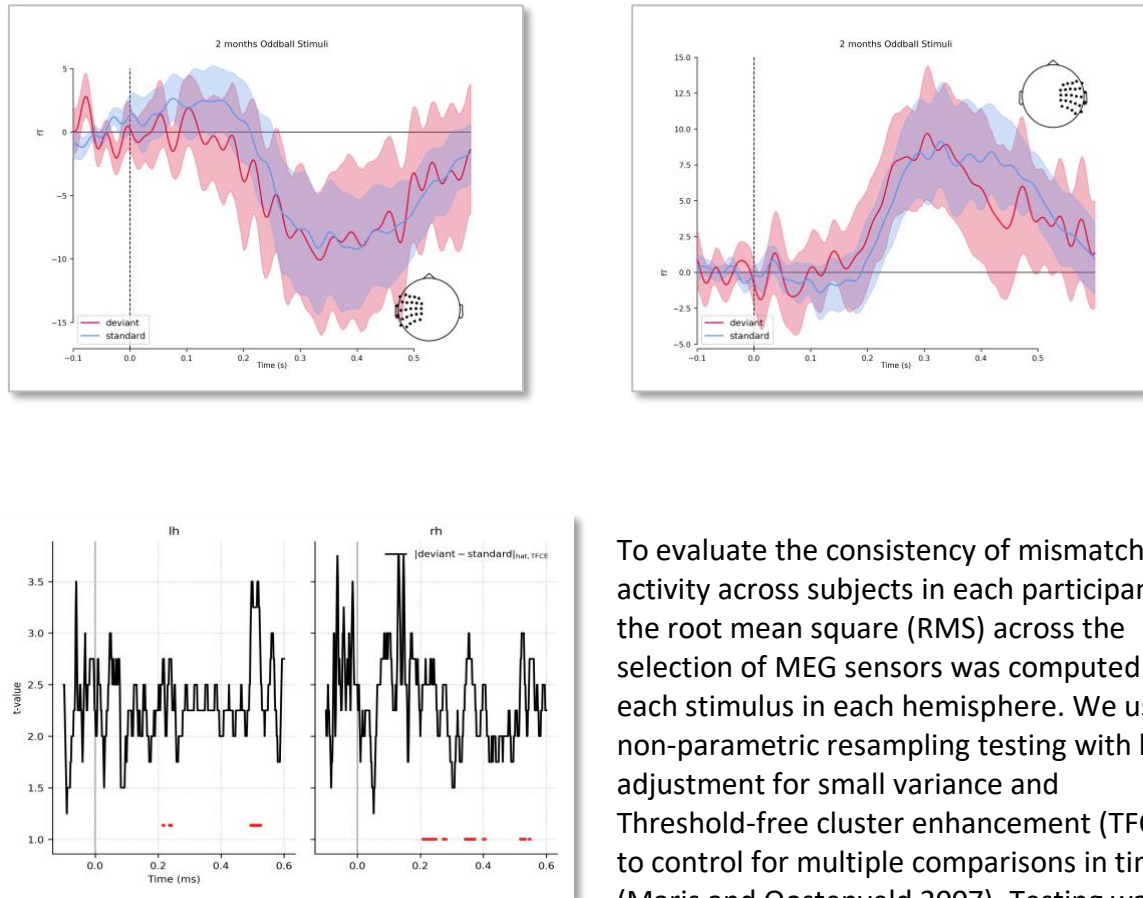


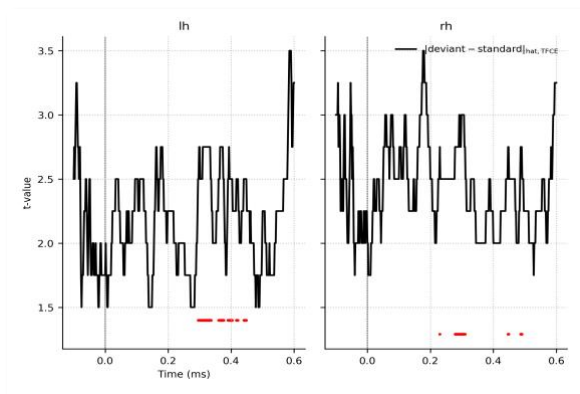
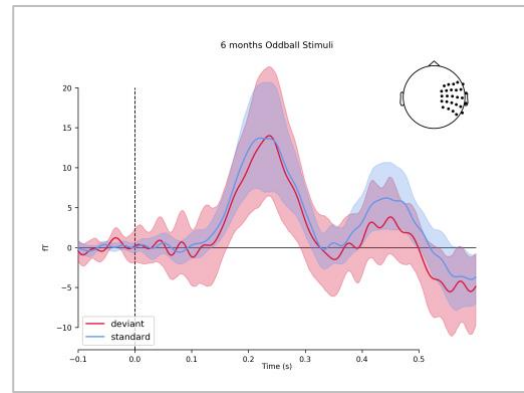
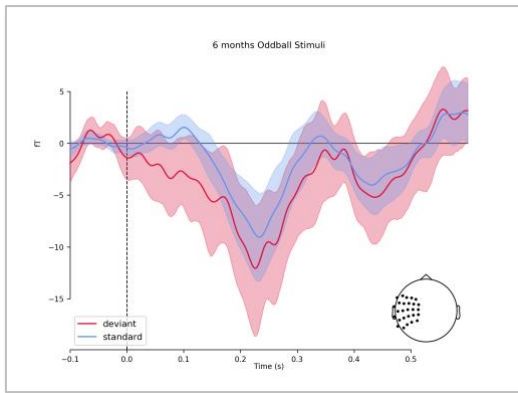
Timing of auditory brain activity to oddball stimuli averaged across 22 infants at (A) two-months and (B) six-months of age. Shaded regions represent 95% confidence interval about mean values. Inserts show the location of MEG sensors positions at the scalp situated over auditory brain regions used to measure evoked activity to each stimulus.

