Priming Scalar Alternatives under Negation and by Antonyms in Lexical Decision

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Introduction

Which alternatives appear during online scalar implicature derivation?

- Informational strength has been seen as key when it comes to scalar implicature ([SI] derivation, Horn, 1972)
- Most accounts of SIs assume that stronger alternatives are needed
- The processing literature on focus has shown that comprehension operates with alternatives online
- Lexical decision and probe recognition experiments show alternatives being activated and represented (Husband & Ferreira, 2016; Gotzner et al., 2016; see Gotzner & Spatek, 2019, for an overview)
- Recently, researchers have adapted these methods to the study of alternatives in online SI derivation
- De Carvalho et al. (2016) showed isolated scalar words prime the strong ones more than the reverse
- Ronai & Xiang (2023) tested the priming of strong scalars (hot) by weak ones (warm)
- When they presented isolated scalar words, there was no priming
- The strong terms were activated in a sentential context—suggesting involvement in SI derivation

Lexical decision experiments

- Web-based on PCibex
- Single factor: Related vs unrelated
- Either weak scalar or antonym
- Rapid Serial Visual Presentation
- 350ms per word, 650ms SOA
- Experiment 3: Only prime words (clean) and targets (filthy) presented
- 150ms per prime, 650ms SOA

Results: Individual experiments

- Experiment 1 (Negated weak scalars)
  - Relatedness: β = 0.0081, SE = 0.011, df = 32.25, t = 0.71, p = 0.483
  - Experiment 2 (Antonyms in sentences)
  - Relatedness: β = 0.0238, SE = 0.0089, df = 2846, t = 2.93, p = 0.0034*
  - Experiment 3 (Antonyms in isolation)
  - Relatedness: β = 0.0248, SE = 0.009, df = 2665, t = 2.75, p = 0.0061**
  - Experiment 4 (Negated antonyms)
  - Relatedness: β = -0.001, SE = 0.013, df = 29.37, t = -0.05, p = 0.958

Combined analysis

- Combined data from Exp 1, 2, & 4 and Exp 4 from Ronai & Xiang (2023), which tested non-negated weak scalars
- We created a 2 x 3 factorial design
- Negation: Negated (baseline) vs. non-negated
- Prime: Weak scalar vs. antonym vs. unrelated (baseline)
- Simple effect of Negation
  - β = 0.03, SE = 0.028, df = 200.5, t = 1.117, p = 0.2653
- Simple effect of Prime (unrelated baseline)
  - Weak scalar: β = -0.04, SE = 0.009, df = 8922, t = -4.390, p = 0.0001***
  - Antonym: β = -0.03, SE = 0.009, df = 8915, t = -2.625, p = 0.00587**
  - Interaction of Negation and Prime
  - Weak scalar: β = 0.028, SE = 0.013, df = 8917, t = 2.164, p = 0.03049*
  - Antonym: β = 0.026, SE = 0.013, df = 8917, t = 1.954, p = 0.05069

Discussion

- Negation cancels the activation of targets (formerly stronger scale-mates)
- Informational strength matters; consistent with De Carvalho et al. (2016)
- Negation influences priming differently when weak scalar vs antonym primes are used
- Antonymic primes activated the targets both in sentences and in isolation
- An epiphenomenon in online SI derivation?
- But see Dorn & Metzger (2019) for evidence that non-entailed alternatives facilitate SI derivation
- The results are most compatible with the Alternative Activation Account
- Comprehenders seem to activate a slew of associates [antonyms] and then select depending on the grammar and context (negation)

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References