



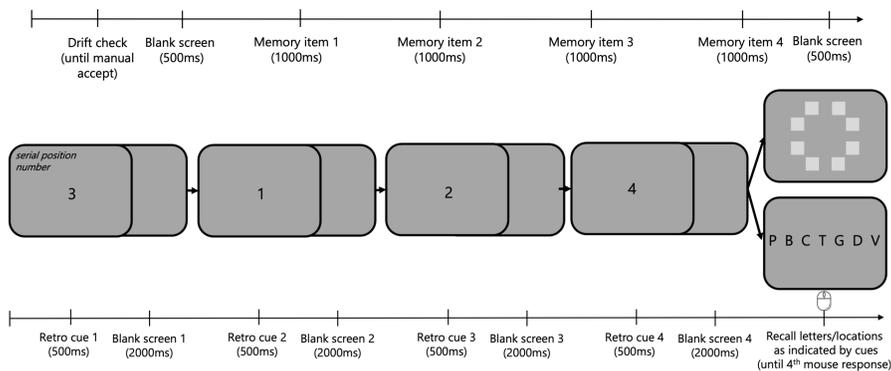
1. Introduction

- Eye movements can provide important insight into working memory.
- Two different verbal maintenance mechanisms have been identified: an articulatory mechanism, suggested to be verbal-information specific, and an attention-based mechanism, which is suggested to be domain-general, allowing maintenance of both visuospatial and verbal information [1].
- Saccades to to-be-remembered items are found to be scarce during encoding of spatial information in comparison with verbal information, with no link between item fixation and memory performance [2].
- Eye movements are suggested to have a specific role for maintenance in visuospatial working memory [3, 4]. Selecting an item from visuospatial memory produces a higher proportion of gaze shifts towards compared to away from the memorized location of a probed item [5]. However, eye movements to associated spatial locations does not help verbal memory retrieval more than shifting attention covertly [6].
- It is still unclear to what extent and how we use our eyes during the maintenance of memory for verbal or spatial features, and whether looking back at memorised locations of items is associated with a memory benefit. Our aim was to investigate gaze during encoding and maintenance of verbal or spatial features by using a retro-cue paradigm

2. Methods

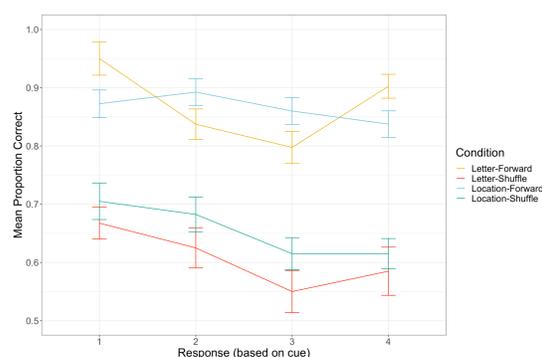
- N = 22 (5 male, 1 non-binary)
- Age = 22.5 (SD = 4.97; range = 18-42)

