

# Resolving competition during memory-guided visual attention

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## Introduction

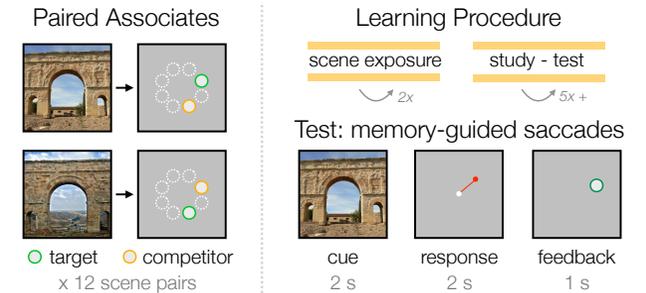
In the absence of explicit cues, we often rely on memory to guide our attention.<sup>1-3</sup>

Many of our experiences share similar features, meaning memories will compete to guide attention.

*How does the brain resolve competition between memories to effectively allocate attention?*

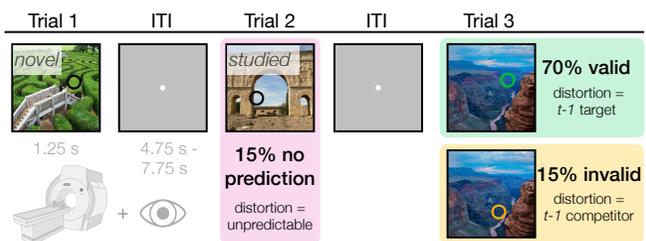
## Task Design

### Session 1: Competitive learning



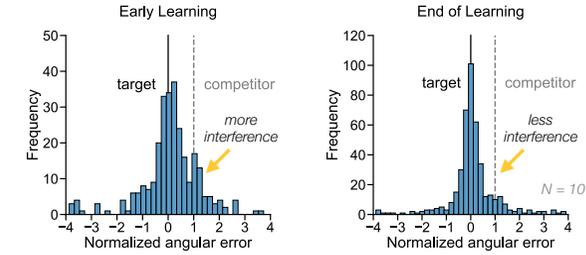
### Session 2: Memory-guided visual search

Task: find small distortions in scenes, exploiting memory for previous scene's target location to improve performance

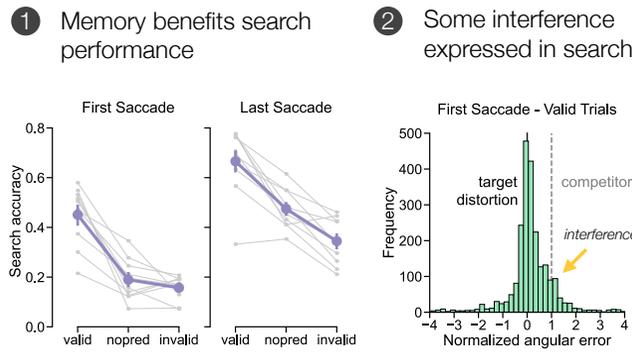


## Behavior

### Competition resolves over learning

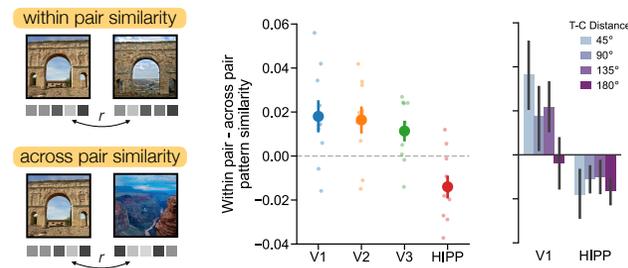


### Memory effects on search performance



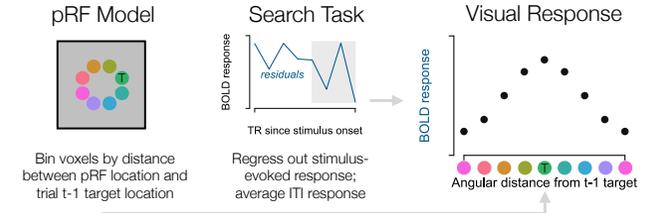
## Stimulus pattern similarity

Competing stimuli are differentiated in the hippocampus

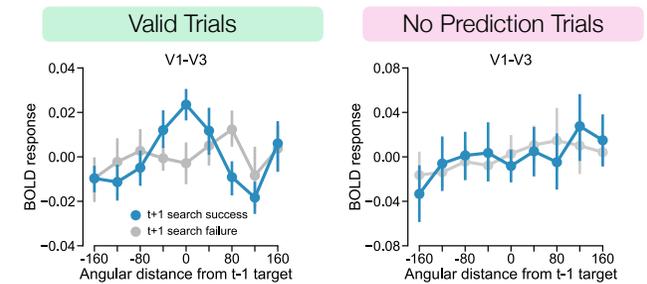


## Visual spatial responses

### 1 Method for generating visual cortex spatial responses



### 2 Target location coding during ITI predicts search success



### 3 Analyses in progress

- Representation of competitor location and relationship to behavior
- Relationship between hippocampal differentiation and target + competitor responses in V1-V3

## Conclusions

- Novel task with robust behavioral effects of memory competition and memory-guided attention.
- Replication of competition-induced hippocampal differentiation.<sup>4</sup>
- Spatial responses in visual cortex show clear memory-based prediction of precise target location.
- Ongoing work will focus on representation of competitor location and link between hippocampal and visual representations.

1. Hutchinson & Turk-Browne (2012). *TICS* 2. Stokes et al. (2012). *PNAS*  
3. Günseil & Aly (2020). *eLife* 4. Favila et al. (2016). *Nat Comm*