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RELATIONSHIP OF GENERALIZATION TO AWARENESS IN VERBAL CONDITIONING

A THESIS SUBMITTED TO THE GRADUATE SCHOOL OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN PSYCHOLOGY

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ABSTRACT

Students from the introductory psychology class at the University of Hawaii initially participated in a verbal conditioning session. Following the conditioning task Ss performed a generalization task, at the end of which they were given two post-experimental interviews based on both the conditioning task and the generalization task for the assessment of awareness.

It was found that awareness of the response reinforcement-contingency did produce significant differences on the conditioning task, yet the reinforcement effect for the non-aware Ss was also clearly demonstrated. However, awareness of the response reinforcement-contingency on the conditioning task did not result in significant differences in generalization. Also awareness of the influence of the initial experiment or of the relationship between the two experiments while performing the generalization had no affect on generalization. Intertrial activity did not produce any difference in conditioning, generalization, or in the determination of awareness.

Results were interpreted as supporting the Reinforcement theory of conditioning.

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Chapter I

Introduction

Current literature in psychology is replete with experimental investigations in the area of verbal conditioning, as evidenced by recent reviews of Krasner (1958), Salzinger (1959), and Williams (1964). An increasing trend in the number of publications in this field since 1947-1962 has been aptly represented by Kanfer (1964) by a graphical illustration. (See Figure 1)

The theoretical framework in which early investigations in the realm of verbal conditioning were carried on can be traced to the conceptual framework provided by Skinner's (1957) descriptive behaviorism, an approach strictly devoted to the study of responses. Characterization of verbal behavior by Skinner was basically a generalization from his operant conditioning research with infra-humans to humans, based on the assumption that a parallel degree of lawfulness exists across the species.

In essence, the principles underlying operant conditioning, as stated by Skinner, assert that the probability of the emission of any response is automatically strengthened if the response is followed by a reinforcing state of affairs. Further, this response can be brought under the control of the situational stimuli, in that it tends to be emitted under circumstances which characteristically had accompanied reinforcement. Such responses operating on the environment and generating consequences

