Limitations of intra-hemispheric exchange of attention information in PPC during shifts of object-based attention

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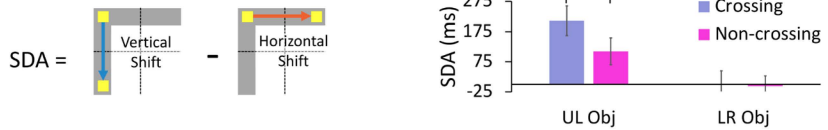
1. Introduction

- Shift Direction Anisotropy (SDA) quantifies the relative advantage of horizontal compared to vertical shifts of object-based attention[1]
- The SDA is reduced when targets do not cross the visual field meridians[2]
- In our fMRI study, SDA was observed for upper left (UL) but not lower right (LR) object[3]
- SDA does NOT result from a post-cue prioritization of invalid horizontal target locations[4]

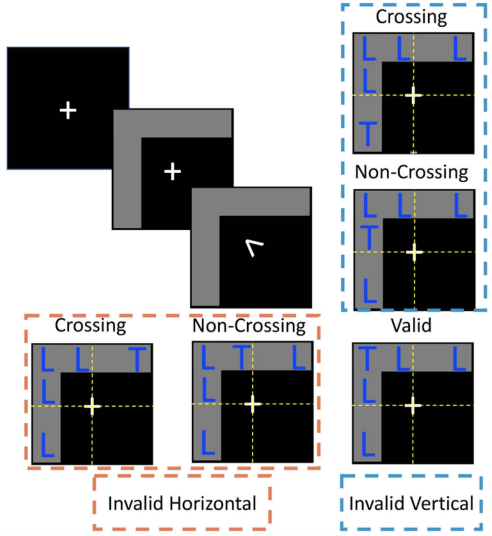


Does the SDA result from a shift direction bias in attentional control regions?

2. Paradigm

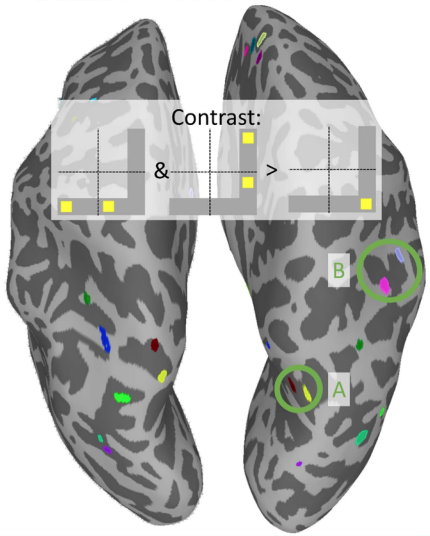
- 18 healthy young adults
- 8 runs, with crossing condition blocked
- 60 trials per run
  - 60 % valid, 20 % invalid, 20 % catch

Inter-trial interval: 1-4 s | **Object**: 1 s | **Cue**: 1-4 s | **Target**: 2 s



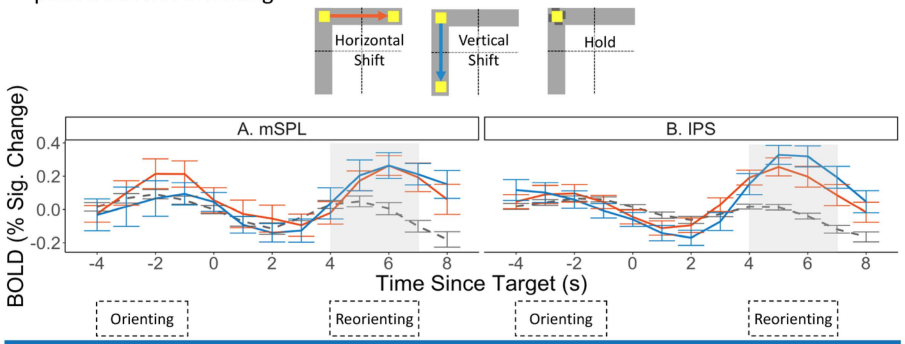
3. Attentional Control ROIs (lower-object trials)

- Contrast: Invalid > Valid
  - **Only** included **LR object** trials
  - Included both crossing and non-crossing invalid trials
- Significant clusters of activation in bilateral SPL and IPS



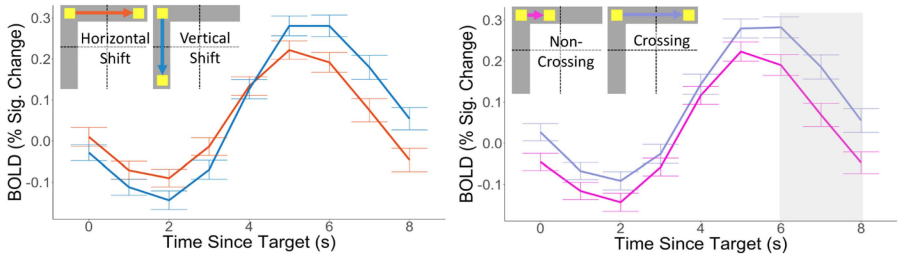
4. Greater PPC activation for shifts vs. holds

- Greater activation for vertical and horizontal shifts than holds during the reorienting period but not orienting



5. Meridian crossing (not shift direction) influences PPC

- Horizontal and vertical shifts did not elicit significantly different activation in PPC
- Greater activation for crossing than non-crossing shifts during reorienting



6. Discussion

- LR object independently defined accurate attentional control ROIs for UL object
- **PPC activation not modulated by shift direction** (consistent with previous work[5])
- **SDA could arise from more efficient exchange of attention information between hemispheres when shifting across vertical meridian**
- Crossing condition modulated PPC activation but further studies needed to control for shift distance

7. References

1. Barnas AJ, Greenberg AS. *Attention, Perception, & Psychophysics*. 2016.; **2.** Barnas AJ, Greenberg AS. *Visual Cognition*. 2019; **3.** Hughes DH, Barnas AJ, Greenberg AS. *Journal of Vision*. 2022.; **4.** Hughes DH, Barnas AJ, Greenberg AS. *Journal of Vision*. 2023.; **5.** Shomstein S, Behrmann M. *PNAS*. 2006.

8. Acknowledgements

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