

Effects of Re-exposure on Memory Retrieval and Representational Neural Changes

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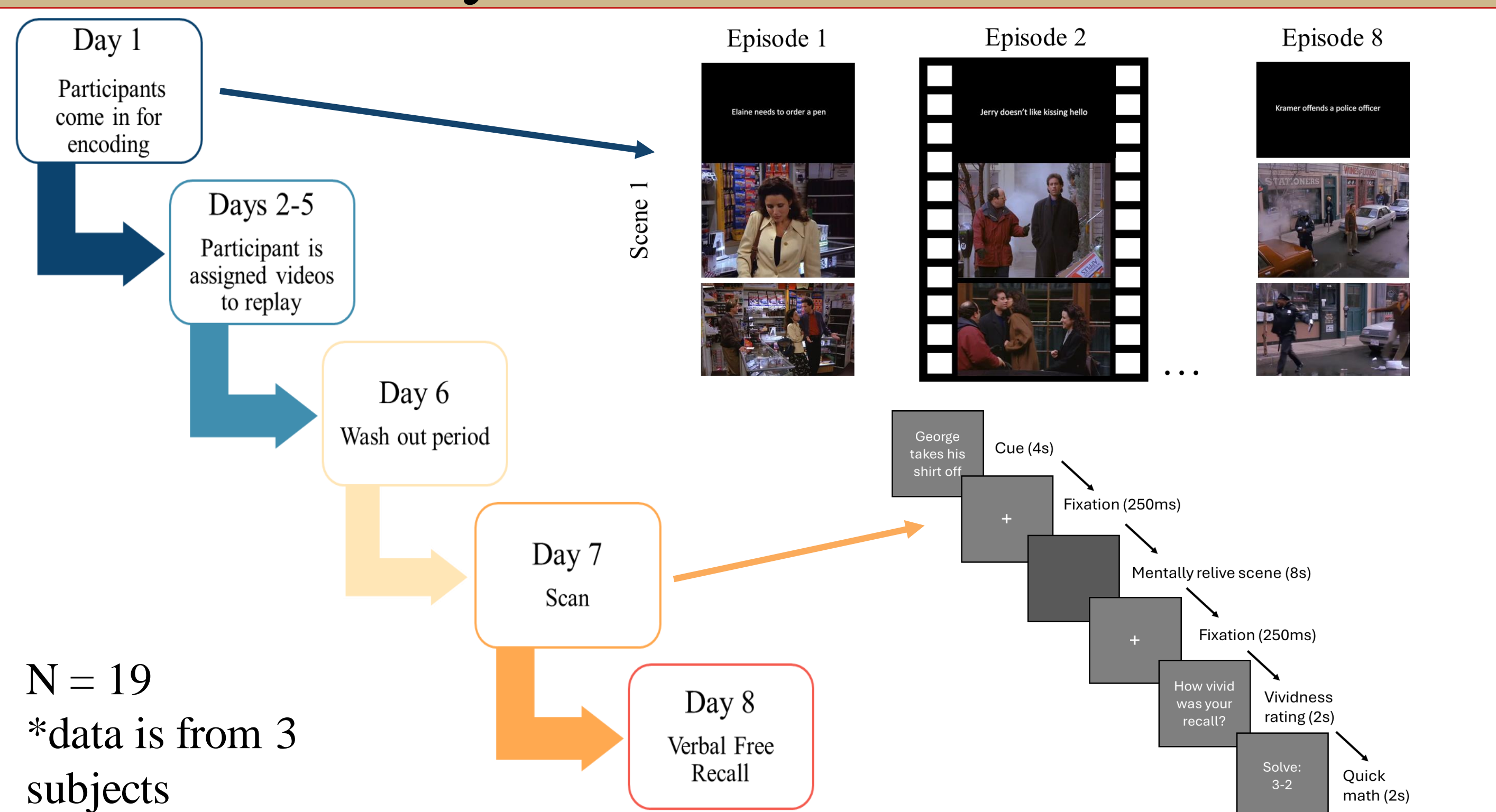


