Volitional Attention Modulates Memory Encoding and Retrieval

Kirsten Ziman, Madeline R. Lee, Alejandro R. Martinez, and Jeremy R. Manning
Department of Psychological and Brain Sciences, Dartmouth College

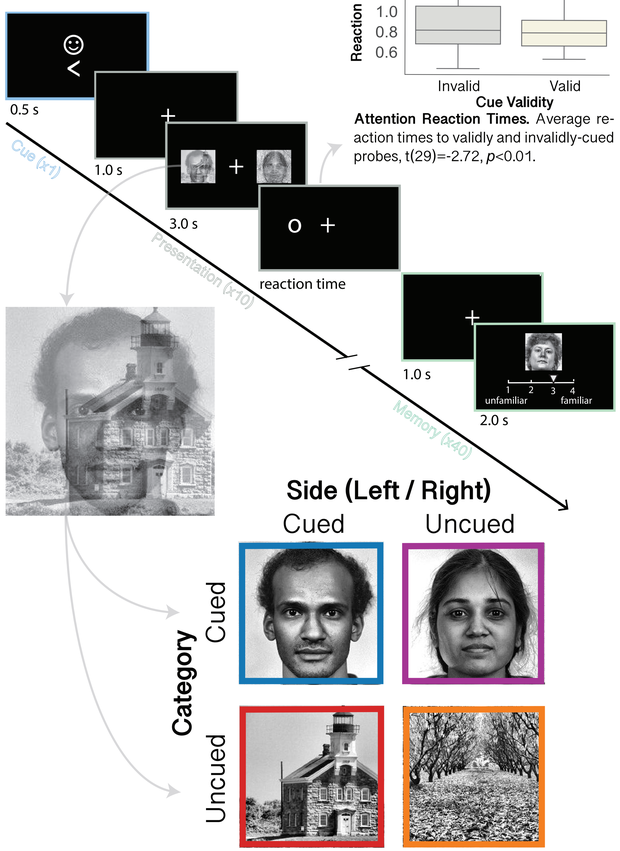
www.context-lab.com

Introduction

One role of our attentional systems is to prioritize which aspects of our experience we should process further and store into memory. Here, we utilized a variant of the Posner cuing task to study the ways volitional modulation of attention affects recognition memory for previously attended versus unattended items.

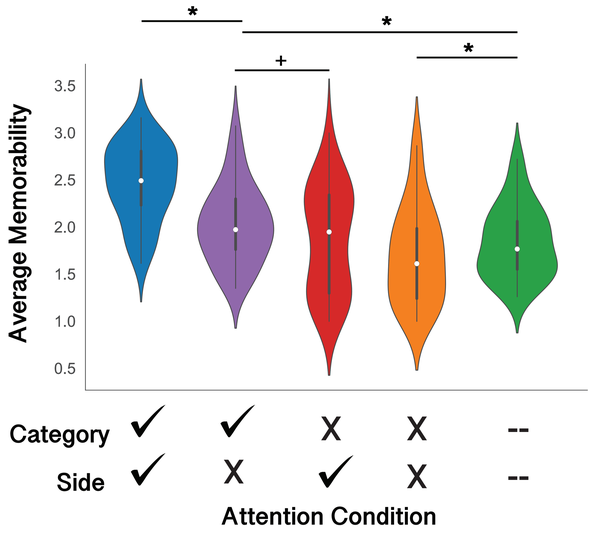
Specifically, we used composite stimuli and endogenous, covert attention to preserve participants' visual experience from trial to trial while manipulating the focus of attention.

Experiment Paradigm

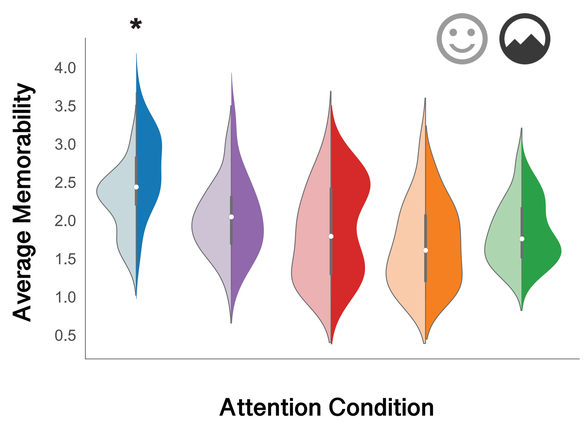


Attention Reaction Times. Average reaction times to validly and invalidly-cued probes, $t(29)=-2.72$, $p<0.01$.

