

Spatial Attention Tunes Temporal Processing in Early Visual Cortex by Speeding and Slowing Alpha Oscillations

Poppy Sharp, Tjerk Gutteling, David Melcher, Clayton Hickey

Presented by: Sai Zhang

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Outline

1 Materials and Methods

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Trial Structure

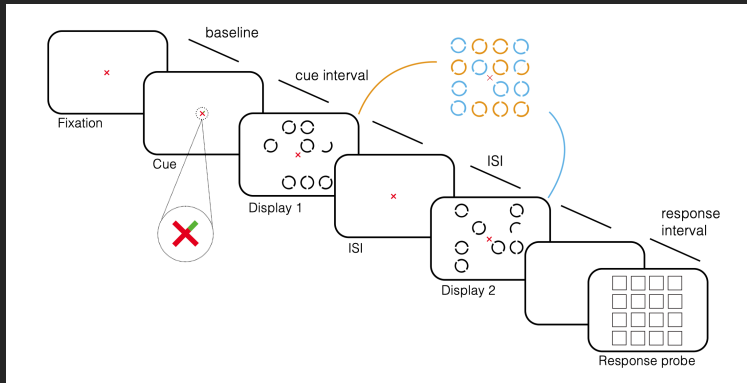


Figure 1: Trial Structure

Trial Structure

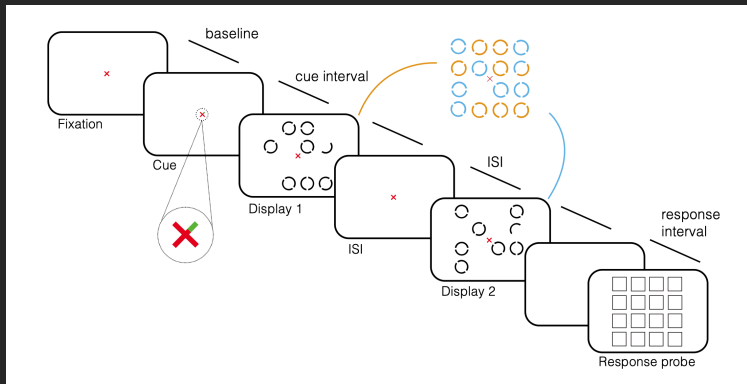
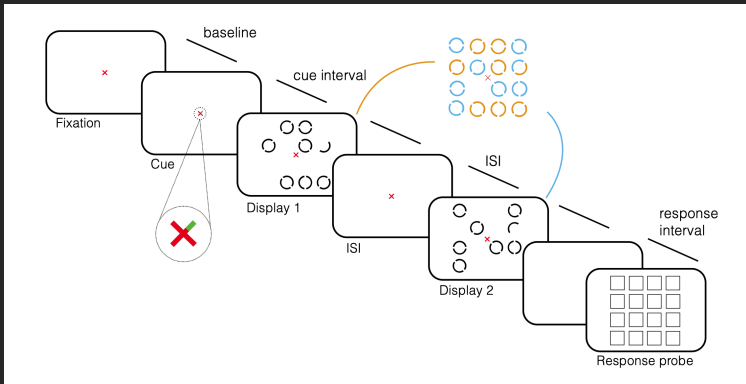


Figure 1: Trial Structure

Timeline:

- pre-cue: 1000-1500ms
- cue interval: 850-1350ms (randomized)
- display: 16.67ms
- ISI: 48.3ms
- response delay: 400ms

Trial Structure

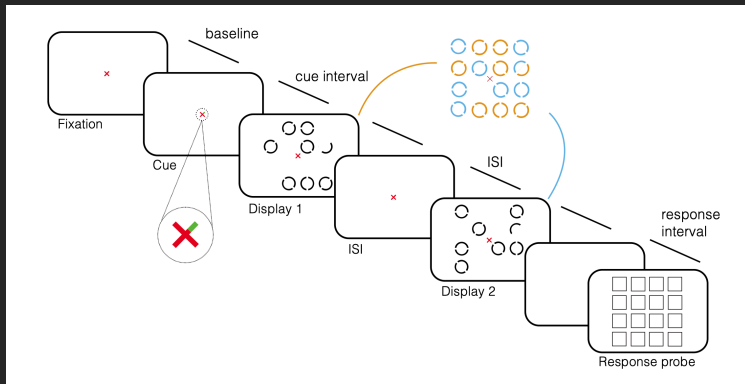


visual cue: **red** cross

- 75% (T): one of the arms turn **green**
- 25% (C): neutral cue

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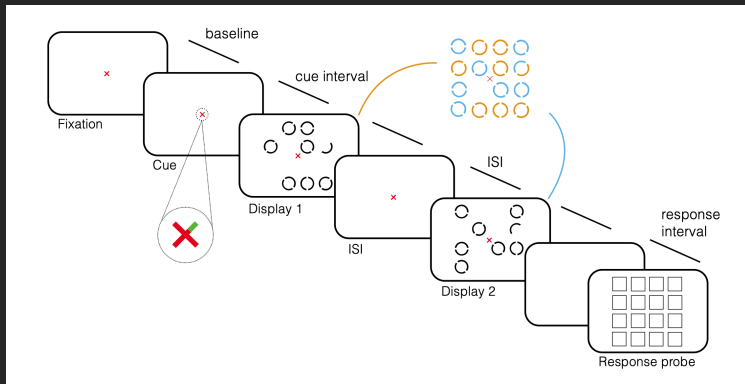


2 displays:
complementary,
non-overlapping

- neutral cue: the 2 displays **complete** each other
- empty: one left **empty** in both

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Trial Structure



task: moving a highlighted square

- segregation: targeting the half circle
- integration: targeting the empty spot

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Measures

Eye tracking

MEG recording

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- sampling rate: 1kHz
- rejection:
 - saccades: $7 \pm 7\%$ trials
 - blinks: $3 \pm 4\%$ trials

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MEG recording

- estimate instantaneous α -frequency: 7- to 14-Hz frequency band
- rejection
 - nonbiological noise: 10 ± 1 channels

Analysis

Source analysis

Numerical analysis

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- combine head digitization data with anatomic MRI data
- regions of interest:
 - parietal cortex
 - occipital cortex

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Numerical analysis

- method: 2-way repeated ANOVA
- noise of raw estimates of α frequency:
center on results following a neutral-cue
 - within each of the
integration/segregation conditions
separately

Other technical details

- Participants: 29 (**normal/corrected-to-normal** vision; age 24 ± 2.7 years; 11 male, 18 female)

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- Number of trials: 10 blocks \times 67 trials/block
- Base for numerical analysis: a shift in the **neutral-cue** baseline emerges equally in **ipsilateral** and **contralateral** signals

References I

Sharp, P., Gutteling, T., Melcher, D., & Hickey, C. (2022). Spatial attention tunes temporal processing in early visual cortex by speeding and slowing alpha oscillations. *Journal of Neuroscience*, 42(41), 7824–7832.

