

## Motivation



The Storyteller  
Philip de Laszlo (1891)

Stories readily take hold of the human mind, carrying us away from our immediate surroundings and immersing us in alternate worlds<sup>1,2</sup>.

Stories also have lasting consequences such as increasing the memorability of episodes<sup>3</sup> and the malleability of long-standing beliefs<sup>1</sup>.

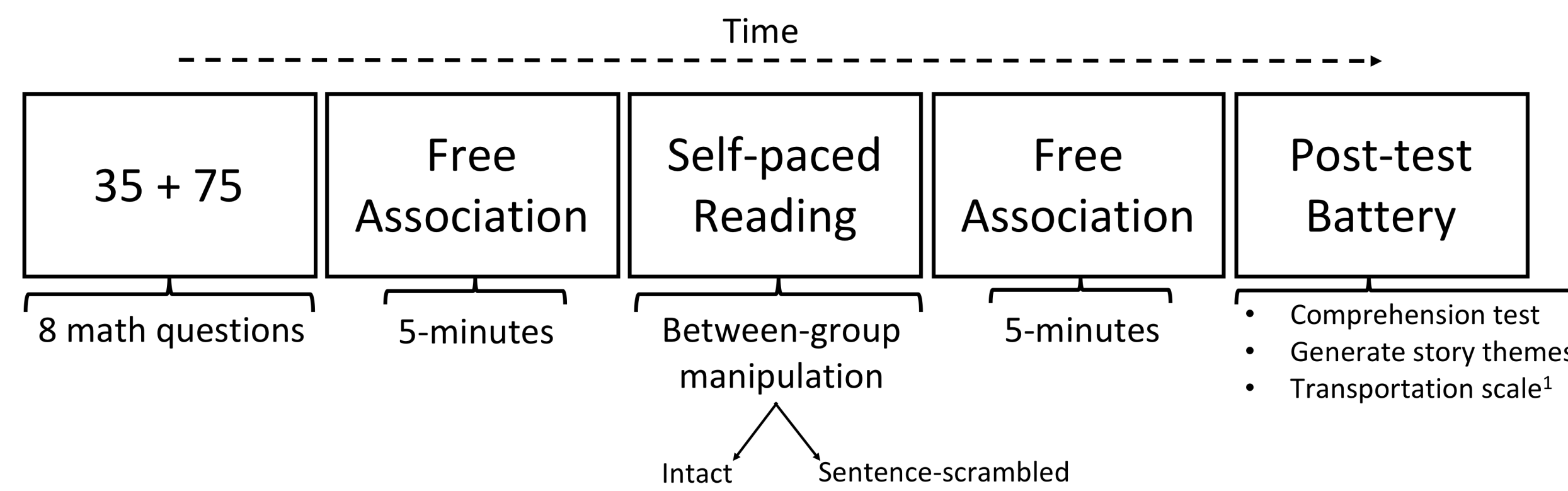
Little is known about *how* stories exert such a lasting influence over our mind, particularly after they have already ended.

## Experimental Design

### Questions:

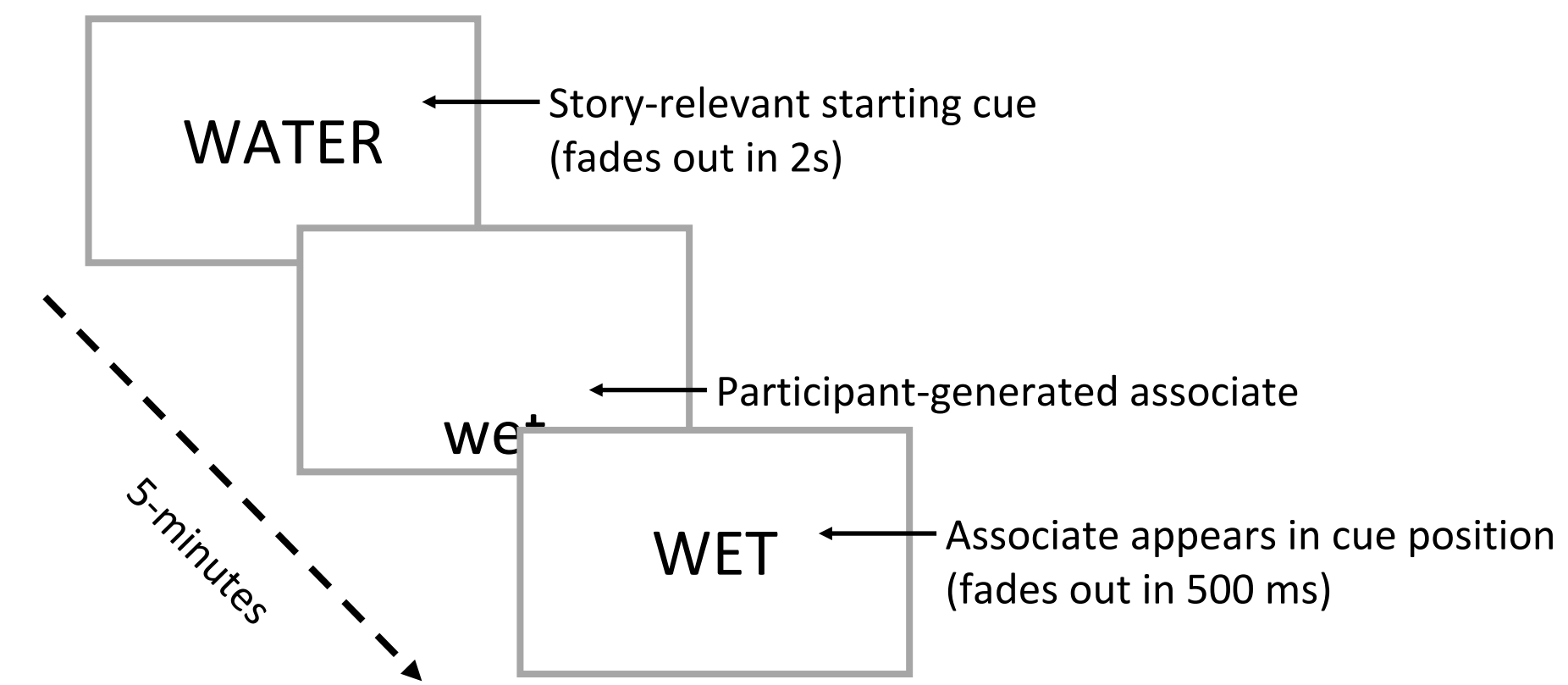
- I. Do stories have a lasting influence on our spontaneous thought?
- II. What lasts, for how long, and what are the underlying processes?

