

PSYCHOLOGY

Chairman: E. J. ASHER, Purdue University

R. W. Bruce, Wabash College, was elected chairman for 1950.

ABSTRACTS

Two Components of a Social Attitude. EMANUEL K. BELLER, Indiana University.—*Problem:* Sherif has stated that social attitudes are interiorized social norms. A modification is here suggested: One can distinguish two verbalizable components of a social attitude: (1) The interiorized norm (an internal response), which reflects a source that impels the individual to react in a positive, negative, or neutral way toward the relevant value object, (2) a behavioral disposition, which reflects other sources of instigation (including incompatible interiorized norms) and which is more likely to be in accordance with actual overt responses of the individual to the same value object.

Population and Procedure: A test was conducted to measure two components of the attitude toward prejudiced conduct in boys. These were the interiorized norms of and the behavioral disposition toward prejudice against Negroes. The test was given to thirteen groups (totaling 513 boys), in which age (9, 12, 15) and environment (institutionalized and non-institutionalized) were the independent variables.

These groups were compared with respect to their (1) verbalized behavioral disposition, (2) verbalized interiorized norm, (3) discrepancies between interiorized norm and behavioral disposition, and (4) degree of interiorization of norms of prejudiced conduct.

Results and Conclusions:

Comparisons between these groups showed that:

1. The measures of the two components yielded essentially different results for the 9 and 12 year old groups but not for the 15 year olds.

2. Behavioral Disposition. Prejudice increased with age in the non-institutionalized groups of boys. This trend was reversed in the institutionalized groups (the older boys were less prejudiced).

3. Interiorized Norms: Prejudice decreased from 9 to 12- and increased from 12 to 15 year old non-institutionalized boys. No trend with increasing age was found in institutionalized boys.

4. Interiorization of Prejudice: The 9 year old boys were more prejudiced in their 'interiorized norms' than in their "behavioral disposition". This relationship was completely reversed in the 12 year old boys. The difference of the relative position of the two components of prejudice disappeared in the 15 year old boys. (The orphan boys deviated from all the other subjects.)

Some further conditions of transfer of training. ROBERT W. BRUCE, Wabash College.—This is a further study of some of the conditions of transfer of training. We seek to answer these questions: What is the relation of the following conditions of learning to transfer: (1) Learning to make *successive* new responses to an old stimulus? (ab, ac, ad, ae, af); (2) Learning to make an old response to *successive* new stimuli? (ba, ca, da, ea, fa); (3) Learning to make *successive* new responses to *successive* new stimuli? (ab, cd, ef, gh, ij).

In general, the experimenters Hunter, Pearce, Wylie, Bair, Kline, and Bruce have found that (1) learning to make an old response to a new stimulus results in a marked degree of positive transfer; that (2) learning to make a new response to a new stimulus results in a slight degree of positive transfer; and that (3) learning to make a new response to an old stimulus results in very little transfer at all.

We have sought to extend this finding,—to carry these sequences further. Also, we offer a theoretical explanation for the phenomena disclosed.

We found that learning to make the *same* response to *successive* new stimuli, Condition II, results in such marked positive transfer (100, 56, 45, 36, 30) as to suggest, that the type of learning involved, in reality shifts from a retained members type of learning, to a recognition type of learning.

The considerable degree of positive transfer which occurs in learning to make successive new responses to successive new stimuli, Condition III, (100, 95, 89, 84, 80) suggests that successive learning as such, typically gives a small to fair degree of positive transfer.

The negligible degree of positive transfer which occurs in learning to make successive new responses to an old stimulus, Condition I, (100, 97, 97, 95, 95), suggests that the mere experience of learning these syllables undoubtedly aids, as is shown in the condition II results. On the other hand, a negative factor is undoubtedly present here, which more or less neutralizes the total final effect. In fact, several investigators including Kline have reported a very slight degree of negative transfer in the learning involved in making new responses to an old stimulus.

