



NO

# Pronounceability effects during sentence reading by deaf and hearing readers

Brittany Lee<sup>1,2</sup>, Jonathan Mirault<sup>3</sup>, Nathalie Bélanger<sup>1</sup>, and Karen Emmorey<sup>1</sup>

San Diego State University<sup>1</sup>, University of California, San Diego<sup>2</sup>, Aix-Marseille University<sup>3</sup>



## INTRODUCTION

Hearing readers are sensitive to whether a string of letters is pronounceable (barve) or not (brvae). However, dyslexic readers are not, suggesting that pronounceability effects may have a phonological rather than orthotactic basis [1].

Deaf readers are an interesting group for comparison because they are sensitive to orthography just like hearing readers, but they have reduced access to phonology [2].

**Are deaf readers sensitive to priming with pronounceable and unpronounceable previews? Do they process the target word more efficiently [3]?**

## METHODS

### PARTICIPANTS

40 deaf readers (21F, mean age = 36.1 years)

40 hearing readers (19F, mean age = 29.9 years)

Deaf participants were all native or early signers of ASL

Groups matched on reading ability and nonverbal intelligence

### TASK

Participants read 184 single-line sentences and answered comprehension questions for 20% of sentences. Each sentence contained a 5-letter target word.

The little girl acted brave when she fell down.

### PARADIGM

A preview word took the place of the target word when the sentence was first displayed.

The preview word was pre-processed in the reader's parafovea, acting as a prime for the target word.

Without the reader noticing, the target word replaced the preview word when her gaze crossed an invisible boundary on the screen.

Eye movements were recorded with an Eyelink 1000+.

92 no preview word	46 unpronounceable preview words	46 pronounceable preview words
brave dance	brvae dnace	barve dacne

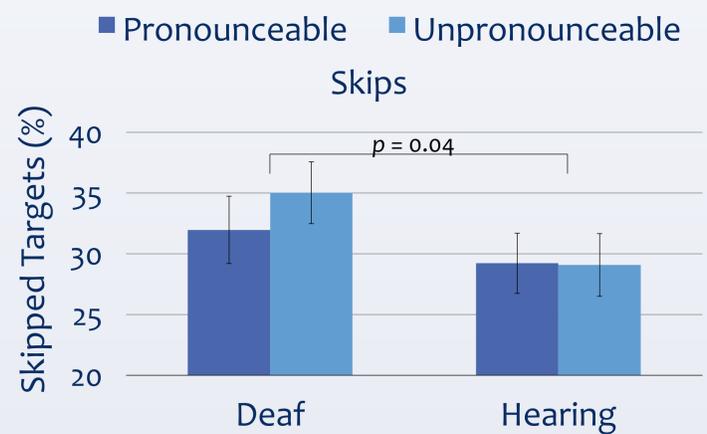
### ASSESSMENTS

Phonological awareness test (Hirshorn et al., 2015) [4]

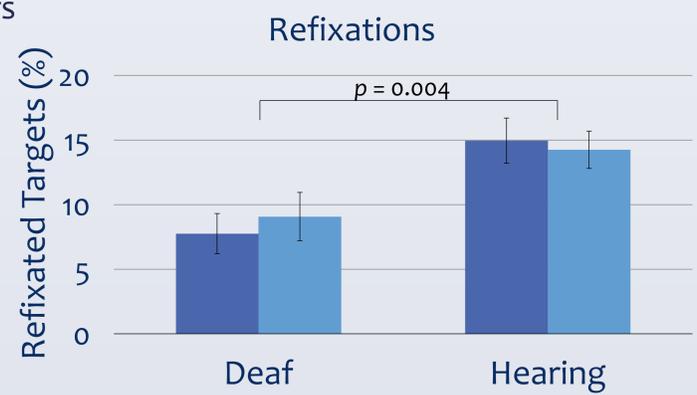
Spelling recognition test (Andrews & Hersch, 2010) [5]

## RESULTS

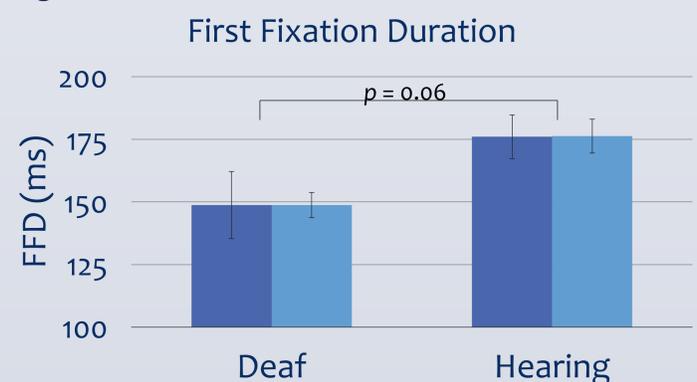
- No pronounceability effects in either group



- Deaf readers skipped more target words compared to hearing readers



- Deaf readers had fewer refixations on target words compared to hearing readers



- Deaf readers had shorter first fixation durations on target words compared to hearing readers
- No difference in accuracy to comprehension questions for deaf and hearing readers
- Error bars reflect SE

## CONCLUSIONS

- Pronounceability effects were found in single word processing [1] but not sentence level reading, perhaps due to additional context and top-down processing.
- Replicating the Word Processing Efficiency Hypothesis [3], deaf readers were more efficient at processing words in the parafovea.
- Findings highlight differences between deaf and hearing readers and the importance of naturalistic reading tasks.

## REFERENCES

- [1] Frankish, C., & Turner, E. (2007). SIHGT and SUNOD: The role of orthography and phonology in the perception of transposed letter anagrams. *Journal of Memory and Language*, 56(2), 189-211.
- [2] Bélanger, N. N., Mayberry, R. I., & Rayner, K. (2013). Orthographic and phonological preview benefits: Parafoveal processing in skilled and less-skilled deaf readers. *The Quarterly journal of experimental psychology*, 66(11), 2237-2252.
- [3] Bélanger, N. N., & Rayner, K. (2015). What eye movements reveal about deaf readers. *Current directions in psychological science*, 24(3), 220-226.
- [4] Hirshorn, E. A., Dye, M. W. D., Hauser, P., Supalla, T. R., & Bavelier, D. (2015). The contribution of phonological knowledge, memory, and language background to reading comprehension in deaf populations. *Frontiers in Psychology*, 6(1153). doi:10.3389/fpsyg.2015.01153
- [5] Andrews, S., & Hersch, J. (2010). Lexical precision in skilled readers: Individual differences in masked neighbor priming. *Journal of Experimental Child Psychology: General*, 139(2), 299-318. doi:10.1037/a0018366