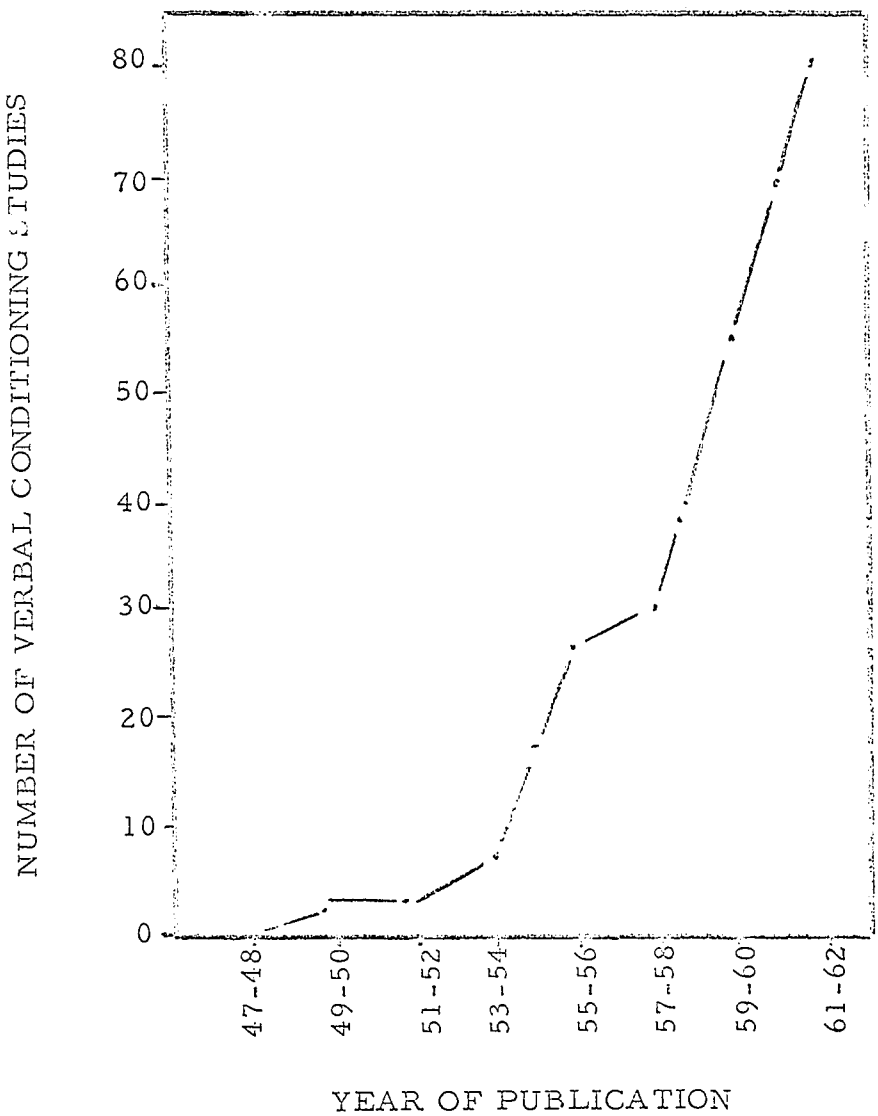

Fig. 1. Articles relating to verbal conditioning published between 1947 and 1962. Based on unpublished data from F. H. Kanfer.

are termed 'operants'. According to Skinner, verbal behavior, too, can be classified as operant behavior and can be subjected to experimental manipulations of the independent variables in order to achieve prediction and control of the probability of a given verbal response. Commenting on the aims and purpose of studying verbal behavior through techniques initiated within the operant conditioning paradigm, Speilberger aptly states "this approach to verbal behavior has as its goal the functional analysis of relationships between observable physical and environmental events and a speaker's verbal responses". (Speilberger, 1965 p. 7)

Although the impetus to the research in verbal conditioning was provided by Skinner's descriptive behaviorism, a new school of thought, guided by cognitive learning theories, emerged. Investigators influenced by the cognitive frames of reference disclaimed the contentions held by Skinnerians of a direct-strengthening viewpoint of conditioning resulting from reinforcement, and, instead proposed the mediation of cognitive processes as having an important role in the modification of verbal behavior. In other words, Ss performance is viewed as a complex product of his hypotheses and his motives, variables considered to be non-significant to the conditioning process by the Skinnerians.

The major difference in the two approaches to verbal conditioning, namely, the cognitive and the reinforcement, stems from the definition of the 'learned response' proposed by them. For theorists working

within the Skinnerian tradition, no distinction is made between learning and performance, as learning is solely gauged by observed gain in Ss performance, whereas learning is inferred by the cognitive theorists on the basis of Ss verbalized hypotheses-his ability to decipher the correct response-reinforcement contingency and his willingness to act on his hypotheses. Thus the variable of 'awareness' assumes a central position in the cognitive interpretation of learning.

Convincing evidence of the modification of verbal behavior both by reinforcement theorists and the cognitivists is found in the literature, and a more thorough exposition of the variable of awareness will be deferred until later.

General Survey of Basic Research in Verbal Learning

The earliest explorations carried out in the field of verbal conditioning were by Greenspoon (1954; 1955) and Taffel (1955). Considering the impact their methodological procedure has had in the designing of later experiments, the techniques used by Greenspoon and Taffel may be regarded as classics in the field. Most of the investigations carried out in this area today follow a similar procedure or slight variations of it.

In the Greenspoon (1955) word-naming procedure, an attempt was made to design an experimental situation to study verbal behavior that would parallel the operant conditioning procedure used with infra-humans.

Ss were instructed to say words ad libitum, taking special care in not using sentences or phrases. The class of response selected for reinforcement was 'plural nouns' and the reinforcers used were 'mmm-Hmm' and 'huh-uh'. A control group in the experimental design received no reinforcement. Results indicated that Ss reinforced with 'mmm-Hmm' increased the frequency of emission of plural nouns, whereas 'huh-uh' had no effect, suggesting that the type of reinforcer used has an effect on conditioning.

Variants of this technique used by investigators include situations like informal conversation and interviews (Ullman, Krasner & Collins, 1961; Weiss, Krasner, & Ullman, 1960; Rogers, 1960); story-telling tasks (Krasner & Ullman, 1958); free-responding situation to ink-blots (Fahmy, 1953); free discussion in a group situation (Oakes, Droge & August, 1960, 1961; Oakes, 1962a, 1962b); etc.

