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ABSTRACT

Assessing the effect of memory improvement strategies upon long-term forgetting, two studies investigated the influence of popular mnemonic devices (the keyword method and the "method of loci") upon forgetting relative to rote rehearsal. The first study (79 subjects) compared the forgetting of French vocabulary words learned either by using the keyword technique or by rote rehearsal. In the second study (76 subjects) the "method of loci" was compared to rote rehearsal for serial recall of unrelated word lists. Results indicated that subjects using mnemonic devices forgot at a faster rate than subjects rote rehearsing the same information. Thus, contrary to widely held expectations, mnemonic devices do not appear to confer any long-term advantage to the retention of material so learned. Perhaps the deleterious effect of mnemonic devices upon memory is due to the interference that may accompany use of an unfamiliar learning strategy. This suggests that training in the use of mnemonic devices should be of an extended and distributed nature so that potential interference effects can be minimized. (Two figures are included.) (SR)

Do Mnemonic Devices Lessen Forgetting?[1]

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Abstract

Two experiments are reported which investigate the influence of popular mnemonic devices upon forgetting. Two retention periods (immediate and one-week delay) were included in both experiments so that the lines relating amount retained (y-axis) and time (x-axis) could be plotted for each learning condition. According to this analysis, parallel lines suggest equivalent forgetting rates whereas nonparallelism (i.e., a Condition x Time interaction) indicates different rates of forgetting. Study 1 compared the forgetting of French vocabulary words learned either using the keyword technique or by rote rehearsal. In Study 2 the *method of loci* was compared to rote rehearsal for serial recall of unrelated word lists. In both experiments, separate 2 x 2 completely randomized ANOVAs revealed significant Condition x Time interactions with *greater* forgetting under conditions of mnemonic strategy-use relative to rote rehearsal. These results are discussed in terms of interference effects which may accompany use of unfamiliar learning strategies.

[1]Paper presented at the annual meeting of the American Psychological Association, New Orleans, 1989

Introduction

This paper assesses the effect of memory improvement strategies upon long-term forgetting. Specifically, two studies are reported which investigate the influence of popular mnemonic devices (i.e., the *keyword method* and the *method of loci*) upon forgetting relative to rote rehearsal.

It is well documented that mnemonic strategies facilitate the rate of learning (see Bellezza, 1981 for a review). However, while it is clear that memory aids enhance learning performance and immediate recall, there exists no direct evidence indicating that mnemonic devices confer a long-term advantage when forgetting is evaluated.

Theoretically, there are several reasons for expecting less forgetting when material is acquired mnemonically rather than by rote rehearsal. The "levels of processing" approach (Craik & Lockhart, 1972), the dual-coding view (Paivio & Foth, 1970), and the attribute models of memory (Bregman, 1969), all predict less forgetting when mnemonic devices are used rather than rote repetition. In short, mnemonic devices are presumed to increase the durability or retrievability of memories relative to Type I (maintenance) rehearsal.

In the present studies identical 2 (mnemonic vs. rote) x 2 (immediate vs. delay) between-subjects designs were used. The studies differed in terms of learning materials (i.e., foreign vocabulary words or unrelated word lists), and the type of mnemonic device taught to the experimental group (i.e., the keyword technique or the method of loci). Since two retention periods were included, it is possible to plot the lines relating retention (y-axis) and time (x-axis) for each learning condition. Parallel lines indicate equivalent amounts of forgetting whereas nonparallelism (i.e., a Condition x Time interaction) suggests different rates of forgetting (Slamecka & McElree, 1985).

Method and Results

Study 1

All subjects (N = 79) were required to learn the English equivalents of 22 French concrete nouns (fully described in Thomas, 1986). Subjects in the keyword group were exposed to the study material in two stages: (a) four study-test trials of keyword learning in conjunction with French words; (b) two acquisition trials using the keywords to learn the English equivalents of the French words. Subjects in the rote rehearsal condition first studied the French words alone over four trials. During acquisition both the French word and its English definition were shown together and subjects were asked to write them down a total of five times each.

One-half of the subjects in each learning condition were tested for cued recall either immediately or after one week. The 5 min test (unpaced) of cued recall consisted of each French word followed by a blank line. Subjects were instructed to write down the appropriate English definition in each blank and to guess if possible. Debriefing questions given after the recall test indicated that none of the subjects had rehearsed the material during the retention period.

Figure 1 shows the recall performance for all four conditions in Study 1. A 2 x 2 Analysis of Variance (ANOVA) indicated that the mnemonic group recalled more words than the control group, F (1, 75) = 17.71, $p < .001$, and that there was an overall decrement in recall after one week, F (1, 75) = 95.55, $p < .001$. Of greater interest is the obtained Group x Time interaction, F (1, 75) = 11.10, $p < .002$, which in conjunction with Figure 1 indicates that forgetting was greater in the mnemonic compared to the control condition.

Study 2

The same 2 x 2 factorial design was used to evaluate subjects' (N = 76) serial recall of unrelated word lists. The material consisted of a list of ten unrelated words that was learned either by

rote rehearsal (control group) or by the method of loci (experimental group). The particular loci used were ten large U.S. cities and their respective landmarks (e.g., New York City and the Statue of Liberty). A map highlighting these ten locations and their landmarks was presented to experimental subjects prior to serial learning. The map detailed an "imaginary cross-country trip" that began in New York, continued through the South to Los Angeles, and concluded in Detroit. Experimental subjects practiced the loci for three study-test trials.

During serial learning, the word list was presented to experimental subjects across two study-test trials. Experimental subjects were now encouraged to apply the Method of Loci to serial learning. Control subjects rehearsed the word list five times via a method which emphasized rote rehearsal of immediately preceding words. Pilot studies indicated that this number of trials would insure comparable performance for both groups on the immediate test for recall. Subsequently, one-half of the subjects in each condition were tested for serial recall either immediately or after one week.

Figure 2 shows the serial recall data for all four groups. A 2 x 2 ANOVA revealed a highly similar pattern of results to that of Study 1. Specifically, main effects were obtained for Group, F (1, 72) = 11.08, $p < .001$, and Time, F (1, 72) = 142.62, $p < .001$. Furthermore, the Group x Time interaction was also significant, F (1, 72) = 5.07, $p < .05$, indicating once again that subjects using a mnemonic device forgot at a faster rate compared to subjects rote rehearsing the same material.

Interpretation of Findings

The results of two studies indicated greater forgetting for material acquired mnemonically relative to rote rehearsal. Thus, contrary to widely held expectations mnemonic devices do not appear to confer any long-term advantage to the retention of material so learned. Perhaps the deleterious effect of mnemonic devices upon memory is due to the interference that may accompany use of an unfamiliar learning strategy. Consider the student that has just learned the method of loci. In effect, twice as many items (i.e., the list of loci, as well as the study items) must be recalled compared to when rote repetition is used. Therefore, it may be that a newly acquired mnemonic device may, over time, interfere with the recall of material that it was intended to strengthen (Bower and Clark, 1969; Ott, Butler, Blake, and Ball, 1973). Pedagogically, this suggests that teachers can not assume that mnemonic devices as will "automatically" strengthen memory for study material. In this regard, the apparent benefit of mnemonic devices may occur solely during the acquisition process and not over the retention interval. This suggests that training in the use of mnemonic devices should be of an extended and distributed nature so that potential interference effects can be minimized.

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