Rewarded Stimuli Do Not Capture Attention @ Task-Irrelevant Locations

Xiaojin Ma & Richard A. Abrams Washington University in St. Louis

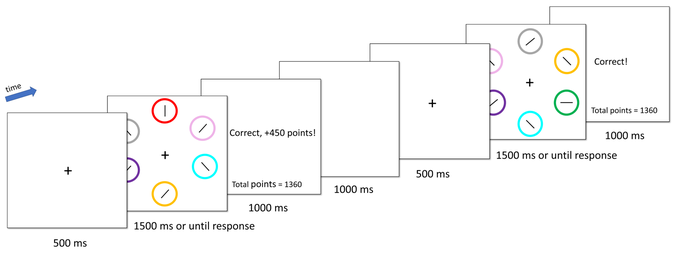
-Introduction-

- **Value-Driven Attentional Capture (VDAC)**: Stimuli previously associated with reward prioritize attention in subsequent unrelated tasks [1][2].
- Almost all previous studies presented the rewarded stimulus at a potential target location, making it reasonable to be attended. [1]
- Does VDAC occur at task-irrelevant peripheral locations?

-Methods-

Reward Training Phase

- "Look for a red or green target, and report the line orientation inside."
- Two colors followed either by reward or no-reward.



Test Phase

- **Experiment 1**: RSVP task w/ peripheral flanker + additional singleton task, task blocks in alternate order
- **Experiment 2**: RSVP task w/ central distractor

References

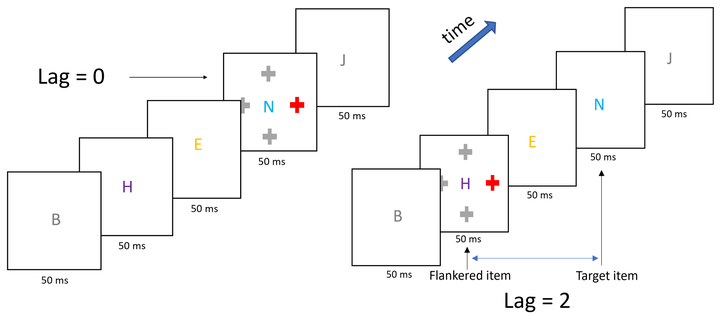
[1] Anderson, B. A., Laurent, P. A., & Yantis, S. (2011). Value-driven attentional capture. *Proceedings of the National Academy of Sciences*, *108*(25), 10367-10371.
[2] Anderson, B. A., & Yantis, S. (2013). Persistence of value-driven attentional capture. *Journal of Experimental Psychology: Human Perception and Performance*, *39*(1), 6.
[3] Joseph, J. S., Chun, M. M., & Nakayama, K. (1997). Attentional requirements in a 'preattentive' feature search task. *Nature*, *387*(6635), 805-807.
[4] Folk, C. L., Leber, A. B., & Egeth, H. E. (2002). Made you blink! Contingent attentional capture produces a spatial blink. *Perception & psychophysics*, *64*(5), 741-753.
[5] Theeuwes, J. (1992). Perceptual selectivity for color and form. *Perception & psychophysics*, *51*(6), 599-606.

Note 1. MacLean, M. H., & Giesbrecht, B. (2015). Irrelevant reward and selection histories have different influences on task-relevant attentional selection. *Attention, Perception, & Psychophysics*, *77*(5), 1515-1528.

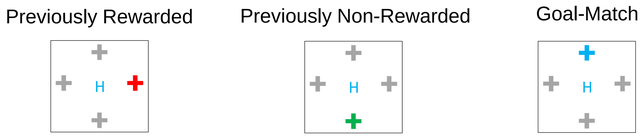
-RSVP Task w/ Peripheral Flanker-

test for VDAC at task-irrelevant locations

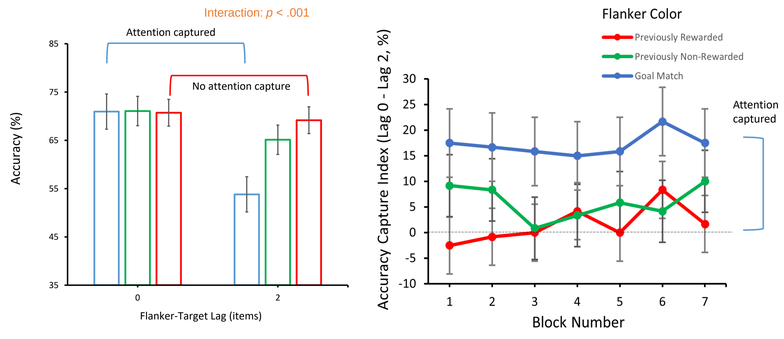
Flanker-Target Lag



Flanker Type



Results

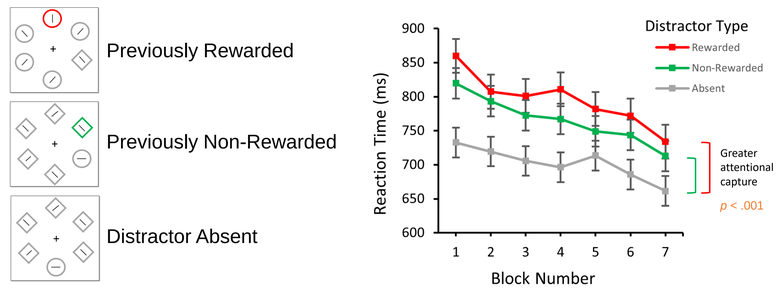


- The difference in accuracy between Lag 0 and Lag 2 serves as an index of the distractive effect of the flanker.
- A goal-matching color significantly impaired accuracy.
- However, at the same peripheral location, a **rewarded color did not capture attention and had no distractive effect.**

(n = 30, replicated in two other experiments)

-Additional Singleton Task-

verification of learned value



- The presence of a previously rewarded distractor impaired performance significantly more than the other two conditions.
- This replicates the typical VDAC pattern, showing that rewarded stimuli captured attention here when presented at task-relevant locations.

(n = 30)

-RSVP Task w/ Central Distractor-

confirmation of VDAC in an RSVP task

- Closely surrounding the target location, a rewarded ring color significantly impaired performance more than a non-rewarded color.
- Confirms that VDAC can occur in an RSVP task.

(n = 55)

-Conclusion-

Reward-associated stimuli do not capture attention when presented at task-irrelevant locations, unlike goal-matching stimuli which do capture attention.

Correspondence should be directed to: xiaojinma@wustl.edu