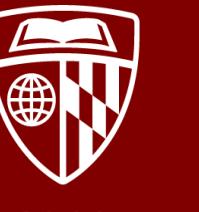


Distinct influence of value-driven attentional capture when maintaining locations and spatial relations in working memory



JOHNS HOPKINS
UNIVERSITY

Gormley, M.¹, Hinault, T.¹, Blacker, K.J.¹², Anderson, B.A.¹³, & Courtney, S.M.¹⁴⁵

¹Department of Psychological and Brain Sciences, Johns Hopkins University, ⁴Department of Neuroscience, Johns Hopkins University, ⁵F.M. Kirby Research Center, Kennedy Krieger Institute

²The Henry M Jackson Foundation for the Advancement of Military Medicine, Inc , ³Department of Psychological and Brain Sciences, Texas A & M University

thinaul1@jhu.edu

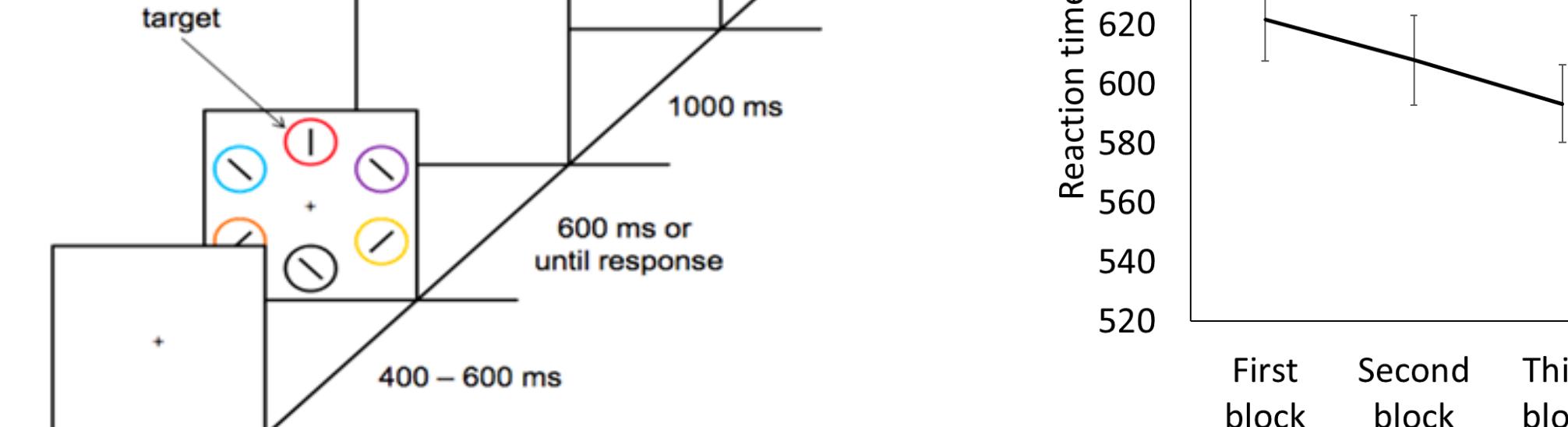
Background

- We aimed to specify the interaction between working memory maintenance and attention allocation processes
- Distinct cognitive processes underlie maintenance of abstract and sensory information in working memory¹
- The value of a stimulus can influence the allocation of attention, even when this stimulus is no longer relevant²
- Here, we investigated whether value-driven attentional capture and its effects on WM are modulated by the active maintenance of a sensory representation vs. an abstract representation in WM

Methods

-19 participants.

