

# Semantic Supports Don't Improve Episodic Memory After Errorful Learning Conditions

Siobhan Moher, Melissa Bernald, Hannah Hausman, PhD

University of California Santa Cruz

## Introduction

### When are errorful learning conditions beneficial?

- Answering a question with an error can increase learning of the correct answer more than studying the correct answer alone.<sup>1</sup>
- Primarily researched with semantically rich information.
  - ✓ “What is the capitol of Australia?” Canberra
  - ✓ swim-float
  - x swim - table
- Errorful learning can be effective for semantically unrelated materials in some cases.<sup>2</sup>
  - ✓ tree-palm-HAND
- Semantic support may have helped.

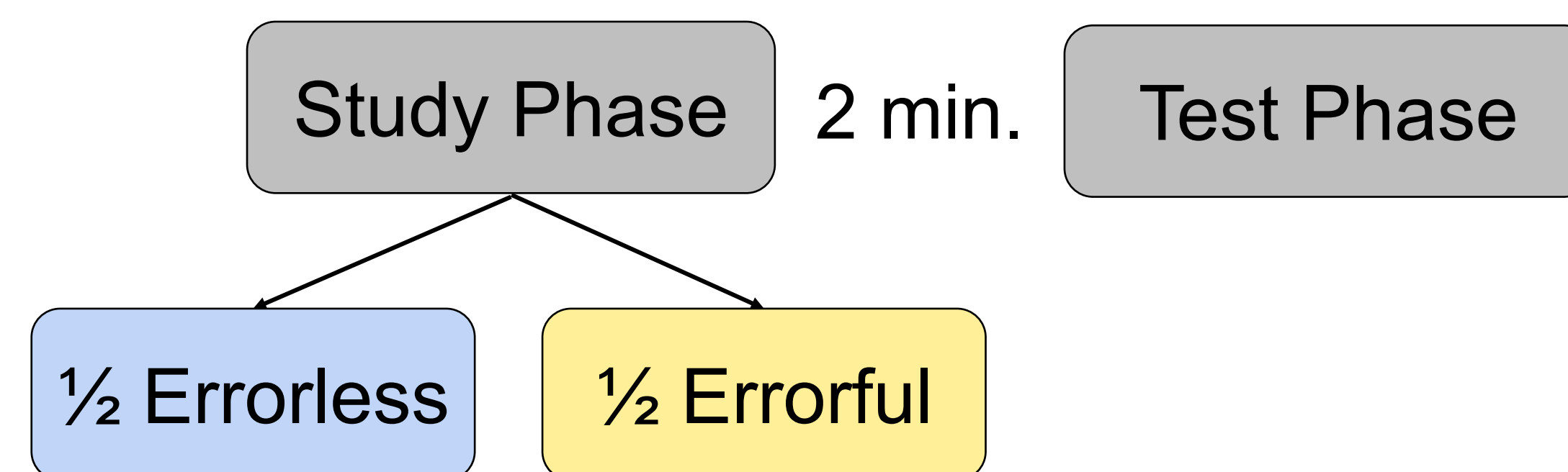
### Do errorful learning conditions increase episodic memory for semantically impoverished materials if semantic supports are available<sup>3</sup>?

## Study Design

2 (Study Condition) x 2 (Price Type)

Study Condition (within-subjects)  
 Errorless vs. Errorful with feedback  
 Price Type (between subjects)  
 Reasonable vs. Unreasonable

## Procedure



1. Studied the prices of 8 grocery items
  - 1/2 errorless: study correct price for 10 seconds
  - 1/2 errorful: guess the price at your own pace, then study the correct price for 10 seconds
2. 2-minute distractor task
3. Test on 8 grocery prices
4. Repeat steps 1-3 with 8 new items and prices

## Hypothesis

We predicted an **interaction** such that memory for prices would be better if participants guessed before studying the correct price, but only when the prices were reasonable.

