



# Processing (non)compositional expressions: Context Effects

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## Background & Motivation

Fixed expressions, such as *kick the bucket*, provide a test case for investigating the nature of the lexicon.

- Fixed expressions are often ambiguous between a compositional/literal and non-compositional/non-literal meaning.
  - John kicked the bucket ...
    - ... the funeral is on Sunday. [n-comp/n-lit]
    - ... he nearly broke his foot. [comp/lit]
- Existing research has focused on two major avenues of inquiry
  - Are literal and non-literal expressions processed differently? (Bobrow & Bell, 1973; Cacciari et al., 2007)
  - What sort of cues do individuals use to identify an ambiguous phrase as literal or non-literal? (Van Lancker, Canter, & Terbeek, 1981)
- This experiment sought to examine the effects of sentential context and recovery from incorrect expectations:
  - Can sentential context bias individuals toward a (non)literal interpretation?
  - If so, do these biases affect the ease of processing?
  - If so, do these effects differ depending upon whether one is processing a literal or non-literal structure?
  - We are interested in how individuals recover from parsing mistakes / incorrect expectations, and whether their recovery is quantitatively different when processing literal vs non-literal sentences.

## Stimuli & Method

We used self-paced reading to investigate the processing of ambiguous phrasal verb sequences.

- Why use phrasal verbs?
  - Phrasal verbs are idiomatic expressions consisting of a verb plus one or more additional words (normally prepositions).
  - Phrasal verbs allow us to maintain maximum comparability between conditions.
  - Unlike verb particle constructions, our stimuli do not exhibit structural differences from their literal controls.
- Targets were designed to bias participants toward either a **literal** or **non-literal** interpretation of the verb.
  - The impatient commuter**, who was saving up for a car, **waited on** ...
  - The loveable waitress**, who was saving up for a car, **waited on** ...
 

Norming

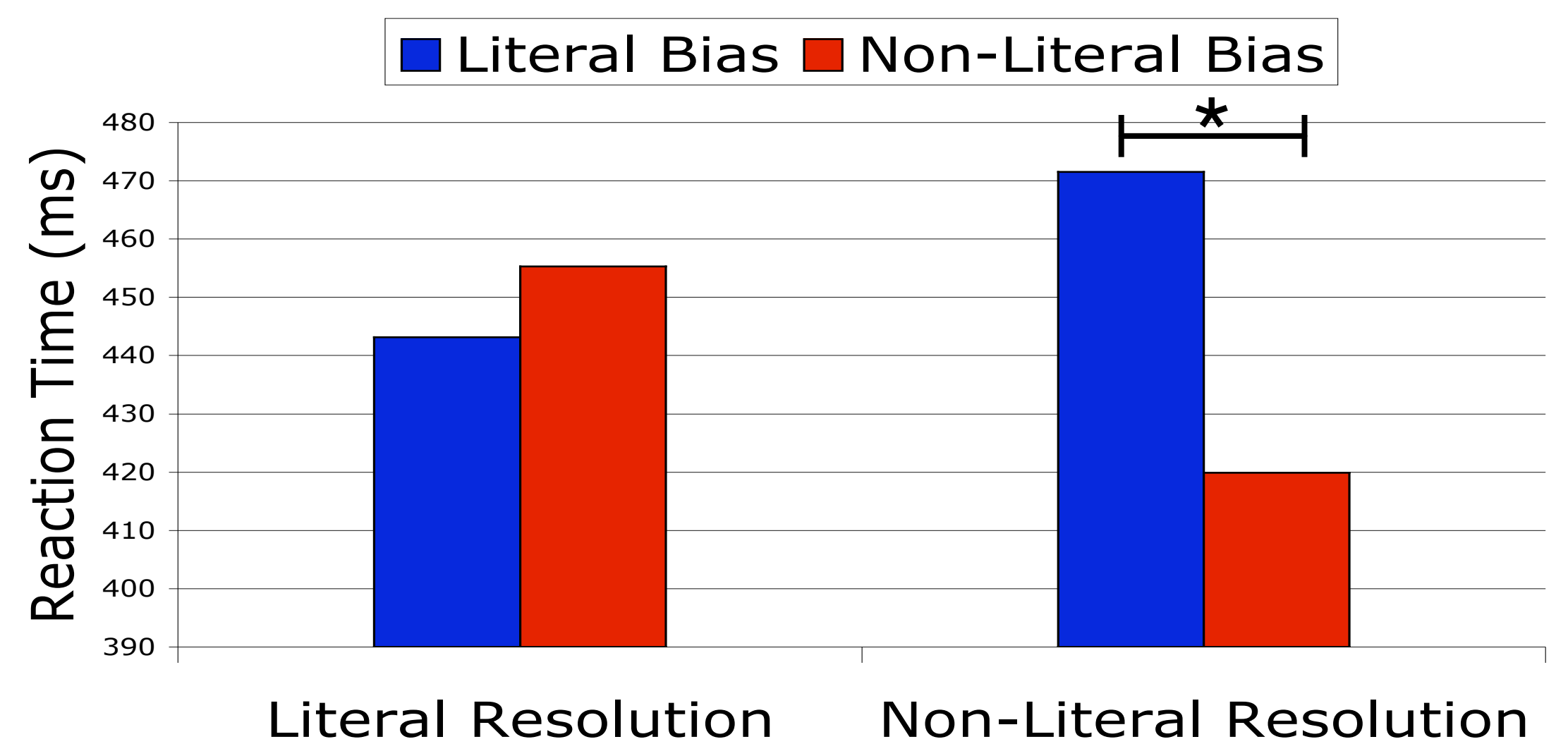
    - An independent study was carried out to select the experimental items which biased participants most strongly.
    - This study provided a metric of bias strength. A second study provided a metric of inherent lexical bias.
- Targets resolved to either a **literal** or **non-literal** interpretation of the verb.
  - ... **waited on the bench** on a sunny Thursday afternoon.
  - ... **waited on the customer** on a sunny Thursday afternoon.
- This resulted in four conditions.
 