In the Taffel (1955) task a somewhat different procedure is used, which is more restricted compared to Greenspoon's, as the choice of response is limited to specific categories. In this situation Ss are typically presented with a series of 3 x 5-inch white index cards on which six personal pronouns are printed, namely, I, you, he, she, they and we. In the center of each card is a past tense verb. S is instructed to make sentences beginning with one of the pronouns and containing the verb on the card. During the first 20 trials E does not say anything, in order to establish the operant rate of responding. At

the end of the 20 trials, E says 'good' each time S begins a sentence with either 'I' or 'we'. A significant increase in the reinforced response class was obtained compared to a non-reinforced group.

Modifications of this technique have involved variations in the stimulus material used on the cards, e.g., Buss & Durkee (1958) used three verbs and reinforced the use of the intensely hostile verb on the card. Leventhal (1959) used four pronouns only and reinforced the use of he and they; etc. The nature of the reinforcers used have also been varied. Reinforcement stimuli which have proved effective in producing conditioning effects include verbal statements, like 'I agree' (Verplanck, 1955), 'right' (Spivak & Papajohn, 1957), 'good' (Cohen & Cohen, 1960; Matarazzo, Saslow & Pareis, 1960, etc.), etc.; chips (Buss & Gerjuoy, 1958); bell-tone (McNair, 1957); light (Kanfer, 1958); cigarettes (Lindsley, 1956), etc.

Though the techniques followed by investigators in the field of verbal conditioning have been variations of either the Greenspoon or Taffel procedures, the recent advancements in the explorations of parameters affecting the conditioning process have been noteworthy. Some investigators (e.g., Ferguson & Buss, 1960; Kanfer, 1958; Ogawa & Oakes, in press) have examined differences in E characteristics as differentially affecting S's behavior during conditioning; others have been interested in exploring the 'types of reinforcement' influencing the rate of acquisition during conditioning (e.g., O'Donnell, 1959; Reidy, 1958); rate of

extinction of a reinforced verbal response has generated much research (e.g., Weiss, Krasner & Ullman, 1960; Verplanck, 1955); pre-experimental interaction of the E and the S has also engaged the interests of many psychologists (e.g., Solley & Long, 1958; Kanfer & Karas, 1959); characteristcs of subjects as affecting the rate of acquisition in conditioning has been studied by Sarason (1958), Cohen & Cohen (1960), Leventhal (1959) and Ogawa & Oakes (in press). The theoretical issue of schedules of reinforcement has also been extensively explored (e.g., Kanfer, 1954; Kanfer, 1958; Grossberg, 1956; McNair, 1957).

These varied aspects of the variables influencing the modification of verbal behavior by no means exhaust the bulk of research, but are merely indicative of the broad coverage of topics within it that have engaged the attention of many psychologists.

In the above review, a deliberate attempt has been made to exclude two important facets of verbal conditioning, namely, generalization of the verbal response and the 'role of awareness' in this process. As this paper is devoted to the study of these two aspects of verbal conditioning, an exposition of both these topics will be presented with careful attention.

Review of Research on Generalization

Attempts at extension of the verbal conditioning paradigm have been

sought in areas like social psychology (e.g., Insko, 1965) and clinical psychology (e.g., Krasner, 1962; Greenspoon, 1962), but unfortunately its applicability has remained limited because of paucity of evidence concerning the extent of the generalization of the reinforced verbal response. Thus the generalization of the reinforced verbal response remains a critical issue in evaluating any conditioning procedure, and the few investigations that have been made so far have not been conclusive.

Timmons (1959) reinforced Ss for emitting responses related to 'buildings'. The generalization task required Ss to draw anything that they desired. Significant differences were found between the drawings of Ss who had been reinforced and those who had not. The drawings of the reinforced Ss were closely related to 'buildings'.

