprocity**: the vast majority of the symmetric binary predicates in English have a reciprocal parallel.

  notable exceptions: *far from*, *near*, *border on*, *resemble*

Some lexical reciprocals in English

Symmetric:

share NP (*with*)	*marry* (ACC)	*neighbor* (*of*)
rhyme (*with*)	*match* (ACC)	*partner* (*of*)
collaborate (*with*)	*similar* (*to*)	*sibling* (*of*)
more *with* entries?	*identical* (*to*)	*cousin* (*of*)
	parallel (*to*)	*twin* (*of*)

Non-symmetric:

talk (*to*)	*collide* (*with*)	*fight* (ACC)
meet (ACC)	*hug* (ACC)	*pet* (ACC)
fall in love (*with*)	*kiss* (ACC)	*cuddle* (ACC)
be in love (*with*)	*embrace* (ACC)	no adjectives and nouns?

- *kiss with*, *hug with*... (Hebrew, Greek...)
- productive *with* (Bantu)

Plain reciprocity

A unary predicate P is called the **plain reciprocal** of a binary predicate R if for all entities x, y:

$P(x{+}y) \Leftrightarrow R(x,y) \wedge R(y,x)$

Sue and Dan dated $\Leftrightarrow$ Sue dated Dan and Dan dated Sue

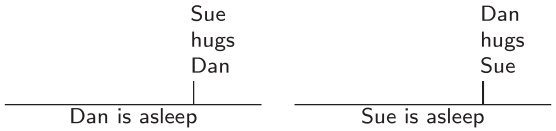
Sue and Dan are cousins $\Leftrightarrow$ Sue is Dan's cousin and Dan is Sue's cousin

Sue and Dan are similar $\Leftrightarrow$ Sue is similar to Dan and Dan is similar to Sue

Non-plain reciprocity

Sue and Dan hugged

$\not\Leftrightarrow$ Sue hugged Dan (and Dan hugged Sue)



Reciprocity-Symmetry Generalization

Symmetry goes hand in hand with plain reciprocity.

date:	+symmetric	+plain
hug:	−symmetric	−plain

No other classes!

Reciprocity-Symmetry Generalization: *A binary predicate R that alternates with a collective predicate P is symmetric if and only if P shows plain reciprocity.*

If correct, the RSG gives substantial semantic support for the hypothesis that symmetry stems from inherent collectivity.

The puzzle of gender-sensitive nouns

The noun *sister* is not symmetric:

Kim is Hillary's sister $\not\Rightarrow$ *Hillary is Kim's sister*

Hillary may be a male...

Yet reciprocity is plain:

Kim is Hillary's sister and Hillary is Kim's sister
$\Leftrightarrow$ *Kim and Hillary are sisters*

Truth-conditional symmetry

Schwarz (2006) and Partee (2008):

(1) Kim is Hillary's sister
Asserted: Kim is Hillary's sibling
Presupposed: Kim is a female

(2) Kim and Hillary are sisters
Asserted: Kim and Hillary are siblings
Presupposed: Kim and Hillary are females

The analysis in (1) takes the predicate "sister" to be **truth-conditionally symmetric**.

The RSG only concerns truth-conditions.

Quite useful for languages with grammatical gender, where virtually **no** gender marked predicate is symmetric.

Deriving symmetric predicates

Let P be a unary-collective predicate meaning. The **symmetric image** of P is the binary predicate R that is defined as follows:

$R \stackrel{def}{=} \lambda x.\lambda y.P(x{+}y)$

$\text{similar\_to}(a,b) \stackrel{def}{\Leftrightarrow} \text{similar}(a{+}b) \Leftrightarrow \text{similar}(b{+}a) \stackrel{def}{\Leftrightarrow} \text{similar\_to}(b,a)$ (Symmetry)

$\text{similar}(a{+}b) \Leftrightarrow \text{similar\_to}(a,b) \wedge \text{similar\_to}(b,a)$ (plainR)

Irreducible collectivity

(1) A, B & C are similar
$\Rightarrow$ A & B are similar, B & C are similar, and C & A are similar
$\not\Leftarrow$ A & B are similar, B & C are similar, and C & A are similar

Goodman (1951), Lasersohn (1995)

(2) A, B & C agree
$\Rightarrow \not\Leftarrow$ A & B agree, B & C agree, and C & A agree

(3) A, B & C are partners
$\Rightarrow \not\Leftarrow$ A & B are partners, B & C are partners, and C & A are partners

SIMILAR	$\approx$	"share a property"
AGREE	$\approx$	"share an opinion"
PARTNER	$\approx$	"share an asset"
SIBLING	$\approx$	"share a parent"
COUSIN	$\approx$	"share a grandparent, non-siblings"

Symmetry-Collectivity Hypothesis

We have seen: if R is in plain reciprocity with P, then R is symmetric.

Hypothesis: If a binary predicate is symmetric then it has a reciprocal alternate, and the alternation is plain.