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Introduction

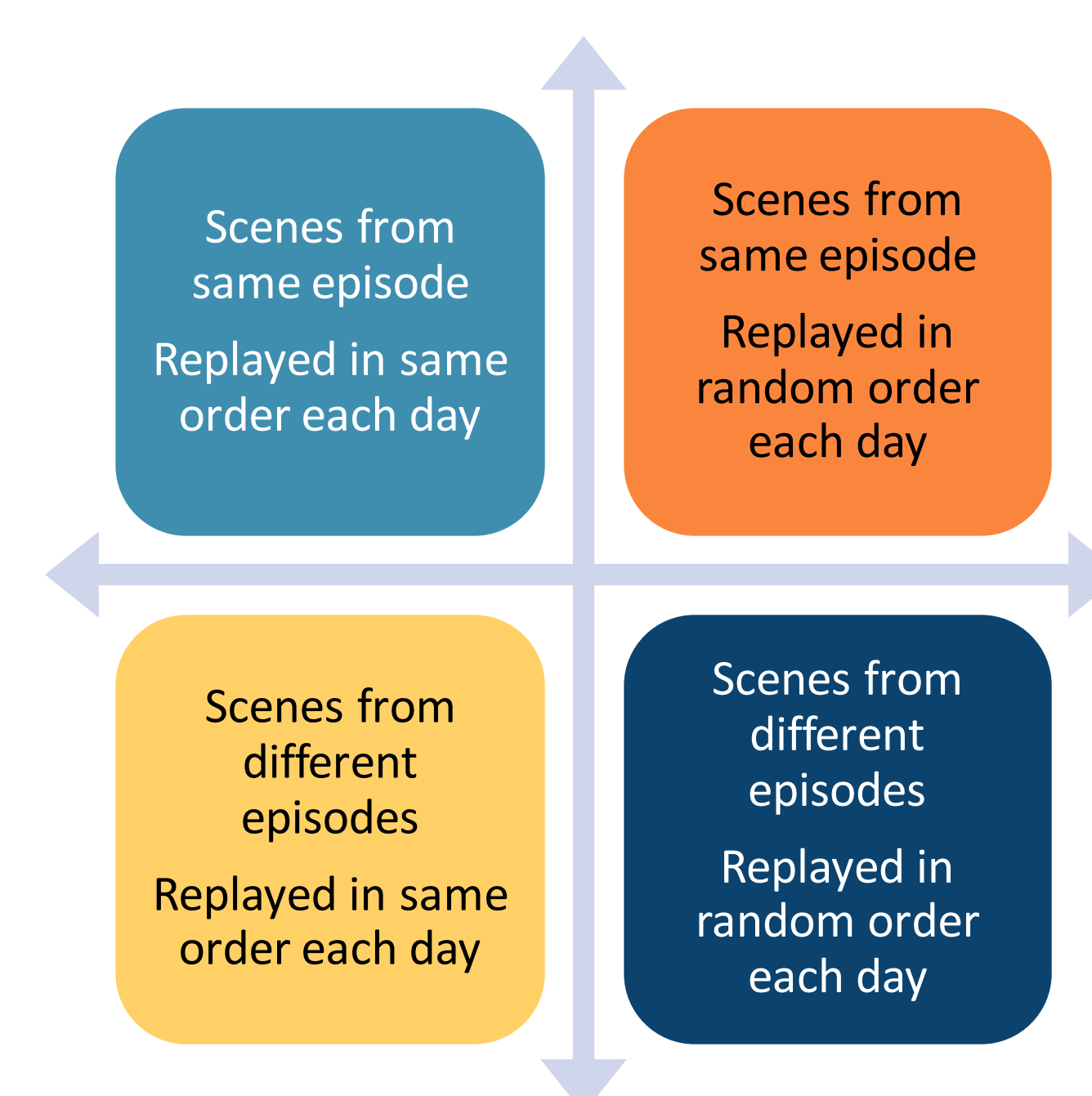
- Opportunity to re-experience events has been shown to increase detail rich memory, as seen in a study investigating aging adults and memory performance¹.
- We were interested in how to optimize the re-exposure, or replay, for optimal episode recall.
- Using naturalistic stimuli, scenes from a television sitcom *Seinfeld*, we created four replay conditions which manipulated narrative and structure of the spliced "episodes".
- Hypothesis: we will find more detail rich recall in the *narrative* replay conditions than in the *non-narrative* replay condition.

