Reading Between the Lines: Eye Movement Responses to Homophone Errors

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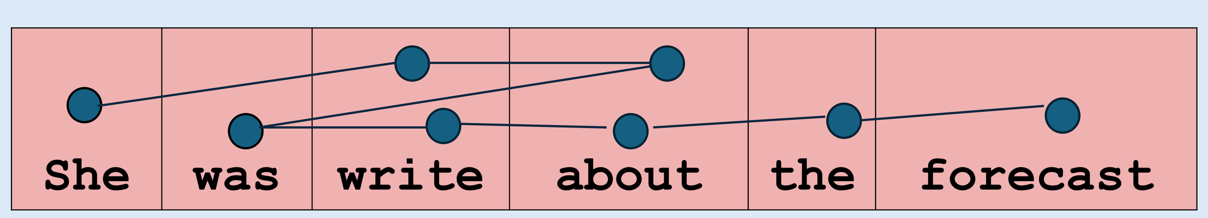
INTRODUCTION

Eye-tracking is a wonderful tool that can provide answers and further guidance towards questions surrounding human language. Having this tool can show researchers the specifics of how humans recognize language by analyzing individual factors such as fixations, saccades, regressions, skips and more! Each of these little details in eye-tracking help us better understand what we do with language as we perform a simple task such as silent reading. What are these factors, you might ask? Great question!

- **Fixation:** a small period of time when the eyes are stationary and focused on a specific word.
- **Saccade:** a rapid, ballistic movement of the eyes that shifts the focus from one location to another.
- **Regression**: an eye movement that goes opposite of the direction of text.
- **Skip**: an eye movement where an individual literally skips their gaze instead of fixating on a word



Past research has investigated readers' attention to homophones and the amount of cognitive processing required to understand their meaning. We want to further that research by seeing how this applies to students at Brigham Young University.

RESEARCH QUESTIONS

- Do college students notice homophone errors in the English language?
- If so, how does how is this extra attention shown in fixation, dwell time, and regression patterns?

METHODS

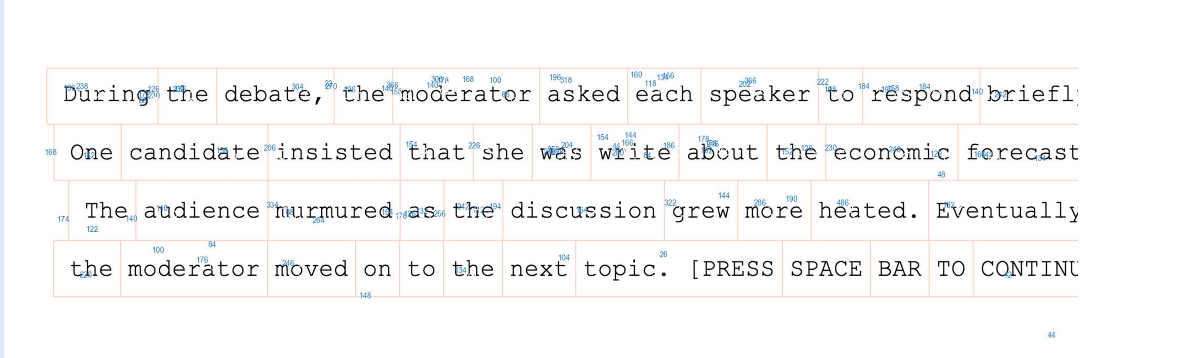
In order to study whether college students notice misusage of homophones, we prepared ten paragraphs, each containing a homophone form. Five paragraphs contained one of the words *effect*, *hear*, *their*, *which*, and *write*, each used correctly, while the other five paragraphs contained an incorrectly-used homophone pair for each of these words.

We used Perplexity to AI-generate the ten paragraphs and proofread them to ensure that they were similar and that the homophones were embedded in the middle of the paragraphs. We also prepared a simple AI-generated question that readers answered after they read each paragraph. We did not record their answers; the question was simply to help them stay engaged and read the whole paragraph as they participated in the study.

Participants were calibrated at the beginning of the experiment, and in between every screen with text on it, there was a drift correct sequence to help the participants reset in preparation to read a new paragraph or answer a new question.

