The Object-Based Attention Shift Direction Anisotropy May Depend On Expectations About Shifting Across Visual Field Meridians

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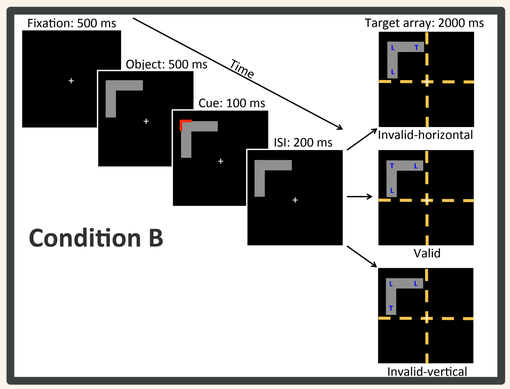
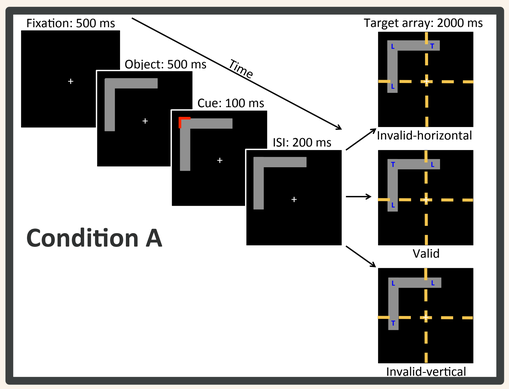
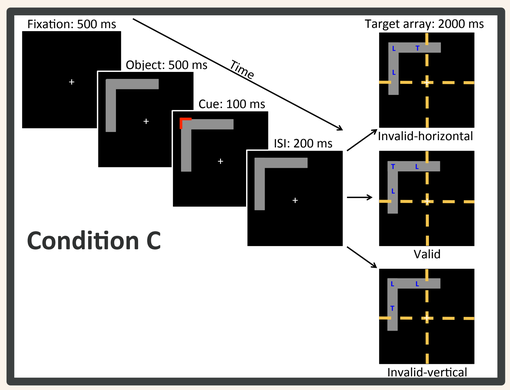
Introduction

- Object-based attention (OBA) leads to preferential processing of visual information contained in/on an attended object vs. unattended object[1,2]
- OBA varies by orientation[3]; faster effects for horizontal vs. vertical objects
- Crossing visual field meridians produces horizontal-vertical shift direction anisotropy (SDA) [4]
  - Shifting from fixation to periphery produces SDA
  - Shifting from periphery to fixation eliminates SDA
- Here, our goal was to measure SDA during OBA by juxtaposing meridian crossings of objects vs. meridian crossings of targets

Method







- Experiment 1: Conditions A & B
  - Object and target array placement consistent
- Experiment 2: Conditions A & C
  - Object placement consistent; target array placement varies
- Experiment 3: Conditions B & C
  - Target array placement consistent; object placement varies

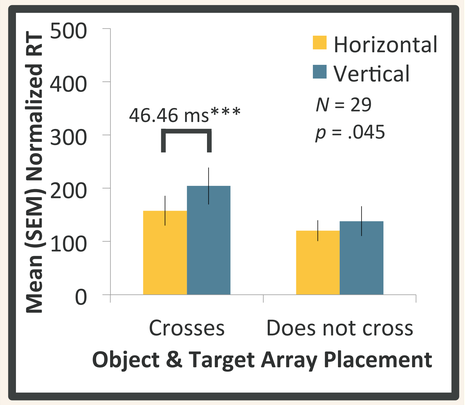
960 trials • 60% valid trials • 20% invalid trails • 20% catch trials

Note: objects and target array placement not drawn to scale; Dashed yellow lines indicate horizontal and vertical meridians and were not visible to participants

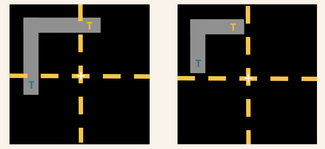
Results

Experiment 1

Object and target array placement consistent

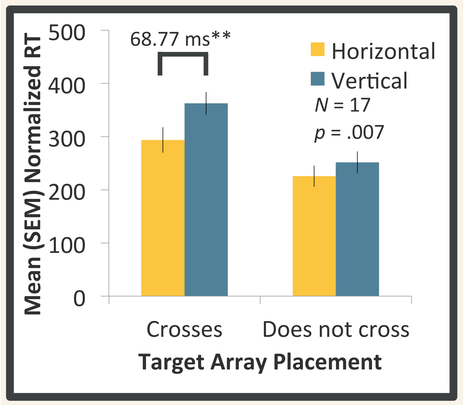


Note: *** = SDA (sig. difference from zero; p = .005)

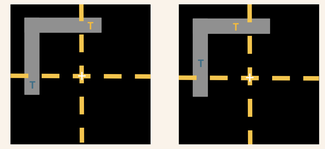


Experiment 2

Object placement consistent; target array placement varies

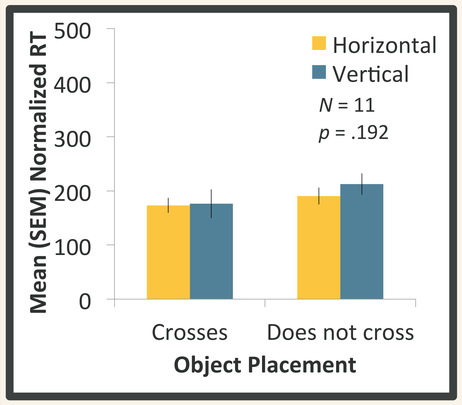


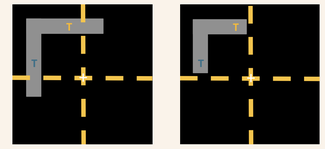
Note: ** = SDA (sig. difference from zero; p = .02)



Experiment 3

Target array placement consistent; object placement varies





Discussion & Conclusion

- SDA when target placement required attention shift across meridians; No SDA when target placement did not cross meridians, regardless of object placement
- Pattern of performance supports attentional prioritization strategy[5], and suggests that participants prioritize target's position rather than entire object or object dimension[4]
- SDA not explicitly caused by objects that cross meridians[4], but may depend on expectations regarding upcoming shifts to target positions and their relation to meridians
- Forthcoming experiments will further test effects of object and target placement on emergence of SDA (i.e., target positions that cross but object position that does not cross meridians)

References

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2. Egly, R., Driver, J., Rafal, R. D. (1994). *JEP: General*
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4. Barnas, A. J., & Greenberg, A. S. (2016). *AP&P*
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Acknowledgments

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