Shifts of Object-Based Attention Differ Across Visual Field Meridians

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Introduction

• Object-based attention (OBA) leads to preferential processing of visual information within the boundaries of an attended object.

• OBA shifts are faster for horizontally-oriented rectangles than for vertically-oriented rectangles.[1]

• When controlling for attention shifts across the vertical screen meridian, effects of orientation are eliminated.[2]

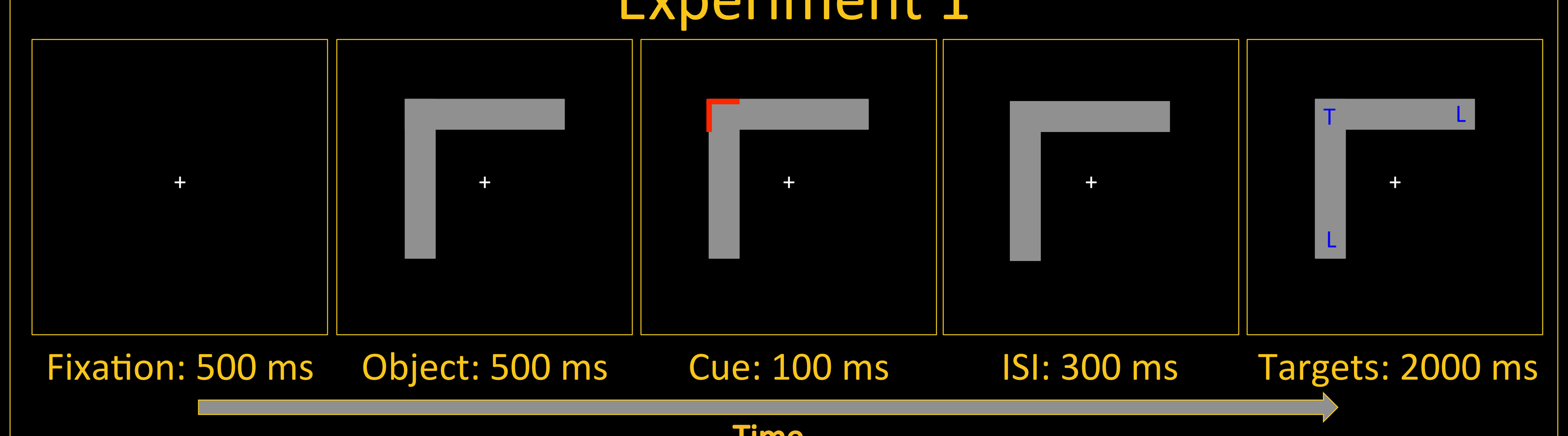
• Previous studies used the double-rectangle cueing paradigm[3] which contains attention shifts within and between objects.

• OBA exhibits an object-specific attentional prioritization strategy: locations within an attended object are given higher priority than locations in unattended objects.[4]

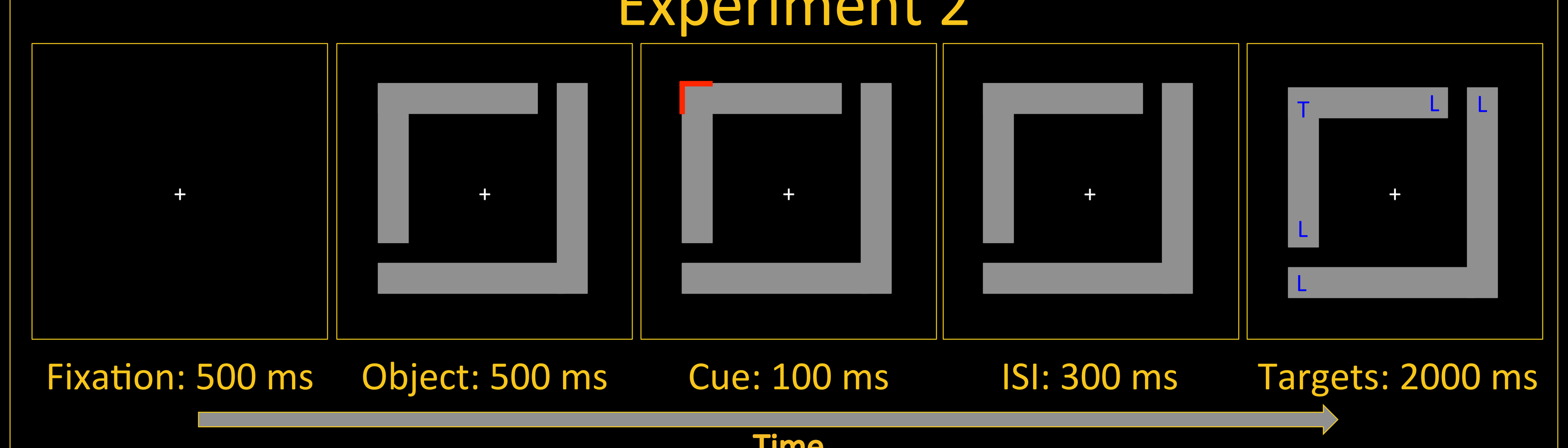
• Here, we examine within- and between-object shifts of attention across both screen meridians.

