

# A Ton of Planks in *Plankton*: Examining Morpho-Orthographic Decomposition in the Early Stages of Complex Word Processing

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## Introduction

### Morphological decomposition:

- Processing of morphologically complex words (e.g., "walked", which contains more than one morpheme) is argued to involve morphological decomposition (breaking complex words into their constituent morphemes)
- While increasing evidence for morphological decomposition is present in the visual modality, it remains a matter of debate as to what extent factors such as semantic relationships between complex words and their constituents modulate this process
- It has been proposed that if word recognition involves automatic, across-the-board morphological decomposition then even monomorphemic words like "plankton" may also be initially decomposed (in this case, into "plank" and "ton") due to *appearing* to be morphologically complex on an orthographic basis

### Research questions:

- Does complex word processing in the visual modality involve decomposition of words that have only the appearance of morphological structure (like "plankton")?
- Is decomposition modulated by factors such as semantic relationships, word type (compound vs. affixed words), or whether a word is truly morphologically complex?
- Or does morphological decomposition apply in an unmodulated, across-the-board manner, on the basis of orthography?

## Previous Research

### Rastle et al. (2004):

- Semantically transparent suffixed words (e.g., "teacher") and semantically opaque monomorphemic words with the *appearance* of suffixation (e.g., "corner") primed their apparent roots ("teach" and "corn", respectively) equivalently
- However, monomorphemic words like "brothel" failed to prime shorter, orthographically overlapping morphemes ("broth")

### Fiorentino & Fund-Reznicek (2009):

- Semantically transparent compounds (e.g., "teacup") and semantically opaque compounds (e.g., "honeymoon") primed their constituents equivalently
- However, monomorphemic words like "battalion" failed to prime shorter, orthographically overlapping morphemes ("lion")

### Taken together:

- Morphological decomposition operates in the visual modality on the appearance of morphological structure – even in the absence of a semantic relationship between prime and target
- However, the semantically opaque conditions in the two studies are not equivalent: one tests opaque but truly complex compounds while the other monomorphemic words that only appear complex

### Current study:

- Based on Experiment 1 from Fiorentino & Fund-Reznicek (2009), adding a new condition containing words like "plankton"
- These "false compounds" have the appearance of a morphologically structured compound, but are monomorphemic (and semantically opaque: "plankton" has nothing to do with a ton of planks)

## Stimuli

- 16 prime-target pairs per condition; 64 fillers with nonword targets

Condition	Prime	Target
Transparent compound	drainpipe	drain
Opaque compound	hallmark	hall
Orthographic overlap	flamenco	flame
False compound	plankton	plank

