

Background

- Prediction is a distinctive characteristic of episodic memory, and when a prediction is violated through surprise, encoding is strengthened¹
- A surprising event (prediction error) can destabilize a memory and make it vulnerable to change²
- Knowing the outcome of a story, decreases suspense of story content³
- When a story contains a surprising event, memory recollection for preceding events will be better than when it contains no surprise³

Methods and Materials

Participants: 65 participants, mean age = 35 years old

Stimuli

- One audio recording of a story that described an event with a surprising detail (a butler poisoned the wine that was served to a Lord, the Lord died from the poisoned wine)
- Participants received one of two stories which differed only by their titles:
 - Version A (surprise): Title with no outcome (“The Story of Lord Higginbotham”) + Story
 - Version B (no surprise): Title with outcome (“The Story of Lord Higginbotham, who died by poison”) + Story

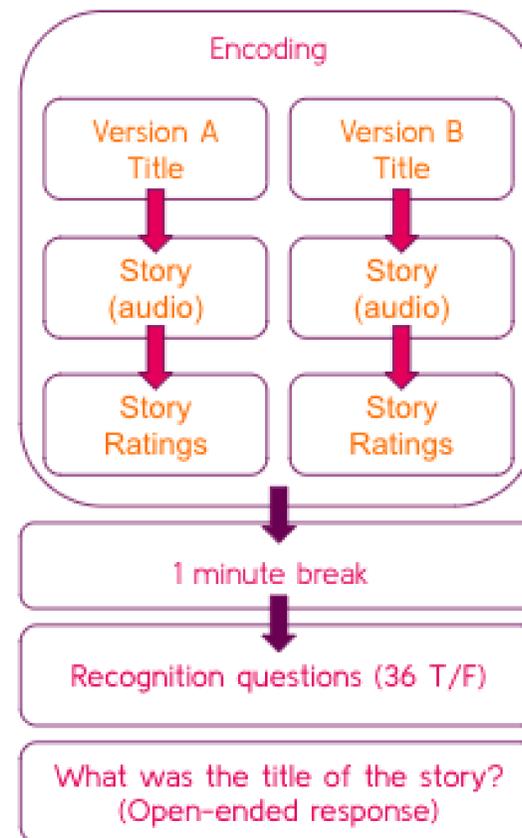
Recognition Questions

- 36 statements about the details of the story (2 for each sentence of the story except the surprising detail and the outcome)
- Half were presented as true and half as false;

Prediction

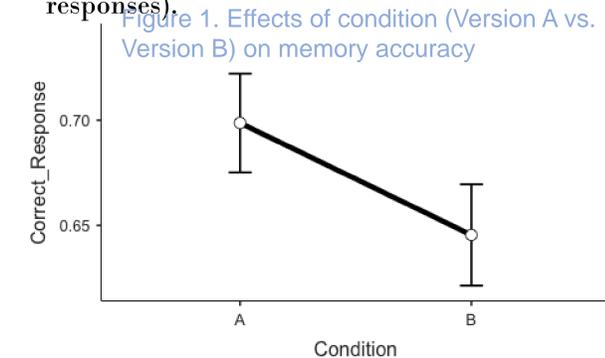
Memory for the content of a complex narrative will be reduced when the outcome of a surprising event is given, since the prediction error will be removed.

Experimental Design



Results

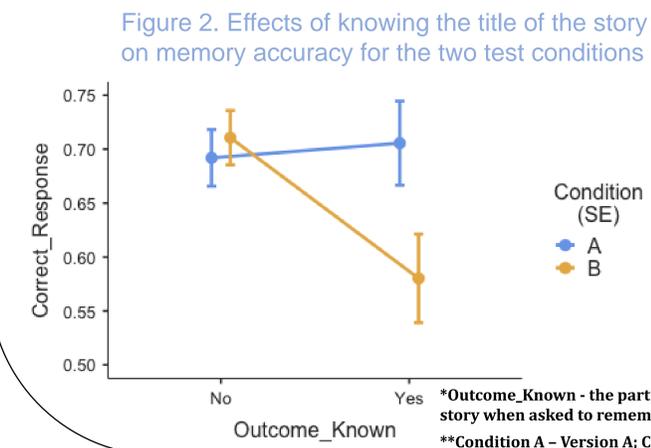
A linear mixed model test was conducted for the effects of condition (version) and knowing the outcome of the story (based on if the participant remembered the title of the story at the end) on memory accuracy (number of correct responses).



There was no significant difference between memory accuracy for participants given Version A (surprise) and Version B (no surprise).

Main effect of condition (Version A vs. Version B): $F(1,61) = 2.51$, $p = 0.118$

There was a significant interaction effect between condition and knowing the title of the story on memory accuracy. Unexpectedly, memory accuracy was reduced, *specifically* when participants recalled the outcome within Version B (no surprise).



Main interaction effect: $F(1,61) = 4.58$, $p = 0.036$

*Outcome_Known - the participant included the outcome of the story when asked to remember the title
**Condition A - Version A; Condition B - Version B

Discussion and Conclusions

- The manipulation of the title did not provide evidence that memory for the content of a complex narrative will be reduced when the outcome of a suspenseful action is known
- Based on Fig.2, knowing the outcome in a no surprise condition seemed to have reduced memory accuracy which provides that our manipulation may not have accurately addressed our question
- Future research could alter this manipulation or use a stronger manipulation, such as within story changes, for testing effects of prediction errors on memory recollection

References

- ¹ Pine, A., Sadeh, N., Ben-Yakov, A., Dudai, Y., & Mendelsohn, A. (2018). Knowledge acquisition is governed by striatal prediction errors. *Nature communications*, 9(1), 1-14.
- ² Sinclair, A. H., & Barense, M. D. (2018). Surprise and destabilize: prediction error influences episodic memory reconsolidation. *Learning & Memory*, 25(8), 369-381.
- ³ Hoeken, H., & van Vliet, M. (2000). Suspense, curiosity, and surprise: How discourse structure influences the affective and cognitive processing of a story. *Poetics*, 27(4), 277-286.

Acknowledgements

I would like to thank the Arts Internship Office and Mr. Harry Samuel for the support and funding of this project.