

# 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?

### LINGUISTIC

- Verb meaning**
  - Verbs that do vs. do not entail change-of-state e.g. *break* vs *hit*
- Tense** (e.g. Altmann & 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)

### NON-LINGUISTIC

- Generalized Event Knowledge**
  - dropping a wine glass* vs. *dropping a plastic cup*

## 2. Research Question

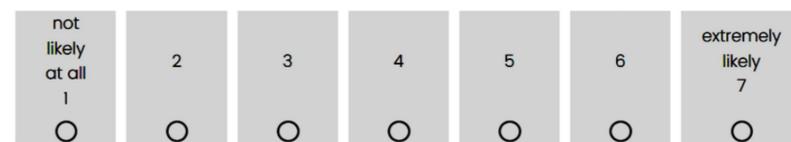
- Research Q:** When the verb does not entail change-of-state, how are expectations of a changed end state modulated by (1) tense, (2) real-world knowledge, and (3) discourse structure (specifically, topic-hood)?
- Prediction:** When verb semantics is uninformative, real-world knowledge will modulate 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*)

[WHACK - the watermelon] / *cracked*

If you imagine a situation that is related to [WHACK - the watermelon], how likely are you to imagine that **the watermelon** gets **cracked**?



## 4. Experiment

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

Talking about John/the watermelon:  
John whacked/will whack the watermelon.

### Sentence stimuli (2 X 2)

Topic = subject vs. object  
Past tense vs. Future tense

+

### Fixation cross

cracked

### Lexical decision:

Is this a word?  
Press F for "Yes",  
J for "No"

How fast is the F (yes) key pressed?

### Table 1: Example stimuli:

Discourse topic (subject vs. object) x Tense (past vs. future)

Talking about {John/the watermelon}:  
"John {whacked/will whack} the watermelon."

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.

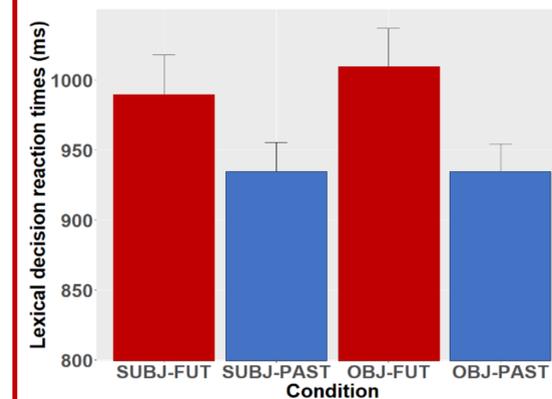


Figure 1: Lexical decision reaction times for **ambiguous events** (n<sub>item</sub>=12)

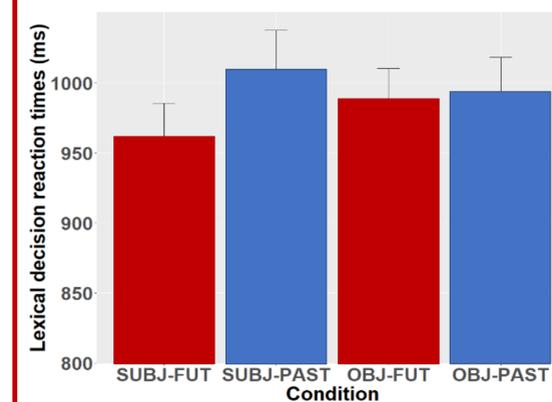


Figure 2: Lexical decision reaction times for **high end-state likelihood events** (n<sub>item</sub>=12)

## 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.