

PSYCHOLOGY

Chairman: BARRON B. SCARBOROUGH, DePauw University
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ABSTRACTS

The Effect of Alcohol on the Response Level in Rats. B. B. SCARBOROUGH, B. L. BROWN and J. M. WHEATON, DePauw University.—A number of experiments have indicated that alcohol reduces anxiety in animals in approach-avoidance situations. An important consideration is whether alcohol brings about a diminution in visceral and motor components associated with anxiety only as long as it is within the system of the organism or whether alcohol effects a relatively permanent reduction in the anxiety-producing properties of the external stimulus situation.

A group of 18 male hooded rats were trained by being shocked for two trials a day for eight days for two minutes per trial in a modified Skinner box. A bar located in the side of the box could be depressed to cut off the shock and simultaneously activate an electric timer. The time each rat pressed the bar was recorded and used as basis for dividing the rats into two equal groups. During the test trials one group was injected intraperitoneally with 1.5 cc of 10% solution of ethyl alcohol per 100 grams of body weight. The other group received injections of 1.5 cc of distilled water per 100 grams of body weight. Four minutes after injections all rats were placed in the shock box for a two-minute period without shock. The bar-pressing response of the alcohol group was significantly less (.01 level of confidence) than that of the water group. During the extinction trials, which were given 72 hours following the test trials, both groups were injected with water and given one shockless trial per day for five days. The average time the alcohol group spent on the bar was significantly less (.01 level of confidence) than the average time spent on the bar by the water group. Following the five extinction trials each rat was given five relearning trials without any injections. There was little difference in the average rate for relearning the bar-pressing response (t value of .16 with 2.31 required at the .05 level of confidence).

The results of the experiment indicated that (1) alcohol did reduce anxiety in rats with anxiety defined in terms of a bar-pressing response made in a situation previously made fearful by shock (2) the fear-reducing qualities of alcohol last at least 72 hours after injection. The effects of alcohol in reducing anxiety persisted beyond the period of anticipated physiological involvement. Thus the results indicate that alcohol brings about a relatively permanent reduction of the fear-producing properties of a feared situation.

There is another possible hypothesis which may account for the findings of this study. As a result of the alcohol on the visceral and motor and/or cortical activity, the rats learn different responses in the test trials and therefore exhibit different extinction rates. However,

after five trials the water group has also experienced considerable extinction and have learned some new responses. Therefore by end of the extinction trials both groups have learned different responses to the original stimulus situation to an extent that the difference in their relearning rates was not significant.

An Experimental Study of Learning in the Immediate Post-Electro-Shock Period. GEORGE A. ZIRKLE, Hanover College.—The purpose of this study was to investigate the effects of electro-convulsive shock on the learning ability of mental patients. Subjects were 5 female and 3 male psychotic patients at Madison State Hospital. All were literate, co-operative, and in fairly good contact.

Three types of learning materials were employed—pictorial, verbal, and numerical. Pictorial materials were 16 mannikin drawings, with varying conditions and objects at 15 locations on the pictures. Each also contained an eight-word mental hygiene aphorism. Verbal materials were 16 lists of paired adjectives. Numerical materials were 16 lists of 2 to 8-place numbers ranged in the pattern of the Wechsler-Bellevue scale.

Six runs of the three types of materials were given before shock to establish a control level of performance. Three runs each were presented after three electro-convulsive shocks, making a total of 9 experimental runs. Experimental testing began as soon after shock as patients could walk to a nearby examining room, an average for all subjects of 18½ minutes later. The second run followed immediately after the first, an average of 38¾ minutes after shock. The third run came after the subjects had had lunch, an average of 2¾ hours after shock.

Results showed a profound interference of shock with learning performance. Critical ratios of the difference between experimental means on the first run after shock and control means are highly significant for the mannikin and paired adjectives materials, being respectively 12.39 and 7.26. Like ratios for the second run were 4.23 and 2.89. By the third run, experimental performance returned to control levels. Little effect of shock on the learning of numbers was noted.

Implications of the findings for psychotherapy in the post-shock period were noted.