Possible locations of letters

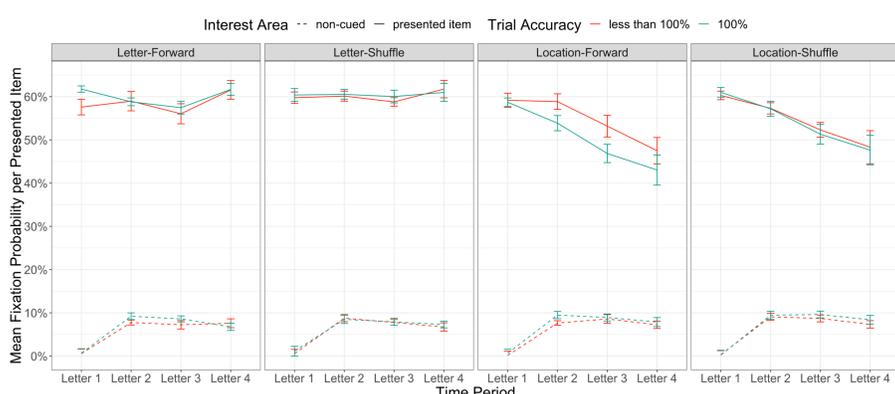


3. Results

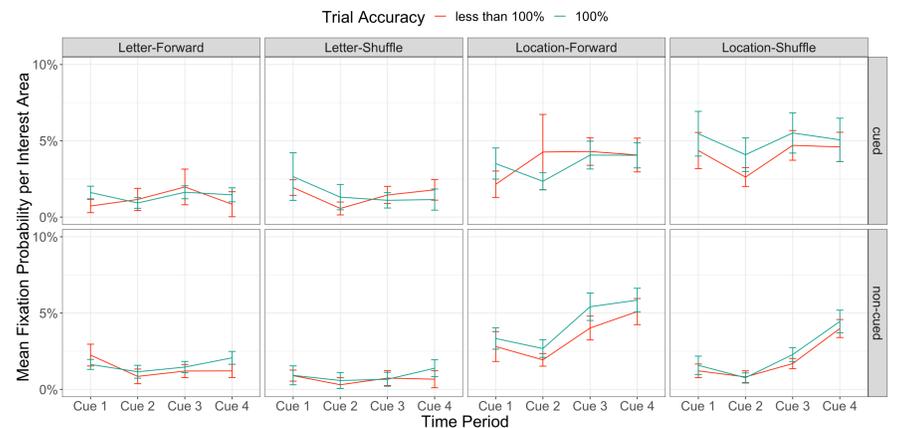
What was the memory accuracy for each condition?



What do we fixate during encoding of verbal or spatial information?

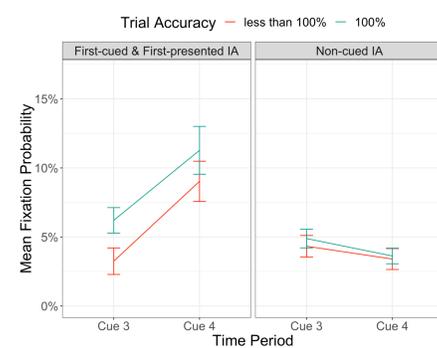


How likely is fixating the relevant retro-cued interest area (IA)?

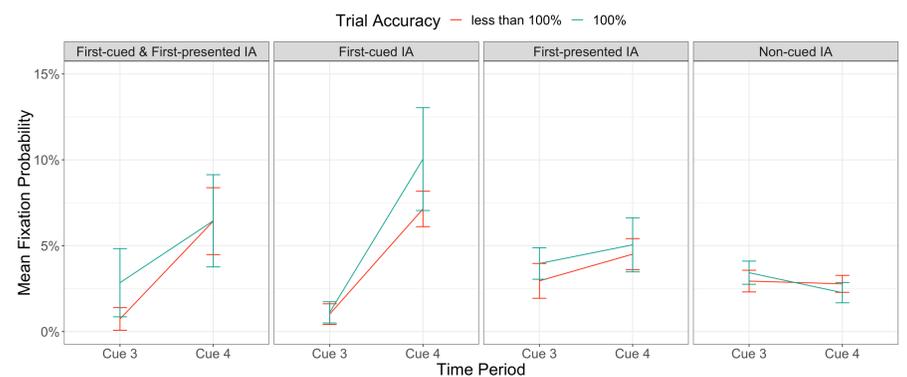


Which IA do we fixate during maintenance of verbal or spatial information?

Location-Forward



Location-Shuffle



4. Conclusion

- Findings suggest that more precise eye movements to to-be-remembered items are needed for encoding verbal information compared to those needed to encode spatial information.
- More eye movements are needed to locations that previously contained memory items during maintenance of spatial compared to verbal information.
- No clear memory benefit associated with both eye movement patterns.
- During the final retro cue period, eye movements are more likely to be directed to the location of the first action-relevant item for location recall but not for verbal recall.
- Further research should further investigate the influences of memory and action on oculomotor activity.

References:

- Camos, V., & Barrouillet, P. (2014). Attentional and non-attentional systems in the maintenance of verbal information in working memory: The executive and phonological loops. *Frontiers in Human Neuroscience*, 8.
- Czoschke, S., Henschke, S., & Lange, E. B. (2019). On-item fixations during serial encoding do not affect spatial working memory. *Attention, Perception, & Psychophysics*, 81(8), 2766-2787.
- Morey, C. C., Mareva, S., Lelonkiewicz, J. R., & Chevalier, N. (2018). Gaze-based rehearsal in children under 7: A developmental investigation of eye movements during a serial spatial memory task. *Developmental Science*, 21(3), e12559.
- Tremblay, S., Saint-Aubin, J., & Jalbert, A. (2006). Rehearsal in serial memory for visual-spatial information: Evidence from eye movements. *Psychonomic Bulletin & Review*, 13(3), 452-457.
- van Ede, F., Chekroud, S. R., & Nobre, A. C. (2019). Human gaze tracks attentional focusing in memorized visual space. *Nature Human Behaviour*, 3(5), 462-470.
- Scholz, A., Klichowicz, A., & Krens, J. F. (2018). Covert shifts of attention can account for the functional role of "eye movements to nothing". *Memory & Cognition*, 46(2), 230-243.