The Evolution of Tactile Letter Representations in Blind Braille Readers

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Presentation Abstract Summary In blind individuals, traditional visual cortical areas are responsive to a range of nonvisual tasks, suggesting a functional reorganization in response to sensory loss. The general principles governing the dynamics of reorganized cortical processing remain unclear. Here we presented blind participants with braille characters while recording brain responses with MEG, then decoded the signals using multivariate pattern classification analysis. We found that letter identity was most readily decodable in sensorimotor cortex contralateral to the braille-stimulated finger, peaking ~125-200 ms after stimulus onset. Early visual and fusiform regions displayed more sustained decoding responses. The similarity structure of early MEG responses suggests an organizational scheme responsive to low-level features of the stimuli, i.e., the number of dots each character comprises, a scheme that shifted as the trial evolved. Our results could not only inform computational models of tactile processing but also expand future models of cortical processing optimized solely for visual stimuli to include crossmodal responses.

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