## Sample Materials

**Study**  
Reasonable + Errorless

Price: \$3.59

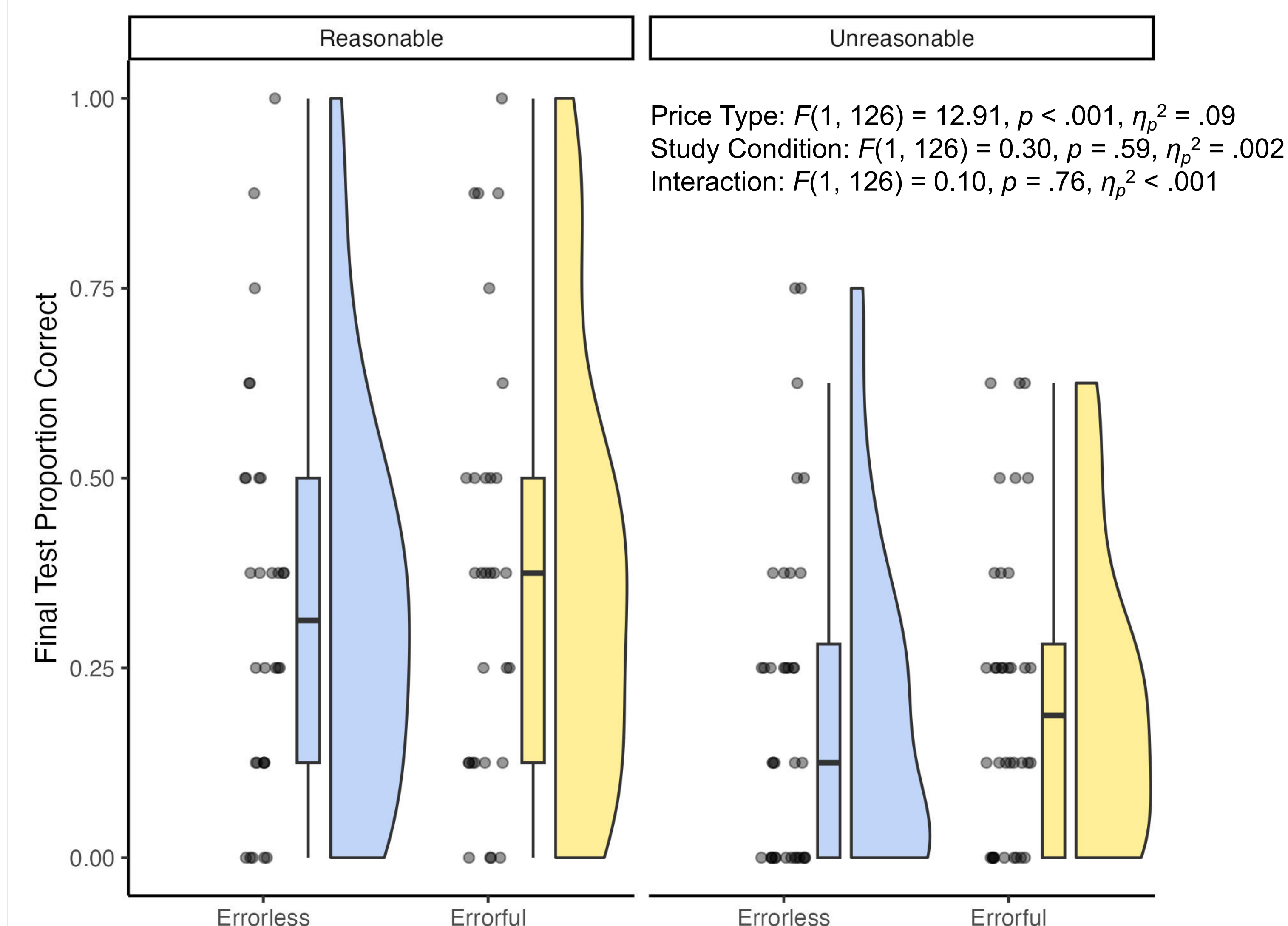
**Study**  
Unreasonable + Errorful w/ Feedback

Price: \$7.49

**Test**

Price: \$

## Results (N = 66)



Reasonable prices were more memorable.  
 Errorful vs. errorless conditions was not important.  
 Contrary to our hypothesis, there was no interaction.

## Summary Statistics

Mean (SD) **test accuracy** was more dependent on price type than study condition.

	Errorless	Errorful
Reasonable	.33 (.26)	.38 (.29)
Unreasonable	.20 (.22)	.22 (.20)

Mean (SD) of each participant's **median absolute deviation** between test response and correct answer was more dependent on price type than study condition.

	Errorless	Errorful
Reasonable	2.404 (11.43)	6.319 (33.21)
Unreasonable	26.88 (157.30)	27.49 (161.53)

## Discussion

### Conclusions

- Guessing had little to no effect on episodic memory.
- Adding semantic supports (i.e., reasonable grocery prices) improved memory.
- Semantic supports did not result in the expected benefits of errorful learning.

### Future Analyses and Research

- Test performance was highly variable and quite low.
  - Replicate this study with higher levels of performance.<sup>3</sup>
- Did some people benefit from errorful learning more than others? If so, why?

## References

- <sup>1</sup> Metcalfe, J. (2017). Learning from errors. *Annual Review of Psychology*, 68, 465-489.
- <sup>2</sup> Metcalfe, J., & Huelser, B. J. (2020). Learning from errors is attributable to episodic recollection rather than semantic mediation. *Neuropsychologia*, 138, 107296.
- <sup>3</sup> Whatley, M.C., Castel, A.D. (2022). The role of metacognition and schematic support in younger and older adults' episodic memory. *Memory & Cognition*, 50(3), 601-616.



## **Abstract**

Error correction, rather than restudying, is beneficial for learning with semantically rich material (trivia, related word pairs). We asked: is errorful better than errorless learning for remembering episodic information? We hypothesized no, unless semantic supports were provided. Participants learned grocery item-price pairs, which were reasonable or unreasonable prices through errorful (guess price then study correct price) or errorless (study correct price) conditions. On a cued-recall test, participants better remembered the reasonable than unreasonable grocery prices. Memory was not impacted by errorful vs. errorless learning conditions and there was no interaction with the reasonableness of the prices. Episodic memory is more impacted by its reasonability than by how it is learned. Results will be discussed in terms of theories of error correction. Individual differences and error correction will also be explored.