

Failed Tests Can Enhance Learning

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Question

What is the effect of attempting, and failing, to remember something (if the recall attempt is followed by feedback)?

Background

The *testing effect* is the finding that tests enhance memory (Roediger & Karpicke, 2006). Tests seem to potentiate future encoding even if unsuccessful (Izawa, 1970), but the evidence for this claim is limited.

Our innovation

Comparing failed tests to presentations is problematic because of item selection effects. We avoided such problems by using fictional questions, which guaranteed that initial recall attempts would be unsuccessful.

Hypotheses

Pros: Tests may enhance future encoding.

Cons: A fruitless memory search may be a waste of time. Errors may have negative consequences.

Acknowledgments

A grant from the James S. McDonnell Foundation supported this research. Thanks to the Bjork lab.

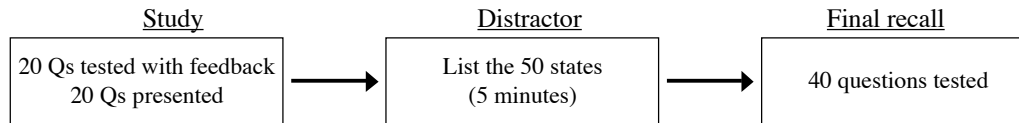
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Method overview

Trivia questions were either presented (with answers) or tested (with feedback). We asked fictional trivia questions to guarantee initial retrieval failure.

Procedure

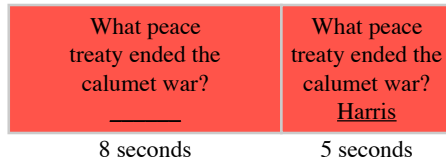
The procedure consisted of three phases. The manipulation took place during study.



Study phase — trial procedure

Experiment 1 (n=25)

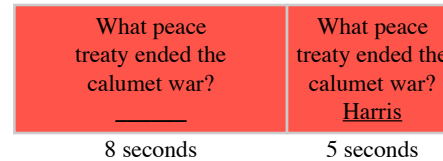
Is an unsuccessful test better than nothing?



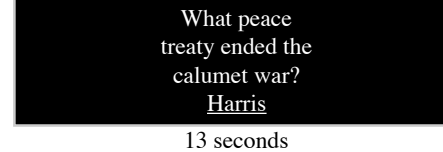
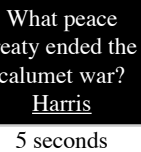
Test
Condition

Experiment 2 (n=20)

Is an unsuccessful test better than a presentation?



Present
Condition



Materials

The materials of interest were 20 fictional trivia questions (see Berger, Hall, & Bahrck, 1999). Twenty non-fictional questions were also included so participants would not become discouraged or suspicious.

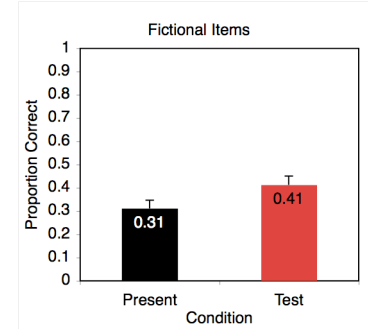
Fictional questions

What is the last name of the commander of the Theodonts?	Woodbury
What is the name of the singing coyote in old cartoons?	Rusty
What is a community of green beetles called?	Village
What kind of bird spoke to Amelia in the story 'Over the Rainbow'?	Cockatoo

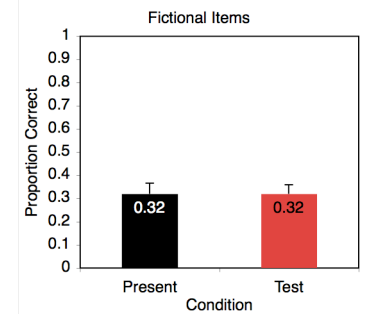
Non-fictional questions

What is the fin on the back of a fish called?	Dorsal
What are people who explore caves called?	Spelunkers
What is the name of King Arthur's sword?	Excalibur
What fabled bird sprang to new life from the ashes of its nest?	Phoenix

Final recall (fictional items)



Experiment 1:
Unsuccessful
recall attempts
enhanced
memory.



Experiment 2:
Unsuccessful
recall attempts
& presentations
were equally
effective.

Conclusions

Theoretical implications: Failed tests appear to enhance the encoding that occurs during feedback. Trying to recall an unknown answer and studying the answer have similar effects.

Practical implications: Taking challenging tests, as opposed to avoiding errors, enhances learning.

Summary

Unsuccessful tests enhanced learning.

Berger, S. A., Hall, L. K., & Bahrck, H. P. (1999). Stabilizing access to marginal and submarginal knowledge. *Journal of Experimental Psychology: Applied*, 5, 438-447.
Izawa, C. (1970). Optimal potentiating effects and forgetting-prevention effects of tests in paired-associate learning. *Journal of Experimental Psychology*, 83, 340-344.
Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1, 181-210.