The Influence of Attentional Fluctuations on Memory

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Introduction

- Episodic memories are temporally organized: the order in which we recall memories is influenced by the order in which the events occur[1,2].
- The order in which we recall events is also influenced by attentional states[3,4].
- In prior research attentional fluctuations based on a participants' speed of performing a task did not predict memory organization[5]
- Changes in pupil size can index attentional fluctuations[6,7].

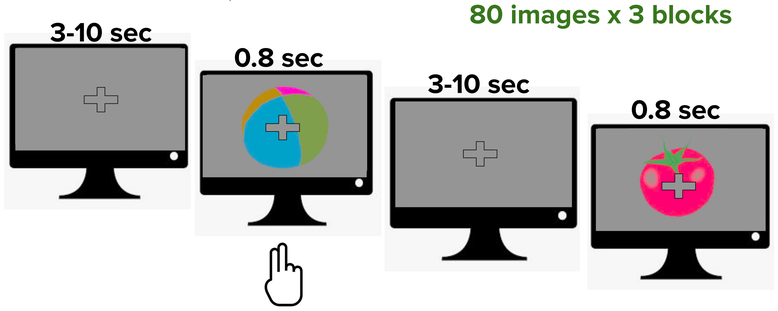
In what ways can attentional fluctuations (using pupil size as a measure of attentional state) shape the temporal organization of memory?

Task & Methods

Participants: Adults ages 18-35 (N=42); M_{age} = 20

Phase 1: Study

80 images x 3 blocks

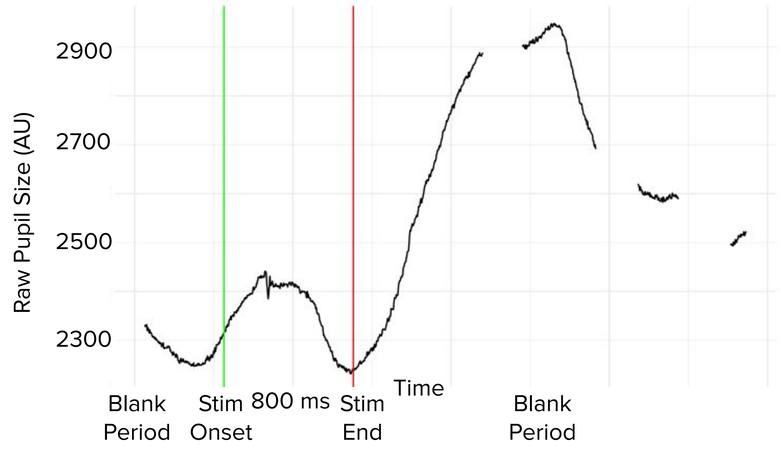


Is this object a food or non-food item?
Press a response for non-food; withhold for food

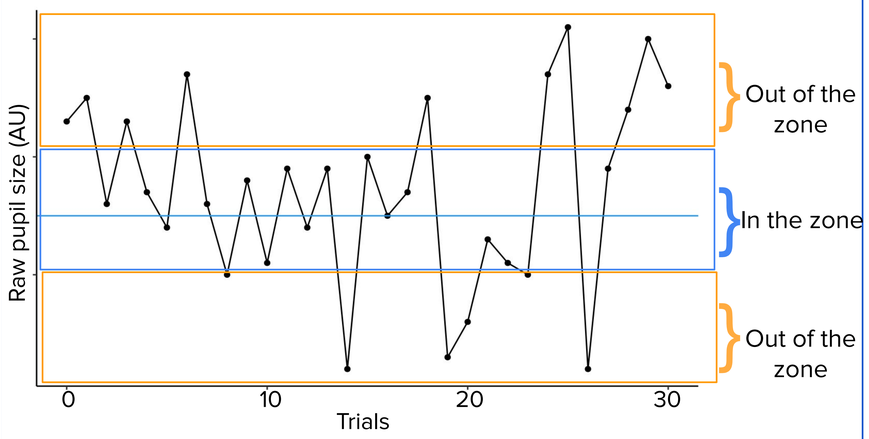
Phase 2: Free Recall Beachball, Tomato, ...

The Eyelink 1000 Plus by SR Research was used to record eye-tracking data during the study phase.