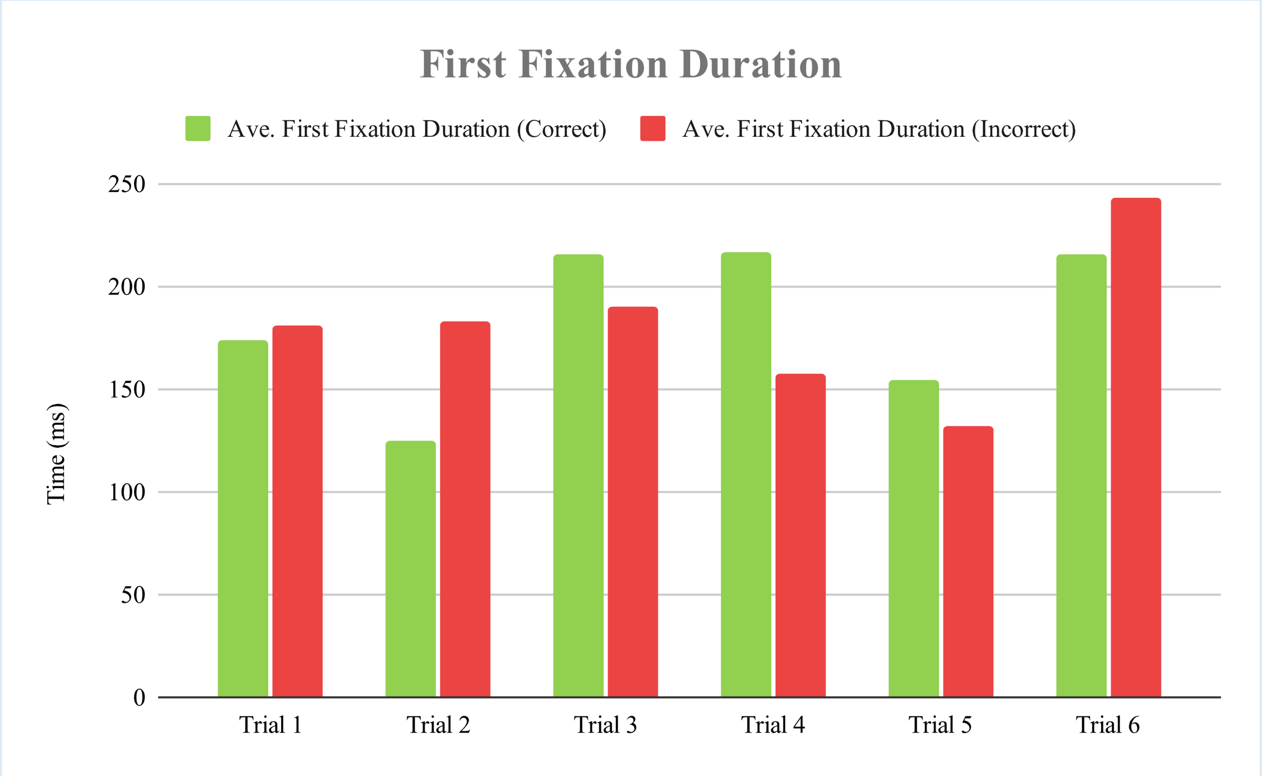
Participants were not compensated for their participation, and all data was kept anonymous and confidential.

