Intentional Suppression of Attention to Spatial Locations takes Time

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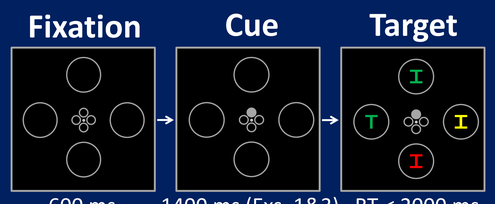
Introduction

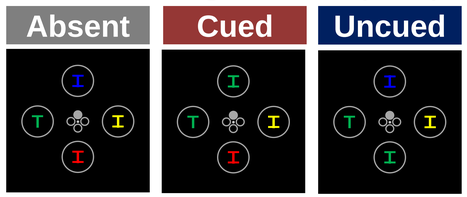
- Informative spatial cues facilitate responses for stimuli presented to cued locations
- Researchers have begun to explore whether spatial cues can be used to intentionally ignore spatial locations with some success
- Only limited information exists regarding the time-course of this effect, and even less is known regarding the underlying mechanisms
- In the present study, we investigated time-based effects associated with cueing "to-be-ignored" locations using a combination of behavioral and electroencephalographic (EEG) measures

Procedure

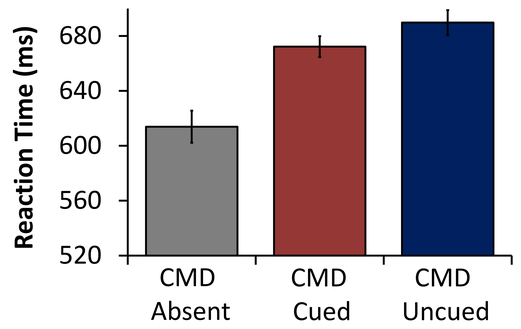
"Indicate if the 'T' is upright or inverted. The 'T' will never appear at a cued location."



Color-Matching Distractor (CMD)

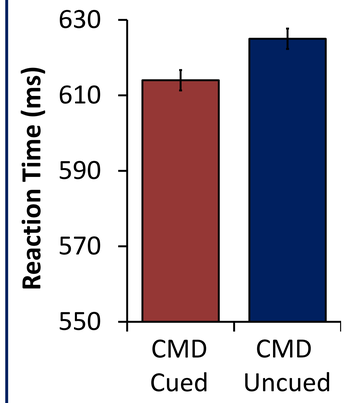


Experiment 1: RT



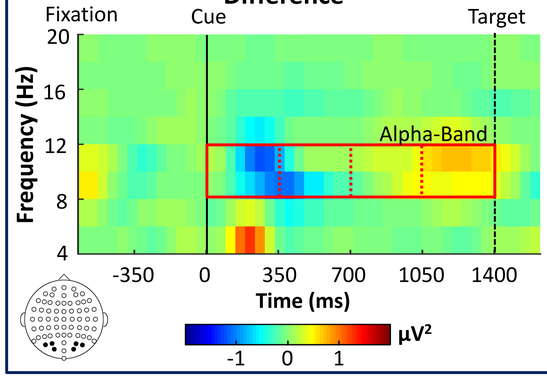
Distractor interference was attenuated for Cued CMDs relative to Uncued CMDs.

Experiment 3: RT

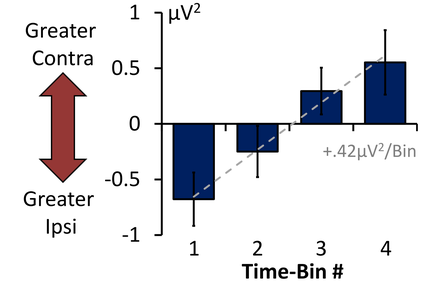


Experiment 3: EEG Results

Cued-Side Contralateral–Ipsilateral Difference

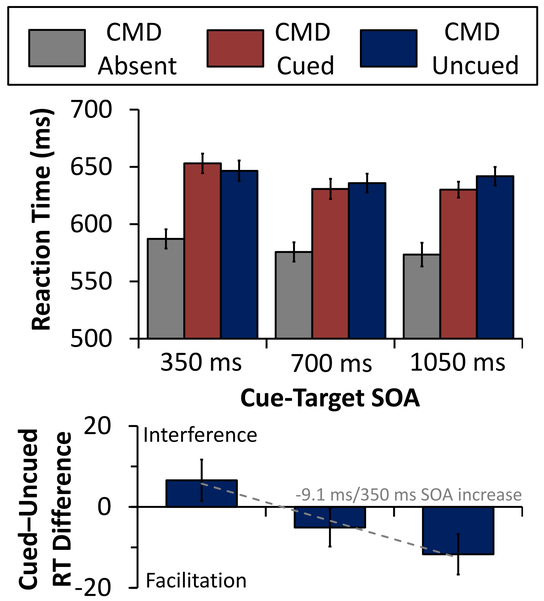


Hemispheric Alpha-Band Difference



Over the first time bin, alpha-band activity was greater ipsilateral to the cued location; Increasingly greater contralaterally over time.

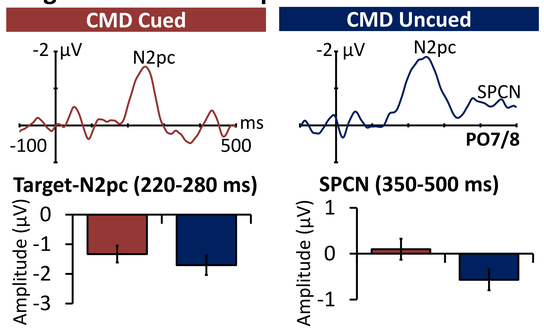
Experiment 2: RT



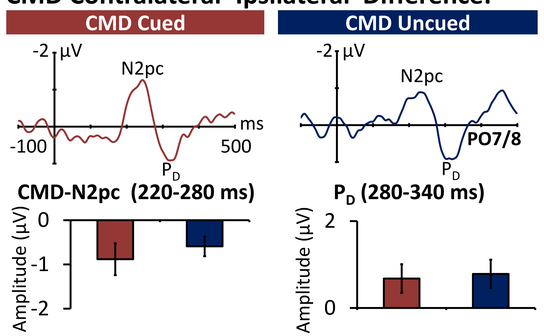
Only at the longest SOA (i.e. 1050 ms) was a significant difference observed between Cued and Uncued CMDs.

Experiment 3: ERP Results

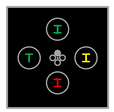
Target Contralateral–Ipsilateral Difference:



CMD Contralateral–Ipsilateral Difference:

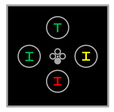


Target Lateral/ CMD Midline



N2pc amplitude for target stimuli did not differ by CMD condition. Targets present among Uncued CMDs, but not Cued CMDs, generated an SPCN.

CMD Lateral/ Target Midline



CMDs elicited an N2pc followed by a late P_D; however, the amplitudes of these components did not differ by condition.

Conclusions

- Knowledge of "to-be-ignored" locations can be used to reduce interference from salient distractors
- This benefit is time-dependent
- Alpha-band activity following the cue suggests attentional selection occurs prior to the suppression of these locations
- A late stage of target processing (i.e., SPCN) is sensitive to whether salient distractors are presented to "to-be-ignored" locations

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