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Expertise modulates neural tracking of dance and sign language

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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.