Exhaustivity, relatedness and the final rise
— and of course inquisitive semantics
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Part I: Exhaustivity and relatedness

1.1 The puzzle

(1) Q: Was John or Mary at the party?
   R: John was. → Mary wasn’t.  ‘exhaustivity’

- Exhaustivity is not a contribution of the focus (Horn, 1972)
- Exhaustivity has been considered a prime example of a conversational implicature.

Conversational implicature (Grice, 1975):
something implicated by the speaker, which the hearer can derive purely from what is said plus her assumption that the speaker is cooperative.

- For the exhaustivity of (1), the derivation goes as follows:
  1. The responder didn't say that Mary was there too.
  2. The responder should have said so, had she been able to. (due to maxim of Quantity)
  3. Hence, she must not have the belief that Mary was there.
  4. Presumably the responder has an opinion regarding Mary's presence.
  5. The responder believes that Mary was not there

- The step from 3 to 5 is called the Epistemic Step (Sauerland, 2005), and the assumption in 4 is made by, e.g., (Spector, 2007; Van Rooij & Schulz, 2006; Alonso-Ovalle, 2008). (among everyone else)
- Assumption 4 makes this a case of underspecification; instead of conv. implicature.

Problem:
- It is hard to think of a circumstance where (1) does not implicate exhaustivity.
- To treat exhaustivity as underspecification is to admit defeat.

Goal: To give a properly Gricean explanation of exhaustivity as conversational implicature.

1.2 Proposal

- The maxim of Relation is the key. (GroSto (1984) already said that Quantity cannot be the solution)
- This maxim, recall, is supposed to enable implicatures as in (2):

(2) Q: Was John at the party?
   R: It was raining. → John loves (or hates) rainy parties
• I assume the following maxim of Relation:

Maxim of Relation
A speaker with knowledge state s (set of worlds), should give A in response to Q
only if A, restricted to s, entails Q.

This is basically a weaker version of:
- 'Pragmatic answer' (GroSto 1984)
- 'Contextual entailment' (Roberts 2012).

• What this maxim achieves depends on which semantics and entailment we use.
  ○ The more fine-grained our semantics, the more sparse entailment,
    and hence the stronger the Relation implicatures we can derive.
  ○ How fine-grained should the semantics be?

(3) Q: Was John or Mary at the party?
   R: John, and maybe Mary. / At least John was.

  ○ Our best bet is a semantics fine-grained enough to distinguish (1) from (3).

Unrestricted Inquisitive Semantics (Ciardelli, 2009)
• Meanings are regarded as proposals to update the common ground in one of several ways;
  ○ And as drawing attention to the proposed updates. (Ciardelli, et al., 2009)
• Possibility: A set of possible worlds
• Proposition: A set of possibilities, always containing пустое множество (ugly but helpful)

For p a proposition letter, ϕ, ψ formulae:
1. [p] = \{w ∈ W|w(p) = \text{true}\}, ⌀
2. [1] = {⌀}
3. [ϕ ∨ ψ] = [ϕ] ∪ [ψ]
4. [ϕ ∧ ψ] = [ϕ] ∩ [ψ] (where A ∩ B = \{a ∩ b : a ∈ A, b ∈ B\})
5. [ϕ → ψ] = \{w| for all a ∈ [ϕ], if w ∈ a, then w ∈ f(a)\}[f : [ϕ] → [ψ]]

The examples in inquisitive semantics
(1) Q: Was John or Mary at the party?
   R: John was at the party
   \( p ∨ q \lor \neg(p ∨ q) \) (Groenendijk, et al, 2009)
(3) R: John and maybe Mary / At least John was
   \( p \lor (p ∧ q) \) (Ciardelli, et al., 2009; Coppock, et al., ms.)
(2) Q: Was John at the party?
   R: It was raining.
   \( p \lor \neg p \)
Entailment (Westera, 2012)

\[ A \text{ entails } B, \ A \models B, \text{ iff } \exists C, B \cap C = A \] (+ its syntactic counterpart)

- This is a standard way to define entailment, only the meanings are now richer, and as a consequence, entailment is sparser.
  - \( r \) does not entail \( p \lor \neg p \)
  - \( p \) does not entail \( p \lor q \lor \neg(p \lor q) \)
  - \( p \lor (p \land q) \) does entail \( p \lor q \lor \neg(p \lor q) \)