### Paradigm: "Assorted Cognitive Tasks"

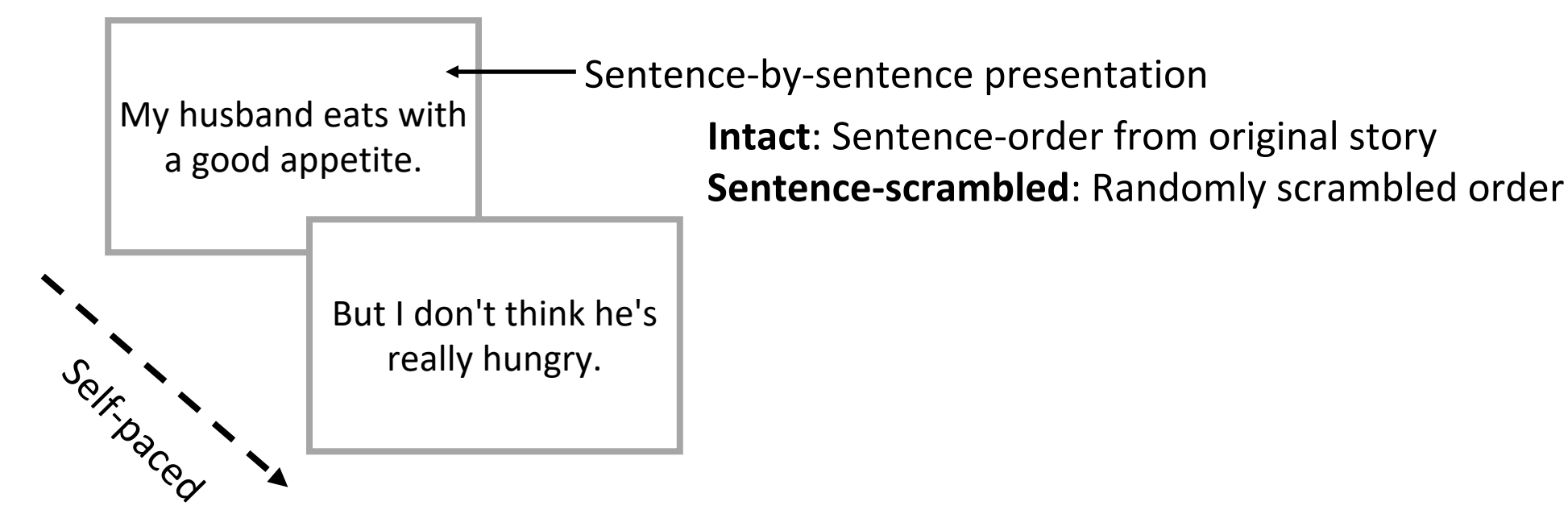


**Sample:** N = 160, tested via Amazon's MTurk; n = 80 per condition (e.g., Intact)  
**Story:** *So Much Water So Close to Home* by Raymond Carver  
**Summary:** A brooding and unsettling story about a wife who suspects her husband of committing a murder on a recent camping trip with his friends.  
**Length:** 2356 words; 268 sentences