Thompson (1959) has also reported positive results in the demonstration of generalization. Ss who had been given previous training, that is, reinforcement for animal responses, emitted significantly more of them on card X of the Rorschach, compared to those who had not been so reinforced. Deering's (1958) conditioning situation involved the reinforcement of angry or egotistical responses and generalization effects were manifested on a posttest where Ss were required to complete sentences which dealt with reactions to social situations. Krumboltz & Thorenson (1964) reinforced Ss for verbal information-seeking behavior with regard to educational and vocational decisions in

a free counseling type interview situation. Follow-up of the students so reinforced in the counseling session indicated more overt information-seeking tendencies (like writing to colleges, making summer-employment plans, etc.) as compared to the control group.

Evidence of generalization has also been reported in a study conducted by Oakes, Dorge, & August (1961). In the conditioning session, groups of Ss were presented with a case study and asked to discuss three alternative hypotheses which best described the case in question. In each group, all favorable comments about one of the three hypotheses were reinforced, and any negative comments made concerning the other two hypotheses were also reinforced. At the end of the discussion period, Ss were individually requested to indicate the hypothesis they thought was best in accounting for the patient's behavior. Results indicated that Ss choice of hypothesis in the final phase of the experiment was determined by the reinforcements they had received during the discussion session, that is, Ss reinforced for Hypothesis-1 tended to choose Hypothesis-1 more than the other hypotheses. Similar was the case for the other two hypotheses.

Another recent study substantiating generalization has been that of Insko (1965). Ss were reinforced for expressing a favorable attitude toward a local Hawaiian festival through the medium of a telephone interview. Later, in the class situation, a questionnaire was administered, where Ss were requested to give their opinions on several

issues wherein there were interspersed a few questions dealing with the local Hawaiian festival. Ss who had received reinforcement for expressing favorable attitudes in a totally different context tended to maintain a positive opinion towards this festival.

Singer (1960) has also demonstrated that pro-democratic responses conditioned on one scale generalize to a related scale in absence of reinforcement. Ullman, Krasner & Collin (1961) have established generalization in a group-therapy situation. Ss receiving positive-personal reinforcement in a story-telling situation were rated by a therapist as showing significant gain in adequacy of interpersonal relationship manifested in the group therapy situation before and after the experimental story-telling sessions.

Though the studies above have demonstrated generalization effects, there are others in the literature which report a failure in manifestation of this effect, a justification of the statement made earlier that evidence on generalization is inconclusive.

Roger's (1960) failed to obtain substantiating evidence for generalization on post-conditioning personality tests after having obtained significant conditioning on positive self-reference statements.

Drennen (1963) conditioned future tense responses in the making of sentences and assessed generalization to another sentence completion task, wherein were present certain stimulus cues from the original task. No evidence of any transfer was obtained. Wimsatt & Vestre

(1963) employed the Si items of the MMPI scale for the initial conditioning task, and despite having achieved significant conditioning, failed to find generalization either on a correlated self-administered temperament scale or on the withdrawal symptom behavioral scale. Greenspoon & Ward (1960), using resistance to extinction as a measure of generalization, failed to obtain generalization across experimenters and physical conditions.

Other investigators who have failed to report generalization have been Dinoff, Horner, Kurpiewsk (1959); Richard & Timmons (1960); Ekman & Friesen (1960); Moos (1961); Weide (1959); Williams (1958); etc.

A perusal of the above studies clearly indicates that the problem of generalization in verbal operant conditioning remains ambiguous, as there is both positive and negative evidence for and against it. A clear-cut interpretation of this phenomenon awaits more positive evidence from studies illustrating this effect.

Role of Awareness in Verbal Conditioning

The most controversial issue in the field of verbal operant conditioning has been the role of 'awareness' in this process, an issue which has caused a split in research orientation. Investigators influenced by the stimulus-response approach (e.g., Dixon & Oakes, 1965; Verplanck, 1962; Krasner, 1958) consider this variable to be incidental to the conditioning process and adopt the direct-strengthening viewpoint of

conditioning as intially expressed by Thorndike (1939), and later restated by Skinner (1951; 1957). However, the cognitive view of conditioning, strongly influenced by its leading proponents Dulany (1962; 1962) and Speilberger (1962; 1964), holds that the mediation of the cognitive processes is essential for the demonstration of 'conditioning' as exhibited in verbal conditioning. In other words, recognition of the response reinforcement-contingency by S is necessary in accounting for any increase in the emission rate of the reinforced response class.