- **Intuition:** entailment is sensitive to the possibilities a proposition draws attention to. For \( A \) to entail \( B \), \( A \) should not leave any possibility of \( B \) unattended. (This intuition is formalized in part II)

- Hence, plugged into the maxim of Relation, it says: *do not leave possibilities unattended!*

1.3 Predictions

For (2):
- For \( r \) to entail \( p \lor \neg p \), it must be restricted to the info that \( r \rightarrow p \) or \( r \rightarrow \neg p \).
- Hence, to comply with Relation, the speaker must know either \( r \rightarrow p \) or \( r \rightarrow \neg p \).

For (3,1):
- \( p \lor (p \land q) \) entails \( p \lor q \lor \neg(p \lor q) \) hence for (3) we predict no Relation implicature.
- For \( p \) to entail \( p \lor q \lor \neg(p \lor q) \) it must be restricted to \( p \rightarrow q \) or \( p \rightarrow \neg q \).
- Hence, for (1), we predict:
  
  3. The responder does not have the belief that \( q \) (as before, via Quantity)
  4. She must believe either \( p \rightarrow q \) or \( p \rightarrow \neg q \) (maxim of Relation)
  5. She does believe that \( p \) (maxim of Quality)
  6. She cannot believe \( p \rightarrow q \), hence must believe \( p \rightarrow \neg q \)
  7. Hence, she must believe \( \neg q \rightarrow \text{exhaustivity!} \)

1.4 Summary:
- Exhaustivity is a conversational implicature!
- The only real innovation is to use unrestricted inq. sem.
  - ...which we need anyway to distinguish (1) and (3).
- This comes with an entailment, plugged into the maxim of Relation, that is strict enough.
- **Speakers/hearers care about what they draw attention to/from.**
Part II: Relatedness and the final rise

2.1 Problems for existing work

- Gunlogson (2008): Final rise indicates the speaker's uncertain commitment to what is said:

  (4) Q: What is your favourite colour?
  R: Blue... → I'm not sure whether blue is really my favourite.

- Constant (2012): Rise-fall-rise (focus+final rise) indicates uncertainty regarding the truth of non-dispelled alternatives. → non-dispelled = neither inconsistent nor redundant.

  (5) Q: Was John or Mary at the party?  (i.e. (1), but with final rise)
  R: John was... → Not sure about Mary.

  It is motivated by the infelicity of final rise with alternative-disspelling focus:

  (8) Q: Was John or Mary at the party?
  R: # They both were...

- Final rise has been associated with 'emotional' content, friendliness, politeness, submissiveness, etc. (e.g., Gussenhoven, 2004).

Problems:
- Constant's account is non-compositional, unrelated to, e.g., Gunlogson's final rise.
  ◦ A unified account of final rise and rise-fall-rise along their lines seems impossible.

- Gunlogson's account of the final rise is limited to a reading of (4) of qualitative uncertainty:
  ◦ Quality: I'm not sure whether this is really my favourite colour.
  ◦ Quantity: Is that detailed enough? Sky on a clear winter's day blue?
  ◦ Manner: Is that even a colour? My English is not so good.
  ◦ Relation: [strange for (4), but salient for (6), also without the focus]

  (6) Q: Was John at the party?
  R: It was raining... → Perhaps John's presence depended on the rain? (i.e. (2), but with final rise)

Goal: A unified account of the semantics of final rise and rise-fall-rise.

2.2 Proposal

- I propose that the final rise indicates uncertain cooperativity.
- I assume the effect of final rise is non-at-issue content (Simons, et al., 2010).

Contribution of final rise

For a natural language expression $\alpha$, with $<\alpha>$ its translation into logic, let:

- At-issue($\alpha$...) = $<\alpha>$
- Non-at-issue($\alpha$...) = Non-at-issue($\alpha$) \ $\land$ 'I'm uncertain whether I'm being cooperative' >
Claims:
1. Constant's rise-fall-rise = uncertain compliance with the maxim of Relation.
2. Focus of rise-fall-rise makes the uncertain Relation reading especially salient.
3. Gunlogson's final rise = uncertain compliance with the maxim of Quality.
4. All other readings = uncertain compliance with some maxim or other.

