Real-world event knowledge modulates the use of tense cues in event comprehension

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1. Introduction

- Which factors modulate people’s representations of the object state during event comprehension?
  - Verb meaning: Verbs that do vs. do not entail change-of-state e.g. break vs hit
  - Tense: (e.g. Aitmann & Kamide 2007) The man has drunk ... (past) vs. will drink ... (future) : empty glass of beer vs. full glass of beer
  - Discourse-level information: Question under Discussion (e.g. Lee & Kaiser 2019)
  - Generalized Event Knowledge: dropping a wine glass vs. dropping a plastic cup

2. Research Question

- Research Q: When the verb does not entail change-of-state, how are expectations of a changed end state modulated by (1) tense, (2) real-world knowledge, and (3) discourse structure (specifically, topic-hood)?
  - Prediction: When verb semantics is uninformative, real-world knowledge will modulate use of tense and topic-hood cues.
  - However, we do not predict tense & topic-hood to have equally strong effects across-the-board.
  - We hypothesize that people will make more use of tense and discourse cues when real-world knowledge does not lead them to strongly expect a particular outcome.

3. Event type norming study

- N=35, MTurk: 24 [verb-object-adjective] triplets
- None of the verbs entailed a particular object state.
- adjective = a potential changed state of the object as a result of the verb’s action
  - (i) 12 events that are ambiguous about whether the changed end state obtains (mean rating=4 on a 7-point scale) (e.g. [YANK - the cord] / [broken])
  - (ii) 12 events where the expectation for a changed end state is high (mean rating=5.54) (e.g. [PULL - the dough] / [stretched])

4. Experiment

- N=106, Mturk (PennController IBEX)
- 24 targets (12 ambiguous events;12 high end-state-likelihood events), 36 fillers

Sentence stimuli (2 X 2)

<table>
<thead>
<tr>
<th>Topic = subject vs. object</th>
<th>Past tense vs. Future tense</th>
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<tbody>
<tr>
<td>Talking about John/the watermelon: John whacked/will whack the watermelon.</td>
<td></td>
</tr>
<tr>
<td>Fixation cross: cracked</td>
<td></td>
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<tr>
<td>Lexical decision:</td>
<td></td>
</tr>
<tr>
<td>Is this a word? Press F for “Yes”, J for “No”</td>
<td></td>
</tr>
</tbody>
</table>

How fast is the F (yes) key pressed?

Table 1: Example stimuli: Discourse topic (subject vs. object) X Tense (past vs. future)

How do (i) topic structure and (ii) tense influence reaction time (RT) for lexical decision of the adjective?
- The more an event description leads one to expect a changed end state, the faster they would be to recognize the adjective as a word.

5. Results

- Ambiguous events: RTs following past tense < future tense (t=2.6, Fig. 1)
  - This effect, however, was not observed when the sentence described a high end-state likelihood event (Fig. 2).
  - There was no effect of topic-hood with either event type.

6. Discussion

- How do cues beyond the verb modulate expectation about a changed end state?
- Generalized event knowledge modulates the strength of tense cues during event comprehension.
  - People turn to tense cues only when real-world knowledge does not provide a strong expectation for a particular end state.
  - By using verbs that do not entail an end state, we saw that the impact of tense is not equal for all event types, even within a linguistically uniform verb class.
  - We consider a possibility that the lack of topic-hood effects may be attributed to task-specific reasons.

References