Investigation of N400m brain activity in an 18 month old infant at risk for Specific Language Impairments using anatomically constrained magnetoencephalography (aMEG)

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Abstract

Can we show evidence of N400m in an infant at risk for language disorder using words in his vocabulary?

Method: Anatomically Constrained MEG

NEUROIMAGING PROCEDURES:
- Two visits to the Radiology and Imaging Laboratory, UCSD
- Visit One: MEG scan (Fig. 1 for MEG set-up) and Experimental Language task (Fig. 2)
- Visit Two: MRI scan

EXPERIMENTAL METHODS:

Participants and Tasks

Adult Comparison

N400m Activity Observed in Infant At-Risk for SLI
Congruent words - Congruent words
350-550ms

N400m Activity in Infant with Typical Language
Incongruent words - Congruent words
350-550ms

Conclusions

When infants are familiar with experimental word stimuli, N400m activity shares similar latencies, cortical location and scalp topography as adult N400m activity (Halgren et al., 2002).

N400m brain activity of infant at risk for SLI shares similar latencies, cortical location and scalp topography as age matched typical participant and adult N400m activity.

In light of these qualitative similarities of N400m activity, future applications of anatomically constrained MEG may be useful for:

1. Quantifying spatial and temporal characteristics of N400m activity in typically developing children and those at-risk for developing SLI.
2. Localizing the generators of N400m activity in adults with SLI which have been proposed to arise in different hemispheric regions (Helenius, et al., 2009).
3. Informing current understandings about the neural mechanisms that may be disrupted in developmental language disorders.