The Relation Between the Human Blink Rate and Induced Muscular Tension. DONALD C. KING, Purdue University.—The blink rate of sixty-six college psychology students was recorded for one minute while the subjects were relaxed, while they squeezed two hand dynamometers simultaneously with one-eighth of their maximum grip, and while they squeezed the dynamometers with three-eighths of their maximum grip. These three records were made for each subject in two different experimental settings. In the first setting (Part 1) the subjects were unaware that their blink rates were being recorded. In the second setting (Part 2) the subjects were aware that their blink rates were being recorded and were told to attempt to inhibit their blinking.

The data obtained were analyzed to determine the effect of induced muscular tension upon the blink rate, the difference in the blink rate

during twenty-second periods under the same degree of tension, and the correlation between the total number of blinks in Part 1 and Part 2 of the experiment. A replicated 3 x 3 Latin square design was used in the experiment.

Subjects blinked significantly more during both tension conditions than was the case for the relaxed condition in both parts of the experiment. In Part 1 there was no significant difference in the blink rate during the two conditions of induced muscular tension. In Part 2, the subjects blinked significantly more while working with three-eighths of their maximum grip than was the case with one-eighth of their maximum grip. There was no significant differences in number of blinks between twenty-second periods of recording for any of the three conditions of recording in Part 1.

The correlation between the subjects' total score on Part 1 and their total score on Part 2 was .50.

A possible explanation of the results is that, when there is muscular tension in the hand, there is response interaction resulting from spatial summation with a consequent reduction in the amount of sensory input needed to trigger an eye blink. Spatial summation is possible because of the proximity in the motor cortex of the motor channels of the hand and those responsible for the eye blink.

Electroshock and Conditioned Avoidance Learning in the White Rat. L. A. DORY, Purdue University.—The purpose of this investigation was to determine the effects of a series of 10 electroconvulsive shocks upon the relearning and extinction of a conditioned avoidance response.

Thirty-four male albino rats learned a conditioned avoidance response which required the animals to cross a barrier to escape shock to the feet following the presentation of the conditioned stimulus. Animals were assigned to experimental and control groups. These groups were equated on the basis of the series of original learning trials. The experimental animals then received a series of electroconvulsive shocks, one each day for ten days. Control animals were given pseudo-shock.

Following this series of treatments, all animals relearned the conditioned avoidance response. One day later the response was extinguished.

Analysis of the results obtained during the relearning and extinction trials clearly differentiated between shocked and control animals. Those animals that received convulsive shock showed a definite impairment in ability to relearn the conditioned response. Five animals failed to relearn. The conditioned response was also found to be much more resistant to extinction in the control animals than in the shocked group.

Expectancy and the Extinction of Expectancy in the Rat. F. E. GOODSON, G. W. LEWIS and R. R. KIMBELL, DePauw University.—A group of 20 female hooded rats was given 5 training trials per day for 8 days in a single unit T maze while under 22 hours food deprivation. On three of these trials Ss were reinforced with a mixture of bread, milk and sugar in the right hand goal box. On the other two trials Ss were reinforced with the same food in the left hand goal box. On all trials Ss were forced to go to the right hand goal box before going left on left hand

goal box reinforcement trials. The position of the reinforcement was determined from a sequence obtained from a table of random numbers.

During the test trials wet mash was placed in the right hand goal box. It was hypothesized that Ss would fail to eat the wet mash in the right hand goal box and that they would make the "expectancy" response to the left hand goal box where no food was available.

On the first test trial, when wet mash was placed in the right hand goal box, only one animal ate the wet mash during the 20 second test period, and 12 of the Ss made the "expectancy" response to the left hand goal box.

In order to test the hypothesis that Ss failed to eat and made the "expectancy" response because of stimulus disruption another group of 23 female, hooded rats were given identical training except that the foods were reversed. That is, these Ss were trained with wet mash and tested with bread, milk and sugar.

On the first test trial all of these animals ate the bread, milk and sugar during the test period and only two made the "expectancy" response. The difference between the two groups was significant at the 1% level of confidence. In all cases the "expectancy" response extinguished by the 3rd test trial.