Dulany (1961; 1962), guided in his research by a cognitive frame of reference, has attempted to clarify the mediating role of conscious processes in verbal conditioning through a theoretical network. According to him, there are three separate variables affecting the conditioning process. The first is Reinforcement Hypothesis, which is S's awareness of the contingency of the reinforcer used by the E and the verbal behavior of S. Second is Behavioral Hypothesis, which is S's understanding of the 'correctness' of his response. Finally, there is Behavioral Intention, where the S reports a deliberate intention to use a specific response class. Through use of retrospective reports, Dulany has found results consistent within this theoretical network. As according to his expectations, Behavioral Intention had the highest correlation of .71 to S's response selection. Mere awareness of the correct reinforcement hypothesis had the lowest correlation with

response selection.

Speilberger's (1962; 1962; 1964) standpoint on the function of 'awareness' is similar to Dulany's, namely, that awareness is a necessary precondition to behavior change in verbal 'conditioning'. In reviewing earlier studies which demonstrated learning in the absence of awareness (e.g., Krasner's review indicated 29 out of 31 studies as showing no evidence of awareness), Speilberger explained the obtained results as having been an outcome of insensitive post-conditioning interviews, making a strong case against the previous techniques used for assessing awareness.

Thus Speilberger (1962) and his students (Levin, 1961; Speilberger, Levin and Shepard, 1962; Church, 1961; DeNike, 1963) geared their research activities toward the investigation of the possibility that previous reports of 'unawareness' in verbal conditioning might be the result of insensitive post-conditioning interviews. Using extended interviews they found that Ss who reported unawareness on the basis of brief interviews were able to verbalize the correct response-reinforcement contingency when approached with the extended interview. The studies further showed that S's performance was specific to the pronouns for which they were aware of a correct reinforcement-contingency, and that increment curves of aware Ss corresponded to the blocks of trials on which they had indicated that they had become aware. Incentive or motivation as affecting the conditioning process

has also been brought out by Speilberger, Bernstein, & Ratliff (1964) where additional instructions to Ss that they should try and make E use the reinforcer as frequently as possible resulted in a significant increase in the reinforced response class.

Despite the authenticity of evidence presented by Speilberger and his students of the concommitance of conditioning with the verbalization of the principle involved in the process, there still remains the possibility that the realization of the response reinforcement-contingency could be an outcome of the intensive probing after the termination of the experiment. It is even conceivable that, if enough questions of different kinds are asked all Ss, even those who give no evidence of conditioning will verbalize the contingency, especially if the task involved is a relatively simple one. Commenting on the present confusion existing on the issue of awareness in verbal conditioning, Greenspoon aptly states:-"it is difficult to determine if the subject conditioned because he was aware, or if he was aware because he conditioned. The verbal conditioner, it would appear, finds himself keeping company with the biologist who has difficulty determining which came first-the chicken or the egg". (Greenspoon, 1962; p. 528)

As opposed to Dulany and Speilberger's studies which establish the importance of the cognitive processes in verbal conditioning, there is also strong evidence of a lack of relationship between awareness and conditioning. Dixon & Oakes (1965) designed a study to test Dulany's

theoretical framework of awareness. Using the Taffel procedure, they minimized the likelihood of Ss being able to formulate hypotheses by introducing an interfering task, that is, color-naming, between trials. In all, there were four groups, Reinforced Naming (RN), Reinforced Control (RC), Unreinforced Naming (UN), and Unreinforced Control (UC). No significant differences were found between the two RN and RC groups. Further, the results indicated that inter-trial activity interfered with an "awareness-conditioning relationship, but not with conditioning per se". Following the results of this study Oakes and his students have performed several others, but none so far have replicated the findings of either Dulany or Speilberger. That is, significant conditioning has been obtained in absence of reported awareness. These obtained results suggest that inter-trial activity interferes with awareness, and what Dulany and Speilberger label as 'awareness' might be a comprehension by the S as to what he had been doing during the course of the experiment as a result of retrospection.