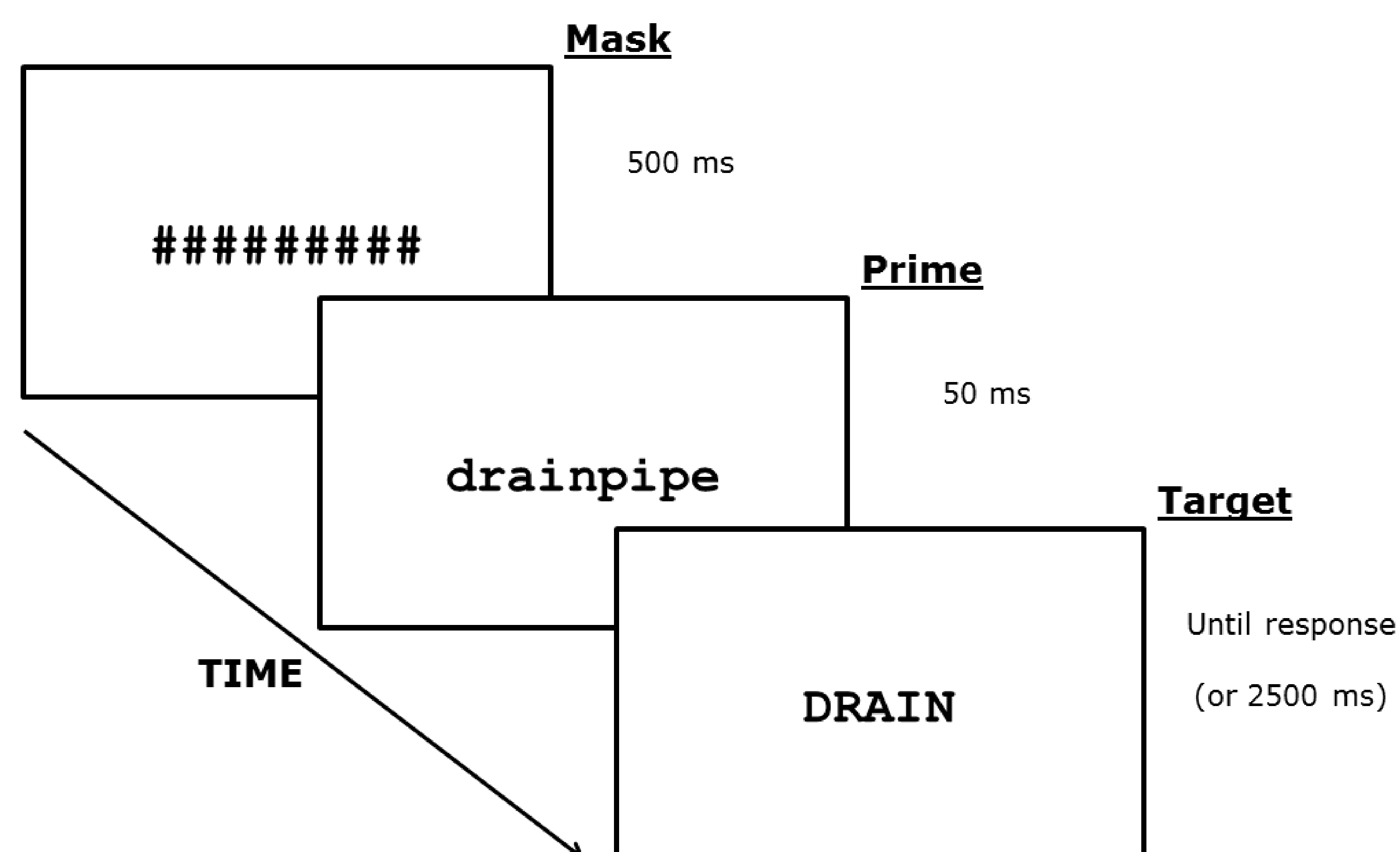
- Each related prime-target pair was matched with a corresponding unrelated control pair (e.g., "stopwatch" and "drain")