Two interpretations of concept formation. ARNOLD H. BUSS, Indiana University.—An experiment on concept formation was performed in order to compare the effectiveness with which two interpretations would handle the data. In traditional terms the purpose of the experiment was to study concept formation as a function of the proportion of positive and negative instances in the learning series. In learning terms the purpose was to discover the functional relationship between the tendency to make a particular response to stimuli with certain properties and the number of reinforcements of the response in the presence of these stimuli. The stimuli were blocks which varied in height, color and surface area; the top and bottom surfaces were triangular. There were five learning series, each having a different proportion of tall blocks (positive instances) and short blocks (negative instances). The subjects,

100 college students of both sexes, were divided into five groups of 20 each. Each group had one of the five learning series followed by a criterion series which was the same for all groups. The blocks were presented singly for five seconds, and the subject released one of two telegraph keys to indicate his choice. The subject was told "Right" or "Wrong" after each response in the learning series but not in the criterion series. The number "correct" and the frequency of responses were recorded.

The results indicated that the number "correct" is primarily a function of the kind of blocks in the criterion series rather than the proportion of positive and negative instances in the learning series. The frequency measures were found to be functionally related to (1) reinforcement of a particular response in the presence of tall blocks; and (2) nonreinforcement of this response in the presence of stimuli other than tall blocks.

Analysis of the Problem of Validation of the Rorschach Technique.

B. D. COHEN, Indiana University.—Rorschach interpretation involves more complex behavior on the part of the psychologist than does the interpretation of more formally standardized test procedures for which precise tables of norms are available. With the Rorschach test, the individual interpreter is a more influential component of the instrumental procedure. Consequently, the problem of validation of the method is a particularly difficult one.

Clinical validation methods have established the Rorschach test as a working clinical instrument and have provided many provocative hypotheses. Many of these hypotheses can and should be subject to direct experimental verification procedures.

An analysis of the typical method whereby inferences are drawn from Rorschach data reveals a functional classification of validation procedures. Evaluation of these procedures indicates the most promising technique to be the prediction of behavior in specially constructed situations designed to test specific Rorschach hypotheses.

The interaction of responses to step function stimuli. DAVID CRAIG, Indiana University.—Research reported here was designed to provide information on the linearity of operator performance in a direct tracking situation by determining the extent to which the responses of the operator-apparatus combination to superimposed inputs conform to the responses of a linear system to such inputs.

Subjects tracked a spot which made step-function movements away from and back to a center position. Four different amplitudes of displacement were used. The time interval between members of each pair of opposed steps was varied so that both uncomplicated responses to single steps and overlapped responses were obtained.

Results indicate that the mean response of the operator-apparatus combination to a pair of opposed step inputs conforms to the requirements of a linear system for all amplitudes tested. However, the

relationship between mean responses to single steps of different amplitudes does not fulfill the requirements of linearity. Information concerning the nature of this non-linearity will require further research.

The psychology of esthetics: a challenge. ROBERT E. DREHER, Wabash College.—It would be the writer's contention that the vast majority of studies catalogued under the classification of the psychology of esthetics might better be classified as the "psychology of esthetic elements"—*Tonpsychologie*, the psychology of line, color, et cetera. It has been safer (and easier) to continue in the Fechnerian tradition of esthetics "from below", apparently, than to attempt analyses of behavior to whole esthetic objects in an esthetic milieu. Some of the fairly obvious reasons for this state of affairs are considered.

It has been only in relatively recent years that psychologists have approached esthetic objects as proper stimuli for behavioral events with the same methods, techniques, and principles which have characterized "objective" psychology in other areas of experimentation. While the number of experimental studies which have been executed with this orientation to the psychology of esthetics is limited, several are cited to illustrate the efficacy of this "new" approach.

Progress in this field, we believe, depends upon the ingenuity and skill of future experimenters to devise more adequate techniques for the control and observation of esthetic behaviors as complex behaviors and to reject the atomistic and piecemeal approach which has dominated the orientation of workers in this type of research.

A preliminary report on the effects of glutamic acid on test scores. P. R. FULLER, D. G. ELLSON, and R. URMSTON, Indiana University.—In order to supplement previous experiments on the effect of glutamic acid on the psychometric test scores of mental defectives, an experiment of nine months' duration was performed at the Muscatatuck State School for the mentally retarded by members of the Indiana University Psychology Department. Thirty pairs of subjects, ranging in age from eight to seventeen years and in Stanford-Binet IQ from sixteen to seventy-four, were matched on the basis of age and IQ. The experimental group received glutamic acid in doses which were increased gradually from 4 to 30 grams per day; the control group received a placebo.

