Drawing and cancelling granularity-based inferences

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Overview

- Scalar implicature (SI)
  - and its relevance to the number system
- Apparent failure of numerical SIs
- Granularity
  - and the inferences it licenses
  - as seen in new experimental data
- Contextual dependence of granularity inferences
  - Support for constraint-based model?

Scalar implicatures (SI)

- Pragmatic inferences
- Arise from 'informational scales', e.g. <some, all>
  - "Some of the delegates arrived on time"
    => "not all of them did"
  - "John likes Mary"
    => the speaker does not think that John *loves* Mary
- Generally, where p → q, a speaker asserting q is unwilling to commit to p
  - If p is relevant and the speaker knows whether it is true, cooperativity => not-p

SIs and numerals

- Numerals can be cardinal or existential
  - "There are eight presentations today"
- Core meaning of numeral could in principle be either, i.e. "exactly" or "at least"
- If the latter, exact meaning comes from implicature
  - Scale is <…, (at least) eight, (at least) nine, …>
  - Saying "eight" means "at least eight" and implicates "not {at least nine}"
  - Therefore "exactly eight" is the communicated meaning
- However, exact semantics more satisfactory (Breheny 2008)

Numerical quantifiers vs. SIs

- "More than *n*" fails to yield SIs
  - "There were more than 100 people there"
    = |People there| > 100
- But still have a scale
  - <…, more than 100, more than 101, …>
  - "There were more than 101 people there"…
  - "There were more than 100 people there"
    => "It's possible that exactly 101 people were there"
  - Violates our intuitions

Implicature scales

- <like, love, *adore*>
- “I love you”
  => “I don’t adore you” (!)
- Terms in a scale must be equally lexicalised (Horn)
- “adore” not as salient as “love” – SI fails
- Similarly, “excellent” ! => “not unsurpassable”
- Related to availability of lexical items for reasoning; not arbitrary

Granularity

- Round numbers preferred (Jansen and Pollmann 2001)
  - because of dual nature of system (Dehaene 1997)
  - and so interpreted as approximations (Krifka 2009)
- Therefore no scale <…, more than 100, more than 101, …>, so no SI
- But no reason to exclude e.g. <70, 80> as a scale…
- ...and hence should admit scalar inferences

Experiment (MTurk)

- Participants given quantifying expressions – asked for either
  - (i) lower and upper bound on the value, or
  - (ii) their best point estimate of the value
- Materials included numbers with different degrees of roundness (100, 110, 93)

Experiment (MTurk) – results

"More than *n*" - medians

Value of n	Lower bound	Upper bound	Preferred
100	100	149	110
110	110	127.5	112
93	93	100	94

Cancellable?

- Choice of number to be *relevant*
- "Are more than 20 people coming to lunch?"
  - Response needs to address QUD
- Implicatures arise because of **what we don't say**
  - Compulsion to use particular number suppresses this
  - Should get fewer implicatures of this type in a context where a number is already activated

Experiment 2

- Pencil-and-paper questionnaire
- Participants asked to give both the bounds and the preferred value for a given numerical expression
- Two conditions
  - 'Unprimed' – expression is the answer to a neutral question
  - 'Primed' – expression is the answer to a question containing the same numeral
- Prediction: unprimed => more inferences

Experiment 2 – results

"More than 100" - medians

Condition	Lower bound	Upper bound	Preferred
Primed	101	150	120
Unprimed	101	132.5	117.5

Constraint-based interpretation

- Actually, don't *have to* repeat numbers…
  - Could say "more than 30" or "17" or "34"
  - Could use a number activated from speaker's point of view, or believed to be relevant
- Hearer must be intelligent about inferring
  - Must consider *contextual motivation* (if any) for hearer's choice of utterance
- Proposal concerning this choice (Cummins & Katsos, under review) makes testable predictions about the inference patterns

Summary

- Granularity-driven inferences available in the numerical domain
  - Parallel to normal SIs
  - Respect structure of number system
- Evidence that these can be overridden by contextual considerations
- Precise nature of process to be determined

References

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