Controlling the "fate" of first list associates^{1, 2}

Bertram E. Garskof, Joel M. Sandak and Eugene W. A. Malinowski
RUTGERS, THE STATE UNIVERSITY

Abstract

Four groups of Ss learned paired-associate lists in the A-B, A-C paradigm. In two of these groups A-B retention was tested with the MMFR technique. The other groups were tested with a recognition matching (RM) technique. One MMFR and one RM group were given learning instructions which suggested that Ss use mnemonics or associations to learn the lists. The other groups received standard P-A instructions. Association instructions led to significantly faster learning. These instructions had no effect on MMFR but did lead to significantly less A-B forgetting in RM. These results suggest that there are two unlearning processes, associative unlearning and response unavailability, and that these processes can be independently manipulated.

Introduction

Paired-associate learning has been described as a two-stage process involving a response learning or response availability stage and a hook-up or association stage (Underwood, Runquist, & Schultz, 1959). In the present approach, unlearning, or the experimental extinction of original learning (OL) during interpolated learning (IL) is thought to occur as a result of the reversal of each stage of the original learning process. That is, OL responses become unavailable and OL S-R associations are broken during IL.

Two retention tests have been used recently to measure unlearning. In modified free recall (MMFR, Barnes & Underwood, 1959), after two paired-associate lists are learned, Ss are asked to recall both OL and IL responses in the presence of list stimuli. Garskof & Sandak (1964) and McGovern (1965) have adopted a recognition matching task (RM) to test for first list unlearning. In RM Ss are presented with all stimuli and responses after both lists are learned. S's only task is to correctly match stimuli and response members of the just-learned pairs. Both MMFR and RM data indicate that fewer OL items are retained after IL than are retained in control groups which rest during the IL interval. An examination of these two retention tests suggests that each test relates to one of the postulated unlearning stages. In MMFR some responses must be unavailable for S's recall and in RM, where stimuli and responses are available, the data indicate that some S-R associations have been broken. The present experiment was directed to an examination of the possibility that one of the stages can be manipulated without affecting the other stage. If OL associations could be strengthened without increasing response availability, then more correct matchings ought to be made in RM without a concomitant increase in correct recall in MMFR.

Four groups of Ss were run in the A-B, A-C paradigm. Two groups were tested with RM and two with MMFR after learning. One RM and one MMFR group were given special learning instructions which introduced Ss to the notion that S-R pairs could be more easily learned through the use of mnemonic devices or associations than through rote memorization. The other groups received standard P-A learning instructions. It was predicted that the association instructions would lead to significantly faster list learning. It was predicted that there would be a difference in OL unlearning between the two RM groups such that the group with association instructions would make significantly fewer errors in RM. It was further predicted that there would be no difference in recall between the two MMFR groups.

Method

Design. The design comprised of four conditions which differed with regard to learning instructions and retention test. All conditions learned two paired-associate lists which conformed to the A-B, A-C paradigm. Two conditions received MMFR as their retention test following learning and two conditions received RM as their retention test following learning. One of the MMFR conditions and one of the RM conditions received standard P-A learning instructions prior to list learning. The other conditions received specially designed association instructions.

Materials. Learning lists consisted of the same items used in the A-B, A-C portion of Barnes & Underwood (1959). Eight nonsense syllables of from the 60% to 73% association value (Glaze, 1928) were used as stimuli. No consonant was repeated, and four vowels were used twice each. Responses were two-syllable adjectives from Haagen (1949) with low intra and interlist similarity in meaning. Two of the three different sets of pairings used in Barnes & Underwood (1959) were used in the present study. An equal number of Ss in each condition was given each pairing. For each condition a given list was used as the first learning list for half the Ss and as list two for the other half. Four orders of items were used.

Subjects. A total of 48 Ss, 12 in each condition, participated in the experiment. The Ss were female Rutgers University undergraduate students who served as paid volunteers. The Ss were assigned randomly to the four conditions in order of their appearance in the laboratory.

Association Instructions. The association instructions included standard P-A directions and a section which pointed out that learning is more rapid when Ss try to think of associations or connections between stimuli and responses. Examples were given.

Table 1
Learning and Recall Scores for the Various Conditions

	MMFR		RM	
	Association Instructions	Standard Instructions	Association Instructions	Standard Instructions
$\bar{X}$ Trials to Criteria Lists 1 and 2	12.9	19.9	15.2	22.6
S.D.	4.05	11.60	7.04	7.74
$\bar{X}$ Correct in Retention Test	5.3	5.2	7.33	5.75
S.D.	.53	.60	.94	1.70

Procedure. Both lists were learned by the anticipation method at a 2:2 sec. rate. The intertrial interval was 4 sec. and the interlist interval was 1 min. Instructions for the retention tests were given immediately following attainment of the criterion of one perfect anticipation of each learning list. Each S was presented with a retention booklet in which each page contained a single stimulus syllable printed twice. In the MMFR condition, Ss were instructed to write down the responses from the two lists next to the stimuli. They were told to write them in the order they came to mind. Ss were not allowed to return to a page once it was turned. Ss worked at their own pace. They were given no instructions pertaining to guessing. Each booklet was collated in a different random order.

Identical materials were used and identical procedures followed in the RM condition except that an additional sheet was available to each S during the retention test which contained the responses used in the learning lists.

Results

Table 1 presents the basic learning and retention data for the experiment. It can be seen that association instructions led to faster learning in both retention test conditions. These differences were significant for the MMFR groups, $t(22)=5.88$; $p<.01$, and for the RM groups, $t(22)=6.38$; $p<.01$. The difference in correct

RM between the two instruction groups was significant, $t(22)=3.16$; $p<.01$. The difference in MMFR scores was nonsignificant, $t(22)=0.31$. These analyses indicate that Ss who learned list one S-R pairs with mnemonic aids did not forget these pairs during IL, while Ss who are not so instructed are subject to associative unlearning. The data further suggest that the development of a mnemonic for a first list pair does not make the response member of that pair more available for recall in MMFR.

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Notes

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