Measuring neural correlates of infant statistical learning using functional near-infrared spectroscopy

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Abstract

Statistical learning may be a key component of language learning in infancy, yet its neural basis is not well established. The goal of this study was to measure prefrontal cortical activity during auditory statistical learning, and to determine whether this activity predicted infants learning of statistical structure. Using non-invasive functional near-infrared spectroscopy (fNIRS), we recorded changes in blood oxygenation in lateral and medial prefrontal cortex in 8.5-10.5 month old infants (n=34) while they were exposed to statistical speech patterns. The stimuli consisted of 20-second videos of infant-directed speakers speaking in either a statistical pattern or in a repeated syllable string. We found a positive association between right lateral prefrontal cortex activation during exposure to novel statistical speech structures, and subsequent learning of these patterns. These results contribute to growing evidence that prefrontal cortical activity during infancy is measurable and correlated with learning.