# Assessing Parietal Contributions to Abstract Numerosity with Steady State Visual Evoked Potentials Peter J. Kohler<sup>1</sup>, Anthony M. Norcia<sup>1</sup> & Bruce McCandliss<sup>1,2</sup>

time (ms)

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Background

Can SSVEPs be used to measure neural computation of abstract numerosity?

steady-state oddball design no change in numerosity ("8") change in numerosity ("5") occurs at oddball frequency images update at constant rate (carrier frequency) 00 numerosity changes at oddball frequency 5 cycles per trial, ~20 trials per condition previous studies have used relatively

fast update rates (8 & 1 Hz) and found evidence of

number processing in electrodes over occipital cortex<sup>1</sup>

#### Numerosity change detection task

At the end of each trial, participants were asked to report  $\exists$ whether or not there had been a change in numerosity.

Sensitivity was weakest in the 6 & 1 Hz case, but consistently above-chance when number changed by 3.

When number changed by 1 (Experiment 2, data not shown) sensitivity was near chance.



### Reliable Components Analysis

A method of spatial dimensionality-reduction<sup>2</sup> that maximizes between-trial covariance, can be applied in the time- or frequency domain and produces physiologically plausible spatial filters





<sup>3</sup>Kay KN, Winawer J, Rokem A, Mezer A, Wandell BA (2013) A two-stage cascade model of BOLD responses neurometric approach to quantifying number sense in educational settings. in human visual cortex. PLoS computational biology 9:e1003079.