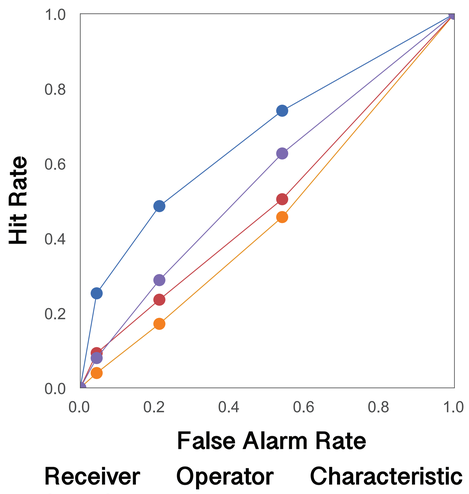
Memorability by Attention Level



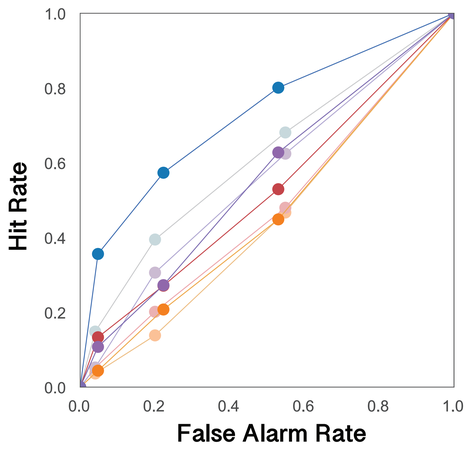
Average Memorability. Subject-wise average familiarity ratings for recall stimuli, by attention level at time of encoding.



Average Memorability. Subject-wise average familiarity ratings for recall stimuli, by attention level at time of encoding, split by stimulus category: face stimuli (light) and place stimuli (bright).

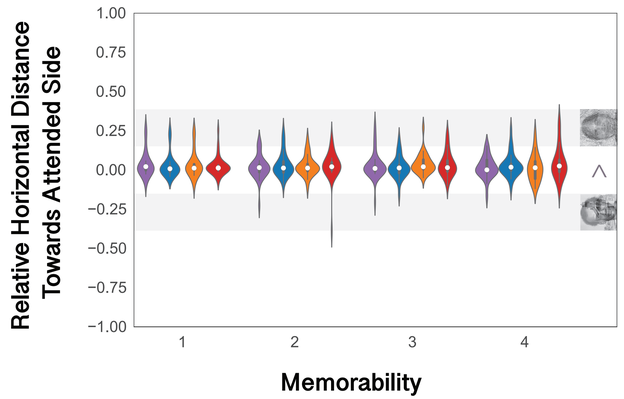


Receiver Operator Characteristic (ROC) Curve. Average false alarm and hit rates as a function of familiarity rating (1 to 4), by attention level at time of encoding.



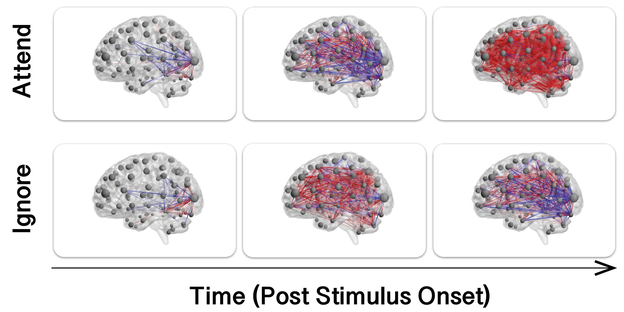
Receiver Operator Characteristic (ROC) Curve. Average false alarm and hit rate as a function of familiarity rating, by attention level, for face (light) and place (bright) stimuli.

Eye Gaze Analysis



Horizontal Gaze Drift. Subject-wise average horizontal drift towards cued side, split by attention level at time of encoding and later memorability.

Upcoming Neuroimaging Analyses



We will estimate, for each ROI at each moment, how much face, scene, left, and right "activity" exists. Then, using dynamic connectivity across ROI's, we can track how these representations are transmitted between regions to explore questions such as:

- **How is information flow affected by volitional changes in attention?**
- **Does information flow to classic memory areas (MTL, PFC, etc.) predict memory for attended and unattended items?**

Acknowledgements.
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