Hare, Hislop & Lattey (1964) attacked this same problem by posing the question as to whether 'awareness' is necessary for behavioral change (operationally defined by them as selection of pictures which E had reinforced). From the reports obtained from Ss it was observed that Ss had been aware of E's reinforcement, but at the same time they expressed that they made a voluntary effort not to be biased in their selection of pictures. In spite of this intention mediating their cognitive

processes, results nevertheless revealed involuntary change in the direction of E's goal. These results are contrary to Dulany's hypothesis, namely, that S's intention to comply is a necessary antecedent for successful conditioning.

A perusal of the above paragraphs reveals that the function of 'awareness' in verbal operant conditioning is far from settled, as there is convincing evidence of the modification of verbal behavior through techniques of reinforcement, both in its presence and absence. So far practically all investigations of awareness have remained restricted to proving its absence or presence within the simple conditioning situation and no attempt has been made to seek the role of this process in generalization, which might give a deeper insight into this unresolved and enigmatic issue.

As it was concluded at the end of the review on generalization that the only means of clearing the ambiguity that exists concerning the effects of generalization is through more refined empirical investigations, so is the writer faced with a similar conclusion to the issue of 'awareness' in verbal conditioning.

The present investigation thus attempts to get at these questions in a design which involves the reinforcement of the use of hostile verbs in a Taffel-like situation and a test for generalization to TAT stories in another situation.

Chapter II

General Statement of the Problem

Although there is little doubt about the empirical validity of the phenomena of verbal conditioning, yet, as mentioned previously, two basic and important issues remain unresolved: Firstly, whether what is learned within the context of a simple conditioning situation can be generalized to another situation; and secondly, how important is the mediation of the cognitive processes, both for the demonstration of conditioning and later for generalization. These two issues have great theoretical import for any further expansion of this analogue to other related disciplines in psychology.

However, in the literature presented above one fails to observe any endeavor to seek the solution regarding these two issues, namely those of generalization and awareness, within a single experimental framework. It is the opinion of this writer that a more advantageous means of gaining further insight into these issues could be achieved through a single study. Hence this study is an attempt in this direction.

On the basis of the writer's theoretical position, the following are the expected predictions of the hypotheses being investigated:

Hypothesis-1

There will be no significant difference in the performance curves

of the conditioning task between Ss reinforced for hostile verbs and those reinforced for neutral verbs. Also there will be no significant difference in conditioning between Ss who inter-trial activity has been occupied with color-naming and those who had no inter-trial activity. However, intertrial activity might interfere with report of awareness.

Hypothesis-2

Though performance curves on the conditioning task of aware Ss might show a higher acquisition rate, yet the unaware Ss will show an improvement in the emission rate of the reinforced response class. Correlations predicted by Dulany between awareness and the three correlated hypotheses, namely the Reinforcement Hypothesis, Behavioral Hypothesis, and Behavioral Intention will not be significant for Ss with the intertrial activity.

Hypothesis-3

Awareness of the conditioning task will bear no significant relationship to the generalization task. In other words, irrespective of the incidence of awareness on the conditioning task, there will be no difference in generalization tendency among those who were able to verbalize the correct response reinforcement-contingency and those who were not able to. Also correlations between Reinforcement Hypothesis, Behavioral Hypothesis, and Behavioral Intentions and the generalization task will not be significant.

Hypothesis-4

Awareness of the relationship between the conditioning task and the generalization task and also awareness of the extent of influence as a result of participation in the conditioning task will not result in significant differences on the generalization task as compared to those Ss who were unaware of both the relationship aspect or of the influence.

Hypothesis-5

Intertrial activity on the conditioning task will have no effect on the generalization task or in the determination of awareness on the generalization task.

All the above predictions made of the hypotheses being investigated necessarily follow from the Reinforcement theory of conditioning, which, simply stated, implies that the elicitation of any class of response can be automatically strengthened if its emission is followed by reinforcement. This experiment further extends this view in maintaining that cognitive processes play a minimal role in producing generalization. The rationale underlying the study is that if a particular activity is brought under the influence of a reinforcer, there will be an increasing tendency of the part of Ss to emit responses pertaining to that activity, even in situations other than that in which they were originally acquired. This total process of initial learning and later generalization to other varying situations could be at an unconscious level and would be non-mediated by the cognitive processes.

