Set Selection and Storage Reflect Differences in Quantifier Meanings

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Meanings, Representational Formats, and Verification

Big Picture: What Representational Formats do Speakers use to Encode Quantifier Meanings?

- What is the logical vocabulary of meaning representations?
- How can truth-conditional equivalent meanings be teased apart experimentally?
- Does each learner acquire only one meaning for a given quantifier?
- Does everyone acquire the same meaning for a given quantifier?

Current Research Questions:

- Are the lexical specifications of more and most detectable by probing set memory?
- Can quantifier complexity more generally be diagnosed the same way?

References:


More v. Most

Background: Direct v. Proportional Comparisons

- More: compare focused & non-focused sets (e.g., blue & yellow)
- Most: compare focused & superset (e.g., blue & total)

Experiment 1: Adult Dots Task

- #superset > #(non-focused set)
  - Superior performance evaluating more-statements

Experiment 2: Centroid Selection

- Attending to a set → better estimate of its center
  - More: good performance on both sets
  - Most: poor performance on non-focused set

Non-focused Set Taps

More ≠/ = actual centroids

Most

Distance from true center (n=97; age=3,11-8,3, mean=6.9)

Fitted parameters -- Most / There is a (n=16)

Fitted parameters -- All / Every (n=18)

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Previous Findings

- A one-to-one strategy isn’t used to evaluate most-statements even when it’s available and would be more accurate [1]
- Interface Transparency Thesis: People are biased to use verification strategies that transparently reflect the meaning under evaluation [2]

1st- v. 2nd-order Quantifiers

Background: Quantifier Complexity

- Most must be 2nd-order [4]; All/Every/Each could be 1st- or 2nd-order
  - Quantifying over individuals or sets: Fa \( \rightarrow \exists x(Fx) \) vs. Fa \( \rightarrow \exists X(x) \)
  - 2nd-order strategy: set-based; 1st-order strategy: individual-based
- Attending to a set → better estimate of its cardinality

Experiments 3 & 4: Most of the v. There is a / All of the v. Every

- Fit to model: underestimation (= bias) [8] and variability (= precision) [6]

Example Sentences

Most of the big dots are blue
All of the big dots are blue
Every big dot is blue

Establish cardinality knowledge baseline [5]
- Most of the → Highlights internal argument
- There is a → No enhanced cardinality knowledge
- All of the & Every → Pattern like Most

Meaning differences are reflected in memory for incidentally encoded properties of sets

(exp. 1 & 2) More’s meaning is comparative, Most’s meaning is proportional
Cardinality knowledge can serve as 1st- / 2nd-order diagnostic

(exp. 4) Every and All seem to be represented as 2nd-order, despite the fact that they are both 1st-orderizable