Rationale:

- *Symmetry of binary predicates is generated by the grammar, on the basis of collective predicates (Lakoff & Peters 1969)*
- *No specialized "meaning postulates" for symmetry*
- *Counter-examples like English "near" should be explained away as singular lexical points*

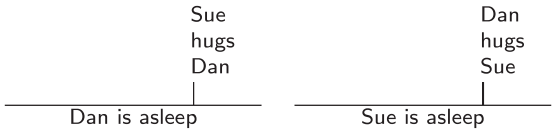
Non-symmetry

The drunk *embraced* the lamppost	⇏	#The lamppost embraced the drunk
The truck *collided* with the lamppost	⇏	#The lamppost collided with the truck
(Dong 1971)		
Sue *kissed* the doll	⇏	#The doll kissed Sue
Dan *fought* the fire	⇏	#The fire fought Dan
Ann *fell in love* with the book	⇏	#The book fell in love with Ann
Bill *talked* to the wall	⇏	#The wall talked to Bill

Sue *embraced* Dan ⇏ Dan embraced Sue
The truck *collided* with the bicycle ⇏ The bicycle collided with the truck
The chihuahua dog *fought* the postman (but the postman ignored it).
Sue *broke up with*/*divorced* Dan (though Dan wished they would stay together).
Dan *fell in love with* the actress (but she wasn't interested in him).
Ann *talked to* the clerk (but the clerk didn't answer).

Non-plain reciprocity

Sue and Dan hugged
⇏ Sue hugged Dan (and Dan hugged Sue)



Conclusion: Non-symmetry corresponds with non-plain reciprocity.
Or, as we call it: **Preferential Reciprocity**

Protoroles and protopredicates

Protoroles:
"entailments of a group of predicates with respect to one of the arguments or each" (Dowty 1991)

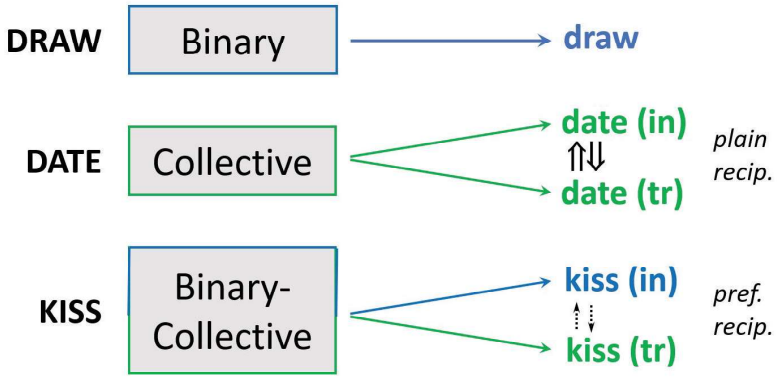
	→	distinct from morpho-syntax
"group of predicates"	→	non-standard types (unary+binary)
thematic arguments	→	Davidsonian

Protopredicates:
typed Davidsonian predicates without morpho-syntactic features

Types of protopredicates

	Protopredicate		Proto-Agent	Proto-Patient
Binary	DRAW		A	B
Collective	SHAKE-HANDS		{A,B}	{A,B}
Binary-Collective	KISS		A	B
			{A,B}	{A,B}

Protopredicates and the RSG



Remaining question: What is "preferential reciprocity"?

Thus, how are the surface meanings of binary-collective protopredicates related?

Class 4

Lexical reciprocals and non-symmetry

In collaboration with


Imke Kruitwagen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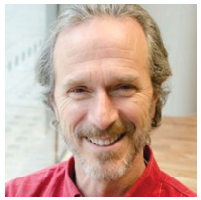

James Hampton

Non-symmetric predicates

talk (*to*)
meet (ACC)
fall in love (*with*)
be in love (*with*)

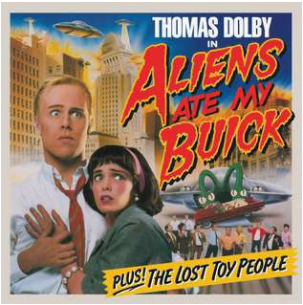
collide (*with*)
hug (ACC)
kiss (ACC)
embrace (ACC)

fight (ACC)
pet (ACC)
cuddle (ACC)

Preferential Reciprocity: relating non-symmetric binary meaning with collective meaning

- No logical relation
- Yet, there IS a semantic relation
- Theta roles – a **semantic mystery**

Resolving the mystery –
using a typicality threshold model

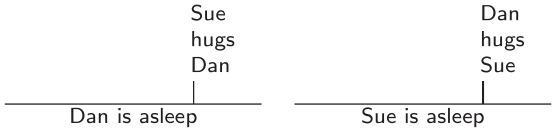


Early approaches

- **No lexical connection** – *each other* deletion (Gleitman 1965)
- **Radical symmetry**:
  - Lakoff & Peters (1969): all reciprocal alternations are plain
  - Gleitman et al. (1996): non-symmetry is somewhat chimerical

    "Despite first appearances, we do not believe that [predicates like *collide* or *embrace*] are perceived as "less symmetrical" than *equal* or *similar*. Rather the difference lies in the local interpretation of Figure/Ground as causal agent/patient of the action."