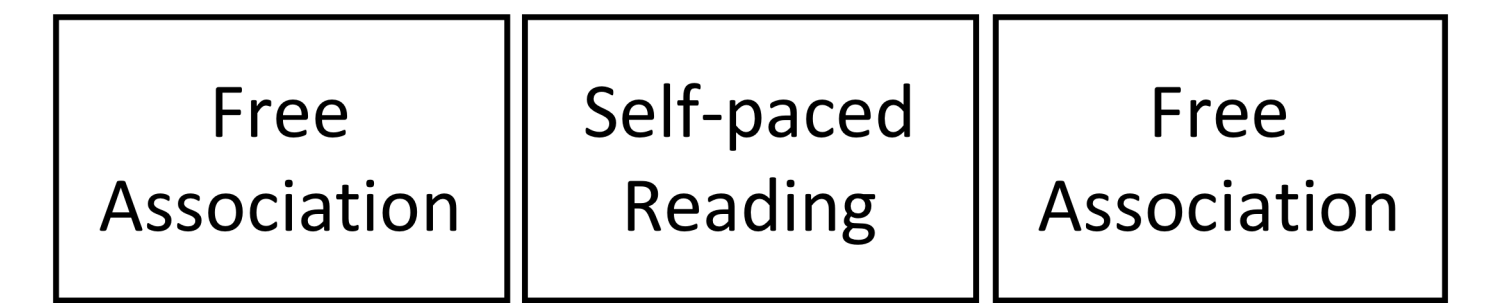
### Word Chain Free Association



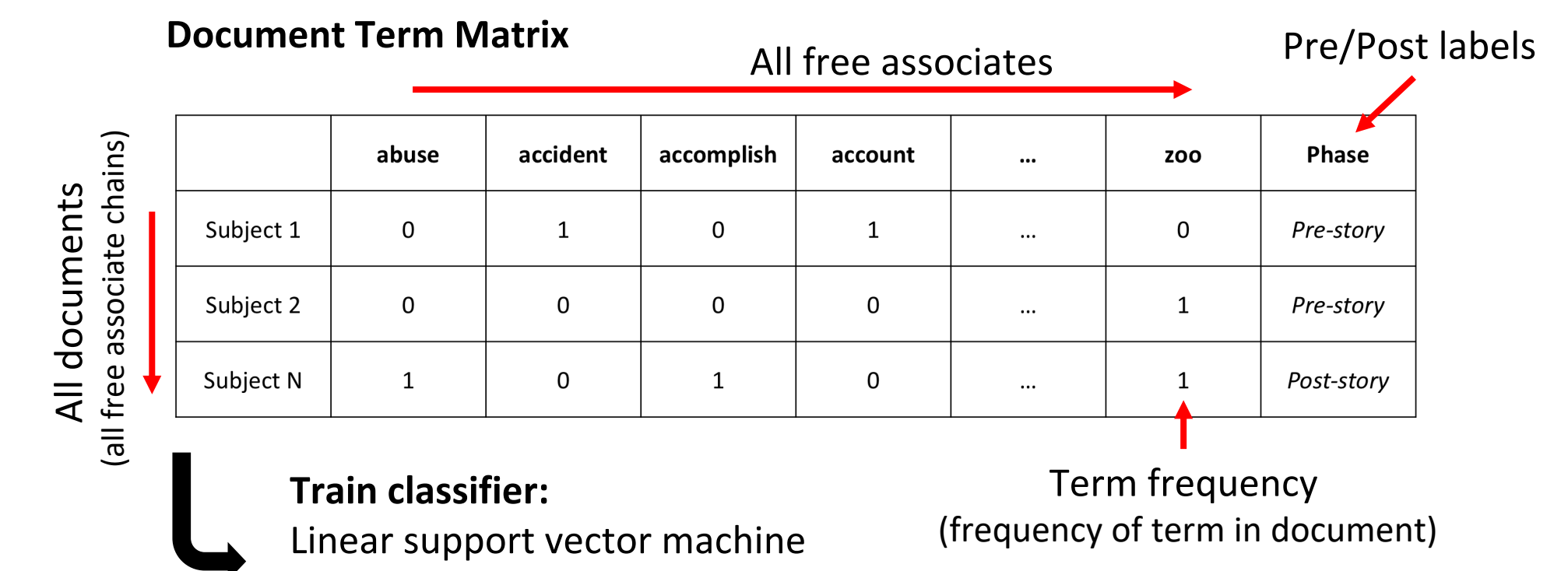
### Self-paced Reading



## Word Chain Classification



Can we tell the difference?



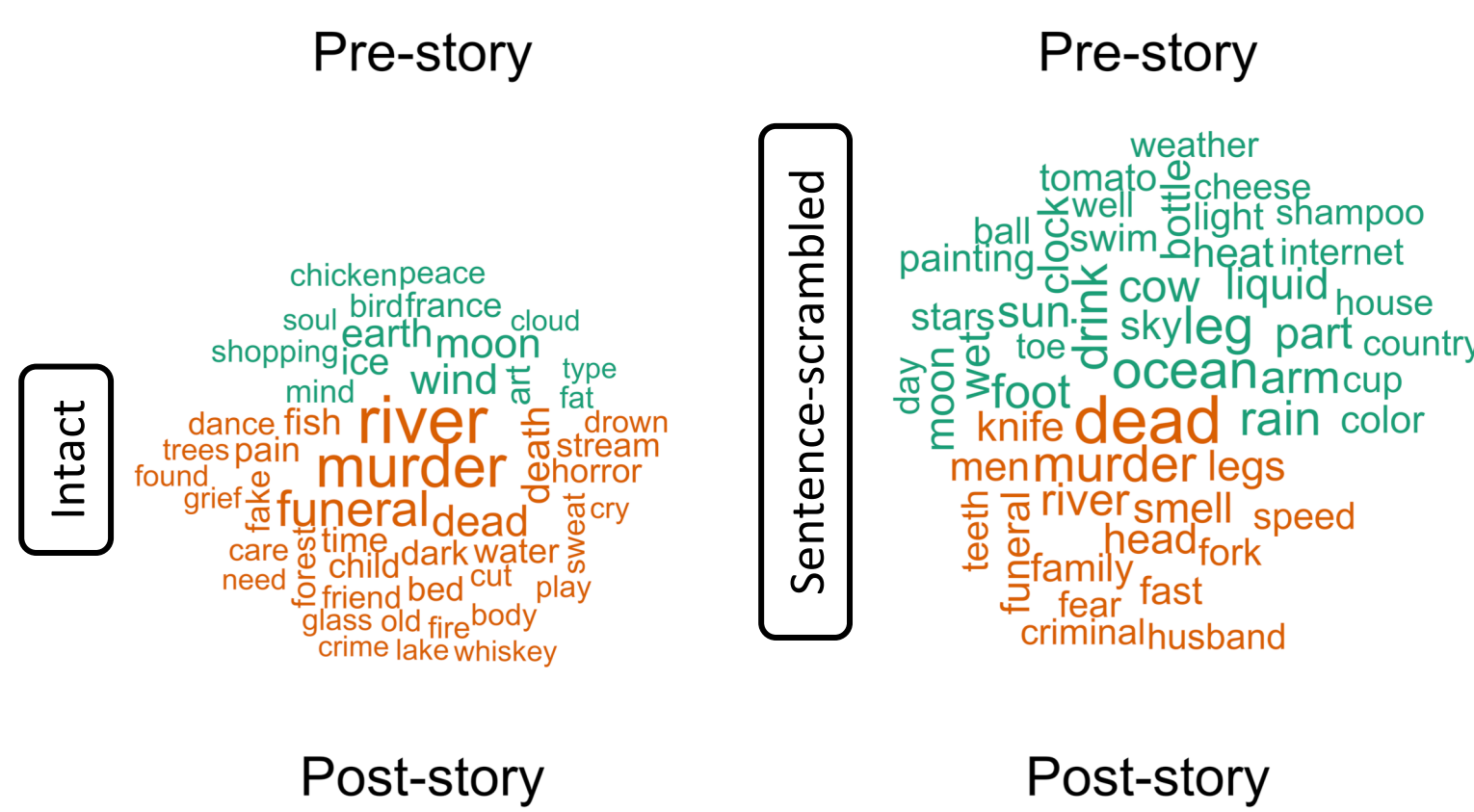
**Classification Details:**

- Training: within experimental condition (e.g., Intact-only)
- Testing Input: word chains from a held-out subject
- Testing Output: Predicted pre/post labels