<b>The loveable waitress</b>	...	<b>waited on the bench</b>	...
<b>The impatient commuter</b>	...	<b>waited on the bench</b>	...
<b>The loveable waitress</b>	...	<b>waited on the customer</b>	...
<b>The impatient commuter</b>	...	<b>waited on the customer</b>	...
- Participants read sentences at their own pace in a standard self-paced reading task, with a one-word moving window.

## Results

Results presented are the average for the four-word region immediately following the critical verb + preposition.

Mean RT by Condition (Resolution)



- There is an expected main effect of congruency, sentences which are congruent with their biases are read faster.
- The four-word region containing the disambiguating resolution plus the two following words (for spillover effects) was averaged and analyzed.
- A significant *Bias X Resolution* interaction ( $p < .01$ )
  - When processing a **non-literal sentence**, participants are much faster when the bias is congruent with the sentence.
  - When processing a **literal sentence**, bias has no significant effect on processing speed.
- Results were analyzed with a linear mixed model, accounting for effects of subjects, items, lexical and sentential bias.
  - This allowed us to filter out potential variance due to item differences, subject differences, or differences due to lexical or sentential bias.
  - Despite adding lexical and sentential bias to our model, item differences still significantly improved model fit. Subject differences, however, did not.

## Conclusions

- When the parser expects a **non-literal** meaning
  - If expectation is correct, it is capable of rapidly processing the sentence
  - If incorrect, it is not significantly negatively impacted, the parser obligatorily considers the literal meaning
- When the parser expects a **literal** meaning
  - If expectation is correct, it is capable of processing the sentence, though not as rapidly as a non-literal sentence
  - If incorrect, it is significantly negatively impacted, the parser does not obligatorily consider non-literal meaning
- These results suggest that the processing of literal meaning is obligatory at some level during real-time processing. There are several possibilities which are consistent with these findings. Thus when one expects a literal meaning, it may be the case that:
  - Non-literal alternatives are ignored
  - Non-literal alternatives are suppressed, or very weakly activated
  - Future work will investigate these alternatives, and examine a more detailed time course of *when* the various alternatives are activated.