Reminder



Sue hugged Dan and Dan hugged Sue $\not\Rightarrow$ Sue and Dan hugged

In general, by RSG:
Non-symmetric predicates are only in non-plain reciprocal alternations.

Non-symmetric predicates and Symmetric Participation

Dimitriadis (2008):

Binary $\text{fight}_b(e, x, y)$

Collective $\text{fight}_c(e, x{+}y) = \exists e_1, e_2 \leqslant e.\, \text{fight}_b(e_1, x, y) \wedge \text{fight}_b(e_2, y, x)$
x, y: co-agents and co-patients in different sub-events of collective event

With $\text{fight}_w(e, x, y) = \text{fight}_c(e, x{+}y)$

Implications:

- B: −Symmetric W: +Symmetric
- Plain reciprocity between W and C entries
  Sue fought with Dan $\Leftrightarrow$ Sue and Dan fought
- No plain reciprocity between B and C entries;
  But C entries evoke *Symmetric Participation* with B:
  Sue and Dan fought $\overset{\Rightarrow}{\not\Leftarrow}$ Sue fought Dan and Dan fought Sue

Questions for Dimitriadis's approach

- Plain reciprocity between W and C entries?
  The truck and the bicycle collided
  $\not\Rightarrow$ The truck collided with the bicycle and the bicycle collided with the truck
- Symmetry of W entry?
  The truck collided with the bicycle
  $\not\Leftrightarrow$ The bicycle collided with the truck
- Symmetric participation?
  Sue and Dan fought
  $\overset{?}{\Rightarrow}$ Sue fought Dan and Dan fought Sue

The 'partner' thematic role

Rákosi (2008):
The *with* argument (*collide with*, *fight with*, ...) – a 'partner' role.

- A reciprocal Agent is necessarily assigned agentive properties
- A reciprocal Partner may have them only possibly

Problem: What is then the difference between Partner and Patient?

The 'with' argument:	
Dimitriadis:	Radical symmetry – plain reciprocity between pairs like: *fight* (in.)-*fight with*, *talk* (in.)-*talk with*, etc.
Rákosi:	Radical non-symmetry – no difference between pairs like: *fight* (tr.)-*fight with*, *talk to*-*talk with*, etc.

Proposed Middle Way: preferential reciprocity & symmetry

talk (*to*,*with*)	*collide* (*with*)	*fight* (ACC,*with*)
meet (ACC,*with*)	*hug* (ACC)	*pet* (ACC)
fall in love (*with*)	*kiss* (ACC)	*cuddle* (ACC)
argue (*with*)	*struggle* (*with*)	

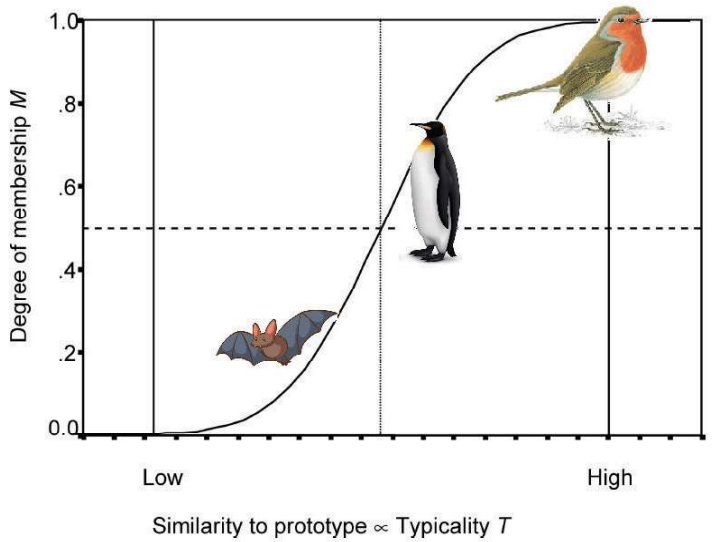
- Different alternates (C,B,W) are conceptually related through the **root's proto-predicate**
- As with other concepts, these relations are maintained using semantic features
- Different alternates use the root's features with different weights
- Thus, different alternates may assign different typicality values to a situation
- Corollary – typicality of symmetry and plain reciprocity: C $\geqslant$ W $\geqslant$ B

Semantic features and typicality

	Robin	Penguin	Bat
lays egg	+	+	−
beak	+	+	−
feathers	+	+	−
flies	+	−	+

- Robins have more bird properties than penguins
  ⇒ considered more typical birds
- Bats have few bird properties
  ⇒ usually not considered birds

