Transfer in repaired S₁-R₂ and S₂-R₁ paradigms¹

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Four two-list paired-associate transfer paradigms (A-B, B-A_T; A-B, B'-A_T; A-B, B-A_T¹; A-B, B-C) were compared with an A-B, C-D control condition. In accordance with predictions made from a transfer surface described by Houston (1965), negative transfer appeared in all four experimental conditions. In contrast to the surface predictions that maximum negative transfer would occur in the A-B, B-A_T situation, that minimum negative transfer would appear in the A-B, B-C paradigm, and that the remaining conditions would display intermediate amounts of negative transfer, the four experimental paradigms did not differ in terms of second-list learning.

Houston (1965) has described a surface which summarizes transfer effects expected in two-list paired-associate paradigms varying in S₁-R₂ and S₂-R₁ similarity when the first-list units are repaired in the second lists. According to this surface, negative transfer should increase as S₂-R₁ similarity increases. This increase should be greater when S₁-R₂ similarity is high than when it is low. The present study was designed to test several points on the surface. Specifically, Ss learned two paired-associate lists conforming to one of the following paradigms: A-B, C-D; A-B, B-A_T; A-B, B'-A_T; A-B, B-A_T¹; A-B, B-C. The A-B, C-D condition is, of course, the control against which transfer in the remaining paradigms is judged. According to the surface all four experimental conditions should yield negative transfer, with the A-B, B-A_T situation displaying the greatest amount of transfer and the A-B, B-C arrangement producing the least. The remaining experimental paradigms were expected to yield intermediate, and perhaps equivalent, amounts of negative transfer. The rationale for these predictions is detailed in the Houston (1965) paper.

Method

The Ss were 100 University of California undergraduates whose experimental participation was in fulfillment of a course requirement. The five paradigm conditions were randomized 20 times such that each occurred once in each successive block of five Ss. The Ss were assigned to this arrangement of conditions as they appeared in the testing situation. All Ss learned two PA lists corresponding to one of the five paradigms. The PA lists were composed of eight pairs of common adjectives chosen from Haagen's (1949) lists. As is the usual procedure in transfer studies, the second list remained constant across conditions while the first lists differed in each condition. Two different pairings of the 8 second-list stimuli and responses were developed and each was assigned to half the Ss in each condition. For each second-list five different first lists were developed such that each corresponded

to one of the paradigms under investigation. Repairing in the A-B, B-A_T condition amounted to insuring that particular A and B units which were paired together in the second list were not paired together in the first list. In the A-B, B-A_T¹ paradigm, the first lists were constructed such that similar A and A' units were not paired with the same B units. Similarly, in the A-B, B'-A_T situation similar B and B' units were not paired with the same A units. The Haagen (1949) similarity ratings of the similar words were 2.1 or better. When not intended, inter- and intralist meaning similarity were minimal. The words within the sets of stimuli and responses began with different letters. No two members of a given pair of words began with the same letter. Five different presentation orders of each list were employed to minimize serial learning. Each order was used equally frequently as the starting order. All learning was at a 2:2 sec. presentation rate with a 4 sec. intertrial interval on a Stowe drum. A 1 min. interval separated the learning of the two lists. The Ss were given 6 anticipation trials on both lists.

Results

The mean numbers of correct first-list responses given by the C-D, B-A_T¹, B-C, B-A_T, and B'-A_T groups were 18.20, 19.50, 18.35, 21.30, and 18.25, respectively. An analysis of variance did not indicate significant differences among these means, $F < 1$. The mean numbers of correct second-list responses given by the C-D, B-A_T¹, B-C, B-A_T, and B'-A_T groups were 29.20, 21.65, 21.20, 20.40, and 18.75, respectively. An analysis of variance revealed significant differences among these means, $F = 3.99$, $df = 4/95$, $p < .01$. Subsequent Newman-Keuls comparisons indicated that the C-D mean was significantly greater than the B'-A_T mean at the .01 level and greater than the remaining means at the .05 level. None of the other comparisons were significant. Thus it seems that significant negative transfer occurred in all paradigms but that the amounts of transfer did not differ from paradigm to paradigm. In an attempt to determine the extent to which transfer occurred early in learning the numbers of correct responses given during the first three second-list trials were tabulated. The means for the C-D, B-A_T¹, B-C, B-A_T, and B'-A_T conditions were 5.50, 3.65, 3.60, 3.70, and 2.75, respectively. The overall analysis of variance was again significant, $F = 3.01$, $df = 4/95$, $p < .05$, but in this case the only significant individual comparison was between the C-D and the B'-A_T means, $p < .05$. It would appear that early learning was less affected than overall second-list learning.

Because the surface predictions are based, in part, upon the assumption that backward first-list associa-

tions compete with the formation of forward second-list associations, first-list stimuli occurring as second-list responses were tabulated. As expected, the greatest number of these kinds of errors occurred in the A-B, B-A_r paradigm. During second-list learning A units were given as responses to the B units that they had been paired with in the first list 49 times. In A-B, B'-A_r second-list learning, A units which had been paired with particular B units in the first list occurred as responses to the corresponding B' units 27 times. In second-list A-B, B-A_r learning, A units occurred as responses to the B units that they had been paired with in the first list 7 times. First-list stimuli occurred as second-list responses once in each of the A-B, C-D and A-B, B-C conditions.

In summary, the principal finding of the present study was that significant negative transfer occurred in all four experimental paradigms but that the amounts of transfer in these situations did not differ. This is in agreement with the hypothesis that negative transfer will occur in these situations but it does not support the prediction that this negative transfer will increase as S₁-R₂ similarity increases.

Following the completion of this experiment two additional groups of 20 Ss were tested. The materials and procedures used in these tests were the same as those used in the main experiment. In an attempt

to determine if the A-B, B-A_r result obtained in the main experiment was reliable, the first of these supplementary groups was tested with the A-B, B-A_r paradigm. The mean number of correct second-list responses produced by this group (19.10) was in close agreement with the main experimental mean of 20.40. The second supplementary group was tested with the A-B, C-A paradigm. Houston (in press) failed to find significant transfer in this condition while Murdock (1958) reports the appearance of significant negative transfer. The second-list learning mean obtained with this supplementary A-B, C-A group (23.50) was not significantly different from the main experimental control mean of 29.20 ($t=1.78$, $df=38$).

References

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Note

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