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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Permalink

https://escholarship.org/uc/item/6x20792j

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 43(43)

ISSN

1069-7977

Authors

Brookshire, Geoffrey
Mangelsdorf, Heather Harden
Sava-Segal, Clara
et al.

Publication Date

2021

Peer reviewed

Expertise modulates neural tracking of dance and sign language

Geoffrey Brookshire
University of Birmingham, Birmingham, United Kingdom

Heather Mangelsdorf
Elmhurst University, Elmhurst, Illinois, United States

Clara Sava-Segal
Dartmouth College, Hanover, New Hampshire, United States

Katherine Reis
University of Chicago, Chicago, Illinois, United States

Howard Nusbaum
University of Chicago, Chicago, Illinois, United States

Susan Goldin-Meadow
University of Chicago, Chicago, Illinois, United States

Daniel Casasanto
Cornell University, Ithaca, New York, United States

Abstract

Information in speech appears in bursts. To optimize speech perception, the brain aligns these bursts of information with slow rhythms in neural excitability (<10 Hz). How does the brain track the timing of external events? Here we tested whether neural stimulus-tracking depends on participants' expertise, or on a language-specific mechanism. We recorded electroencephalography (EEG) in participants who were experts in either ballet or in sign language, while they watched videos of ballet or sign language. We show that stimulus-tracking depends on expertise: Dancers' brain activity more closely tracked videos of dance, whereas signers' brain activity more closely tracked videos of sign language. This effect of expertise emerged at frontal channels, but not at occipital channels. These results suggest that frontal cortex forms temporal predictions based on expert knowledge. The brain may use the same predictive mechanisms to optimize perception of temporally-predictable stimuli such as speech, music, sign language, and dance.