8-Day Procedural Timeline



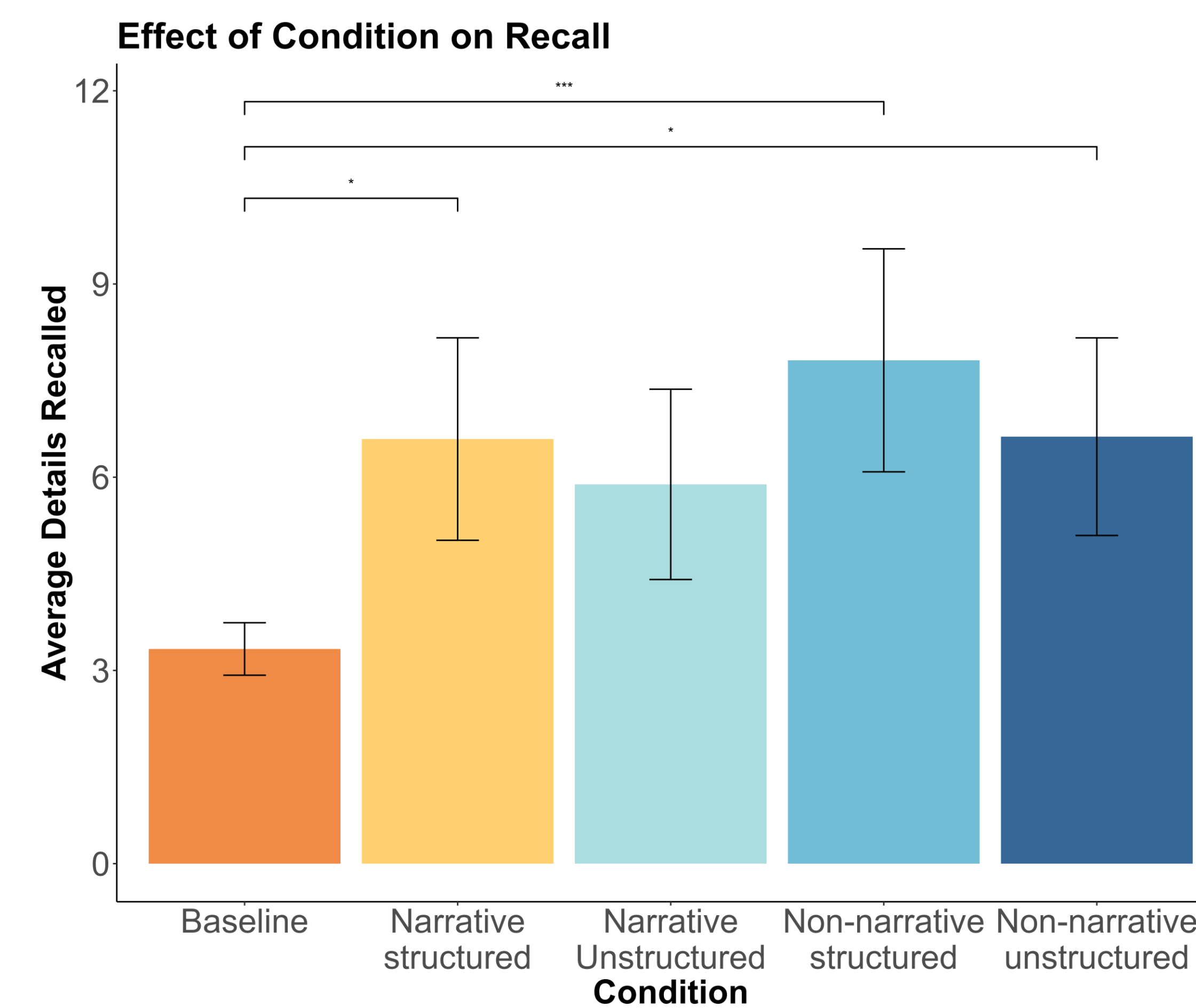
Stimuli and Replay Days

- Stimuli**
- Encoding
 - 64 cues + scenes
- Replay**
- 32 cues of the 64 cues
 - Half serve as baseline
 - Counterbalanced across participants
 - 4 conditions with 8 scenes each:
 - Narrative structured
 - Narrative unstructured
 - Non-narrative structured
 - Non-narrative unstructured
 - Each cue was watched 4 times total

