

# Keep Clam and Carry On: Misperceptions of Transposed-Letter Neighbors



Merrick Fahrenwald, Megan Wootten, Rebecca L. Johnson  
Skidmore College



## INTRODUCTION

- Words can be orthographically similar to other words in a number of ways, making correct identification difficult
- Transposed-letter (TL) neighbors are words that differ from another word only in the transposition of two adjacent letters (ANGLE/ANGEL, CALM/CLAM, SILVER/SLIVER)
- Previous research suggests that the presence of a TL neighbor causes processing difficulty on words relative to matched-controls. Compared to controls, words that have a TL word neighbor lead to:
  - increased reaction times in visual word recognition tasks (e.g., Andrews, 1996; Chambers, 1979; Johnson, Staub, & Fleri, 2012)
  - longer fixation durations and rereading rates in eye-movement studies (Johnson, 2009)
- However, it is unclear why words with TL neighbors suffer a cost:
  - interference could be due to the automatic co-activation of multiple lexical entries across all trials (difficulty at the lexical level)
  - interference could be due to the explicit misperception of the target word (e.g., for its neighbor) on a subset of trials that is later recognized by the reader (difficulty at a post-lexical stage)

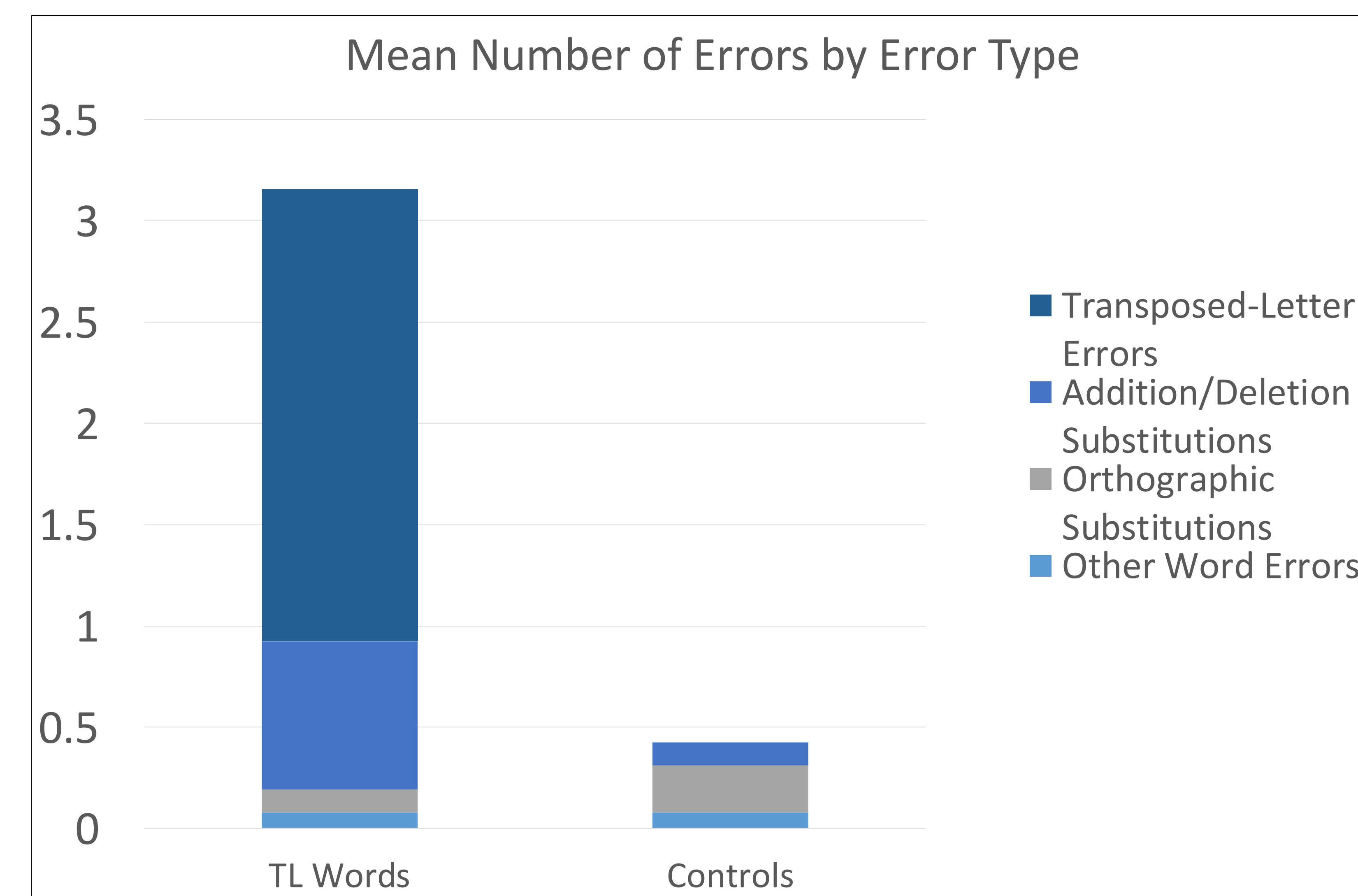
**The purpose of the current study was to explore whether readers make explicit misidentifications when reading words with a transposed letter neighbor within the context of sentence reading while also exploring whether eye-movement measures differ as a function of word type.**

## METHOD

Pat used the marker to draw a small **angel/alien** on the notebook.  
The carpenter took the **silver/golden** coin and put it in his pocket.

- 40 participants read 120 sentences aloud that contained either a word with a TL neighbor (e.g., ANGEL) or a matched control word (e.g., ALIEN) while their eye-movements were being recorded. As they read, mistakes were coded and later organized by error type

## RESULTS



- There were significantly more errors made on words with TL neighbors (7.6% of trials) than on control words (1.7% of trials)
- 71% of the whole word mistakes on TL words involved explicit misidentification of the word as its TL neighbor
- In an additional 6 cases, the reader began speaking the TL neighbor but then self-corrected.

Dependent Measures	TL Words	Controls
Accuracy (%) *	7.6	1.7
<b>First Pass Measures</b>		
Skipping Rate (%)	12.6	12.9
First Fixation Duration (ms)	292.2	290.0
Gaze Duration (ms)	335.6	328.0
<b>Late Measures</b>		
Total Time on Target Region (ms) *	430.7	385.1
Second Pass Time (ms) *	87.07	50.9
Regressions In (%) *	19.7	14.2
<b>Post-Target Region</b>		
Total Time on Post-Target Region (ms) *	545.3	511.5
Regressions Out (%) *	13.4	8.4

\*  $p < .01$

- TL effects show up in later measures of eye-movements, suggesting more difficulty at the post-lexical stage of processing of TL neighbors

## DISCUSSION

- TL words are most commonly misperceived as their TL neighbor
- These findings replicate past studies in our lab which first demonstrated the occurrence of explicit misidentification of the TL word for its neighbor
- Eye movement data revealed that TL effects are observable in later measures of eye movement processing, supporting the prediction that processing difficulties occur at the post-lexical level
- **The processing difficulty associated with reading a TL word stems from the occasional misidentification of the transposed-letter word as its neighbor on a subset of trials, rather than overall processing difficulty at the lexical level**