Five tests, the 1937 revision of the Stanford-Binet, the Cornell-Coxe, a rate of tapping test, a digit span test, and a coordination test in which both time and errors were recorded, were administered just before the experiment began. After 4½ months and after 9 months the tests were again administered. The testers did not know which subjects were receiving glutamic acid and which ones were receiving the placebo.

The experimental (glutamic acid) group made a greater increase in Stanford-Binet IQ and in the rate of tapping than did the control (placebo) group. On the other hand, the mean Cornell-Coxe score and digit span of the control group increased more than did those of the experimental group. None of these four differences was statistically

significant. However, the control group showed significantly greater decrease in errors on the coordination test while the experimental group showed a greater decrease in the time required to perform the coordination test.

In this experiment, supranormal amounts of glutamic acid were not shown to result in significant improvement in psychometric test scores.

The effect of a verbal stimulus as a reinforcement. JOEL GREENSPOON, Indiana University.—The purpose of this research was to determine the effect of a verbal reinforcement introduced immediately following a plural noun response on the frequency of plural noun responses. Twelve college students were randomly assigned to the experimental and control groups. The experiment was conducted in a soundproof room and was recorded on a wire recorder. A chronoscope was used to record the time.

The subjects were instructed to say all the words that they could think of, but were not to use sentences, phrases, or to count. In the case of the experimental group, immediately after each plural noun response the verbal reinforcement, "Mmm-hmm", was introduced by the experimenter. No reinforcement was introduced for the control group. The subjects responded for a period of twenty-five minutes. At the end of the experimental session each subject was asked if he knew what had been transpiring in order to determine if he could verbalize any changes that may have occurred in his behavior.

The results were computed on the basis of five minute periods. The percentage of plural noun responses to the total number of responses was computed for each period and for the total experimental session. It was found that the experimental group gave a significantly larger number of plural nouns than the control group. None of the experimental subjects was able to verbalize any changes in his behavior.

It can be concluded that "Mmm-hmm" is a reinforcement in this type of training and changes in verbal behavior can occur without the subjects' being able to verbalize them.

Indirect extinction of a conditioned response. NORMAN GUTTMAN and WILLIAM K. ESTES, Indiana University.—Can a conditioned instrumental response be extinguished without actual elicitation? We have attempted to answer this question by analyzing the sequence of movements comprising a bar-pressing habit into its component S-R correlations and then eliminating the final member of the sequence before beginning experimental extinction.

Two groups of four albino rats were first conditioned to press a bar for water reinforcement in a Skinner-type apparatus. After both groups had received 500 reinforcements, the experimental group was given six daily 30-minute periods of "indirect extinction." During these periods, the bars were removed from the apparatus. The animal was free to move about in the box during the entire period, and at intervals

of about 90 seconds was stimulated by operation of the empty magazine. At first all animals approached the magazine whenever the motor sounded, but during the six periods this behavior extinguished. Finally, both groups were given experimental extinction of the bar-pressing response. During a 30-minute period, the animal was confined in the apparatus with the bar available but disconnected from the magazine. All bar-pressing responses were recorded.

Extinction curves for the bar-pressing response revealed marked differences in form. The experimental group started at a higher rate, but extinguished much more rapidly. The higher initial rate is presumably due to the previous separate extinction of the final component of the response, which reduces the minimum time required for execution of a response. The more rapid extinction may be attributed to the elimination of secondary reinforcement.

In summary, it appears that a conditioned instrumental response may be weakened, but not completely extinguished, by separate extinction of its final component.

An application of the operant conditioning paradigm to human studies. E. J. HOVORKA, Indiana University.—*Purpose:* (A) To measure stimulus generalization. (B) To test the applicability of the operant conditioning procedure to human studies.

Population: 62 students of elementary psychology.

Procedure: After an initial test on 12 mathematical problems, each subject was placed in a semi-darkened room and told that he would be re-tested in an hour and could play with a machine in the room if he wished.

Three neon lights, mounted on the machine flickered at a rate determined by the experimenter. If the subject pressed a foot-pedal on the machine, a cartoon illuminated by a 30 watt light dropped into view for twelve seconds. In this situation, the cartoon is specified as the reinforcing stimulus for the pedal-pressing response.

