Introduction

The Question

Memory is generally better when study opportunities are distributed in time (spaced practice) rather than when they occur in immediate succession (massed practice). However, when learners decide practice schedules for themselves, do they choose spaced or massed practice?

Background

Son (2004) compared pairs of GRE-standardized and semantic synonyms for each item. After each pair, learners judged whether they had learned it (judging difficulty) and chose to study it again if they were uncertain about their judgments. For items chosen for study (massed or spaced), Son found a negative correlation such that the preference for spaced practice declined as judged difficulty increased.

Son’s results are consistent with the Region of Proximal Learning Model (Metsalle & Kornell, 2005), which predicts that, for items judged to be unlearned, the perceived benefits of immediate study (massed practice) should be greater for more difficult items.

However, Benjamin and Bird (2006), using pairs of common words with related, but different, meanings, found a stronger preference for spaced practice on more difficult items. They interpreted their results in terms of the Discrepancy Reduction Model, which predicts a constant or increasing preference for the more effective strategy (spaced practice) as perceived difficulty increases.

The Present Study

We sought to resolve the conflict between these two earlier studies. Our procedure was similar to Son’s. However, within each experiment, we varied item difficulty experimentally (e.g., Benjamin and Bird) rather than randomly (like Son), and we varied the duration of the initial presentation of each pair across experiments, using varying presentation times for common words (e.g., Benjamin and Bird) in Experiment 1, and GRE-synonym pairs (like Son) in Experiments 2 and 3.

General Method — All Experiments

Procedure. Following Son’s (2004) procedure, word pairs were presented on a computer screen to college students who were given a choice between studying the pair again “now” (immediately), ending it again “now” (after all word pairs were shown a least once), or being “done” (not presented again). (See diagrams)

Duration of the second presentation of each re-studied pair was held constant at 3s. After completing all study trials, participants solved arithmetic problems for 5 min. This was followed by a recall test in which cue words were presented successively, and participants attempted to type the corresponding target word. They responded “yes” or “no” with a keystroke. Immediately after participants decided whether a pair should be massed, spaced, or done, a screen appeared asking them to re-study the pairs closer to the time of the test. Thus, learners’ choices could reflect metacognitive judgments about the need for additional study.

Hypothesis — A 1s presentation duration strainse participants’ ability to perceive and identify encoding difficulty. As a consequence, some pairs (low difficulty) that were massed in Son’s study might be spaced in this experiment.

Hypothesis — A 1s presentation duration strainse participants’ ability to perceive and identify encoding difficulty. As a consequence, some pairs (low difficulty) that were massed in Son’s study might be spaced in this experiment.

Experiment 1

Method

Participants:

• 79 participants

Materials:

• Pairs of common words (Exp. 1) or GRE-synonym pairs (Exp. 2 & 3).

Duration of initial presentation:

• 1s vs. 2s vs. 3s

Design:

Mixed factorial with Condition (massed, spaced, done) x Duration (1s, 2s, 3s).

Proportion of “done” responses

• As difficulty increased, learners generally showed a preference for spaced practice.

Experiment 2

Method

Participants:

• 9 participants

Materials:

• Son’s (2004) GRE-synonym pairs

Duration of initial presentation:

• 1s vs. 2s vs. 3s

Results — Proportion of “done” responses

• No significant effect of difficulty or its interaction with duration.

Discussion

Son (2004) reported that as difficulty increased, learners became less likely to choose spaced practice rather than massed practice. She attributed this to metacognitive judgments in which the perceived benefit of massed practice is assumed to increase with difficulty. However, we found that participants are less likely to choose massed practice as difficulty increases. This parallels the tendency to choose spaced practice more as difficulty increases. This paradigm allows us to understand how learners choose spaced or massed practice.

References


Author Notes

We thank the following for insightful feedback and helpful suggestions: Brian Benjamin, Ted Fish, Jed Jones, and Andrew Piercy.