- Claims 3 and 4 are programmatic: as long as the uncertainty pertains to aspects of cooperativity, there is no reason why this couldn't be described in terms of a maxim.

Section 2.3 → predictions of uncertain compliance with Relation; 2.4 → establish claims 1 & 2.

2.3 Predictions of uncertain compliance with Relation
Assuming the same maxim of Relation and logical translations for (5,6) as for (1,2), we predict for (6):

- For \( r \) to entail \( p \lor \neg p \), it must be restricted to the info that \( r \rightarrow p \) or \( r \rightarrow \neg p \).
- Hence, uncertain compliance with the maxim of Relation entails that the speaker considers both possible, but knows neither.

For (5):

- For \( p \) to entail, \( p \lor q \lor \neg(p \lor q) \) it must be restricted to \( p \rightarrow q \) or \( p \rightarrow \neg q \).
- Uncertain Relation entails that the speaker considers both possible, but knows neither.
- Hence, we predict:
  1. She considers possible \( p \rightarrow q \) and \( p \rightarrow \neg q \), but believes neither (uncertain Relation)
  2. She believes \( p \) (maxim of Quality)
  3. Hence, she considers possible both \( q \) and \( \neg q \), but believes neither.

2.4 Correspondence with Constant (2012)
Claim 1: Constant's account of rise-fall-rise can be captured in terms of uncertain Relation.

- Constant: rise-fall-rise indicates uncertainty regarding non-dispelled alternatives.
- In our theory, the final rise, conveying uncertain Relation, conveys uncertainty regarding the unattended possibilities, which block entailment (e.g., \( q \) for (1)).
- Non-dispelled alternatives are very much like our unattended possibilities:

<table>
<thead>
<tr>
<th>Possibilities left unattended</th>
</tr>
</thead>
<tbody>
<tr>
<td>For all propositions ( A, Q ), where ( A = {a, \emptyset} ) for some ( a \in Q ):</td>
</tr>
<tr>
<td>(i) a non-empty possibility ( a' \in Q ) is left unattended by ( A ) iff ( a' ) overlaps with, or is contained in, ( a ).</td>
</tr>
<tr>
<td>(ii) ( A ) entails ( Q ) iff there is no such possibility.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Unattended vs. non-dismissed</th>
</tr>
</thead>
<tbody>
<tr>
<td>For all propositions ( A, Q ), where ( A = {a, \emptyset} ) for some ( a \in Q ):</td>
</tr>
<tr>
<td>A possibility ( a \in Q ) is non-dismissed by ( A ) iff it is left unattended by ( A ).</td>
</tr>
</tbody>
</table>
• All examples considered by Constant are such that the non-dismissed alternatives and unattended possibilities coincide, yielding the same predictions for both theories.
  ○ However, (7) has a possibility that is non-dismissed, but not left unattended:

(7) Q: Was John or Mary at the party?  
R: At least John was...  
  (same as (3), but with final rise)

  ◦ Because (7) complies with Relation, we predict that the final rise cannot indicate uncertain relatedness.  
  ◦ Indeed, it seems that for (7), an uncertain Quantity reading is most prominent.

Claim 2: The focus of rise-fall-rise pragmatically restricts its range of possible readings

I assume:

Contribution of focus (Grice, Rooth, Krifka...)
The focus marks congruence with a question under discussion.  

→ In InqSem, the question is obtained by replacing the focused constituents by existentially bound variables (Balogh, 2008).

In the case of rise-fall-rise:
• the congruence makes uncertain Manner unlikely;
• uncertain Quality would make the choice for one answer over the others arbitrary;
• and hence uncertain Quantity and Relatedness are the most prominent readings.

• Like Constant, we predict final rise with alternative-dispelling focus to be infelicitous:

(8) Q: Was John or Mary at the party?  
R: # They both were...

  ◦ The answer entails the question, hence no uncertain Relation reading is possible.  
  ◦ It is the most informative answer possible, hence no uncertain Quantity reading either.

2.5 Summary

• Treating the final rise as conveying uncertain cooperativity enables a unified account of final rise and rise-fall-rise (established for the latter, still programmatic for the rest).

• Crucial ingredient for rise-fall-rise is the same strict maxim of Relation we used in part I.

• Pragmatic concepts enter semantics.
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References

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