Demanding an Explanation: Implicit Causality Biases in Discourse Interpretation

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Abstract

Problem: Previous passage-completion studies report strong biases regarding who will be mentioned next following implicit causality (IC) verbs with a ‘because’ prompt. However, these biases are reduced/eliminated with a full-stop prompt.

(1) a. John scolded Mary because ______________ . [strong bias to Mary]
   b. John scolded Mary.

Proposal: In light of recent studies showing two types of coherence-driven expectations in pronom interpretation, we compare responses to contexts like (1a-b). We predict that IC biases depend both on expectations about upcoming continuation types (P(continuation)) and on biases for which event participant will be mentioned again conditioned on continuation type (P(next_mention | coherence)).

Results: By categorizing responses by coherence relation, we localize the previously reported IC bias to Explanation relations. We find an additional IC bias concerning P(Explanation). This bias has gone unnoticed because previous work has not categorized responses by coherence.

1. Goal
To clarify the effects of IC biases on discourse interpretation by distinguishing (i) next-mention biases and (ii) biases toward upcoming coherence relations.

2. Previous work on Implicit Causality
Passage completions: strong IC bias to particular referent with ‘because’ prompt (Caramazza, Grober, Garvey, Yates 1974; McKoon, Greene, Ratcliff 1992; inter alia).

(1) a. IC-1 John annoyed Mary because ______________ . [bias to NP1-John]
   b. IC-2 John scolded Mary because ______________ . [bias to NP2-Mary]
   c. Non-IC John babysat Mary because ______________ . [mixed biases]

However, next-mention bias reduced/eliminated with full stop prompt (Au 1986, inter alia).

(2) a. IC-1 John annoyed Mary ______________ . [bias to NP1-John]
   b. IC-2 John scolded Mary ______________ . [bias to NP2-Mary]
   c. Non-IC John babysat Mary. ______________ . [mixed biases]

What role of ‘because’?
- Modifying salience of event participants directly (Stevenson, Knott, Overlander, & McDonald 2000)
- Signaling an Explanation coherence relation (Hobbs 1979, Kehler 2002)

3. Using coherence to modulate next-mention biases
We generalize Rohde, Kehler, & Elman’s (2007) pronoun model to next mention: Biases towards upcoming coherence relations (CRs) combine with biases for which event participant will be mentioned again, conditioned on coherence.

(3) P(next_mention | referent) = \sum P(CR) * P(next_mention | referent | CR)

4. Story continuation experiment
2 x 3 design: verb type (IC vs. Non-IC) x continuation type (full stop vs. ‘because’ vs. dialog prompt – dialog results not discussed here)

5. IC-1 Results
Next-mention biases were statistically indistinguishable when only ‘because’ prompts and freely generated Explanations were considered (F(1,70)=0.0221, p=0.8822; F(1,19)=0.0320, p=0.86)

However, next-mention bias reduced/eliminated with full stop prompt (Au 1986, inter alia).

5. IC-2 Results
Again, next-mention biases statistically indistinguishable when only Explanations are considered (‘because’ or freely generated) (F(1,61)=1.092, p=0.3892; F(1,36)=1.4298, p=0.2348).

6. IC-1 Results

7. IC-2 Results
Again, next-mention biases statistically indistinguishable when only Explanations are considered (‘because’ or freely generated) (F(1,73)=0.4424, p=0.5081; F(1,19)=1.2235; p=0.2825)

8. Non-IC Results
Again, next-mention biases statistically indistinguishable when only Explanations are considered (‘because’ or freely generated) (F(1,61)=1.092, p=0.3892; F(1,36)=1.4298, p=0.2348).

9. A new IC bias
IC verbs create an expectation regarding the direction the discourse is likely to take – specifically a bias towards an upcoming Explanation.

10. Conclusions
Like Rohde et al.’s results, overall statistics conceal a consistent system of stronger biases once coherence relations are conditioned on.

In contrast to previous results:
- Connective alone does not affect referent salience – mediated by coherence
- There are actually two stronger biases that differentiate IC and Non-IC verbs: P(CR=Explanation) is high for IC-1 and IC-2

11. References

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