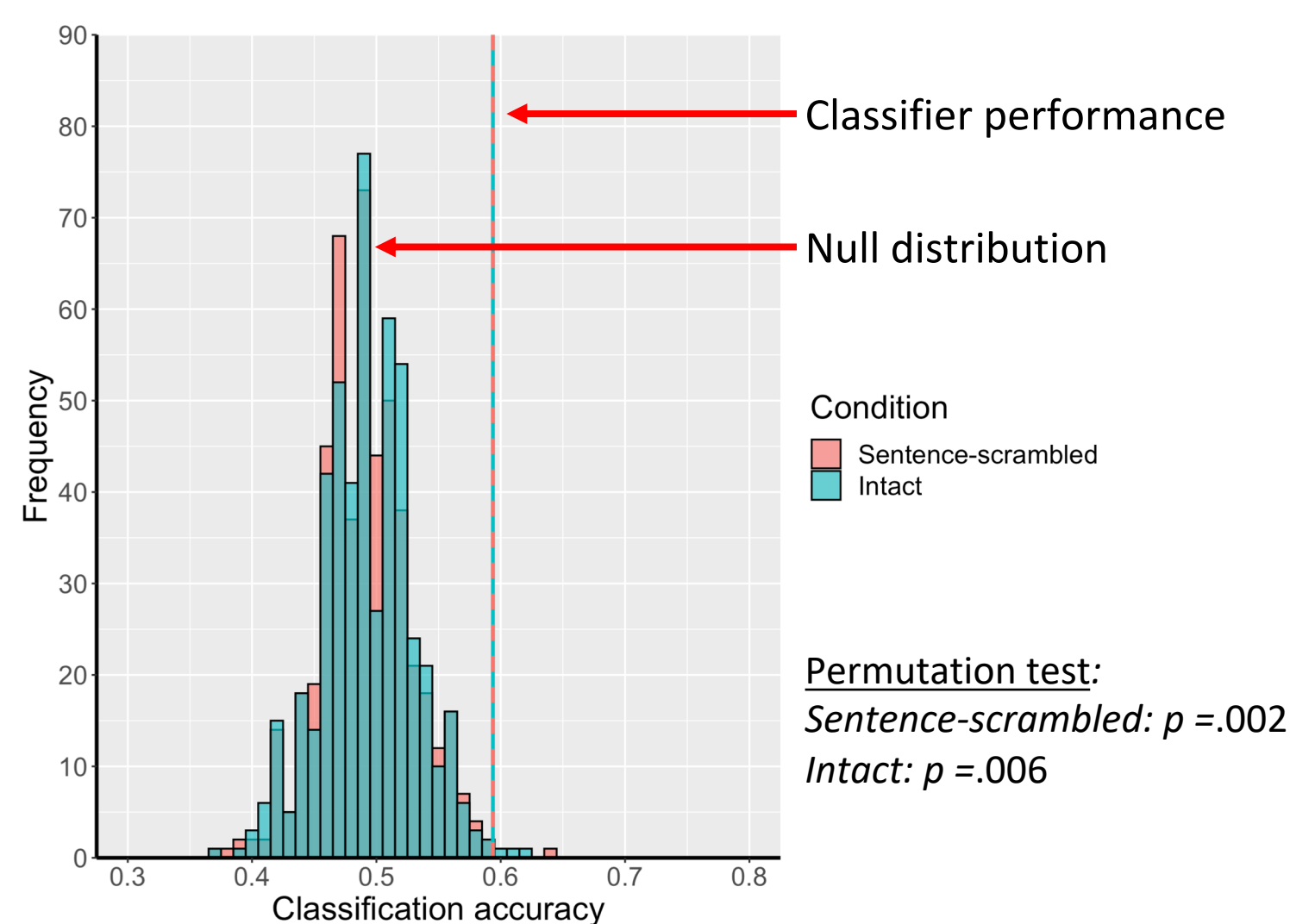
## Classification Results

**Summary:** Pre- vs. Post-story free association is discriminable, and it may be via story-themes.

### Word-clouds (based on term frequency)



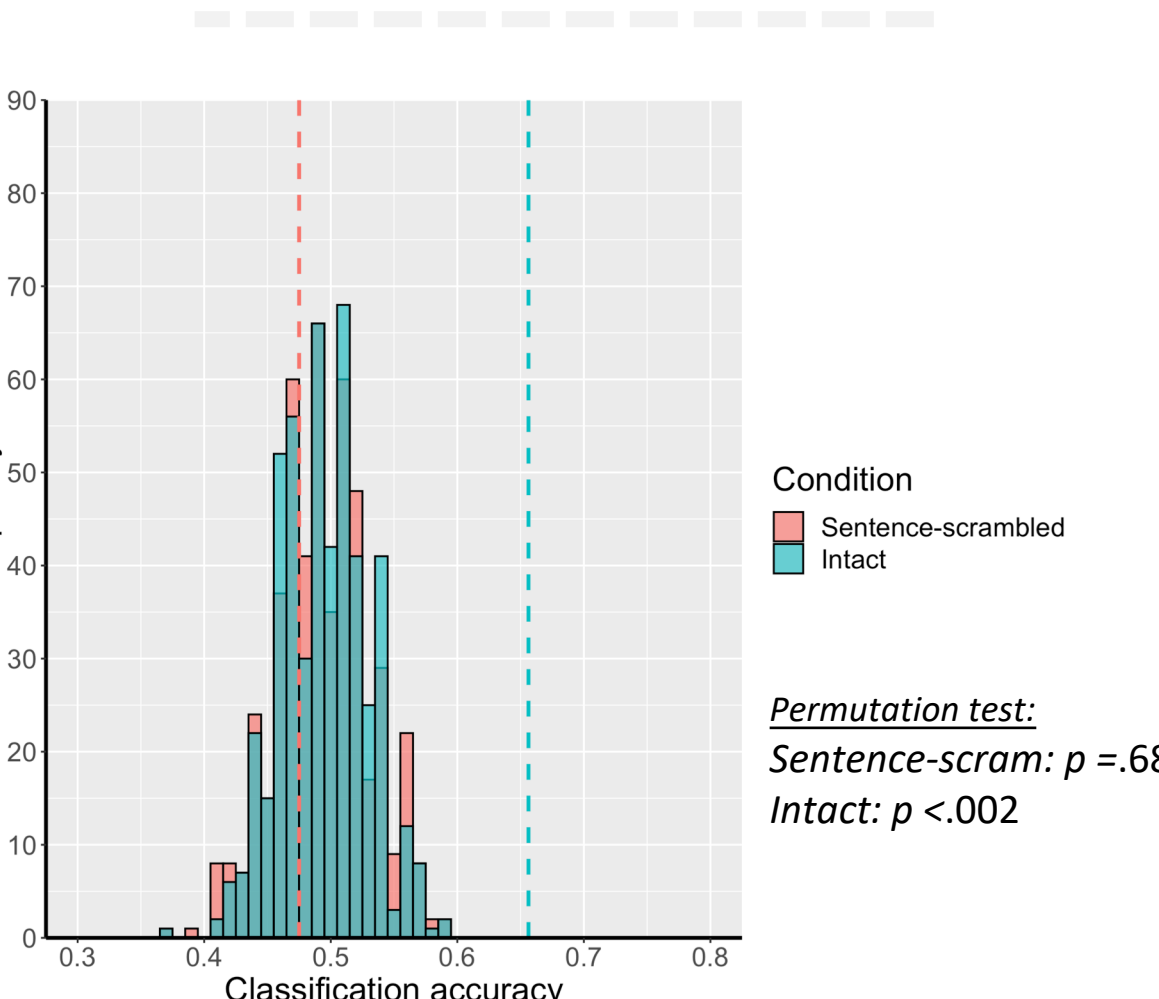
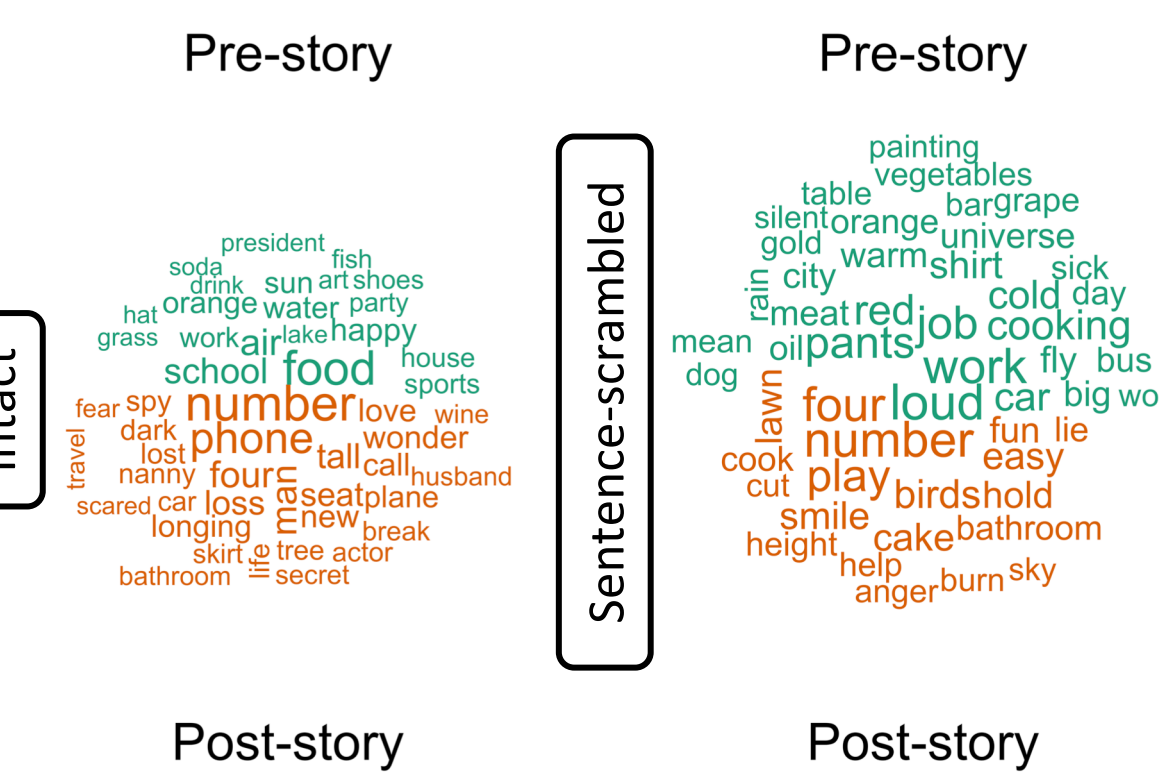
### Document classification accuracy



## Generalizeable?

**Sample:** N = 160  
**Story:** *Roy Spivey* by Miranda July  
**Summary:** A woman and a famous actor flirt on an airplane. He gives her a secret number: four.  
**Length:** 2798 words; 266 sentences

