An experimental analysis of pseudomediation¹

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Abstract

A modified replication of the pseudomediation experiment of Mandler & Earhard (1964) was performed to test the hypothesis of differential first-stage forgetting after second-stage learning in the A-B, B-C, A-E; and A-B, D-C, A-E paradigms. No evidence was found that first-stage forgetting in the former paradigm was greater than in the latter (an important assumption in the pseudomediation argument) and, further, the pseudomediation effect itself was of marginal magnitude.

Problem

Mandler & Earhard (1964) have asserted that the mediational effects found in some verbal learning studies may only be apparent. They argue that the mediational effect may be attributable to lessened interference in the usual mediation paradigms as opposed to the control paradigms. This argument rests on the assumption that in the typical chaining paradigm (A-B, B-C, A-C) the learning of the second stage produces unlearning or forgetting of the first stage whereas in the control paradigm (A-B, D-C, A-C) no such process operates. It is therefore argued that final stage, A-C, learning has little interference in the first case and appreciable interference in the second, thus producing pseudomediation. To support their argument Mandler and Earhard performed a pseudomediation experiment (A-B, B-C, A-E versus A-B, D-C, A-E) and found some evidence that the final stage of learning of the first paradigm was facilitated relative to the final stage of the second paradigm even though there was, clearly, no opportunity for mediation.

Jenkins (1965) has argued that the critical assumption of the Mandler-Earhard argument is unsupported, that their data are subject to other interpretations, and that their argument cannot be extended in any simple way to include other mediational experiments.

The focus of the present paper is, first, an investigation of the assumption of first-stage unlearning or forgetting following the learning of the second stage and, second, a replication of the pseudomediation experiment under slightly modified conditions. The Mandler-Earhard experiment was repeated with unpaced recall trials of the first-list pairs inserted after the second and third stages of learning. The free recall following second-stage learning should reveal the validity of the assumption of differential first-list unlearning. The third-stage learning should provide an independent replication of the pseudomediation effect (whatever its origin). Finally, recall after the third stage should provide summary information of the state of first-list habits following both direct and the postulated indirect interference.

Method

Two groups of 20 Ss each learned successively three lists of paired associates. Learning stages for the Experimental group were A-B, B-C, A-E; for the Control group the stages were A-B, D-C, A-E. Each list consisted of six pairs. Recall of the A-B pairs was tested after the second and third stages for both groups.

The lists were constructed from the same pool of low frequency words employed by Mandler and Earhard and were subject to the same constraints on pairing. Four different complete sets of pairings were constructed to minimize any specific pairing effects. For each learning list five different random orders of pairs were employed to prevent serial learning. Initial and final lists were identical across Experimental and Control groups within each of the four sets of pairings.

Ss were undergraduates from an introductory psychology class at Stanford University. Ss were assigned to an experimental condition and to one of the four sets of material arrangements by a random process completed before they appeared, subject to the restriction that equal numbers of males and females were in each experimental condition. Each of two Es ran an equal number of Ss in each condition.

The S was read standard Minnesota paired associate learning instructions. In each stage S had one familiarization trial in which he read stimulus and response words aloud and then learned by the anticipation method to a criterion of two successive errorless trials. Two Ss were excluded from the experiment because they required more than 35 trials to learn the first list.

Pairs were presented on a Lafayette memory drum at a 2:2 rate with an 8 sec. intertrial interval. The time between stages one and two was long enough to change tapes and instruct Ss that they were to learn a new list.

Immediately after stage-two learning, unpaced, cued recall of stage-one responses occurred. Stage-one stimuli were presented in random order on 3 x 5 cards and Ss were asked to recall the word from the first list paired with the word on the card. Ss were encouraged to guess if they did not know the response and were told that they could give the same response twice (or more) if they desired. No information about correctness of responding was given during or following the recall tests. Ss were told that they were being timed and that they should give the response as quickly as they could but it was emphasized that they should strive for accuracy rather than speed. If the S gave no response after 15 sec. he was encouraged to guess; if he could not, the next word was presented.

Third-stage learning followed after the tapes were changed and S instructed to learn a new list. Following this learning, the second recall of stage-one responses was given exactly as before. Ss were not informed about the purpose of the experiment and did not know that they would be asked to recall any of the material at the time of learning.

Results

The recall of first-list responses after second-list learning failed to show the difference that is assumed by Mandler and Earhard. The Experimental group recalled 4.55 of the six first-list pairs on the average while the Control group recalled 4.40. The difference did not approach significance ($t = 0.64$; $p > .50$). Similarly the recall of first-list responses following the third-list learning showed minimal differences. The Experimental group recalled an average of 3.47 pairs while the Control group recalled 3.28 pairs ($t = 0.73$; $p > .50$).

The data for all three learning stages were analyzed for four dependent variables; number of trials to one

correct trial (C-1), number of trials to two correct trials (C-2), number of trials to two successive correct trials (C-2s) and number of correct anticipations during the first six trials (NC). Figure 1 shows the results for the first and fourth of these variables which may be directly compared with the data of Mandler and Earhard. Table 1 gives the mean for each criterion measure for each group on each stage.

Simple t-tests were applied to each measure of performance on each list to evaluate differences between groups. On first-list learning the groups were not as nicely matched as were those of Mandler and Earhard but only one measure (NC) reached the level of statistical significance. In terms of absolute values the experimental group was inferior in learning speed to the control group on three of the four criterion measures.

In second-list learning the Control group showed highly superior performance, as expected, on all measures of learning.

In third-list learning, where Mandler and Earhard found the pseudomediation effect, only the C-2s criterion showed a significant difference between the groups. On the other measures the groups were similar. The performance of the groups on the final learning stage is given in Fig. 2.

Discussion

The findings of the recall trials fail to support the assumption of differential first-list unlearning or forgetting which is crucial to the Mandler and Earhard argument. This finding is further buttressed by the work of L. R. Goulet (personal communication) in an independent experiment which tested for differential unlearning by a recall task following second-stage learning with A-B, B-C, and A-B, D-C groups. He, too, failed to find a significant difference. It thus appears that the process which is supposed to account for pseudomediation has, itself, not been verified. At this point we feel that the argument of Mandler and Earhard must be discarded as untenable.

Whether the pseudomediation effect may be discounted is a somewhat different question. Certainly there is only very weak evidence for the effect in this experiment. However, the initial difference in learning skill of our two groups (as suggested by the difference in NC for first-list learning) might operate to mask the effect obtained in third-stage learning by Mandler and Earhard. Further, the differences in procedure in introducing recall trials and in changing the time interval between

Fig. 1. Mean trials to one correct trial (C1) and mean correct responses in six trials (NC) for experimental and control groups in the three stages.

Fig. 2. Mean number of correct responses by trials in third stage (A-E) learning for experimental and control groups.

the second and third lists might operate to obscure the effect. At the very least, however, it can be said that the magnitude of the pseudomediation effect, if it does exist, is very slight compared to even backward interference effects which have been shown unequivocally in the second stage of both sets of experiments.

References

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Notes

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