Hampton's threshold model



Different *hug* forms – intuitive typicality

	Girl hugs woman	Girl and woman hug	Girl hugs with woman
+A+I +A+I 	High	High	High
+A+I -A+I 	High	Middle	Middle-High
+A+I -A-I 	High	Low	Low

Parameterizing root features (1)

For every root r:

$\mathsf{A}_r(x, y, e)$ = *activity value* of x towards y in e

$\mathsf{I}_r(x, y, e)$ = *intentionality value* of x towards y in e

values between 0 and 1

Parameterizing root features (2)

$\mathsf{B}_r(x, y, e) \Leftrightarrow [A_r(x, y, e) + I_r(x, y, e)]/2 > thr$

in binary entry: A and I matter in one direction

$\mathsf{C}_r(x{+}y, e) \Leftrightarrow [A_r(x, y, e) + I_r(x, y, e) + A_r(y, x, e) + I_r(y, x, e)]/4 > thr$

in collective entry: A and I matter in both directions

$\mathsf{W}_r(x, y, e) \Leftrightarrow$

$(1{-}c) \cdot [A_r(x, y, e) + I_r(x, y, e)]/2 + c \cdot [A_r(y, x, e) + I_r(y, x, e)]/2 > thr$

where $0 < c < 0.5$

in 'with' entry: A and I matter in both directions, but more in subject

c: degree of symmetry, where $c = 0.5$ means 'logically symmetric'

Example

	Girl hugs woman	Girl and woman hug	Girl hugs with woman
A=1 A=1 I=1 I=1 	$[A_r(x, y, e) + I_r(x, y, e)]/2$ = 1	High	High
A=1 A=0 I=1 I=1 	1	Middle	Middle-High
A=1 A=0 I=1 I=0 	1	Low	Low

Example

	Girl hugs woman	Girl and woman hug	Girl hugs with woman
	$[A_r(x,y,e) + I_r(x,y,e) + A_r(y,x,e) + I_r(y,x,e)]/4$		
A=1 A=1 I=1 I=1 	1	**1**	High
A=1 A=0 I=1 I=1 	1	**0.75**	Middle-High
A=1 A=0 I=1 I=0 	1	**0.5**	Low

Example

	Girl hugs woman	Girl and woman hug	Girl hugs with woman
	$(1-c)\cdot[A_r(x,y,e) + I_r(x,y,e)]/2 + c\cdot[A_r(y,x,e) + I_r(y,x,e)]/2$ c = 0.4		
A=1 A=1 I=1 I=1 	1	1	**1**
A=1 A=0 I=1 I=1 	1	0.75	**0.8**
A=1 A=0 I=1 I=0 	1	0.5	**0.6**

Expected entailments

E1. If the binary form symmetrically holds between x and y in some event e, that entails the 'with' form in both its directions. For example:

A fights B and B fights A (in e)
$\Rightarrow$ *A fights with B and B fights with A* (in e)

E2. If the 'with' form symmetrically holds between x and y in some event e, that entails the collective form in both its directions:

A fights with B and B fights with A (in e)
$\Rightarrow$ *A and B fight, and B and A fight* (in e)

Expected non-entailments

NE1. No symmetric participation:
A and B fight or *A fights with B* $\not\Rightarrow$ *A fights B and B fights A*

More generally:
(i) *A and B fight* $\not\Rightarrow$ *A fights B* (ii) *A and B fight* $\not\Rightarrow$ *B fights A*
(iii) *A fights with B* $\not\Rightarrow$ *A fights B* (iv) *A fights with B* $\not\Rightarrow$ *B fights A*

NE2. The collective form does not entail the 'with' form:
A and B fight $\not\Rightarrow$ *A fights with B*

NE3. The 'with' form does not entail the collective form:
A fights with B $\not\Rightarrow$ *A and B fight*

NE4. The 'with' form is not symmetric:
A fights with B $\not\Rightarrow$ *B fights with A*

NE5. The binary form does not entail the 'with' form:
A fights B $\not\Rightarrow$ *A fights with B*

Experiment: materials (1)

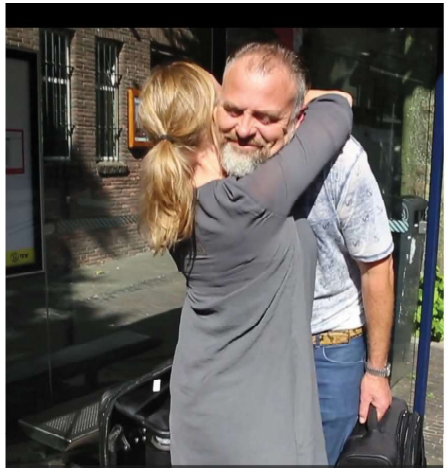
Five Dutch verbs:

botsen (*tegen*/*met*)	'collide (against/with)'
knuffelen (ACC/*met*)	'hug (ACC/with)'
fluisteren (*tegen*/*met*)	'whisper (to/with)'
vechten (*tegen*/*met*)	'fight (against/with)'
appen (ACC/*met*)	'send whatsapp (ACC/with)'

