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Combining EEG and eye tracking: A joint experiment with the exogenous orienting task

Tatiana Malevich, Vadim Nikulin, Zafer Iscan,
W. Joseph MacInnes

Main Assumptions

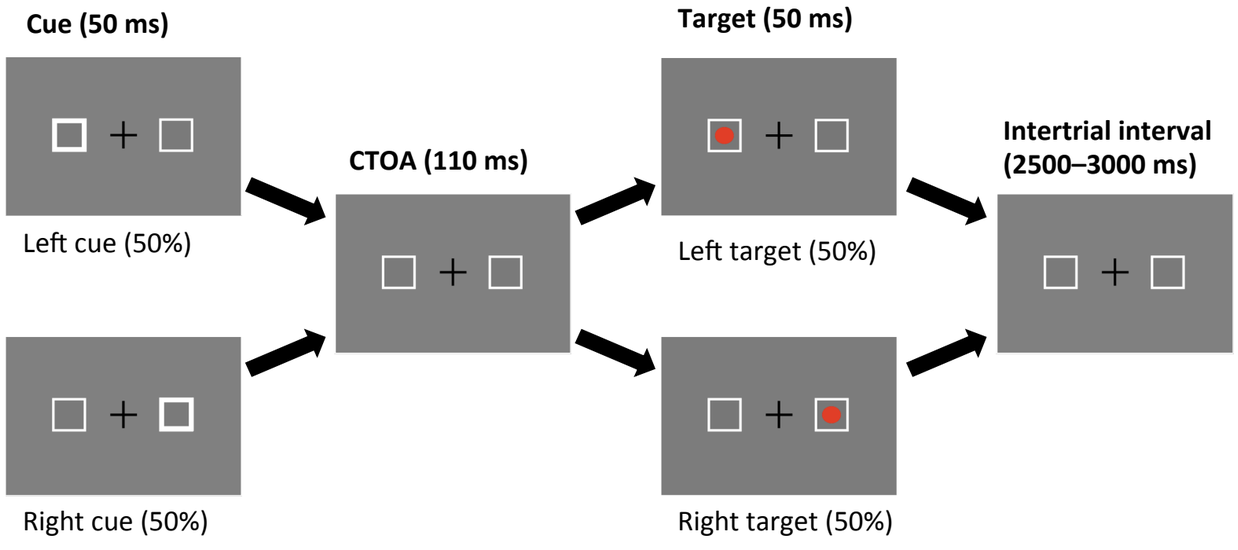
- Exogenous orienting typically shows a biphasic facilitation-inhibition pattern
- **Traditional account:** bottom-up mechanisms triggered by perceptual properties of non-informative cues
- **Perceptual merging account:** interaction between feedforward and feedback projections

Hypotheses

- Perceptual merging effect depends on the current neuronal states in the occipito-parietal cortex
- Suppression of prestimulus α-activity over posterior brain regions covaries with early facilitation

Experimental design:

- MRT task + Eye tracking + EEG recording
- Exogenous, non-informative cues
- Valid vs invalid locations
- Pre-cue vs post-cue conditions
- 5 sessions, 1120 trials in total
- 2 resting state recordings (6.5 min each)
- N = 20 (15 females, mean age = 25.6); 5 excluded

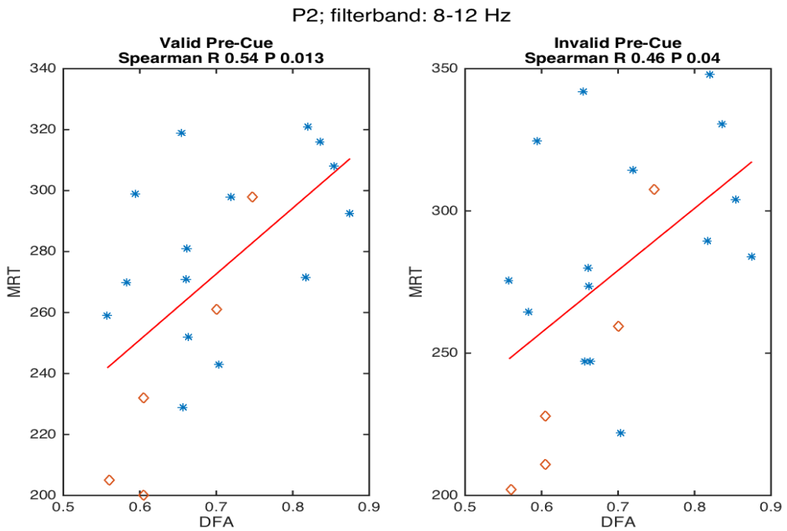


Results

- **Manual reaction time (MRT) results (linear mixed-effects models):**

✓ MRT results show clear facilitation but no evidence of perceptual merging

✓ There are main effects of cue-target onset asynchrony (CTOA) ($\chi^2(1) = 703.45$, $p < .001$), validity ($\chi^2(1) = 17.356$, $p < .001$) and validity by CTOA interaction ($\chi^2(1) = 11.5626$, $p < .001$): valid pre-cue trials are on average 9.2ms faster (*SE* 2.7)



- **EEG results (detrended fluctuation analysis):**

✓ Significant positive correlations of resting state α-activity over occipito-parietal regions with MRTs across conditions: the higher the alpha, the faster the response

✓ Significant negative correlations of resting state α-activity with anticipatory responses: the higher the alpha, the less the false alarm rate

- **To be continued…**