Method

Experiment 1



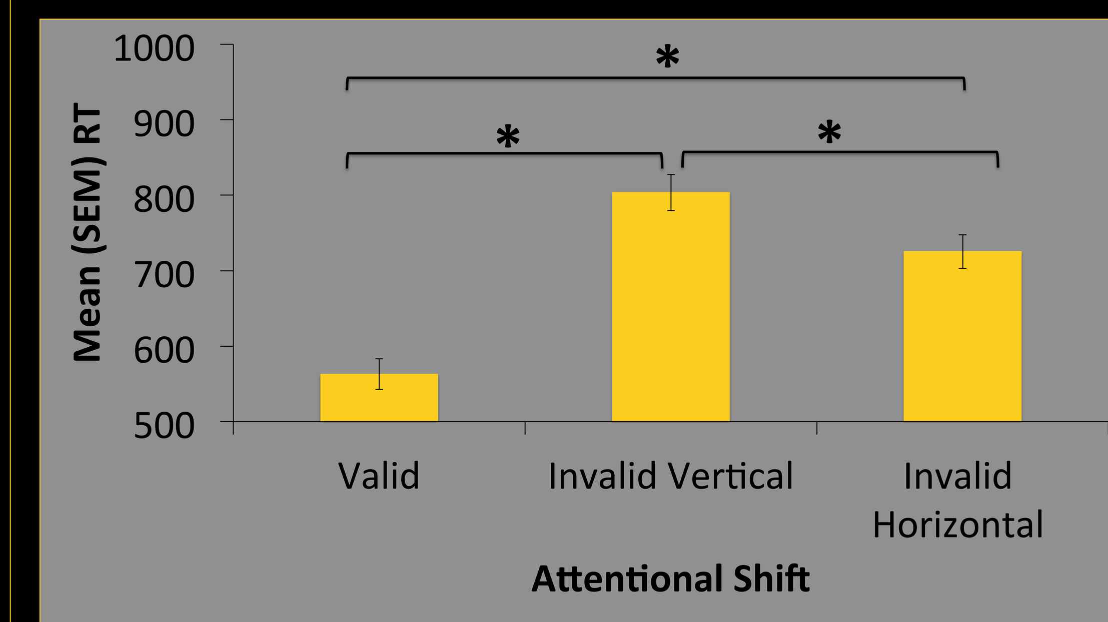
Experiment 2



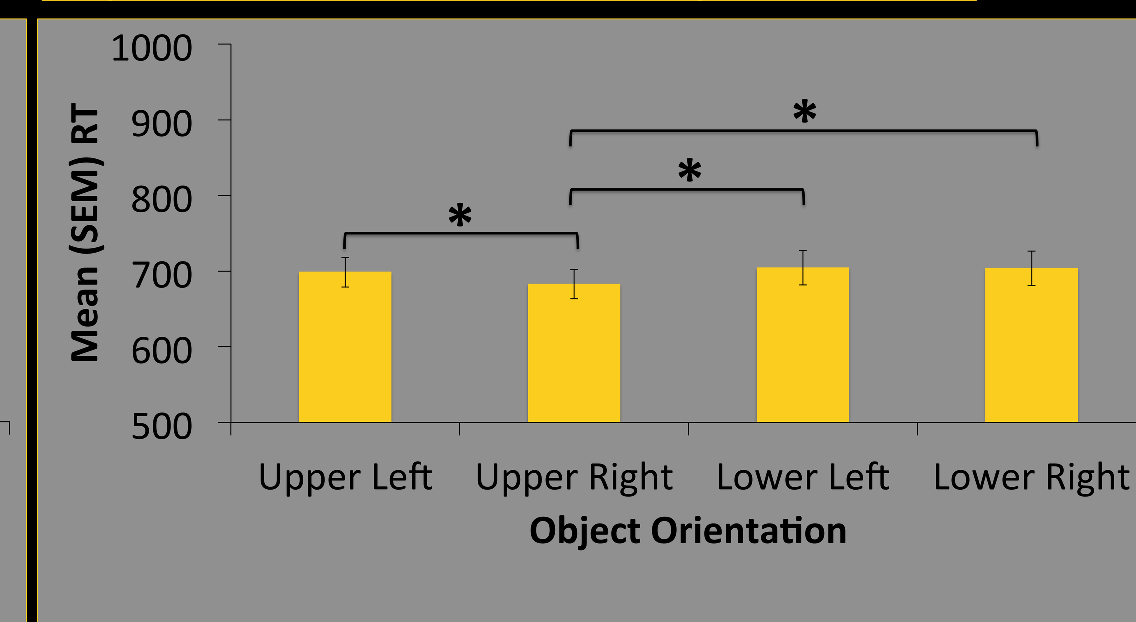