Experiment: materials (2)

- **Two video clips per verb**:
  - 'Violet' and 'Mark'
  - No symmetric participation: Violet active, Mark passive
  - Mark ±intentional
- **Five sentences per verb**:
  - Violet and Mark fight
  - Violet fights Mark
  - Mark fights Violet
  - Violet fights with Mark
  - Mark fights with Violet
- **Truth value judgement**

Experiment: materials (3)



Experiment: procedure

- 5 verbs × 2 clips per verb × 5 versions per verb
  = 50 truth value judgements
- 30-60 (M=38) participants per condition
- per participant: 4 target items of different verbs + 6 filler items
- 477 participants (286 female, age M=26)

Results

		V&M		VbM		MbV		VwM		MwV	
		%	of	%	of	%	of	%	of	%	of
vechten	**M+I**	40%	53	77%	35	32%	57	62%	42	36%	39
('fight')	**M-I**	19%	58	55%	33	4%	49	39%	41	5%	40
knuffelen	**M+I**	84%	57	97%	32	40%	53	84%	45	61%	44
('hug')	**M-I**	51%	49	100%	33	9%	58	67%	43	37%	41
praten	**M+I**	35%	34	100%	32	0%	35	42%	43	16%	45
('talk')	**M-I**	16%	38	94%	33	0%	33	36%	44	0%	41
botsen	**M+I**	69%	59	100%	35	4%	53	94%	32	34%	32
('collide')	**M-I**	70%	53	91%	34	4%	53	82%	33	33%	33
appen	**M+I**	57%	35	100%	34	3%	33	74%	39	27%	41
('WhatsApp')	**M-I**	30%	33	100%	32	9%	34	24%	42	10%	40
TOTAL		**47%**	**469**	**91%**	**333**	**11%**	**458**	**60%**	**404**	**26%**	**396**

Results – No symmetry & Entailment 1

E1. VbM and MbV ⇒ VwM and MwV

		V&M		VbM		MbV		VwM		MwV	
		%	of	%	of	%	of	%	of	%	of
vechten	**M+I**	40%	53	77%	35	32%	57	62%	42	36%	39
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TOTAL		**47%**	**469**	**91%**	**333**	**11%**	**458**	**60%**	**404**	**26%**	**396**

Results – effect of Intentionality

		V&M		VbM		MbV		VwM		MwV	
		%	of	%	of	%	of	%	of	%	of
vechten	**M+I**	40%	53	77%	35	32%	57	62%	42	36%	39
('fight')	**M-I**	19%	58	55%	33	4%	49	39%	41	5%	40
knuffelen	**M+I**	84%	57	97%	32	40%	53	84%	45	61%	44
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('WhatsApp')	**M-I**	30%	33	100%	32	9%	34	24%	42	10%	40
TOTAL		**47%**	**469**	**91%**	**333**	**11%**	**458**	**60%**	**404**	**26%**	**396**

Results – Entailment 2

E2. VwM and MwV ⇒ V&M and M&V

		V&M		VbM		MbV		VwM		MwV	
		%	of	%	of	%	of	%	of	%	of
vechten	**M+I**	40%	53	77%	35	32%	57	62%	42	36%	39
('fight')	**M-I**	19%	58	55%	33	4%	49	39%	41	5%	40
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appen	**M+I**	57%	35	100%	34	3%	33	74%	39	27%	41
('WhatsApp')	**M-I**	30%	33	100%	32	9%	34	24%	42	10%	40
TOTAL		**47%**	**469**	**91%**	**333**	**11%**	**458**	**60%**	**404**	**26%**	**396**

Results – no symmetric participation

		V&M		VbM		MbV		VwM		MwV	
		%	of	%	of	%	of	%	of	%	of
vechten	**M+I**	40%	53	77%	35	32%	57	62%	42	36%	39
('fight')	**M-I**	19%	58	55%	33	4%	49	39%	41	5%	40
knuffelen	**M+I**	84%	57	97%	32	40%	53	84%	45	61%	44
('hug')	**M-I**	51%	49	100%	33	9%	58	67%	43	37%	41
praten	**M+I**	35%	34	100%	32	0%	35	42%	43	16%	45
('talk')	**M-I**	16%	38	94%	33	0%	33	36%	44	0%	41
botsen	**M+I**	69%	59	100%	35	4%	53	94%	32	34%	32
('collide')	**M-I**	70%	53	91%	34	4%	53	82%	33	33%	33
appen	**M+I**	57%	35	100%	34	3%	33	74%	39	27%	41
('WhatsApp')	**M-I**	30%	33	100%	32	9%	34	24%	42	10%	40
TOTAL		**47%**	**469**	**91%**	**333**	**11%**	**458**	**60%**	**404**	**26%**	**396**