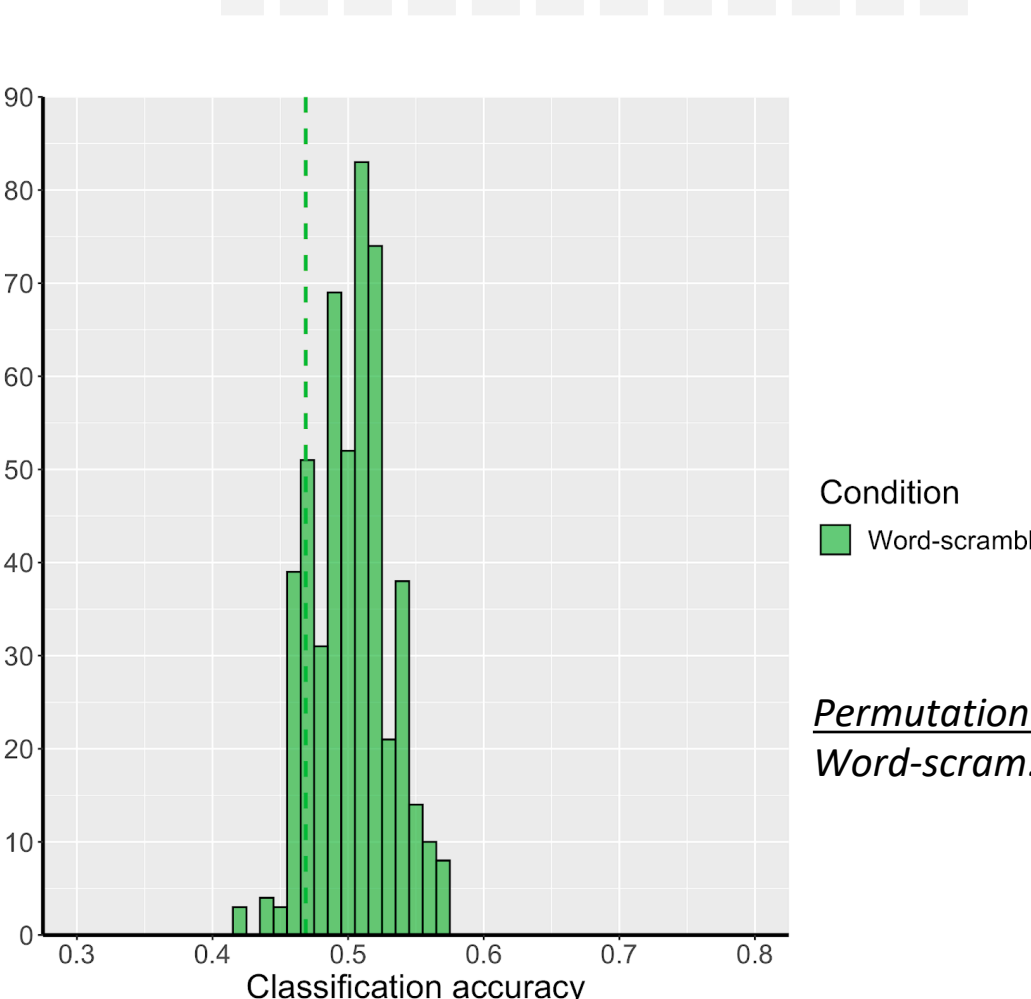
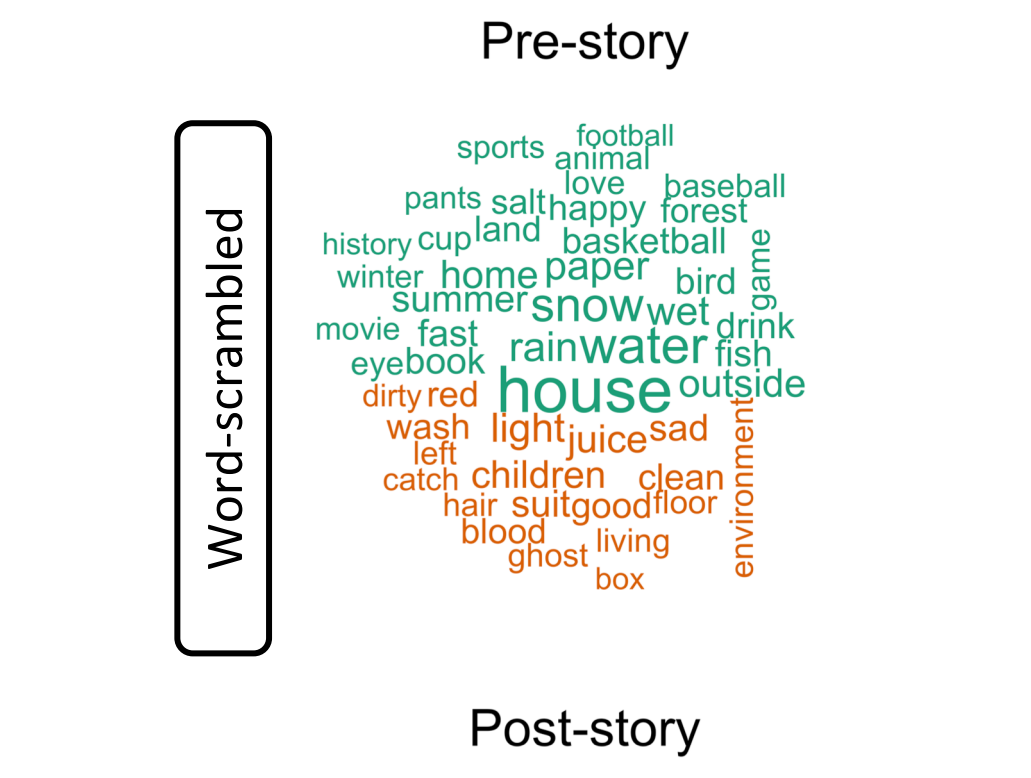
**Summary:** Generalizes across stories!



## Word Priming?

**Sample:** N = 80  
**Story:** *Word-scrambled* version of the Carver story  
**Details:** Scrambling within 5-sentence windows from intact story to preserve order.

