

# Cooperation and Competition in Memory-Guided Attention



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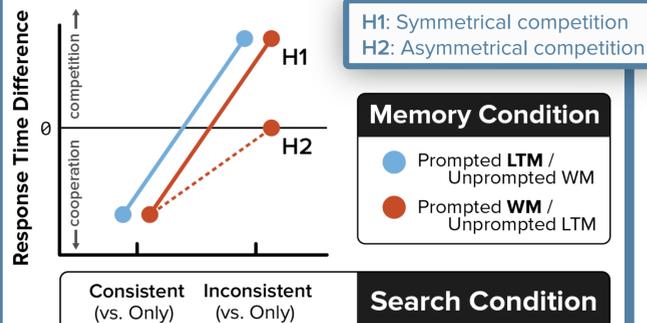


## Introduction

- Memories from long-term memory (LTM) or working memory (WM) can automatically guide attention<sup>1-4</sup>
- LTM may only contribute to WM-based tasks when beneficial<sup>5</sup>

- How do LTM and WM guide attention in the same task?
- Do LTM and WM cooperate and compete symmetrically or asymmetrically?

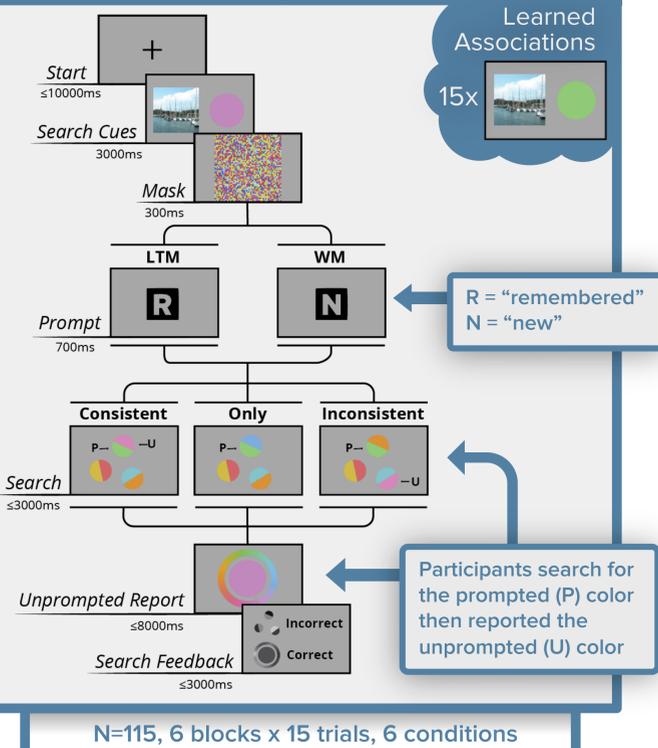
## Hypotheses



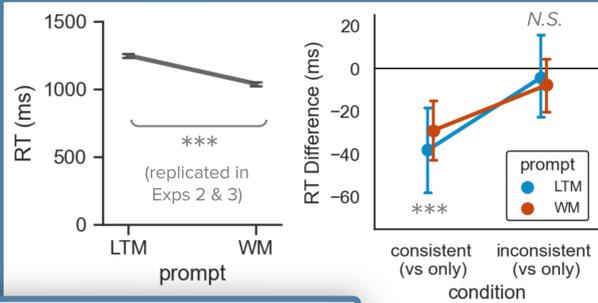
## References

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2. Bahle et al. (2020). The architecture of working memory: Features from multiple remembered objects produce parallel, coactive guidance of attention in visual search. *J Exp. Psych., General*, 149(5), 967-983.
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## Exp. 1



## Results

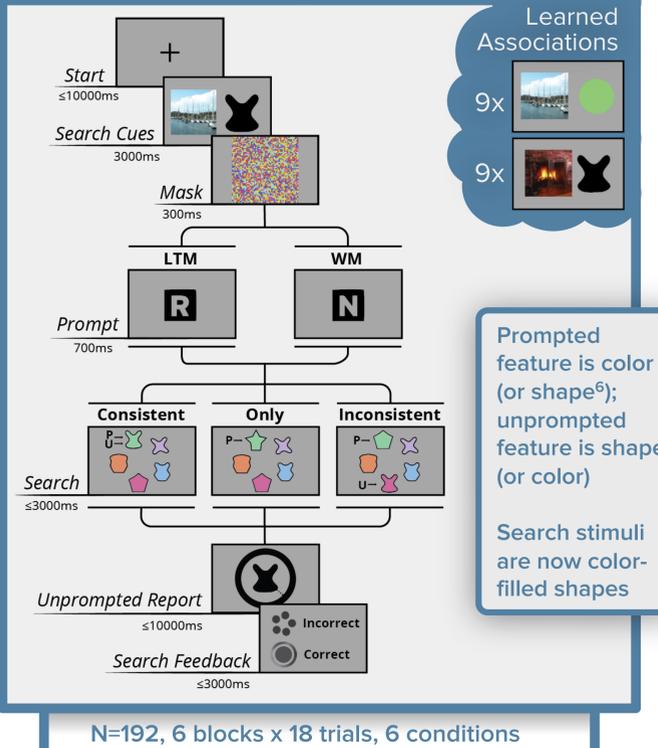


- Graphs of within-subject (w/s) means
- Error bars = SEM of w/s difference
- \*\*\*p < .001; \*\*p < .01; \*p < .05