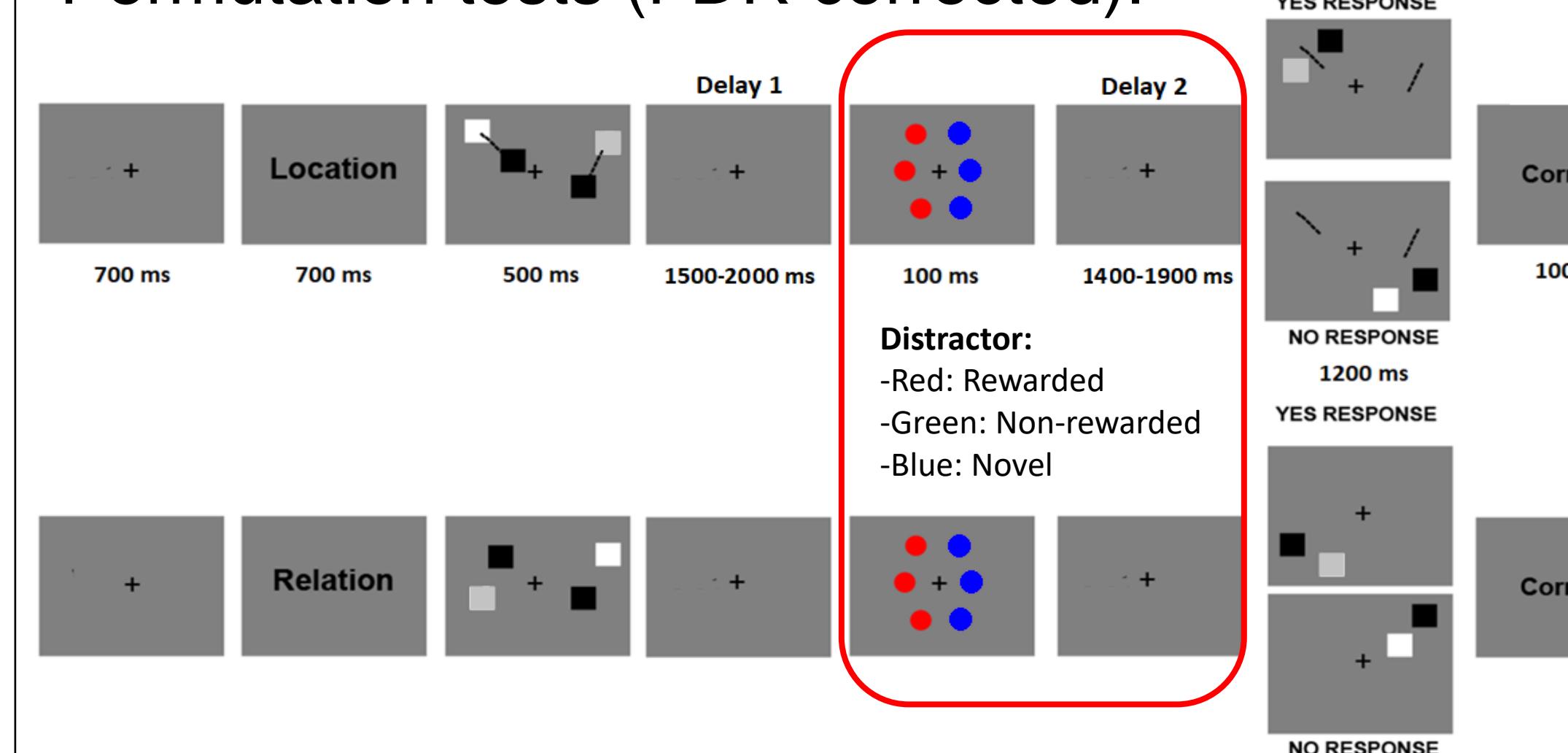
-256 trials.