Results – Non-Entailments

Two-tailed Fisher Exact Test

		V&M vs MbV	MwV vs MbV	MwV vs VbM	V&M vs MwV	V&M vs VwM	VwM vs MwV	VwM vs VbM
vechten	**M+I**	p=0.428	p=0.666	**p<0.001**	p=0.829	**p=0.040**	**p=0.026**	p=0.217
('fight')	**M-I**	**p=0.034**	p=1	**p<0.001**	p=0.068	**p=0.039**	**p<0.001**	p=0.242
knuffelen	**M+I**	**p<0.001**	**p=0.042**	**p<0.001**	**p=0.012**	p=1	**p=0.018**	p=0.129
('hug')	**M-I**	**p<0.001**	**p<0.001**	**p<0.001**	p=0.204	p=0.139	**p=0.008**	**p<0.001**
praten	**M+I**	**p<0.001**	**p=0.016**	**p<0.001**	p=0.062	p=0.641	**p=0.009**	**p<0.001**
('talk')	**M-I**	**p=0.027**	p=1	**p<0.001**	**p=0.009**	**p=0.047**	**p<0.001**	**p<0.001**
botsen	**M+I**	**p<0.001**	**p<0.001**	**p<0.001**	**p=0.0018**	**p=0.008**	**p<0.001**	p=0.224
('collide')	**M-I**	**p<0.001**	**p<0.001**	**p<0.001**	**p=0.0016**	p=0.310	**p<0.001**	p=0.305
appen	**M+I**	**p<0.001**	**p=0.009**	**p<0.001**	**p=0.010**	p=0.144	**p<0.001**	**p=0.0012**
('WhatsApp')	**M-I**	**p=0.033**	p=1	**p<0.001**	**p=0.038**	p=0.603	p=0.142	**p<0.001**
TOTAL		**p < 0.00000001**	**p < 0.00001**	**p < 0.00001**	**p < 0.00001**	**p = 0.0001**	**p < 0.00001**	**p < 0.00001**

NE1 NE2 NE3 NE4 NE5

(Non) Entailmants – expectations

	Dimitriadis	Rákosi	Current	Results
E1	+	+	+	consistent with E
E2	+	+	+	consistent with E
NE1(i-iii)	+	+	−	support NE
NE1(iv)	+	−	−	support NE
NE2	+	+	−	support NE
NE3	+	−	−	support NE
NE4	+	−	−	support NE
NE5	−	+	−	support NE

Conclusions

- Theta role distinctions do not give a full account of **non-plain** reciprocal alternations
- They should be supplemented by their **preferential** lexical semantics
  - Things like: "The activity requirement from Agent $\geqslant$ Partner $\geqslant$ Patient"
- Typicality features and threshold model: a more fine-grained model of the semantics of alternations

Class 5

Reciprocity in Romance

In collaboration with

Giada Palmieri

Joost Zwarts

Renato Miguel Basso

Júlia Nieto i Bou

Two common distinctions with reciprocals

- Lexical alternations vs. Morpho-syntactic operations

English:	*hug* (tv./iv.)	*hug/draw each other*
Hebrew:	*xibqu* (tv.)/*hiTxabqu* (iv.)	*xibqu/ciyru exad et ha-šeni*

- Reciprocity vs. reflexivity

English:	*hug/wash*	*draw each other/themselves*
Hebrew:	*hiTxabqu/hiTraxcu*	*ciyru exad et ha-šeni/et acmam*

- Both distinctions may seem to be missing in Romance:

  Mary e Lisa si sono abbracciate/punite

  Mary and Lisa SE be-AUX-3P hug/punish-PP-3P

  Italian: 'Mary and Lisa hugged/punished each other/themselves'

  *Mary e Lisa sono abbracciate

Plot

- Reciprocity and reflexivity without SE
  → as common in Romance as R/R alternations can be...
- Characterizing lexical reciprocals
  → meanings similar to other languages as lexical meanings can be...
- The operation of SE with transitive verbs
  → R-marking à la Reinhart & Reuland (1993)

Reciprocity without SE – Brazilian Portuguese

Mary e Lisa *(se) puniram
Mary and Lisa SE punish-PST-3P
'Mary and Lisa punished each other/themselves'

Mary e Lisa se abraçaram
Mary and Lisa SE hug-PST-3P
'Mary and Lisa hugged (each other/themselves)'

Mary e Lisa abraçaram
Mary and Lisa hug-PST-3P
'Mary and Lisa hugged (∼each other/*themselves)'

Reflexivity without SE – Brazilian Portuguese

Mary e Lisa se depilaram
Mary and Lisa SE depilate-PST-3P
'Mary and Lisa depilated (each other/themselves)'

Mary e Lisa depilaram
Mary and Lisa depilate-PST-3P
'Mary and Lisa depilated (*each other/∼themselves)'

Generalization 1 (BP): In finite clauses, SE is:
– *obligatory* for reciprocity/reflexivity with 'regular' transitives ('punish')
– *optional* for reciprocity/reflexivity with corresponding 'natural' class ('hug'/'depilate')

