LLCN LABORATORY FOR LANGUAGE AND COGNITIVE NEUROSCIENCE

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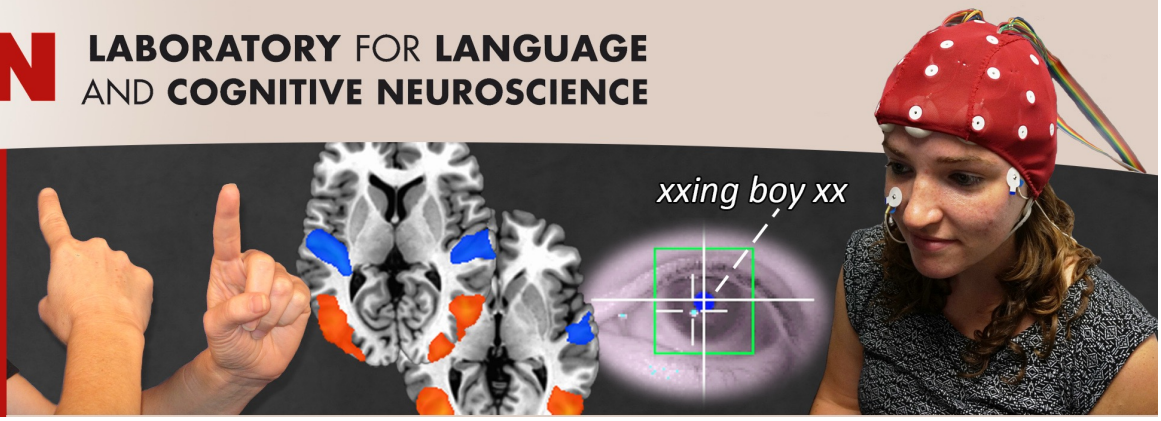
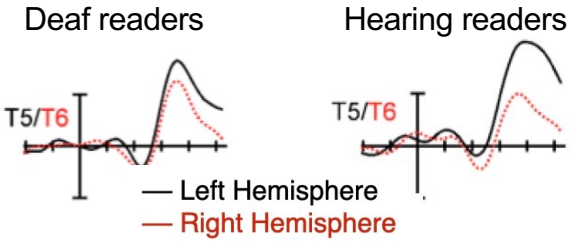
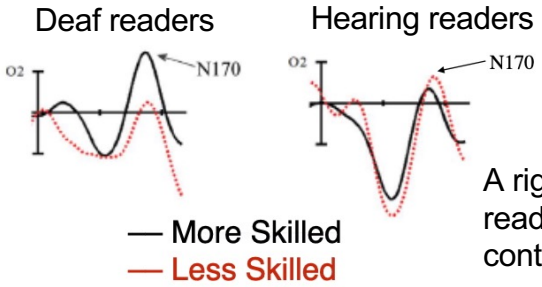


Skilled deaf and hearing readers have distinct neural profiles

Introduction: The N170 is an early brain response that reflects neural "tuning" to printed words. In hearing people, the N170 is larger in the left hemisphere because words are linked to left-brain auditory regions, according to the Phonological Mapping Hypothesis. Is this true for deaf readers? NO

Results: Skilled deaf readers show a bilateral N170 response when recognizing words, unlike reading-matched hearing adults who show a larger left N170.



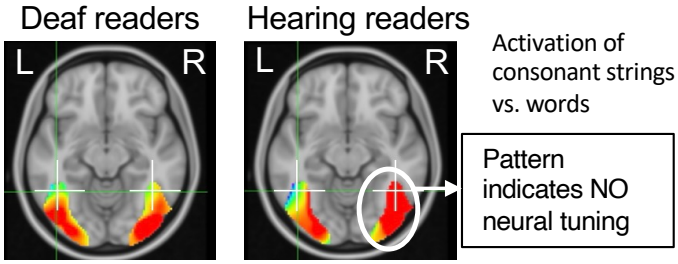


A right hemisphere N170 response is NOT maladaptive for deaf readers – better deaf readers show a **larger** right N170; in contrast, better hearing readers show a **smaller** right N170.

Introduction: The Visual Word Form System (VWFS) is a brain region that is tuned to printed words and may generate the N170. In hearing readers, only the left VWFS is tuned so that the posterior (back) part responds to words/letters and the anterior (front) part only responds to words. True for deaf readers? NO

Results: Skilled deaf readers show tuning in *both* the left and right hemisphere, while matched hearing readers only show tuning in the left hemisphere.

BOTTOM LINE: The neural end-state for skilled reading differs for deaf and hearing populations.



LLCN studies investigating the neural basis of skililed reading in deaf adults

Emmorey, K., Midgley, K.J., Kohen, C., Sehyr, Z.S,, & Holcomb, P.J. (2017). The N170 ERP component differs in laterality, distribution, and association with reading measures for deaf and hearing readers. *Neuropsychologia*, 106, 298-309.

Emmorey, K., & Lee, B. (2021). The neurocognitive basis of skilled reading in prelingually and profoundly deaf adults. *Language and Linguistics Compass,* 15(2), e12407. https://doi.org/10.1111/lnc3.12407

Glezer, L.S., McCullough, S., Terhune-Cotter, B., & Emmorey, K. (2025). Bilateral word selectivity gradients in the visual word form system in skilled deaf readers. *Neurobiology of Language*, 1-37. https://doi.org/10.1162/nol.a.13

Glezer, L. S., Weisberg, J., Farnady, C. O., McCullough, S., Midgley, K.J., Holcomb, P.J., & Emmorey, K. (2018). Orthographic and phonological selectivity across the reading system in deaf skilled readers. *Neuropsychologia*, 117, 500-512.

THANK YOU. None of these studies would be possible without the contributions of individuals like you. We would like to take the opportunity to thank those of you who have generously given your time. For more information, please visit our website at https://slhs.sdsu.edu/llcn/