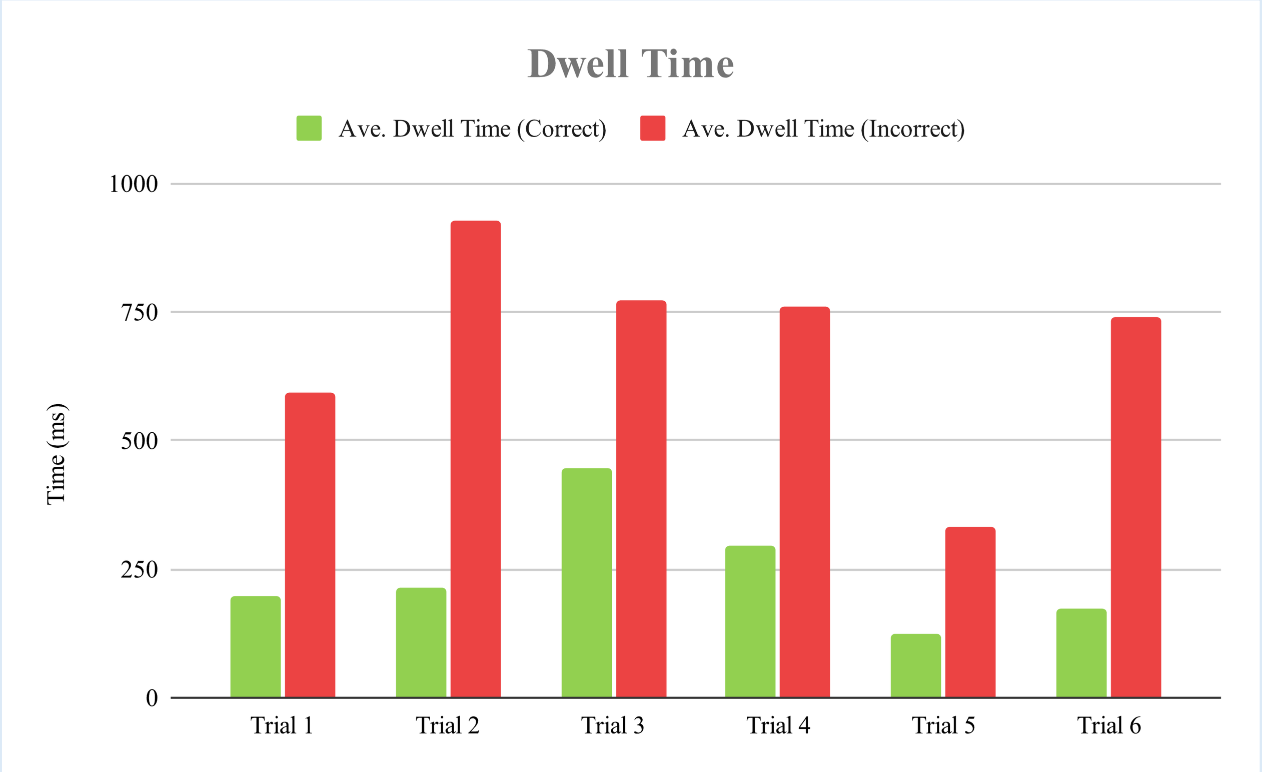
After collecting data from six participants, we cleaned the data to ensure that all data points matched the area of interest they belonged in by altering outlier points as necessary. We log-transformed the data and performed paired t-tests in order to compare students' eye behaviors when looking at correctly- and incorrectly-used homophones. Because our data was not always fully parametric, we used Wilcoxon signed-rank tests to calculate the *p* value. We compared the measures *first fixation duration*, *first-run dwell time*, *skip*, *dwell time*, *regression*, and *regression count*.



RESULTS

As students initially viewed the incorrect homophone forms, there was no statistically significant difference in their first fixation durations ($p = 0.929$) or first-run dwell times ($p = 0.461$). However, students spent significantly longer viewing the incorrect homophone forms ($p < .001$), were more likely to regress to them ($p = .004$), and regressed to them more frequently ($p = .003$).





Variable 1	Variable 2	W	p	Effect size
First Fixation Duration (Correct)	First Fixation Duration (Incorrect)	179.50	0.929	0.0228
First-Run Dwell Time (Correct)	First-Run Dwell Time (Incorrect)	205.00	0.461	0.1681
Dwell Time (Correct)	Dwell Time (Incorrect)	31.50	< .001	-0.8645
Regression (Correct)	Regression (Incorrect)	6.50[b]	0.004	-.8333
Regression Count (Correct)	Regression Count (Incorrect)	3.00[d]	0.003	-.9341

DISCUSSION

These findings suggest a pattern: readers initially process homophones as plausible lexical items and only detect errors once they integrate the word into the broader semantic context of the sentence. The increased dwell time and regression behaviors indicate that readers actively reanalyze the sentence when the homophone disrupts meaning.

These results contribute to our understanding of how readers detect spelling and usage errors during natural reading. Rather than immediately identifying incorrect homophones, readers appear to rely on contextual integration to determine whether a word fits semantically within a sentence. This finding has implications for studies of proofreading and reading comprehension, suggesting that error detection may depend more heavily on contextual processing than on word-level recognition alone.

However, this study was limited by a small sample size and a restricted set of homophone pairs, which may limit the generalizability of the findings. Future research could examine a larger and more diverse participant pool, include additional homophone pairs, or investigate whether similar eye-movement patterns occur with other types of commonly confused words. Further studies could also explore whether factors such as reading proficiency or familiarity with homophones influence how quickly readers detect these errors.

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