Reciprocity/Reflexivity without SE – Italian

Ho fatto *(si) ringraziare *(si) Mary e Lisa
have-AUX-1S make-PP se thank-INF se Mary and Lisa
'I caused Mary and Lisa to be thanked'

Ho fatto *(si) abbracciare *(si) Mary e Lisa
have-AUX-1S make-PP se hug-INF se Mary and Lisa
'I caused Mary and Lisa to be hugged' / 'I caused Mary and Lisa to hug'

Ho fatto *(si) lavare *(si) Mary
have-AUX-1S make-PP se wash-INF se Mary
'I caused Mary to be washed' / 'I caused Mary to wash'

Generalization 2 (Italian): In causative clauses, SE is *disallowed*:
→ no reciprocity or reflexivity with 'regular' transitives ('punish')
→ reciprocity/reflexivity with 'natural' class ('hug'/'wash', resp.)

Reciprocity and reflexivity without SE – Spanish

Causatives with SE:
Hice agradecerse/afeitarse/abrazarse a Mary y Lisa
make-PST-1S hug/shave/thank-INF-SE DOM Mary and Lisa
'I caused Mary and Lisa to thank/hug/shave each other/themselves'

Causatives without SE:
Hice abrazar/afeitar a Mary y Lisa
make-PST-1S hug/shave-INF DOM Mary and Lisa
'I caused Mary and Lisa to be hugged/to hug / to be shaved/to shave'

Hice agradecer a Mary y Lisa
make-PST-1S thank-INF DOM Mary and Lisa
'I caused Mary and Lisa to be thanked/*to thank each other/*to thank themselves'

Generalization 3 (Spanish): In causative clauses, SE is:
– *obligatory* for reciprocity/reflexivity with 'regular' transitives ('thank')
– *optional* for reciprocity/reflexivity with corresponding 'natural' class ('hug'/'shave')

Romance reciprocal verbs without SE

In Brazilian Portuguese, Italian, Spanish, Catalan

With transitive entry:

'hug' (BP,C,I,S); 'kiss' (BP,C,I,S); 'meet' (BP,C,I,S); 'break up' (BP,C,I,S); 'confer' (BP,C,I,S); 'marry' (BP,C,I,S); 'date' (I); 'greet' (BP,I); 'compete' (I); 'bump into each other' (BP,C,I,S); 'be partners' (BP); 'to be in touch' (I); 'intertwine' (BP,C,I,S); 'alternate' (BP,C,I,S); 'separate (BP,C,I,S); 'mix, blend' (BP,C,I,S); 'align' (BP,C,I,S); 'overlap' (BP,C,I,S); 'unite' (BP,C,I,S).

Without transitive entry:

'discuss' (BP,I,S,C); 'wrestle' (BP,I,S); 'converge' (BP,I,S,C); 'fight' (I,S); 'ryhme' (BP,I,S,C); 'converse' (BP,I,S,C); 'compete' (BP,I,S,C); 'divorce' (BP,I); 'correspond' (BP,I,S,C); 'chat' (BP,I,C); 'collaborate' (BP,I,S,C); 'cooperate' (BP,I,S,C); 'argue' (BP,I,C); 'negotiate' (BP,I,S,C); 'make love' (BP,I,S,C); 'talk' (BP,I,S,C); 'compete' (I,S).

Intermediate summary

In certain environments, Romance languages allow reciprocal and reflexive readings without SE for a specific class of verbs.

- We say that these verbs have an **L-reciprocal/L-reflexive** interpretation.
- Lexical meanings belong in the class of 'natural' reciprocals/reflexives (Kemmer 1993).
- SE leads to the familiar reciprocal/reflexive under-specificity unless it appears with an overt reciprocal/reflexive operator (BP *uma a outra*).
- All transitive verbs show reciprocity and reflexivity with SE and overt operators – **G-reciprocity/G-reflexivity**.

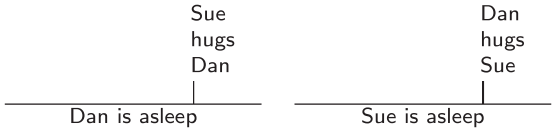
Distinguishing L-reciprocity from G-reciprocity

Verbs that require SE for reciprocity (unambiguously transitive, by assumption) never show the following properties:

- **Reciprocal nominalization** (Doron & Rappaport-Hovav 2009): *separazione/consultazione* (It: 'separation/consultation')
- **Semantic drift** (Kemmer 1993): *trovare* (tv.): 'find', *trovarsi*: 'find each other' (tv.), 'meet' (iv.)
- **Non-plain reciprocity**
- **'With' arguments**
- **Singular group arguments**

Reminder – non-plain reciprocity in English

Irreducibility:



Sue hugged Dan and Dan hugged Sue $\not\Rightarrow$ Sue and Dan hugged

No symmetric participation:

Sue and Dan hugged $\not\Rightarrow$ Sue hugged Dan and Dan hugged Sue

In sum – non-plain reciprocity: A&B PRED $\not\Leftrightarrow$ A PRED B and B PRED A

Proposal: Non-plain reciprocity may appear with L-reciprocals, but not with G-reciprocals.

