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Verbal Discrimination Learning as a Function of Anxiety and Task Difficulty

By JAMES T. FREEMAN and RICHARD I. MOREN

Several studies have reported data bearing on the relationship between anxiety and various measures of discriminative behavior. Work by Spence and his associates (3, 4) seems uniformly to suggest that higher anxiety levels are associated with superior performance in differential eye-lid conditioning while the work of Hilgard et al (2) demonstrates impaired performance of high-anxiety Ss in the differential eyelid-conditioning situation. It must be noted that these studies involved relatively simple tasks. There is, however, some suggestion from perceptual studies involving somewhat more complex response measures (and where notably competing response tendencies were more prevalent) that discriminative performance is also impaired in the case of high-anxiety Ss (1).

The experiment to be reported utilized verbal discrimination learning as the task. It has been previously reported that rate of verbal discrimination learning is inversely related to difficulty of the task where intra-task similarity defines the difficulty level (6). In addition to the above type of task difficulty variable the present work incorporated an anxiety variable in an attempt to determine what relationship exists between anxiety and discrimination learning of a more complex nature. Further, any interactions which might obtain between anxiety level and difficulty of task may be noted within the present design.

PROCEDURE

Stimulus materials. The stimulus lists were composed of fourteen pairs of three-letter consonant syllables (7) ranging from 42 to 54% association value with an average of 47% association value for each list. There was a practice list of medium intra list similarity (12 letters being used) and the two experimental lists; low intra list similarity (18 letters used) and high intra list similarity (9 letters). The lists were constructed using the procedures described elsewhere by Underwood (6). The lists were presented in three different orders to prevent serial effects.

Experimental method. All Ss received ten trials on the practice list to acquaint them with the task and to determine equality of experimental groups. Then the Ss were given the experimental lists,

half of them receiving the high similarity list and the other half the low similarity list. All learning was carried to a criterion of one perfect trial.

The lists were presented on a Hull-type memory drum set at a 4 sec. rate. The stimulus pair was presented, one above the other, for 2 sec. then the shutter raised to reveal the correct syllable of the pair for 2 sec., the stimulus pair and the correct syllable being simultaneously present. Ss were instructed to anticipate the correct syllable prior to the raising of the shutter. The sequence of the spatial positions of the correct syllables (i.e. up or down) was randomized. The inter-trial interval was 4 secs.

Subjects. Sixty-four Ss were chosen from undergraduate psychology courses on the basis of their Taylor A scale scores (5). The cutting score for the low-anxious group was six and for the high anxious group 23; the Ss being chosen from the bottom 12% and top 15% respectively of our distribution.

Ss of both the high and low anxious groups were assigned randomly to the experimental conditions (high and low intra list similarity).

All Ss were naive as to the purpose of the A-scale and as to how they were chosen for the experiment.

RESULTS

F tests which were run on the practice trials were all below unity which indicates equality of groups with respect to initial learning ability.

Table 1
Analysis of Variance of Trials to Criterion

Source	df	MS	F	P
Similarity (S)	1	5112	51.45	>.001
Anxiety (A)	1	76		
S × A	1	226	2.27	.16
Error	60	99.35		
Total	63			

The basic data are the number of trials to reach the criterion of one perfect recitation and a summary of an analysis of variance of

Table 2
Mean Number of Trials to Criterion
as a Function of Anxiety and Task Difficulty

Anxiety	Task Difficulty (similarity)			
	High		Low	
	Mean	σM	Mean	σM
High	30.63	2.66	16.56	1.88
Low	36.62	2.59	15.00	2.72

these data appears in Table 1. It may be noted that the effect of similarity was highly significant while that of anxiety failed to reach significance. The interaction of anxiety and similarity is apparent but falls short of statistical significance ($P = .16$). However, even though the interaction is not statistically reliable, a table of means is presented in Table 2 in order that the relationships between the several variables may be more clearly seen. It should be noted that the high anxious Ss took fewer trials to reach the criterion in the more difficult task (high similarity) while the two groups were approximately equal in the less difficult task (low similarity). Once again it may be seen that the differences in rate of learning as a function of task difficulty were much greater than differences due to the effects of anxiety level.

DISCUSSION

The differences in learning as a function of intra-task similarity are not only consistent with, but are actually greater in magnitude than those reported by Underwood (6). It seems clear that the effects of intra-task similarity are prominent in verbal discrimination learning and that the corresponding set of operations defining task difficulty is justified.

The general effects of anxiety on verbal discrimination learning in this experiment were negligible. However, there is the suggestion of an interaction between anxiety and task difficulty. It may be said that the high-anxious Ss performed somewhat better than the low-anxious Ss on the more difficult task. This finding would be consistent with those of Spence (3, 4) which indicated somewhat better discrimination by the anxious Ss. In this connection, our results are counter to those obtained by Hilgard et al (2) for only in the case of the less difficult task do we find low anxious Ss performing better than the high anxious Ss although the magnitude of such differences is much smaller than in the case of the high similarity task. The present results are not altogether consistent with some studies of discriminative behavior involving perceptual measures which have indicated an impairment of performance associated with high anxiety in more difficult tasks (1).

It is not completely clear as to what is involved in the lack of generality of anxiety effects upon discrimination obtaining in studies of simple conditioning, verbal learning, and perception. Perhaps the nature of the task itself will have to be considered as a parameter influencing such anxiety effects. One fact does appear uniformly however in all the studies here referred to, the present one included; the amount of variance attributable to stimulus variables far exceeds that attributable to "behavioral" variables.

SUMMARY AND CONCLUSIONS

An experiment was performed to determine the relationship between verbal discrimination learning, anxiety, and task difficulty. Sixty-four Ss divided into high and low anxiety groups on the basis of the Taylor A scale, learned a verbal discrimination task to a criterion of one perfect recitation. Task difficulty was varied by providing lists of high and low intra-list similarity.

The data support the following conclusions:

- (1) The effect of intra task similarity on learning was highly significant.
- (2) There was no general effect of anxiety on learning.
- (3) There was a suggested interaction between anxiety and difficulty of task; the high Ss appeared to perform better on the more difficult task while there were no appreciable differences in the less difficult task.

The results were related to those of other studies and, in particular to the effects of anxiety upon differential conditioning which have been reported by Spence and Hilgard. It was suggested that a task dimension may be necessary to provide for uniformity of results originating in different experimental situations.

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