Poster 5035

Computerized Hints Can Optimize Recall

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1 Question

Can a computer ensure that successful retrieval is always the most difficult retrieval, and therefore maximize the benefit of tests?

2 Memory Enhancers

Testing: tests > presentations (e.g., Roediger & Karpicke, 2006)

Effortful Retrieval: When retrieval is more difficult (i.e., closer to impossible), it is more beneficial (e.g., Modigliani, 1976).

3 Static Optimization

Adding interference/delay (in an amount determined *a priori*) between learning events. Examples include expanding retrieval practice (Landauer & Bjork, 1978) and Bjork & Allen (1970), who interpolated distractors of varying difficulty between learning events.

4 Dynamic Optimization

Giving participants *just enough* help so that two conditions are met:

1. Learners are (ultimately) successful on every retrieval attempt.
2. Each success is the most difficult possible retrieval.

References

Bjork, R. A., & Allen, T. W. (1970). The spacing effect: Consolidation or differential encoding? *Journal of Verbal Learning and Verbal Behavior, 9*, 567-572.

Landauer, T. K., & Bjork, R. A. (1978). Optimum rehearsal patterns and name learning. In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), *Practical aspects of memory* (pp. 625-632). London: Academic Press.

Finley, J. R., Benjamin, A. S., Hays, M. J., Bjork, R. A., & Kornell, N. (2011). Benefits of Accumulating Versus Diminishing Cues in Recall. Journal of Memory and Language, 64, 289-298.

Modigliani, V. (1976). Effects on a later recall by delaying initial recall. *Journal of Experimental Psychology: Human Learning and Memory, 2*, 609-622.

Roediger, H. L., III, & Karpicke, J. D. (2006t). Test enhanced learning: Taking memory tests improves long-term retention. *Psychological Science, 17*, 249-255.

5 Paradigm

1. Study: 48 word-pairs (half weakly related, half unrelated), 5s per presentation
2. Practice: 4 rounds, each pair randomly assigned (per participant) to one of three within-subjects "assistance" conditions:

Accumulating Cues (AC)	Diminishing Cues (DC)	Standard Feedback (SF)

Practice Phase

problem _____	problem difficu__	problem _____

If incorrect:

problem d_____	juvenile suggest__	problem difficulty
problem di____		
problem dif___		

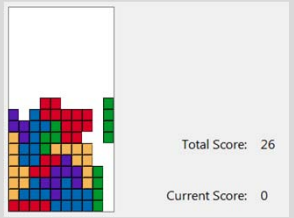
⋮ (until correct response)

NEXT PRACTICE ROUND

problem _____	problem diffi___	problem _____

⋮

3. Distractor: 10 minutes of Tetris

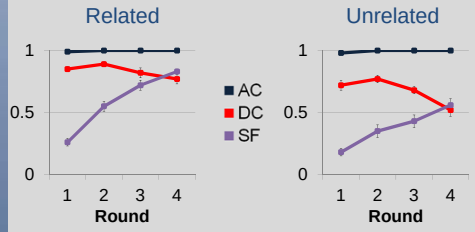


4. Final recall test

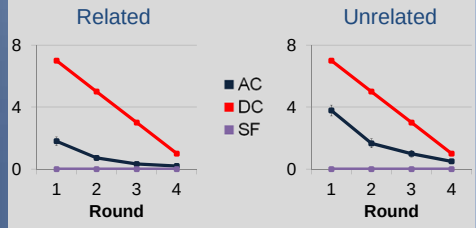
problem _____	problem _____	problem _____

6 Retrieval Practice Results

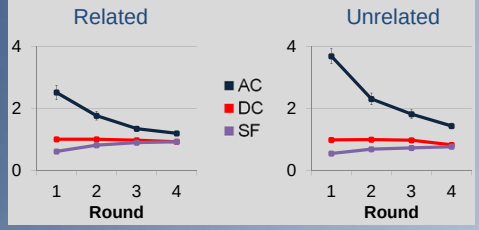
Mean Probability of Correct Response



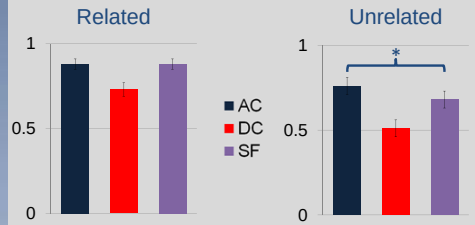
Mean Assistance (Letters) Provided



Mean Number of Attempts



7 Mean Final Test Recall



8 Conclusion

Yes.