### Predictions:

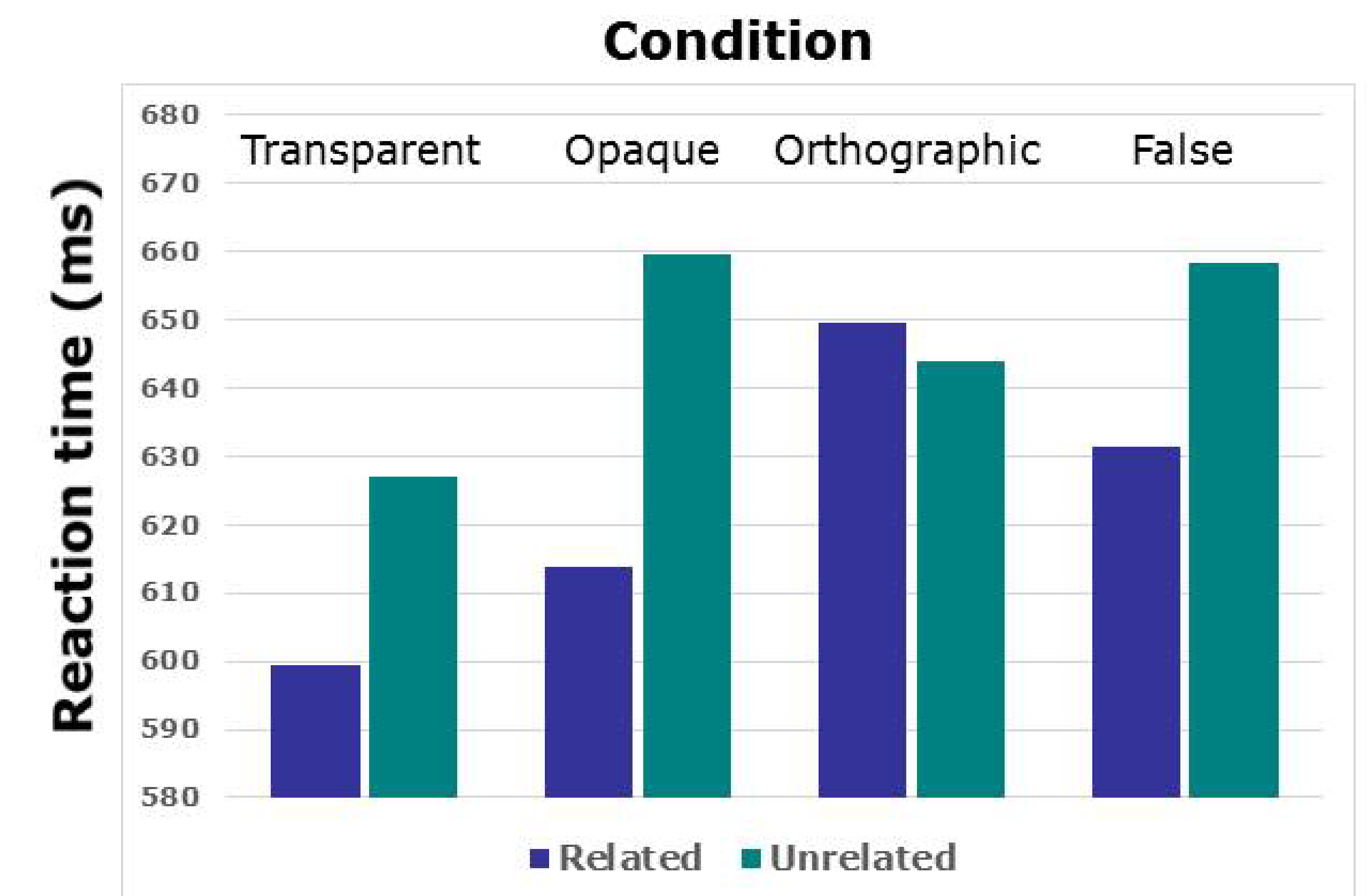
- If the appearance of morphological structure results in decomposition, as expected by models positing across-the-board decomposition on an orthographic basis, then the False compound condition should produce priming effects equivalent to those of the Transparent and Opaque compound conditions, but greater than any priming for the Orthographic condition
- If morphological decomposition is modulated by the presence of affixation or underlying morphological structure, then the False compound condition should show reduced or no priming effects

## Procedure

- N = 33 monolingual native English speakers; all KU undergraduates
- Lexical decision task, utilizing masked priming



## Results & Analysis



### Analysis:

- Log-transformed reaction times were analyzed using a linear mixed-effects model
- An interaction of Condition x Relatedness was found between the baseline Transparent condition and the Orthographic condition, indicating no priming effects were found in the Orthographic condition
- Statistically equivalent priming effects were found in the Transparent compound, Opaque compound, and False compound conditions

## Discussion

- Alongside compound words, "false compound" words like "plankton" undergo morphological decomposition in the visual modality
- This decomposition is unmodulated by semantic relationships, and does not depend on word type (compound or affixed words) or underlying morphological structure
- These results support models positing morphological decomposition as an early and automatic process which is engaged whenever there is an appearance of morphological structure on an orthographic basis
- These results may help inform clinical efforts to address language impairments that involve morphological deficiencies

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