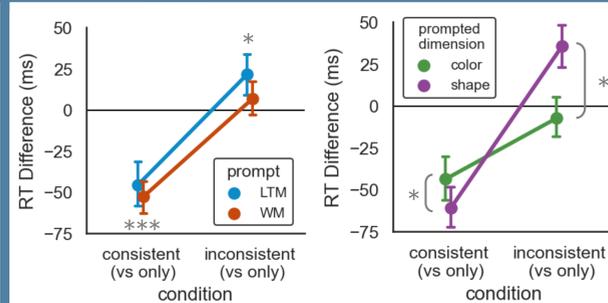
Replicated with minor changes (not shown)

1. Cooperation but no competition
2. No asymmetry by memory type

## Exp. 2

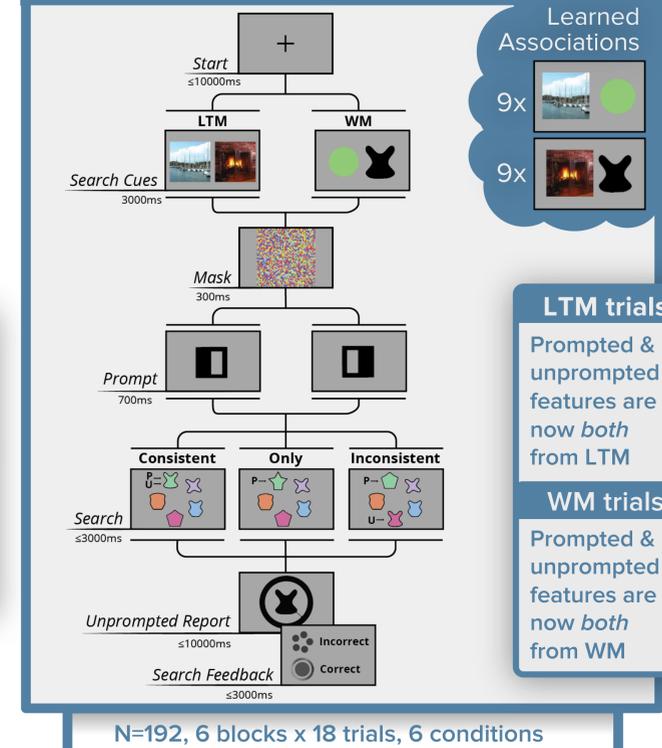


## Results

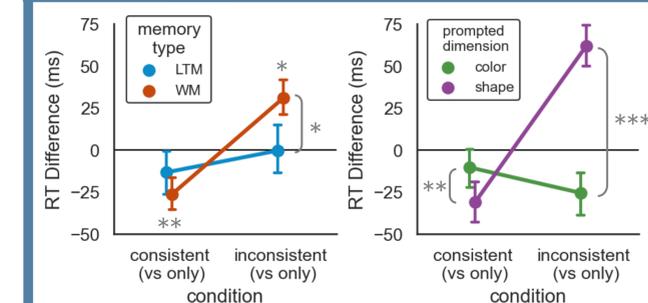


1. Cooperation and competition
2. Both effects larger with unprompted color
3. No asymmetry by memory type

## Exp. 3



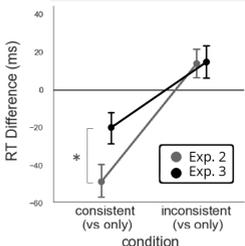
## Results



1. Cooperation and competition
2. Both effects larger with unprompted color
3. Less competition between two LTM than between two WMs

## Exp. 2 vs Exp. 3

More cooperation between LTM & WM than between two memories of the same type



## Conclusions

- WM and LTM readily cooperate
- WM and LTM also compete, but depends on stimulus conditions
  - Consonant with object-wise winner-takes-all mechanism; stronger evidence for color vs. shape
- No evidence of LTM cooperating or competing with WM-guided search more than the other way around
- This symmetry, however, is **not** due to LTM and WM being functionally identical during attentional guidance

## Open Questions

1. Why do two memories from LTM compete less than two from WM?
2. Why do two memories of the same type cooperate less than two of different types?