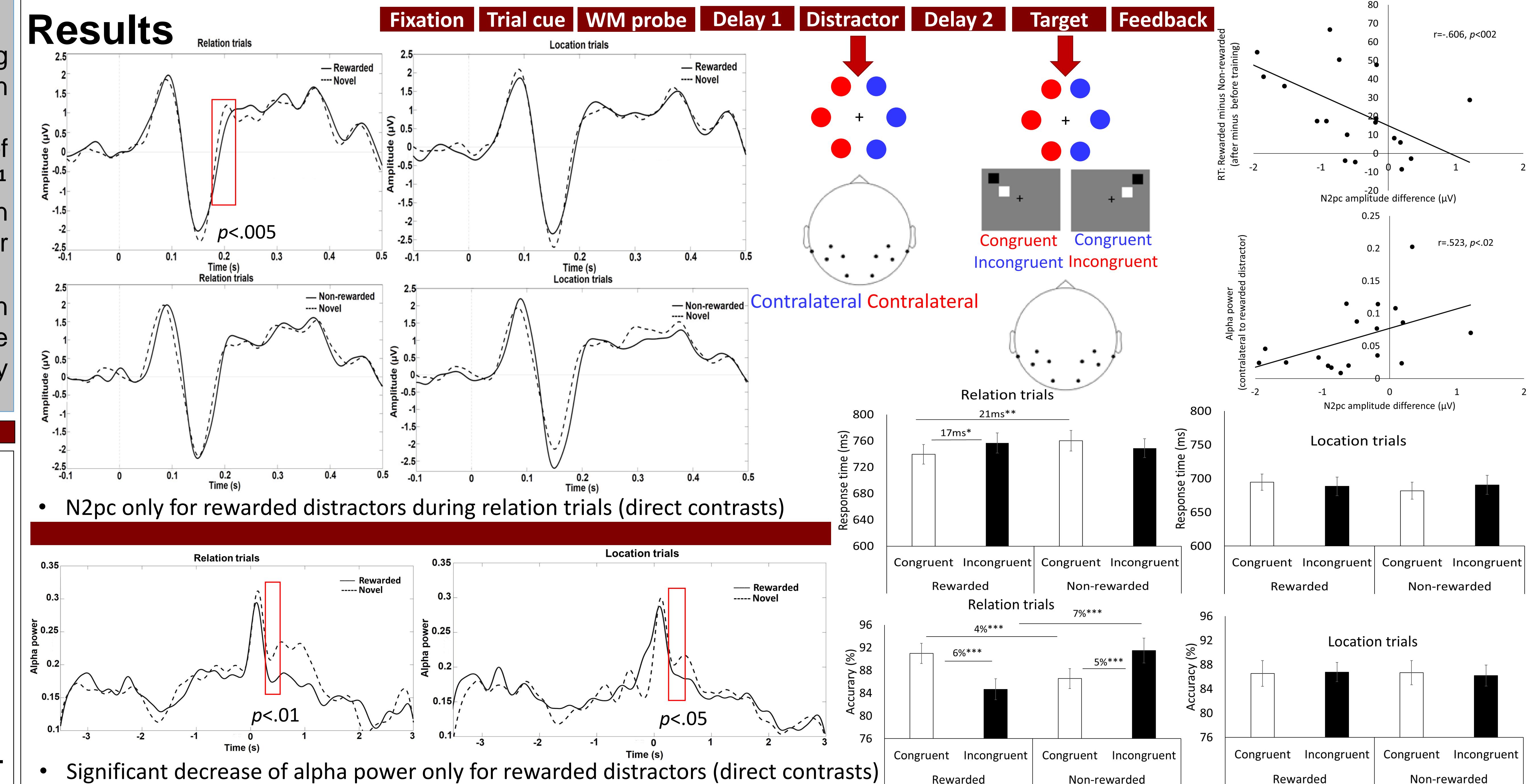
-EEG recorded with 32 electrodes (WM phase only).

-Bandpass filtered (0.1-30Hz).

-Permutation tests (FDR corrected).



Results



Summary/Conclusion

- Better performance when relation WM was tested in the same hemifield as the previously rewarded distractor. Novelty bias when the distractor was not associated with value.
- Alpha power and N2pc amplitudes were modulated over posterior electrodes contralateral to the previously rewarded distractor (compared to a novel distractor)
- The difference between rewarded vs. non-rewarded distractors was significantly greater during relation WM than during location WM, for N2pc ($p<.001$) and alpha power ($p<.01$).
- The influence of attentional capture on working memory maintenance is stronger during relation WM than during location WM, suggesting that location WM may employ focused attention to specific retinotopic locations which helps to filter out distracting stimuli.

References

- ¹Anderson, B. A., Laurent, P. A., & Yantis, S. (2011). Value-driven attentional capture. *Proceedings of the National Academy of Sciences*, 108(25), 10367–10371. <https://doi.org/10.1073/pnas.1104047108>
- ²Blacker, K. J., Ikkai, A., Lakshmanan, B. M., Ewen, J. B., & Courtney, S. M. (2016). The role of alpha oscillations in deriving and maintaining spatial relations in working memory. *Cognitive, Affective, & Behavioral Neuroscience*, 16(5), 888–901. <https://doi.org/10.3758/s13415-016-0439-y>