

Activation of ASL phonology during English sentence reading:



Eye-tracking evidence from deaf readers

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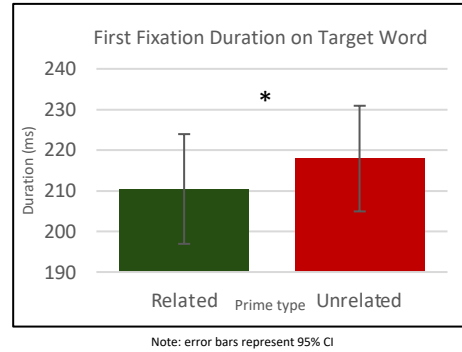
Introduction

- Bilinguals do not completely suppress their inactive language, even in monolingual contexts⁵
- Deaf signers activate the phonology of ASL signs when making semantic judgments about English word pairs (translations) and vice versa^{2,3,4}
 - Facilitated lexical access** (ERPs): Smaller N400 for ASL-related word pairs (vs. unrelated)
 - Behavioral interference** (slowed RT's) when there is a mismatch between the semantic & phonological relationship
- Unclear whether this phenomenon persists in sentence reading¹
 - Naturalistic, monolingual context

Methods

- Participants:** 23 deaf ASL/English bilinguals
 - Mean age = 35 years (SD=9)
 - Native (n=10) or early (n=13) signers
- Materials:** 100 English sentences constructed around 50 target words, with either a **related** or an **unrelated** prime word preceding the target (see Figure 1)
 - All sentences normed for plausibility and predictability
 - Related** and **unrelated** primes matched for:
 - Frequency, length, concreteness, neighborhood density, part of speech
- Eye movements tracked with an **EyeLink 1000+** in desktop configuration

Results



- First fixations** reflect **early, form-based** processing
- Deaf readers spent less time on the target word the first time they fixated it ($t = -2.2$) when preceded by a word with a phonologically **related** ASL translation.
 - Related:** M= 210.4; CI 95%= 26.3
 - Unrelated:** M= 218.0; CI 95%= 27.4

Related: You can play near the yellow desk over there.

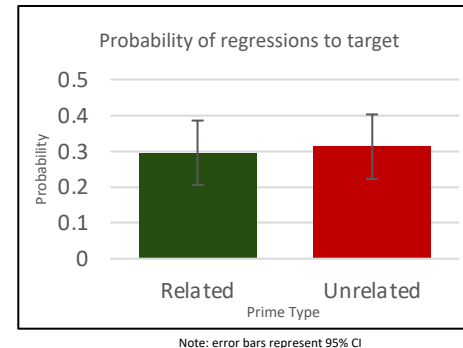


Unrelated: You can pay near the yellow desk over there.



Figure 1: Example sentences

- Regressions** reflect **later, semantic processing** of the meaning of words and the sentence as a whole
- Probability of returning to the target word after reading it was the **same** in both **related** and **unrelated** conditions ($z=0.76$)
 - Related:** M= 0.31; CI 95%= 0.18
 - Unrelated:** M= 0.30; CI 95%= 0.18



Discussion

- Facilitated** processing of target words that **share ASL phonological parameters with the prime**
- No interference** (e.g., Meade et al., 2017); **no task demand** that conflicts with the phonological relationship.
- Early** (i.e., first fixations) but **not late** (i.e., regressions) effects are found.
 - ASL activation takes place at the phonological rather than semantic level
- No participant reported being aware of the phonological relationship during reading
 - ASL activation is automatic and implicit

Conclusions

- Activation of **phonologically-related ASL signs facilitates** English reading for deaf signers
- Cross-linguistic activation is **present at the sentence reading level**

References

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