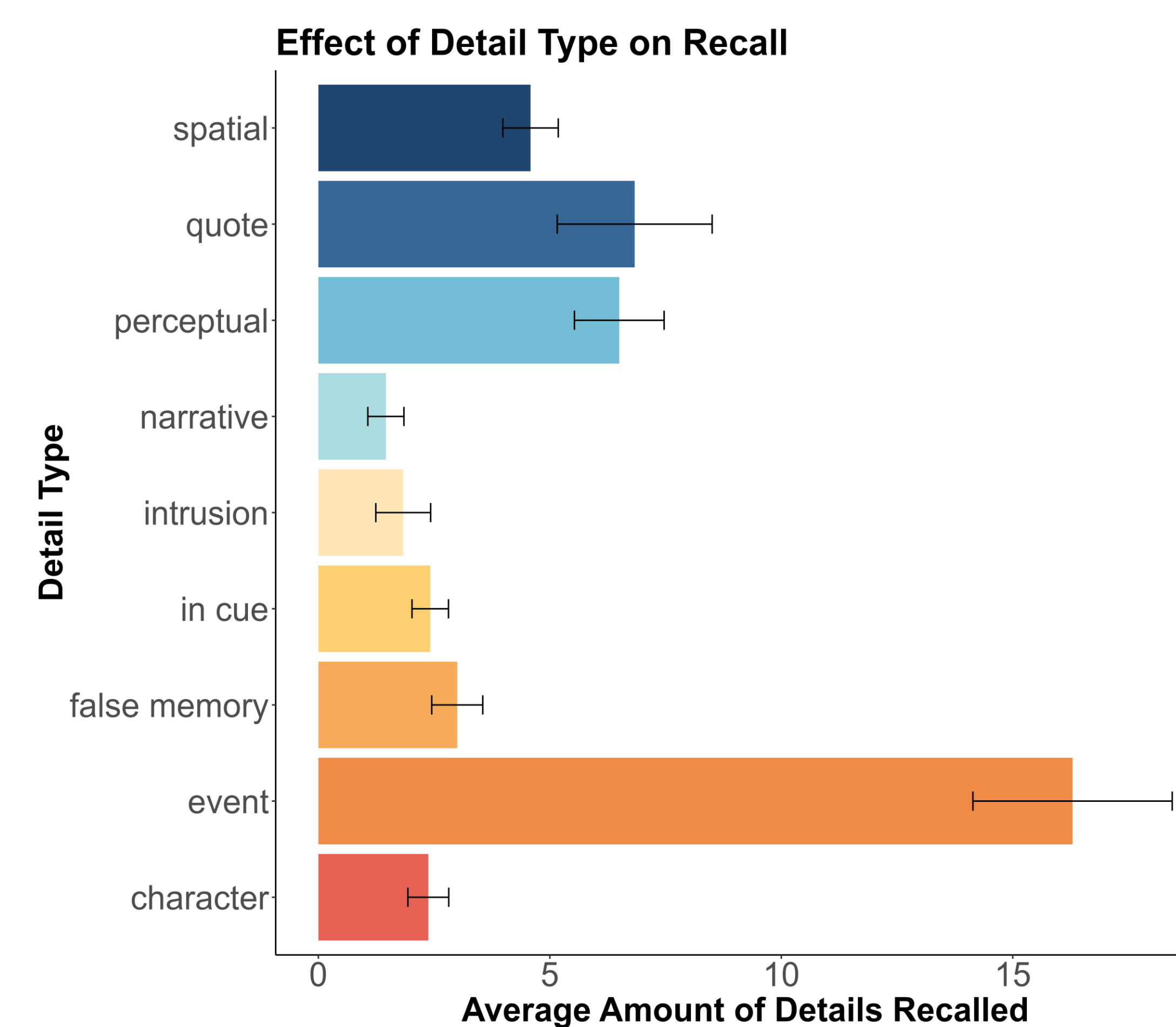


Average Amount of Details Recalled by Condition and Detail Type

A two-way ANOVA predicting average details recalled by detail type and condition revealed a significant main effect of detail type ($F(8, 200) = 20.86, p < .001$), and a significant main effect of condition ($F(7, 200) = 3.90, p < .001$).