The Effects of an Interpolated Response on Spontaneous Recovery.
RICHARD MILLWARD, Indiana University.—The typical spontaneous recovery experiment has four periods: 1. A conditioning period during which the basic response is learned. 2. An extinction period in which the basic response is extinguished. 3. A "blank" period in which recovery has an opportunity to occur. Finally 4. A test period. This experiment is concerned with the effect upon spontaneous recovery of interpolated learning during the "blank" period of a response similar to the basic one; and secondly, the effect upon spontaneous recovery when such a response has been learned and it is extinguished in the test period.

Three groups of five male rats each around 125 days old and maintained at 80 per cent body weight were used. They were run in a Skinner Box with two bars, A and B, each removable. All three groups learned the basic response, bar-A and received 100 regular reinforcements to it. Then they were extinguished to bar-A for 50 minutes. In the "blank" period group 1 was placed in the cage with no bars present for 30 minutes. The second and third groups were conditioned to a second response, bar-B and received 60 regular reinforcements to it. In the test period groups 1 and 2 were extinguished only to the basic response, bar-A. Group 3 was extinguished to both the basic response, bar-A and the interpolated response, bar-B.

Comparing the extinction curves in the fourth period for group 1 which did not learn the interpolated response and group 2 which did; it was found by a median test that group 2 gave a significantly greater number of responses than group 1 at the one per cent level. Comparing, in a similar way, group 2 which learned the second response and group 3 which also learned the second response but which was extinguished on both the basic responses and the interpolated response in the test period;

it was found that group 3 gave a significantly lower number of responses than group 2 with a probability of .07.

Thus, interpolation of a second response similar to the basic one seems to increase the amount of spontaneous recovery; while extinction of a learned interpolated response during the test period seems to decrease the amount of spontaneous recovery.

Further Changes in Attitudes Toward Germans, Japanese, Jews and Nazis. LEWIS E. ALBRIGHT and ARTHUR KIRSCH, Purdue University.—Five measures of attitudes toward Germans, Japanese, Jews and Nazis were made over a 20-year period. Presumably similar samples of introductory psychology students at Purdue University served as subjects in the years 1935, 1942, 1945, 1947 and 1955. The results support these conclusions with regard to the present study:

1. A significant increase in favorableness of attitude has occurred toward Japanese, Jews, and Nazis since 1947. This increase was accompanied by significantly greater homogeneity of attitudes toward Jews, and significantly greater heterogeneity of attitude toward Nazis.
2. No significant change was found in mean attitude toward Germans since 1947, although greater heterogeneity of attitude did occur.
3. In this study, as in each of the previous investigations, Germans were ranked highest of the four groups in favorableness.
4. Partial evidence still supports Remmers' "general tolerance factor."

Discrimination Learning as a Function of the Similarity of the Stimulus Names. IRMA GERJUOY, Indiana University.—This study, using second, third, and fourth grade children as Ss, was designed to test the hypotheses that (1) learning dissimilar-sounding nonsense syllable names, to lights, differing only with respect to position, should result in faster acquisition of subsequent button-pushing responses to these lights than the acquisition of similar-sounding nonsense syllable names, (2) overt verbalization, as compared to no overt verbalization, of the stimulus names during the motor task should result in faster learning if the names are dissimilar and slower learning if the names are similar, and (3) the acquisition of dissimilar-sounding names to stimuli identical with those of the motor task should result in faster learning of the motor task than experience, in a color-naming task, with light stimuli different from those of the motor task.

The results of the motor task reveal that there are no differences in errors or trials between the similar and dissimilar conditions, fewer trials to criterion were required under the overt verbalization condition than under the no verbalization condition, and there is some evidence of an interaction between type of name and verbalization. With respect to both trials and errors there was a significant difference between the name-learning and color-naming pre-training groups in favor of the former. This difference was more pronounced in the first session than

in the second session. There was also a significant decrease in errors for the irrelevant pre-training group from the first to the second session.

The third hypothesis was the only one unequivocally confirmed. The failure to confirm the other predictions may be due to the simplicity of the task, the possibility that Ss gave other verbal names to the stimuli, the possible absence of primary generalization among the stimuli, and/or learning to respond to orientation-produced cues.

Two and Three Item Confusion Matrices for a Set of Three English Syllables. HERBERT GERJUOY, Indiana University.—This is a report on theoretical notions and practical considerations arising in work in progress supported by Air Force Contract No. AF 18(600)-571 on the discrimination basis of confusion matrix data.