60% valid trials • 20% invalid trials • 20% catch trials

Results

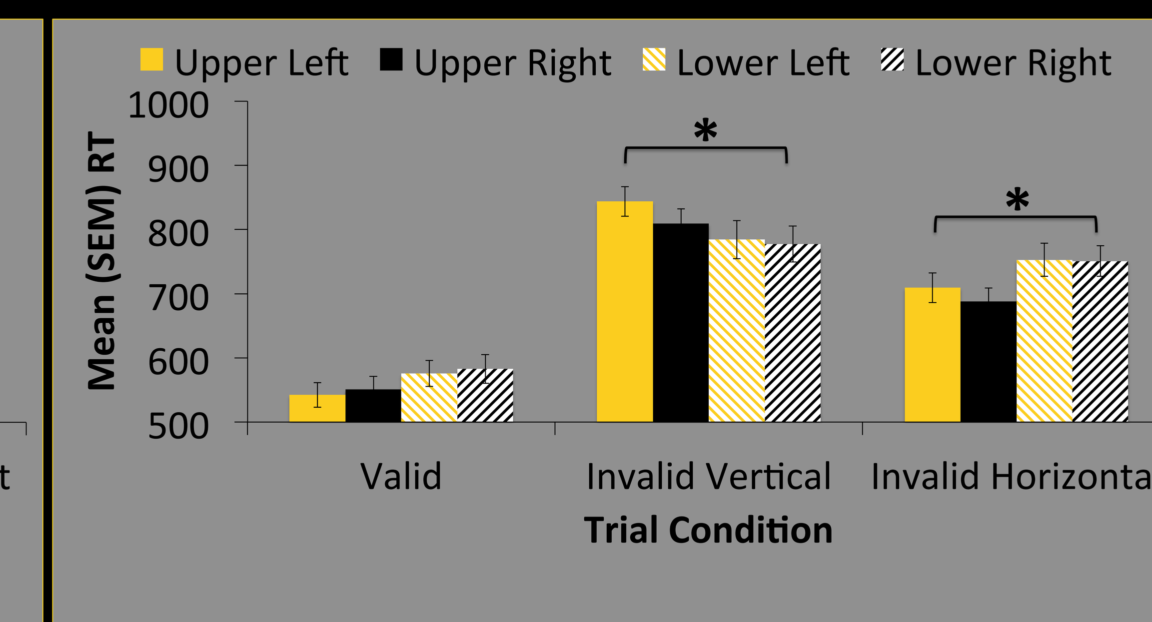
Experiment 1 (within-object shifts): *N* = 32