Attention & Pupil Size

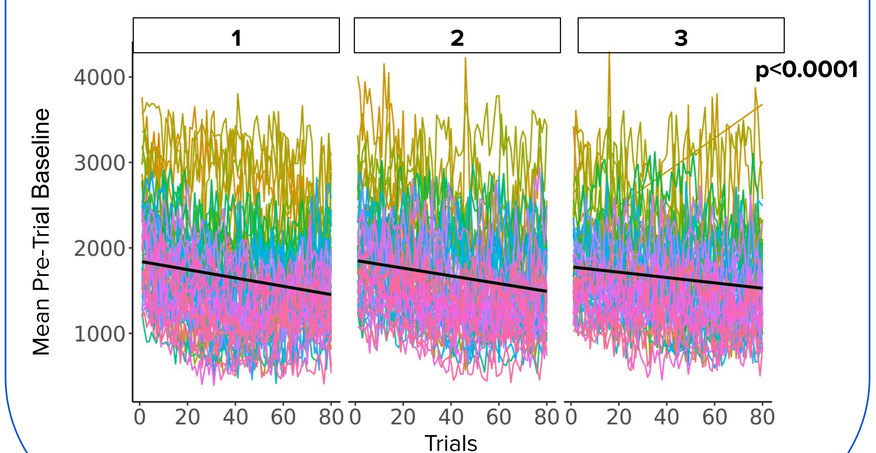


Pre-trial baseline: 500ms interval before the onset of the stimulus



Baseline pupil size that is too small or too large indexes poor sustained attention[6,7].

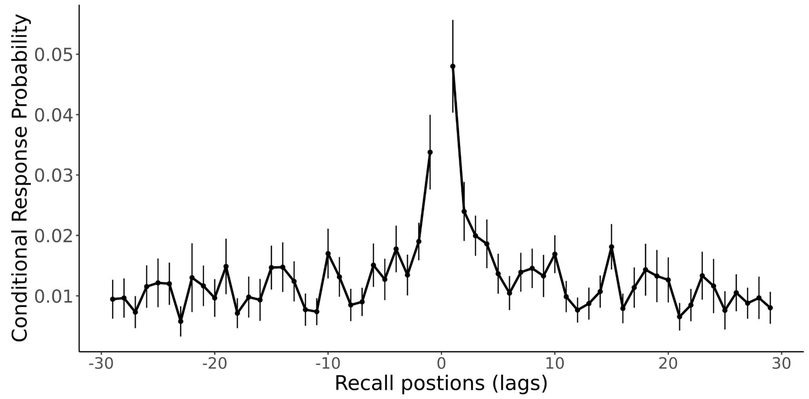
Hypothesis 1: Pre-trial baseline should decrease within a block over time.



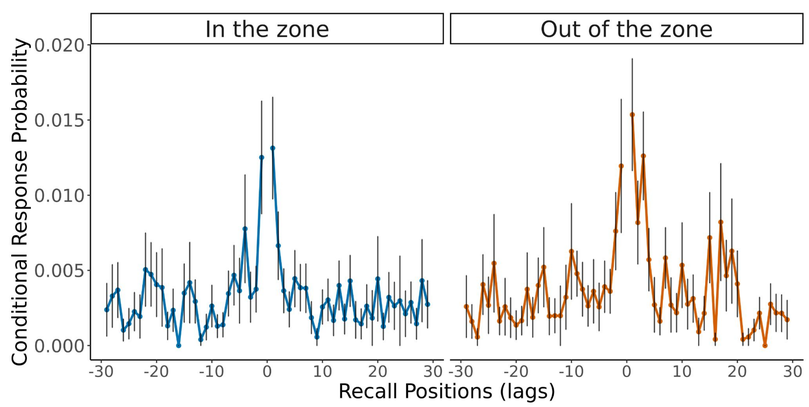
Decreased attention within a block is indexed by pupil size.

Memory and Pupil Size

Lag-CRP (Conditional Response Probability) **Curve:** Probability of recalling two items successively, given their position during the study block[1,2,5].



Hypothesis 2: Good (vs. bad) attentional states during the study block will be associated with better temporal organization of recall.



Temporal organization of memory is not influenced by attentional state.

Conclusion

- Pupil size successfully indexes decreasing attention over time.
- Temporal organization of memory is resistant to attentional fluctuations.

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