Irreducibility in reciprocals

Brazilian Portuguese:

Mary e Lisa se beijaram
Mary and Lisa SE kiss-PST-3P
'Mary and Lisa kissed/kissed each other'

Mary e Lisa beijaram
Mary and Lisa kiss-PST-3P
'Mary and Lisa kissed'

Italian:

Mary e Lisa si sono baciate
Mary and Lisa SE be-AUX-3P kiss-PST-3P
'Mary and Lisa kissed/kissed each other'

Ho fatto baciare Mary e Lisa
have-AUX-1S make-PP kiss-INF Mary and Lisa
'I caused Mary and Lisa to be kissed' / 'to kiss (*each other)'

'With' arguments

Maria si è abbracciata/#ringraziata con Lisa
Maria SE be-AUX-3S hug/thank-PP with Lisa
'Maria hugged/#thanked with Lisa'

Singular group arguments

The team has hugged/*thanked each other.

O time se abraçou/?agradeceu (BP)
the team SE hug/thank-PST-3S
'The team hugged/?thanked each other'

La squadra si abbraccia in campo (It)
the team SE hug.PRS.3S in field
'The team hugs on the field'

El equipo se abraza en círculo (Sp)
the team SE hug.PRS.3S in circle
'The team hugs in a circle'

L' equip s' abraça (Ca)
the team SE hug.PRS.3S
'The team hugs'

SE with transitive verbs

Mary e Lisa (se) admiram uma a outra
Mary and Lisa (SE) admire-PRS-3P one the other
'Mary and Lisa admire each other'

Mary e Lisa se/*ϕ admiram
Mary and Lisa SE/ϕ admire-PRS-3P
'Mary and Lisa admire each other/themselves'

Similarly for other "optional/no SE" environments in Romance.

Form	Meaning
NP RCP/RFL TV	reciprocal/reflexive, respectively
NP RCP/RFL SE TV	reciprocal/reflexive, respectively
NP SE TV	polysemous reciprocal-reflexive
*NP TV	-

Arity reduction and R-meaning

$\lambda R.\lambda x.R(x,x)$ reflexivity with arity-reduction

$\lambda R.\lambda x.\lambda y.R(x,y) \wedge x = y$ reflexivity without arity-reduction

similarly for reciprocity

- Reciprocal and reflexive operators can appear with or without SE
  ⇒ SE cannot on its own reduce arity
- But then how is NP SE TV interpreted?
  ⇒ SE licenses application of covert reciprocal/reflexive operator(s)
- Meaning of covert operator(s) – two possible routes:
  - Ambiguity RCP/RFL
  - One operator RCP+RFL

Remaining questions

- What is "licensing" of covert R-operator(s) by SE?

  Standard binding conditions (Reinhart & Reuland 1993):

  Condition A: An R-marked transitive verb must be interpreted as R.

  Condition B: A transitive verb that is interpreted as R is R-marked.

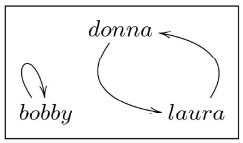
  R-marked = SE and/or overt RCP/RFL expression

  R = arity 2 reduced to 1

- One or two R-operators?

One or two R-operators in Romance? (1)

The one operator thesis: (Murray 2008, Haug & Dalrymple 2020)



Cheyenne (Murray 2008):

*Ka'ëškóne-ho é-axeen-**ähtse**-o'o*
child-PL.AN 3-scratch.AN-*ahte*-3PL.AN
Some children scratched *themselves*
Some children scratched *each other*

One or two R-operators in Romance? (2)

The two operator thesis:
(Palmieri 2020, Palmieri & Basso 2020, Nieto Bou 2021)

Reciprocity/Reflexivity vagueness in such cases is only illusionary, due to the semantics of L-reflexive verbs.

Dona bathed.

≈ Dona bathed herself, or was volitionally bathed by someone else (Doron & Rappaport-Hovav 2009)

Dona, Laura and Bobby bathed.

≈ Each of them was volitionally bathed by (at least) one of the three.

Palmieri, Basso, Nieto Bou: L-reflexive verbs in four Romance languages (It,BrP,Sp,Ca) show significantly more vagueness with SE than plain transitive verbs.

Conclusion

- Romance languages have transitive verbs alternating with intransitive L-reciprocals and L-reflexives similarly to English and other languages.
- Those intransitive entries are semantically distinguished from both SE+transitives and overt RCP/RFL operators.
- SE is often mandatory with L-reciprocals/reflexives, but four languages were shown to have environments where this requirement is relaxed (most flamboyantly: BrP).
- Similarly for overt RCP/RFL operators.
- Analysis of SE: an R-marker licensing two covert RCP/RFL operators, with the usual meanings.

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