Confusion matrices are seen as arising from psychophysical multiple discrimination studies involving multiple-alternative choices. It is suggested that a combination rule be sought that would enable the calculation of theoretical confusion matrix scores from scores when stimuli are discriminated in a two-alternative choice situation, generating 2 x 2 confusion matrices.

A proposed rule would make the ratio between any two response scores for a given stimulus equal the ratio of the scores for the same responses to the same stimulus in two-alternative situations.

It is not expected that data will generally fit this simple relationship. However deviations from predictions using this rule may be taken as defining two new effects: assimilation where there is greater difficulty of discrimination than predicted (greater confusion) and dissimilation where there is less confusion. It is suggested that working with residual confusion matrices consisting of differences between theoretical and observed scores may lead to simpler empirical relationships than working with tables of raw confusion data.

An experimental test of the hypothesis compared 2 x 2 matrices with a 3 x 3 matrix. It was found that deviations from predictions were significant where subjects had strong pre-existing response preferences. As designed, the experiment was part psychophysical and part learning, however asymptotic data were used in the analysis. It is suggested that the possibility of learning be considered in other such experiments.

Extra-cranial Localizations of the Phantom Sound. F. R. SHOAF, Purdue University.—An investigation into directional localization of extra-cranial perceptions of the phantom sound was conducted with nine male and nine female college students. Three groups of six subjects each participated in replications of the experiment.

Intensity differences at the two ears were combined with phase changes to determine the direction of their influence for various pure tones. Binaural intensity differences of 5, 10, 15, and 20 decibels were utilized at each frequency level 500 cps, 2000 cps, and 5000 cps. The standard intensity was 20 phon. The sound-sources, two receiver-type phones, were positioned 50 cm from each ear of the listener.

It was found that use of the phantom sound is an effective technique for accurately demonstrating the influences of changes in the binaural-

ratio for intensity. These intensity changes are quite sufficient to cause displacements of the perceived single sound-source to extra-cranial positions in favor of the more intense tone. On the average, each increase of 5 decibels was effective in causing directional judgments to be displaced 15° in azimuth.

When the two stimulating tones were 180° out-of-phase, the profiles of the three frequencies were quite uniform. When the tones were in-phase, the profile of the 500 cps frequency deviated from the consistent trend of the higher pitch tones.

Spatial Learning as Discrimination Behavior. I. STEELE RUSSELL, Indiana University.—In his article on "Studies in Spatial Learning I.", Tolman reports evidence of short-cut behavior that he interprets as being based on a cognitive map of the situation, including the location of the goal. The purpose of this study is to examine the stimulus-role of the light cue in the Tolman experiment. If orientation is in terms of a cognitive map of the goal location in the environment, alteration in the position of the light should have no effect on short-cut behavior as it still illuminates the environment. However, if behavior is mediated by a discriminated light cue that has acquired excitatory properties as an S_c , then alteration in the position of the light should affect performance. This experiment seeks to decide between these alternatives.

The subjects were twenty rats, ten experimental and ten control. All Ss in the two groups used received five massed daily trials on an identical maze to Tolman's for five days. On the five test trials, the animals were presented with a situation involving two straight paths from the choice point in the maze, one leading to the former goal locus, the other away at an angle to the opposite side of the room. For the control group, the position of the light remained constant (adjacent to the goal) from training to test trials, while for the experimental group the light was *moved* to the end of the path pointing to the other side of the room from the goal.

The control animals made 42 choices on test trials to the goal path, and 8 choices to the path that pointed neither to the goal nor to the light. The experimental animals showed the opposite trend, making 39 choices to the path leading to the light cue, and 11 choices to the path that leads to the goal locus. These results were significant at the .001 level, thus rejecting the hypothesis that the choices are independent of the position of the light. These results would seem to preclude the Tolmanian hypothesis that changes in the position of the light will have no effect on short-cut behavior, that goal performance is based on a cognitive map and that the function of the light is solely in terms of illumination. On the contrary, the path choices or short-cut behavior is perhaps more convincingly seen in terms of a generalized approach response to a discriminated light cue, and not the location of the goal.