Main effect attentional shift: $F(2,62) = 164.64$, $p < .001$

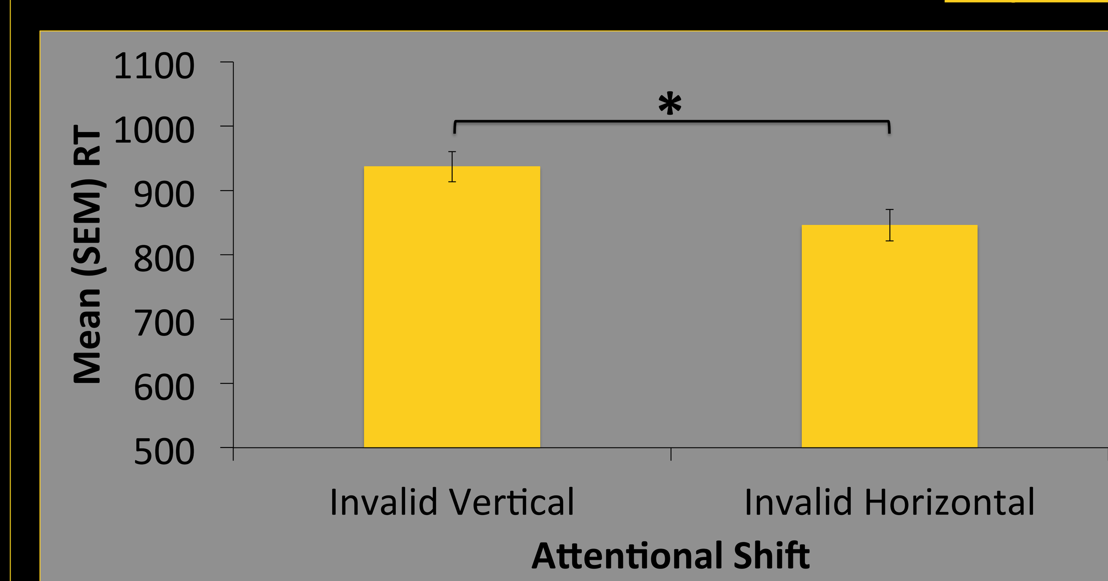


Main effect object orientation: $F(3,93) = 4.46$, $p = .006$

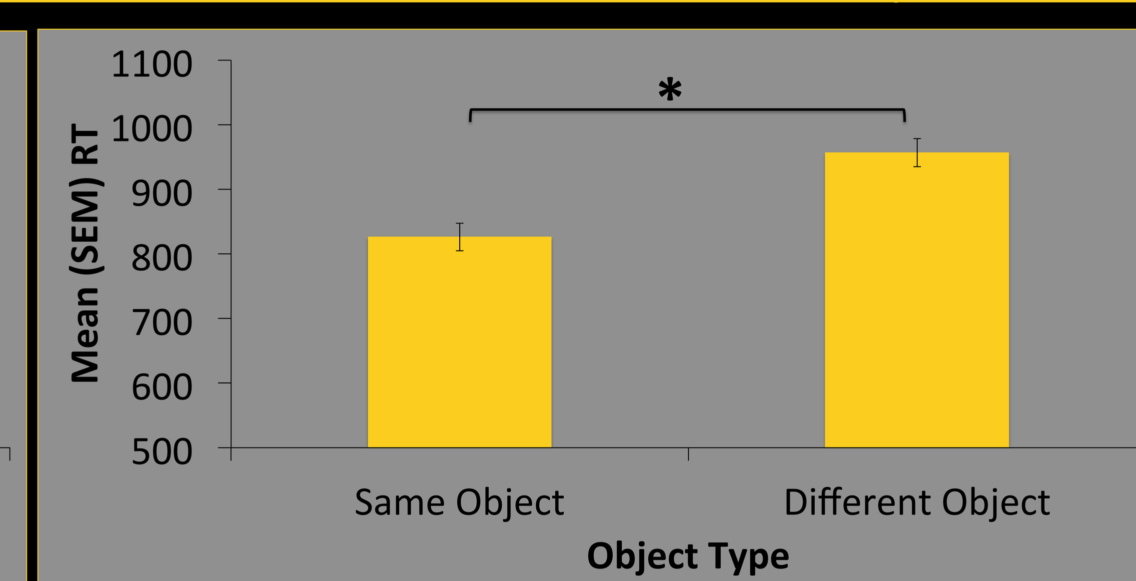


Shift x orientation interaction: $F(6,186) = 10.81$, $p < .001$

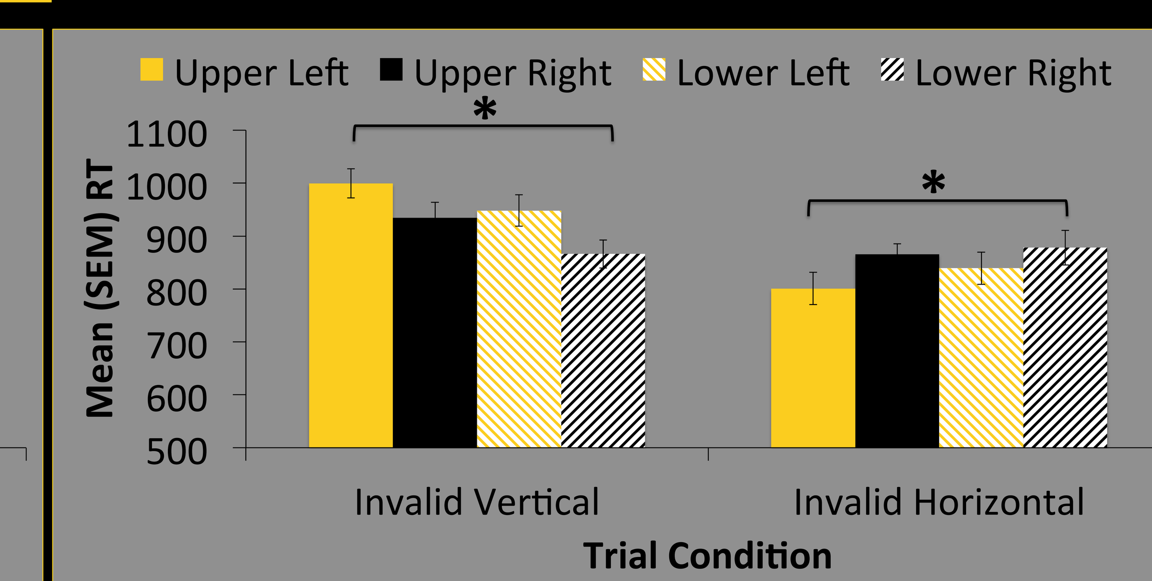
Experiment 2 (within- and between-object shifts): *N* = 16



Main effect attentional shift: $F(1,15) = 11.71$, $p = .004$



Main effect of object type: $F(1,15) = 63.16$, $p < .001$



Shift x orientation interaction: $F(3,45) = 11.28$, $p < .001$

	Within-Object Shift (Exp1)	Within Same Object Shift (Exp2)	Between Different Object Shift (Exp2)	Invalid Different – Invalid Same
Invalid Vertical	803.68	864.59	1009.52	144.93*
Invalid Horizontal	725.29	787.86	904.05	116.19*
Invalid Vertical – Invalid Horizontal	78.39*	76.73*	105.47*	

• Horizontal shift RTs are consistently faster than Vertical shift RTs

• Horizontal advantage is significantly smaller for within-object shifts versus between object-shifts

Discussion

• Results support object-specific attentional prioritization strategy; different types of invalid shifts do not affect attention prioritization.

• Vertical shifts are faster in the right visual field going up and slower in the left visual field going down; Horizontal shifts are faster in the upper visual field going right and slower in the bottom visual field going left.

Horizontal shifts (across vertical screen meridian) are faster than vertical shifts (across horizontal screen meridian)

References

1. Pilz et al. (2012), *PLoS ONE*
2. Greenberg et al. (2014), *VSS*
3. Egly et al. (1994), *JEP: General*
4. Shomstein & Yantis (2002), *Percept Psychophys*

Acknowledgements

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