Fig A

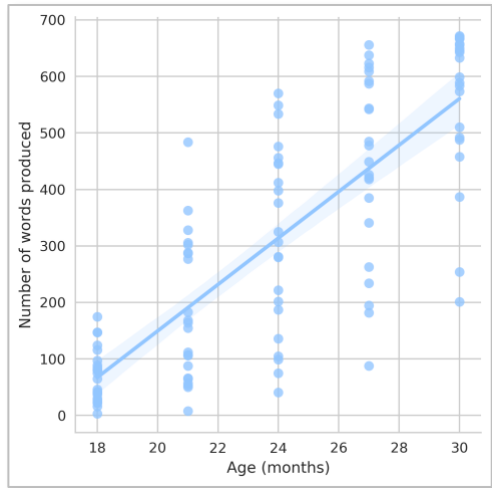


To evaluate the consistency of mismatch activity across subjects in each participant the root mean square (RMS) across the selection of MEG sensors was computed for each stimulus in each hemisphere. We used non-parametric resampling testing with hat adjustment for small variance and Threshold-free cluster enhancement (TFCE) to control for multiple comparisons in time (Maris and Oostenveld 2007). Testing was carried out on the absolute values of the difference waveform computed as deviant minus the standard RMS. The figure in this panel shows result of the hypothesis that the difference waveform did not significantly differ from zero i.e., the null hypothesis that oddball stimuli elicited a similar response. Here we see that at two months of age significant ($p = 0.001$) mismatch activity to oddball stimuli was observed between 200 – 550 ms (highlighted in red) after stimulation in underlying auditory cortices, with more a protracted response on the right.

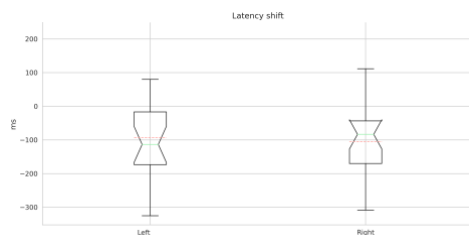
Fig B



Here we see results of the test that responses to oddball stimuli differed in six months-old infants. At this age we see more consistent speech discrimination in underlying left hemisphere structures between 200 – 550 ms after stimulation, as compared to mismatch activity in right hemisphere. Periods of significant ($p = 0.001$) activity are highlighted in red.



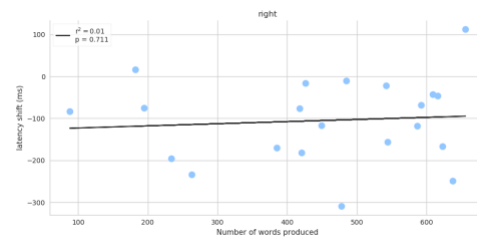
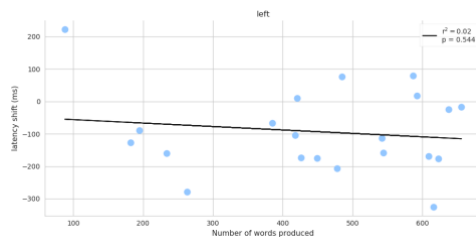
Behavioral results of expressive vocabulary with age shows typical vocabulary development between 18- and 30-months of age.



Latency shifts between 6- and 2-months of age. On average the peak latency of activity following deviant stimuli was shortened by 100ms bilaterally. Across hemispheres deviant stimuli elicited peak activity at 384 ± 95 ms ($M \pm \text{STD}$) and 284 ± 107 ms in 2- and 6-months-old infants. In both hemispheres the magnitude of latency shortening by 6 months of age

was significant ($P < .01$). However, latency shortening between 2 and 6 months of age is not a reliable predictor of expressive vocabulary at 27 & 30 months.

Vocabulary size at 27 months



Vocabulary size at 30 months