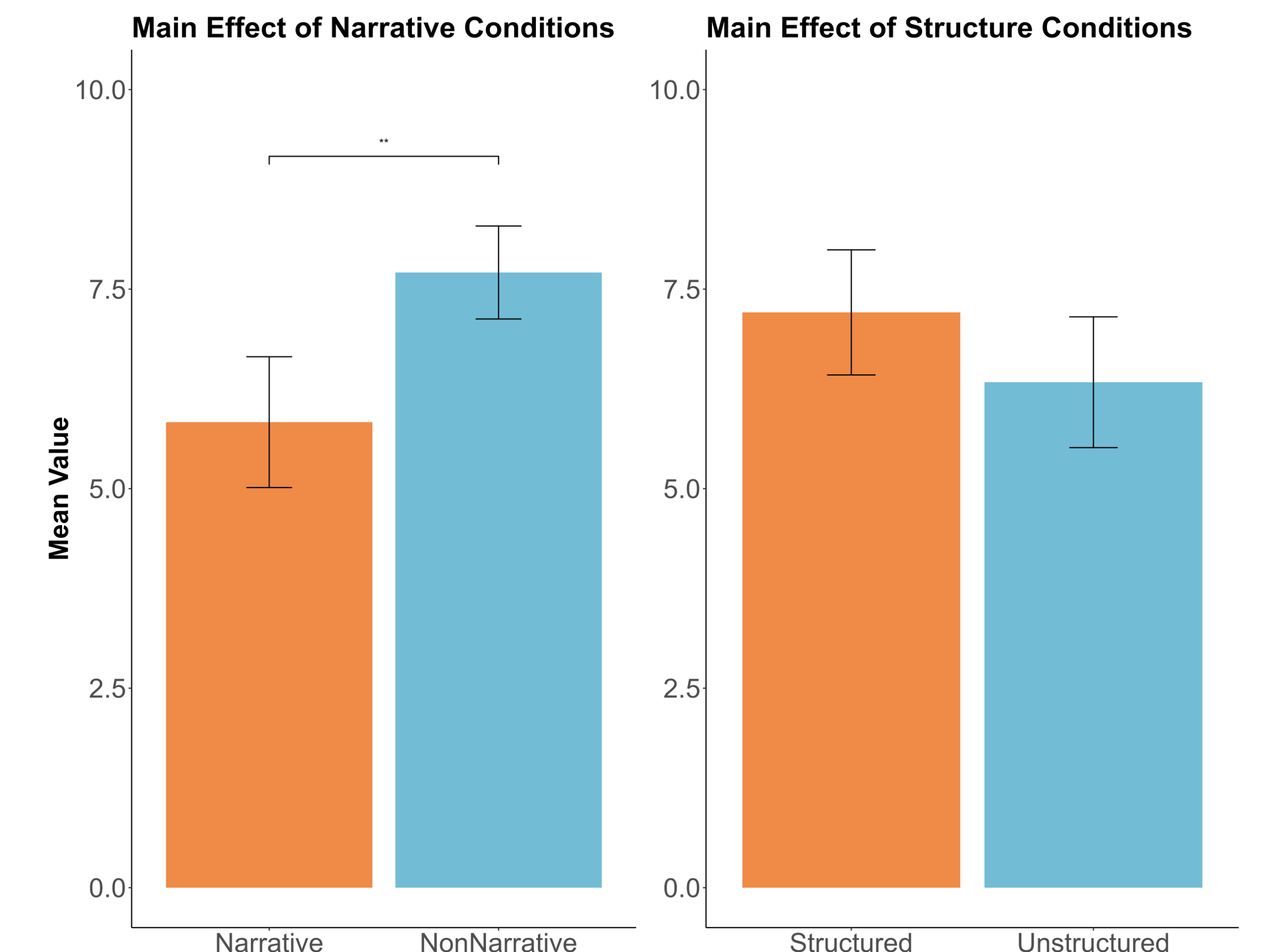


Post hoc comparisons using the Tukey HSD test revealed that the mean score for the non-narrative structured condition ($M = 7.81, SD = 8.99$) was significantly higher than the narrative structured baseline condition ($M = 3.22, SD = 3.82$), non-narrative structured baseline condition ($M = 2.74, SD = 3.21$), and the non-narrative unstructured baseline condition ($M = 3.55, SD = 4.22$).



Post hoc comparisons using the Tukey HSD test revealed that the mean score of the event detail type was significantly higher than all other detail types. Additionally, there were significantly more perceptual details recalled than intrusion ($M = 1.83, SD = 2.90$) and narrative ($M = 1.45, SD = 1.91$). As well as significantly more quote details recalled than narrative ($M = 1.45, SD = 1.91$) and intrusion ($M = 1.83, SD = 2.90$).

Non-Narrative Has Significant Effect on Average Details Recalled



A two-way ANOVA exploring average details remembered by the two main condition types, narrative/nonnarrative and structured/unstructured, found a significant main effect of narrative/nonnarrative ($F(2, 11) = 8.55, p < .05$). There was no main effect of structured/unstructured replay conditions ($F(1, 11) = 2.3, p = 0.39$).

Summary and Conclusion

- The non-narrative condition may cause participants to focus on more individual details per scene, rather than the plot as a whole, contributing to more memories recalled.
- Participants most commonly described event-based details compared to perceptual details, indicating a higher response to plot than setting.
- Non-narrative conditions may be a better representation of what episodic memory is (specific, personal experiences), whereas narrative conditions might reflect more of schema knowledge (mental organization of how things normally work), once you get to know the characters through encoding.
- Results indicate future clinical work may benefit from emphasizing non-narrative context and structures in recall practices when aiming to foster better memory in aging adults.

References

1. Martin, C. B., Hong, B., Newsome, R. N., Savel, K., Meade, M. E., Xia, A., ... & Barense, M. D. (2022). A smartphone intervention that enhances real-world memory and promotes differentiation of hippocampal activity in older adults. *Proceedings of the National Academy of Sciences*, 119(51), e2214285119.