1. The phenomenon: exhaustivity

I. Examples

(1) a. [John or Mary]$_F$ was at the party.
b. [John]$_F$ was. → *Mary wasn't.*

(2) a. Who was at the party?
b. Some of the linguists. → *Not many of them.*

(3) a. How many marbles are in the vase?
b. Five. → *Not more than five.*

I will focus on (1).

II. The problem for the Gricean approach

('Gricean' = 'as a conversational implicature'.)

Conversational implicature: what follows from what is said plus the assumption that speaker is cooperative (Grice, 1975)

Typical 'Gricean' derivation of exhaustivity for (1):

1. She didn't say "John and Mary were both there".
2. She should have said so, had she believed it. (Quantity)
3. She lacks the belief that Mary was there.

⇩ The *epistemic step* (Sauerland, 2005)

4. She believes that Mary was not there.

The epistemic step is a/the major problem for the Gricean approach to exhaustivity (Chierchia, *et al*., 2008).

III. Toward a solution

An insightful minimal pair with (1):

(4) a. [John or Mary]$_F$ was at the party.
b. At least John was. / John and maybe Mary too.

Intuition: (1b) is *not related enough* to (1a), because, unlike (4b), it leaves Mary unattended.

2. Four ingredients

I. The following minimal translations:

(1') a. $p \vee q$
b. p
(4') b. $p \vee (p \wedge q)$ (Ciardelli, *et al.*, 2009; Coppock and Brochhagen, 2013)

II. A standard definition of *entailment*:

Entailment: φ entails ψ iff $\exists\chi$ s.t. $\psi \wedge \chi \equiv \varphi$

III. A pretty standard *Maxim of Relation*:

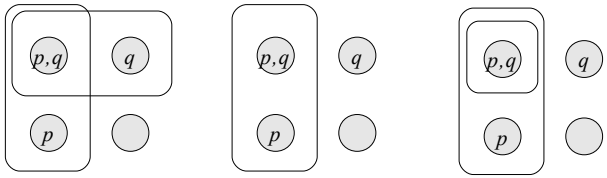
Maxim of Relation: Let your utterance, relative to your knowledge state, entail the *question under discussion*.
(cf. Roberts, 2012; Groenendijk & Stokhof, 1984)

(5) a. Was John at the party?
b. It was raining. → *John likes/hates rainy parties.*

The richer the semantics, the stronger this maxim.

IV. Attentive semantics (Roelofsen, 2011)

Meanings are sets of sets of worlds (in the spirit of *Inquisitive Semantics*): the possibilities that a sentence *draws attention to*.



(1a) (1b) (4b)

(For a definition of the semantics, see back of right column.)

Proposition 1: (1b) does not entail (1a); (4b) does.

Proof: one cannot add possibilities to (1a) or remove worlds from it to obtain (1b). For (4b), this is *possible.* □

3. Results

I. Exhaustivity of (1)

Proposition 2: For (1b) to comply with the Maxim of Relation, the speaker must know $p \rightarrow q$ or $p \rightarrow \neg q$.

Proof: (1a) is entailed by $p \wedge q$ *and by* $p \wedge \neg q$ *. There is no other way for (1b) to comply with Relation.* □

This gives us the following derivation:

1. the speaker believes $p \rightarrow q$ or $p \rightarrow \neg q$ (Relation)
2. the speaker believes that p (Quality)
3. the speaker lacks the belief that q (Quantity)
4. the speaker believes that $\neg q$

II. General result

Unattended possibilities: For meanings $\{a\}, B$, a speaker who responds $\{a\}$ to B, *leaves unattended* all $b \in B$ that properly overlap with a.

Proposition 3: The Relation implicature is that each unattended possibility or its complement follows from the information provided.

Proof: For the entailment to go through, unattended possibilities must be made to coincide with attended possibilities, or be excluded altogether. □

Proposition 4: A speaker implicates for each unattended possibility that she lacks the belief that it is true.

Proof: Unattended possibilities are answers the speaker should have given, had she been able to (Quantity). □

Proposition 5: A speaker implicates for each unattended possibility that it is false.

Proof: Maxim of Quality plus propositions 3 and 4. □

A. Definition of attentive semantics (Roelofsen, 2011)

1. $[p] = \{\{w \mid w(p) = 1\}\}$
2. $[\neg\phi] = \{\overline{\bigcup[\phi]}\}$
3. $[\phi \vee \psi] = [\phi] \cup [\psi]$
4. $[\phi \wedge \psi] = [\phi]_{\bigcup[\psi]} \cup [\psi]_{\bigcup[\phi]}$

where $[\varphi]_\alpha = \{\alpha \cap \beta \mid \beta \in [\varphi]\}$

B. Other semantics with similar results

Minimally, the semantics must lack the *absorption laws*.

Absorption laws: $p \vee (p \wedge q) \equiv p \equiv p \wedge (p \vee q)$

Proposition 6: (1b) and (4b) are semantically distinct only if the absorption laws do *not* hold.

Proof: Easy to see. □

Proposition 7: Exhaustivity can be derived via Relation only if the absorption laws do *not* hold.

Proof: If the absorption laws hold, $(p \vee q) \wedge p \equiv p$ *and hence* p *entails* $p \vee q$ *. That means (1b) would comply with the Maxim of Relation as it is.* □

In particular, the following are also suitable:
- Unrestricted inquisitive semantics (Ciardelli, *et al.*, 2009)
- Truth-maker semantics (Fine, 2013)

C. First-order cases

For (2) and (3), the following translations would work, where:
- *x* ranges over sets of individuals, *n* over numbers.
- *some* denotes a context-dependent quantity.

(2') a. $\exists x\, AtParty(x) \vee \neg\exists x\, AtParty(x)$
b. $\exists x\,.\, Ling(x) \wedge AtParty(x) \wedge |x| = some$
(3') a. $\exists n \exists x\,.\, Marbles(x) \wedge InVase(x) \wedge |x| = n$
b. $\exists x\,.\, Marbles(x) \wedge InVase(x) \wedge |x| = 5$

→ i.e., a one-sided account of numerals/quantifiers.

D. The final rise contour

(Presented at UCSC S-Circle, April 2013)

Constant (2012): rise-fall-rise conveys uncertainty regarding truth of *non-dispelled alternatives*.

(6) a. [John or Mary]$_F$ was at the party.
b. [John]$_F$ was... (final rise) → *not sure about Mary.*

'Non-dispelled' ≃ 'unattended', hence similar results obtain if rise-fall-rise conveys *uncertain compliance with Relation*.

But the final rise has many readings (e.g., Gunlogson, 2008).

New proposal: final rise conveys *uncertain cooperativity.*

→ This can pertain to Quality, Quantity, Relation or Manner.

Focus in (6b) makes uncertain Relation/Quantity more salient.

E. 'Embedded' implicatures (work in progress)

Chierchia, *et al.*, (2008) consider (7) a challenge for Grice:

(7) a. Every student read [Othello or King Lear]$_F$.
b. Every student read [Othello]$_F$. → *no one read King Lear*

But this is already predicted by the present setup...

F. References

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Inquisitive pragmatics: Entailment as relatedness

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Summary

- I present a Gricean account of *exhaustivity implicatures*.
- The main challenge for existing 'Gricean' accounts, the *epistemic step*, is overcome via the *Maxim of Relation*, by adopting a richer notion of meaning.
- Pragmatic reasoning is sensitive to the possibilities that a speaker *draws attention to* (cf. Ciardelli, *et al.,* 2009).

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