Cueing Effects for Simple Detection Are Best Accounted For by a Decision Model of Selective Attention

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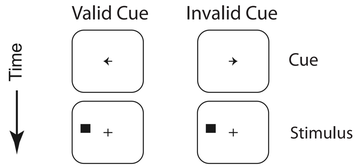
1. Partially-Valid Cueing



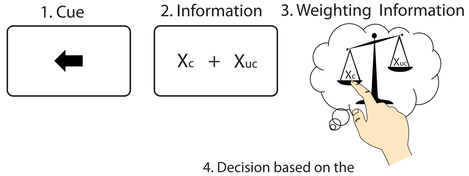
(Posner, 1980)

2. Two Competing Hypotheses

Selective Perception with Limited Capacity in Space But Not in Time

4. Decision based primarily on the **attended information Xc**

Selective Decision with Unlimited Capacity in Space and in Time



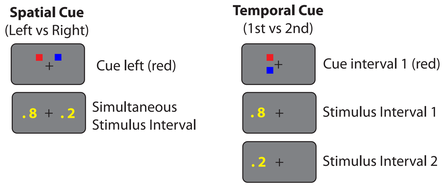
4. Decision based on the **weighted information**

Which hypothesis accounts for partially-valid cueing?

(Sperling & Melchner, 1978; Kinchla, Chen, & Evert, 1995)

3. Experimental Design

Goal: To distinguish the Selective Perception and Selective Decision hypotheses using spatial and temporal cueing.

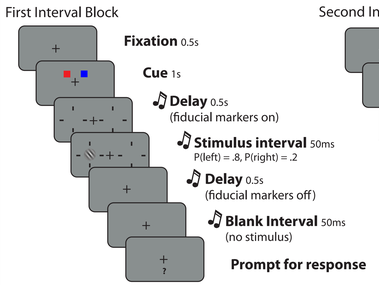


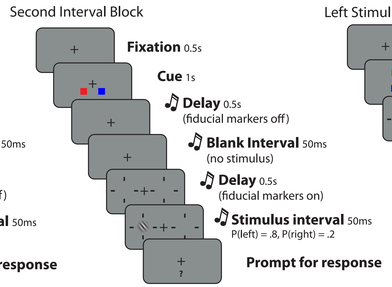
Stimuli: Low-Contrast Oriented Gabors

Left Leaning **Right Leaning**

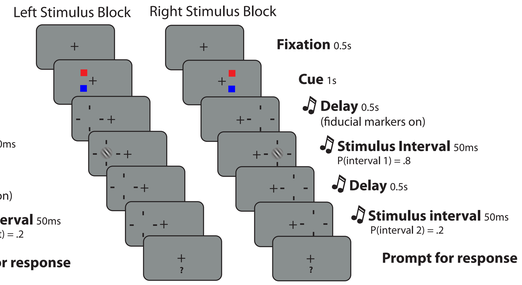
- For each trial, a cue indicated where and when the target was likely to occur (P_{cued} = .8, P_{uncued} = .2)
- Participants were instructed to report the orientation of the Gabor with a button-press
- Stimuli contrast was adjusted for each participant, such that performance was 70-80% correct ($M_{contrast}$ = .08)

Spatial Cueing Trial Sequence





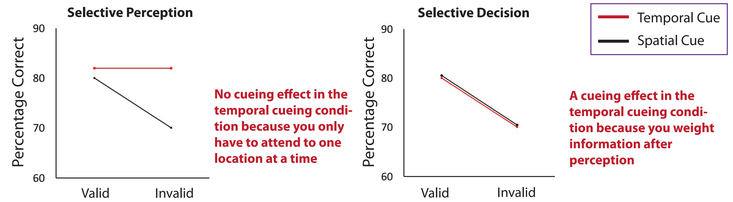
Temporal Cueing Trial Sequence



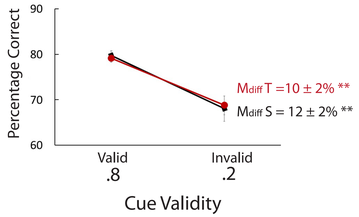
- Fixation was enforced using an eyetracker.
- Spatial and temporal uncertainty were minimized using tone sequences and fiducial markers.

(Correa et al, 2006; Kinchla, Chen, & Evert, 1995; Shiffrin & Gardner, 1972

4. Predictions



5. Results



n = 7

**p < .01

6. Discussion

This result adds to other findings consistent with selective decision and not with this version of selective perception.

a. Previous findings of cueing effects with sequential displays (Kinchla, Chen, & Evert, 1995)
b. Findings of partially-valid cueing effects with post-cues (Kinchla, Chen, & Evert, 1995)
c. Findings consistent with unlimited capacity (e.g. simultaneous-sequential paradigm: Shiffrin & Gardner, 1972; Scharff, Palmer, & Moore, 2011)

7. Conclusion

There was a reliable cueing effect in the temporal cueing condition.

- This result is inconsistent with this version of the Selective Perception hypothesis.
- Instead, it is consistent with the Selective Decision hypothesis, suggesting that for simple stimuli, the cueing effect occurs in decision.

Future work will investigate the roles of perception and decision in partially-valid cueing with word stimuli.