Each subject was allowed to present himself in this manner with 16 cartoons while the neon lights flickered at a rate of 2 flashes per second. Following the 16th reinforcement, subjects were distributed among seven extinction groups. The difference between the seven groups was the rate of flicker of the neon lights which assumed one of the values; $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, or 16 flashes per second. Under these conditions no further reinforcements were available and extinction curves were collected.

Results and Conclusions: The length of time and number of responses made to a criterion of 15 minutes of no responding were computed for each of the 7 groups. Although a double-winged stimulus generalization gradient is suggested, the differences between groups are not statistically significant. The mean extinction curve presented closely resembles the extinction curves produced by pigeons and rats in comparable situations.

A follow-up analysis of an apprentice selection program. E. J. McCORMICK, and J. B. MORETTI, Purdue University.—The purpose of this investigation was to ascertain the relative effectiveness of a battery of tests that had previously been used in the selection of apprentice applicants for a training program in the car and locomotive repair shop of an operating railroad.

In the original testing 83 applicants were given the following tests:

1. Purdue Adaptability Test
2. Purdue Mechanical Adaptability Test
3. Purdue Industrial Mathematics Test
4. Industrial Training Classification Test
5. Can You Read a Working Drawing?

Thirty-six of these subjects were selected for training. 13 of this group were separated for various reasons, leaving the group of 23 trainees. Results of this study are based upon 19 trainees.

Intercorrelations between test scores and three criteria were computed. The Wherry-Doolittle Test Selection Method was worked against each of the three criteria with the following results:

1. School performance. The Purdue Mechanical Adaptability Test, the Industrial Training Classification, the Adaptability Test and Can You Read a Working Drawing? were found to give the optimum predictability of school performance, with a shrunken multiple correlation of .643. The Adaptability Test and Can You Read a Working Drawing? entered into this prediction with negative weights; while they gave the "symptoms" of operating as "suppression" tests to the other two, it is probable that such results were due to chance factors such as the small number of cases.

2. Shop performance. The Purdue Mechanical Adaptability Test was found by itself to give the optimum degree predictability of shop performance.

3. Criterion of combined performance. The Purdue Mechanical Adaptability Test and Can You Read a Working Drawing? were found to result in the optimum degree of predictability of combined school and shop performance, with a shrunken multiple correlation of .610. While Can You Read a Working Drawing? entered into this prediction with a negative weight, and appeared to operate as a "suppression" test, it is probable that such results were due to chance factors.

Eye reaction as an indicator of emotion. ROBERT STANLEY ORT, Wabash College.—A research study in the field of experimental psychology on the validity of involuntary eye movement as an indicator of emotion. Thirty-two female subjects were given a word association test consisting of 5 presumably non-loaded words and 5 presumably loaded words, during which time their eye-movements were being recorded by an American Optical Company Ophthalmograph. The response, reaction-time, and any other visible indicators of emotion such as a laugh were recorded.

The number of eye reactions were then compared with the number of other complex indicators for the presumably non-loaded words. The same procedure was followed for the presumably loaded words. The words were then listed in the order of presentation, and the number of times each word elicited one or more of the known complex indicators was recorded. In addition the number of times each word was accompanied by eye reaction, was recorded.

The results show that a greater number of words are accompanied by eye-reaction, in either the non-loaded or the loaded words, than by all other indicators combined. The words indicated to be loaded, by any one or more of the known indicators, were found to be accompanied by eye-reaction in 79.74% of the cases. It appears that involuntary eye-movement is a more sensitive indicator of emotion than any of the customarily used complex indicators.

The relationship between an individual's role in a homogenous group and his awareness of that role. HOMER G. WOOD, Purdue University.—A sociometric questionnaire covering nine social areas was administered to a fraternity group consisting of thirty-four members, all of whom had lived at the fraternity house for a period of at least one year prior to the administration of the test. Each member of the group was asked to name those individuals in the house with whom he would most like to participate in each of the nine functions, and, also, to name those individuals with whom he would least like to participate. In addition, each man was asked to name those individuals in the house whom he thought would either choose or reject him in any of the categories. An analysis was made of the relationship between the number of sociometric votes, choice or rejection, received by an individual and his ability to estimate which individuals had actually chosen or rejected him.