**Summary:** Not word-priming!



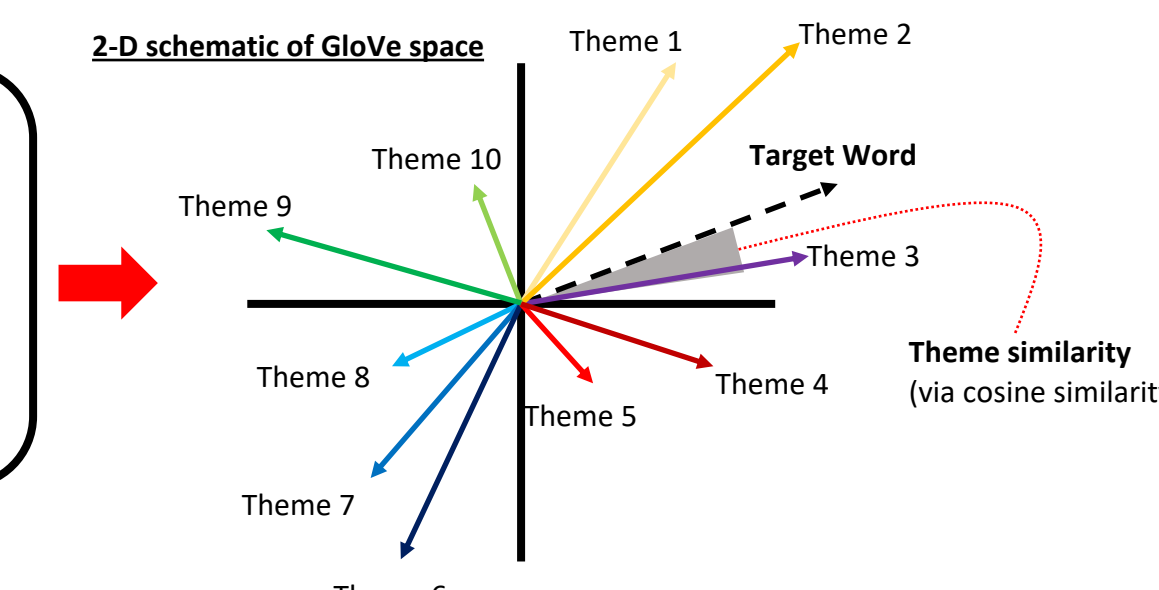
## Influence of Story Themes

Participant-generated free associate chains

10-most common theme words from post-test battery

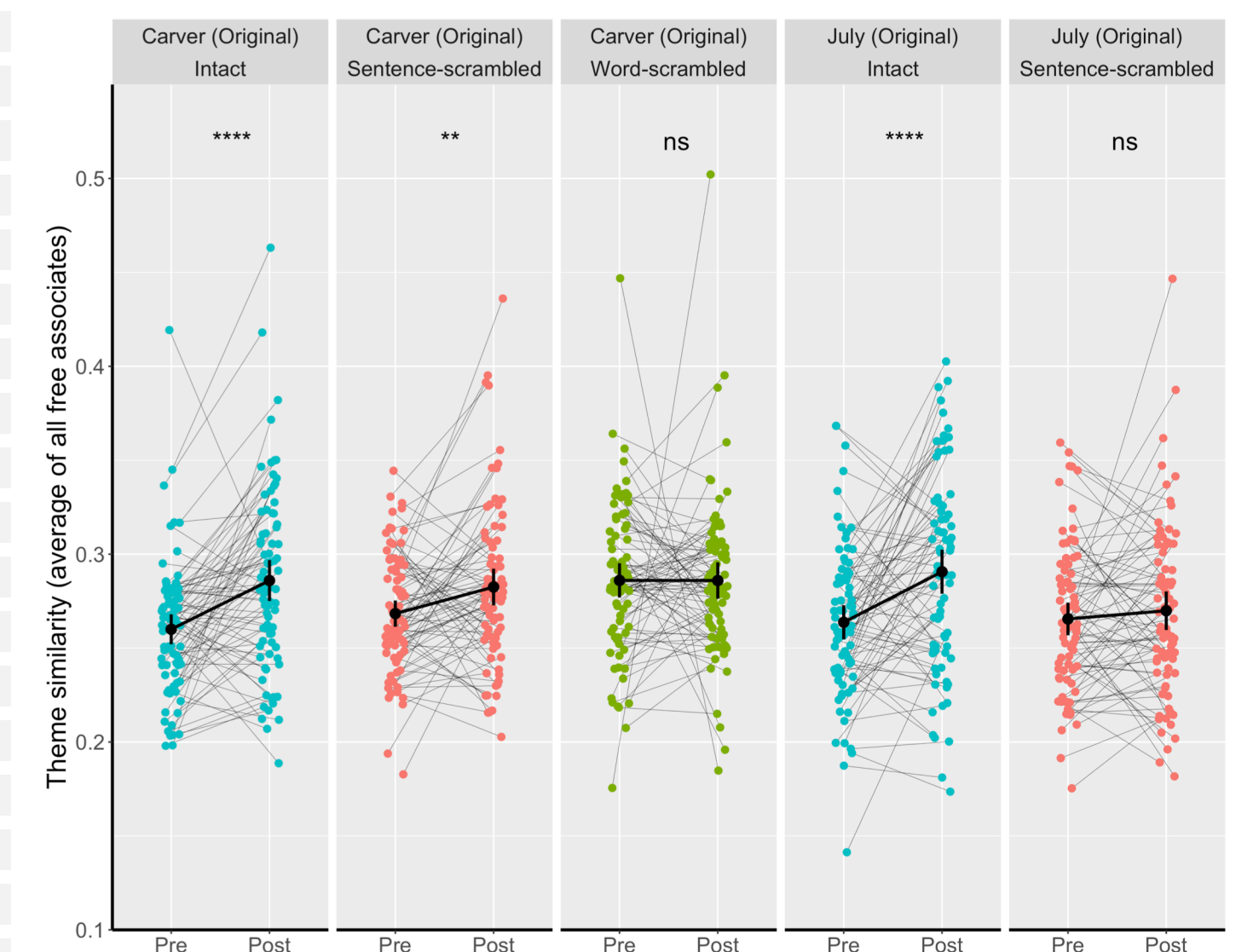
GloVe Embeddings<sup>4</sup>

300-dim vector for each word

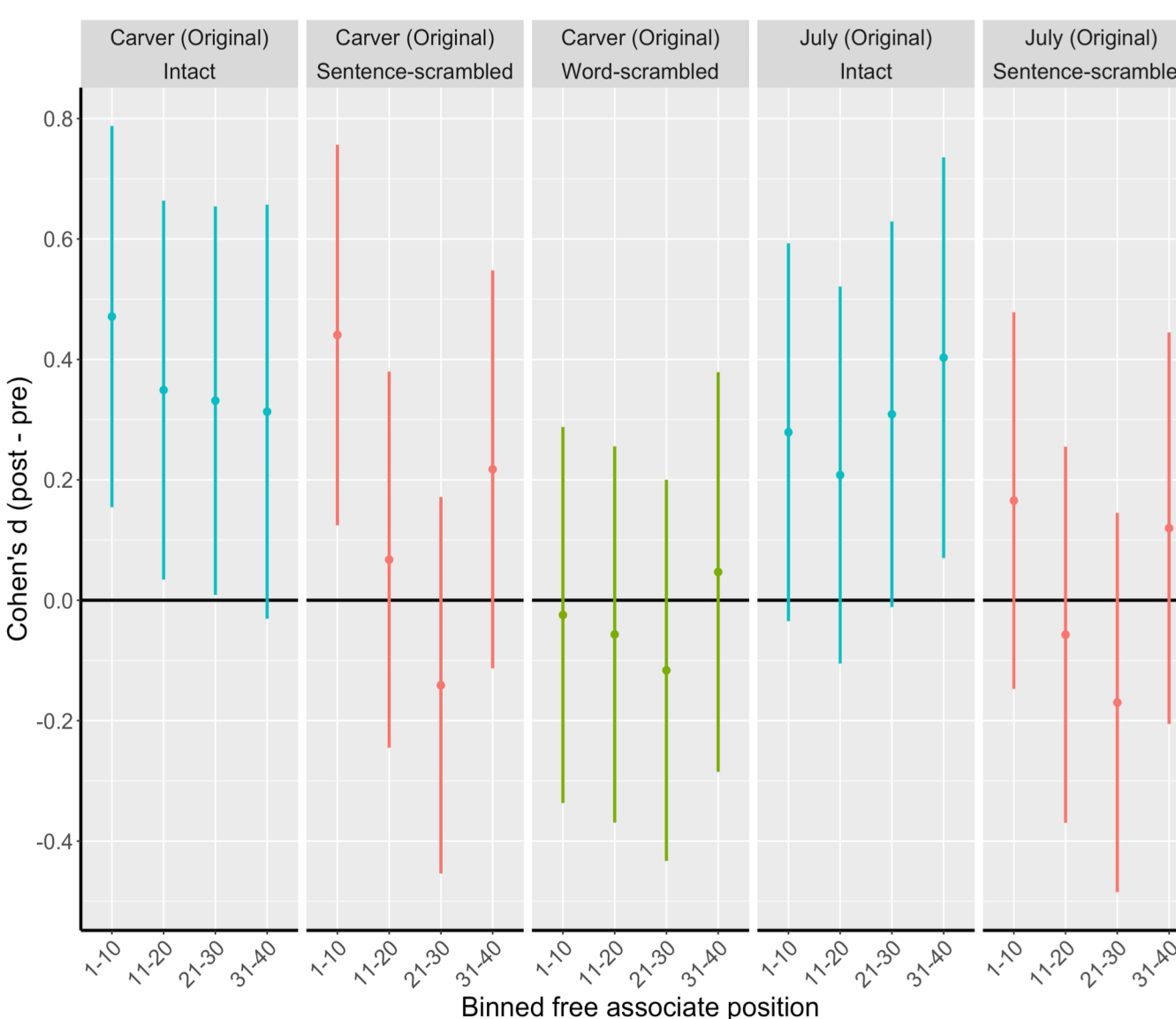


$$ThemeSimilarity(target) = \max_{themes} \left[ \frac{A_{target} \cdot B_{themes}}{\|A_{target}\| \cdot \|B_{themes}\|} \right] \approx \text{how semantically-close a target word is to any of the 10-core themes of a given story}$$

### Similarity to themes: Pre vs. Post-Story



### Effect sizes over time



**Summary:** Reading a story is followed by an increased propensity for story themes to influence/intrude into spontaneous free association. Also, this effect persists longer into free association when the story is intact.

## Summary

Stories shape our spontaneous thoughts, not only during reading, but beyond it.

The coherence (or meaningfulness) of the text determines the strength of this lingering context, which suggests that word-level priming accounts are inadequate.

We propose that the extent to which a recent experience is processed deeply<sup>5</sup>, determines its ability to restructure existing knowledge networks. This restructuring of existing association networks then affects how we traverse them during spontaneous thought<sup>6</sup>.

## References

- Green & Brock (2000). *J. Pers. Soc. Psychol.*, 79(5), 701-721.
- Kuijpers et al. (2014). *Sci. Study. Lit.*, 4(1), 89-122.
- Bower & Clark (1969). *Psychon. Sci.* 14, 181-182.
- Pennington et al. (2014). *In Conference on Empirical Methods on Natural Language Processing (EMNLP)*, 1532-1543.
- Craik & Lockhart (1972). *J. Verbal Learning Verbal Behav.* 11(6), 671.
- Mildner & Tamir (2019). *Trends Neurosci.* 42(11), 763-777.