1955

Proactive Interference as a Function of Amount of Original Training

Alfred Castaneda
State University of Iowa

Copyright © Copyright 1955 by the Iowa Academy of Science, Inc.
Follow this and additional works at: https://scholarworks.uni.edu/pias

Recommended Citation
Available at: https://scholarworks.uni.edu/pias/vol62/iss1/46

This Research is brought to you for free and open access by UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
Proactive Interference as a Function of Amount of Original Training

By ALFRED CASTANEDA

The condition where S must successively learn two responses to the same stimulus has been assumed to provide optimal conditions for generating interference during the learning of the second response. The empirical evidence in support of this assumption is not strong. When compared to a control group this condition tends only to result in fewer correct responses in the early stages of relearning. In addition, this tendency is observed only for lower levels of training on the first task for, with increases in training it diminishes until eventually facilitation is clearly evident. Recently, however, Porter and Duncan (5) following a suggestion by Gagne, Baker and Foster (2) found evidence for interference with this condition in a verbal paired-associate learning task where the stimuli and responses involved in the first task were required to be re-paired in the second task. That is, the stimuli and responses of both tasks were identical, the second task being constructed by pairing each response with a stimulus different from that with which it was paired in the first task. It was also found that the frequency of intrusions, i.e., an error consisting of the response that was learned to a stimulus in the first task being made to that same stimulus in the second task, was related to the number of times that response had been correctly made in the first task. This latter finding would be consistent with the assumption that the degree to which the first learned response competes successfully with the learning of the new response is a positive function of its associative strength. However, in a study of motor learning employing this same basic procedure and in which the amount of first task training was one of variables studied, Duncan (1) found facilitation in the learning of the second task with the amount of facilitation being positively related to the amount of first task training. Similar results have been more recently obtained by Mandler (3) with this procedure.

The present study is concerned with the relationship between amount of first task training and the frequency of intrusions. A modification of the re-pairing procedure is employed and variations in the amount of original training occur among the different stimulus and response components which comprise the task.

Gratitude is expressed to Mr. Ralph W. Gambach, City Superintendent of Schools and Mr. Dean Hage, Principal, Tipton Elementary School, Tipton, Iowa for their assistance and cooperation in arranging for facilities and subjects.
Method

Subjects. Thirty-five fourth grade boys and girls were randomly assigned to one of three groups. The same three of the five stimulus and response pairs involved in the task were required to be re-paired by all Ss. The groups were so constituted that each pair was balanced among the three groups with respect to the amount of training it received.

Apparatus and procedure. The apparatus consisted of a rectangularly shaped box, 9½" x 18" x 19" painted flat black. Five normally closed push buttons spaced 2" apart were arranged horizontally on a sloping panel on the front of the apparatus. Centered 2" above the response panel was a 1" diameter aperture of flashed opal glass. Housed directly behind the aperture was a single 7 watt lamp. The brightness of the lamp was varied by means of a variable transformer. The five voltage values used were 60, 50, 40, 30, and 20 volts. All controls used by E were situated to the back of the apparatus. By means of a holding circuit E could select the appropriate brightness, set any single button to break the circuit and actuate the light by simple adjustments of the transformer and a rotary selector switch. S could then turn off the light by selecting the button designated correct for that brightness. Incorrect responses did not affect the light.

With the restriction that no single brightness appeared twice in succession the order of presentation during the first task was determined randomly for the first 16 presentations. Depending on the design, any given brightness selected for re-pairing appeared either six, three, or one times interspersed by three presentations of each of the two brightnesses which were not to be re-paired in the second task. This same sequence was presented five times generating a total of 80 presentations. For the second task the order of presentation of the five different brightnesses was determined randomly within blocks of five for the first 25 presentations. This was then repeated for the next 25 for a total of 50 presentations. Each of the five brightnesses, then, appeared ten times during the second task. A trial was defined as a single presentation of any given brightness.

The instructions for the first task were designed to indicate to S that he was required to learn which button turned off a given brightness. For the second task he was merely informed that some of the light-button combinations would require re-pairing. S was permitted to correct his responses in both tasks. Every response made and the order in which it was made was recorded for each trial.
Table 1 shows the mean number of intrusions for the stimulus-response pairs that were re-paired in the second task for each level of training for all groups combined. These data indicate that the tendency for the first learned response to be elicited by that same stimulus in the second task, even though that response is now incorrect, varies as a positive function of the number of times it was reinforced to that same stimulus in the first task.

Table 1.
Mean number of intruded errors for each level of training based on trials 1-50

<table>
<thead>
<tr>
<th>Number of first task trials</th>
<th>30</th>
<th>15</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.45</td>
<td>2.77</td>
<td>2.97</td>
</tr>
<tr>
<td>SD</td>
<td>1.94</td>
<td>2.10</td>
<td>1.84</td>
</tr>
</tbody>
</table>

An analysis of variance of these data indicated that the main effect of amount of original training was significant at beyond the .001 level. Comparisons among the three levels of training indicated that 30 trials of original training significantly increased the number of intrusions over either the 15 or the five trials at beyond the .01 level, t = 3.57 and t = 3.10, respectively. The difference between the 15 and five trials was not significant and it should be noted that the means in this case indicate a slight tendency for five trials to elicit the greater number of intrusions.

Discussion

These results are in line with those obtained by Porter and Duncan (5) and are in accord with the assumption that the amount of interference generated in a situation where two responses must be successively learned to the same stimulus varies as a positive function of the associative strength of the first learned response. To date little empirical evidence, particularly in complex learning situations, has been available in support of this assumption. In a more recent study Palermo (4) has replicated the present findings and, in addition, has found evidence that the level of motivation is a contributing factor determining the degree to which the first learned response will persist and hence interfere with the learning of the second response. Where the central interest is in the inhibitory role of such factors as the number and strength of competing responses in complex learning situations these results provide some consistent evidence that their experimental manipulation is facilitated by the employment of the type of procedures used in these three studies.
SUMMARY

The present study was concerned with interference in the learning of a second task as a function of the amount of first task training. Thirty-five fourth-grade boys and girls were given differential amounts of training on the various stimulus and response pairs involved in a motor learning task. The second task involved re-pairing of these pairs. It was found that the frequency with which a response which was learned to a stimulus in the first task and was elicited by that same stimulus in the second task, varied positively with the amount of training given on that pair in the first task. These results were interpreted to be in accord with the assumption that the amount of interference generated in a situation in which two responses must be successively learned to the same stimulus varies as a positive function of the associative strength of the first learned response.

References