Unlearning in recognition memory¹

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Abstract

Subjects learned two lists of paired nonsense syllables and adjectives in the unlearning paradigm (A-B, A-C). Following A-C learning Ss were instructed to indicate appropriate A-B and A-C pairings in a recognition matching task. Significantly fewer A-B matchings were made relative to A-C matchings and relative to A-B matchings made in a control condition where Ss learned only A-B and rested for the amount of time the other group used for A-C learning. Decrement in A-B pairings with response competition minimized through the use of the recognition task indicates that A-B pairings are unlearned during A-C learning.

Problem

Recent research employing the A-B, A-C design has been concerned with the availability of first list responses in a modified free recall task (MMFR) following varying degrees of second list learning (Barnes & Underwood, 1959; Postman, 1962). These studies found that first list responses become unavailable in MMFR as a function of the degree of second list learning. Since the MMFR technique reduces the possibility of response competition by asking Ss for both responses to each stimuli these data are taken to support the Melton & Irwin (1942) notion that the unlearning of first list S-R pairings is the major determinant of forgetting in retroactive inhibition.

The present research was directed to the exploration of the availability of the A-B and A-C connections when a recognition task is substituted for MMFR. It might be argued that response unavailability in MMFR is the result, at least in part, of implicit response competition engendered by S's attempts to recall appropriate responses. In the present experiment Ss were presented with all stimuli and responses. Their only task was to match the S-R combinations just learned. Any decrement found in first list pairings relative to second list pairings can be attributed to the unlearning of the first list S-R connections with less possibility for response competition than in the free recall technique.

Method

Two groups of 20 female undergraduate Ss each learned a list of 8 paired associates to a criterion of 1 perfect recitation (A-B). One of the groups then learned a second list consisting of the original 8 stimulus syllables and 8 new unrelated 2-syllable adjectives to 1 perfect trial (A-C). The other (control) group performed a filler task for an equivalent amount of time. In the test phase, both groups were presented with the stimuli and responses they had learned and asked to correctly match them.

Eight Glaze nonsense syllables of from 60-73% association value (Stevens, 1951) were the stimuli for all lists.

Interstimulus similarity was low, no syllable beginning with the same consonant.

Responses were 16 two-syllable adjectives selected at random from *Roget's Thesaurus* (1942). There was no apparent inter- or intra-list similarity. For each condition, a given list served as A-B for half the Ss and A-C for the other half. Stimuli and responses were randomly paired and 4 random orders of items were used to minimize serial learning.

The lists were presented on a Lafayette memory drum at a 2:2-sec. rate with a 4-sec. intertrial interval. Standard P-A instructions were used. Subjects rested 1 min. between A-B and A-C. The average length of time spent on the second list was determined separately for the 2 lists. In this way it was possible to have control Ss spend the same amount of time as their experimental counterparts on their interpolated activity, performance on the Block Design sub-test of an IQ test.

When A-C had been learned to criterion, or, in the control group, when the allotted time had elapsed, Ss were presented with a sheet of paper on which the stimuli and responses were listed separately. The responses had blank spaces to their left, and Ss were instructed to write the correct nonsense syllable in the appropriate space.

Results and Discussion

The mean numbers of correct A-B and A-C pairings were tabulated. The mean numbers of correct A-B and A-C pairings in the experimental group were 6.60 and 7.75 respectively. The mean number of correct A-B pairings in the control group was 7.70.

Non-parametric tests were used to test the significance of these data since the distribution of correct pairings were not distributed normally. For the comparison between A-B and A-C pairings a Wilcoxon Sign-Rank test was used. Only 1 S made more correct A-B pairings. Eight Ss made equal numbers of A-B and A-C pairings. Eleven Ss made more correct A-C pairings ($T = 1$; $P < .01$). In the case of the experimental vs. control A-B comparisons, 16 of the 20 Ss in the control group made all 8 A-B pairings while only 7 of the experimental Ss made all 8 A-B pairings. A Mann-Whitney U test showed the difference in pairings to be significant ($U = 96$; $P < .02$).

The present results indicate that there was a small but reliable reduction in the strength of A-B pairings after A-C learning. Since the comparison between the recognition for A-B pairings in the experimental and control groups indicated that the decrement in experimental A-B pairings cannot be attributed to the time lapse between the experimental group's A-B learning and their recognition task, it must therefore be inferred

that the observed decrement was due to the interpolation of the A-C list. Although it is quite possible to maintain that any memory task in which more than one response is involved possesses some degree of response competition, the present recognition memory task may be said to minimize such competition. Therefore, the results of this study may be taken to indicate an unlearning effect in a relatively unambiguous situation.

References

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Comment

The most significant finding reported by Eileen B. Karsh (Punishment: effect on learning and resistance to extinction of discrete operant behavior. *Psychon. Sci.*, 1964, 1, 139-140) was that a group of Ss that received shock during food-reinforcement training showed greater "resistance to extinction" than a control group that did not have the shock during training. To support this claim the author cites a significant group-by-trial block interaction (during extinction). Since no mention was made of the overall difference in number of responses of the two groups (the main effect of groups), it must be assumed that it was not statistically significant. If this assumption is correct, serious objection may be raised regarding the conclusion based on the interaction mentioned above. Since the experimental group had received the shock during training, it is not surprising to note that their response level at the beginning of extinction was quite suppressed when compared to the level of responding of the control group at the beginning of extinction. It is not unreasonable, then, to discover that the groups appeared to drop in frequency of response at different rates during extinction. We cannot be certain that a difference in *resistance* to extinction was involved at all, since one of the groups was already at a relatively low level while the other had

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Notes

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"more room to drop" when extinction began.

One must question also the tendency to find significance in the linear component of the differences among more than two means, when no good reason, a priori or a posteriori, exists for examining this type of variation. It may be true that most of the variation due to shock intensity after 50 shock trials was associated with the "linear" degree of freedom (equal steps in the independent variable required but absent, notwithstanding), but what psychological sense does this "linear" variation make? Was it merely that no significance obtained when both df for shock intensity were tested together? This same point may be made again for the data of the second shock period. When we finally get to the extinction data, when a "meaningful" but possibly misinterpreted trend (across blocks of extinction trials) is available for testing, the author merely reports the whole 9 df interaction.

On the basis of these considerations, one would do well to assimilate these results cautiously into the body of psychological knowledge. Replication, with attention given to the foregoing comments, would appear to be called for.

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