Chapter III

Method

Subjects: Ninety-six Ss were solicited from the Introductory Psychology class at the University of Hawaii with the understanding of their receiving extra credits for their participation. Ss were randomly assigned to the following 8-Groups:- 1) reinforced for making sentences with hostile verbs, with color-naming as an interfering task. Interview-1 administered prior to Interview-2 at the end of the experiment. (HC-1). 2) reinforcement for hostile verbs, with color-naming. Interview-2 administered first. (HC-2). 3) reinforcement for hostile verbs, without any intertrial activity. Interview-1 given first. (HN-1). 4) reinforcement for hostile verbs with no intertrial activity. Interview-2 administered first. (HN-2). 5) reinforcement for neutral verbs with color-naming as an intertrial activity. Interview-1 given first. (NC-1). 6) reinforcement for neutral verbs with color-naming. Interview-2 administered first. (NC-2). 7) reinforcement for neutral verbs with no intertrial activity. Interview-1 given first. (NN-1). 8) reinforcement for neutral verbs with no intertrial activity. Interview-2 administered prior to Interview-1. (NN-2).

Apparatus: The stimulus material for the conditioning task consisted of a set of 75 3 x 5 inch index cards of assorted colors (green,

yellow, pink, orange, and white). A hostile and a neutral verb were printed on each of the cards. The hostile verbs used were a combination of mildly and intensely hostile verbs taken from the list used by Buss & Durkee (1958). Though a few of the neutral verbs were also taken from the list used by Buss & Durkee, they were not sufficient and hence more neutral verbs had to be added on to their original list. These were chosen in a manner similar to that used by Buss & Durkee. A compilation of hostile (identical to the ones used by Buss & Durkee) and neutral (new verbs randomly chosen from the Thorndike-Lorge (1944) word count) verbs were submitted to six judges, who sorted them into neutral, mildly hostile, and intensely hostile groups. The criterion of acceptance of a neutral verb was agreement by five of the six judges. Next, the Thorndike-Lorge (1944) word count was used to match them on the basis of frequency range in which they fell. Finally, the matched verbs were placed on the index cards. The order of the placement of the verbs on the cards and the color of the index cards used was randomized for the series of 75-trials. (See Appendix-I for the list of verbs used in the study.) Also on each of these index cards small colored figures (star, square, circle and cross) were drawn at the corners in a random fashion.

A screen with folded leaves was used for the presentation of the cards, with an opening in the center of the panel of about the size of the index cards. Beneath the space through which the cards were shown, a

slot was made in order to fit a memory drum. Through this drum, colors (in all 26 shades-5 varying shades of blue, 8 shades of red, 2 of purple, 3 of yellow, 5 of green, 2 of brown and 1 of black) were displayed. A stop-watch was used for timing the intervals between the trials.

Picture 3 and Picture 5 of the TAT were used for the generalization task. There were also two Interviews used at the end of the experiment. Interview-1, which dealt with the initial conditioning session, was a modification of the one used by Speilberger (1962). Interview-2 dealt with questions pertaining to the generalization task and was constructed by the writer. (See Appendix-2 and -3 for the two interviews).

Procedure: The experimental procedure to be followed is partly Taffel's (1955) and partly Dixon & Oakes (1965).

Ss were seen individually by E. Before the start of the experiment proper, E initiated a casual conversation on the way from the subjects' waiting room to the experimental room merely for establishing a friendly atmosphere. Questions pertaining to S's courses, interests, future vocational plans, etc., were asked. In the experimental room S was requested to take a chair behind the screen and thus E and S could not see each other during the conditioning session. The following were the instructions for each of the eight Groups:

Group 1: HC-1

Ss were instructed to make sentences with one of the verbs on each of the cards that were shown to them at intervals of eight seconds.

During the 8-second period Ss were asked to name colors that were displayed through the memory drum as quickly and as accurately as they could. The first 15 trials were used to establish an operant level of responding. Starting with trial 16, E said 'good' each time a hostile verb was used. This ended the initial conditioning session. For the generalization task, which immediately followed this conditioning session, Ss in all groups went through a similar procedure which will be explained at the end of the description of Group treatments. At the end of the generalization task Ss were given the post-conditioning interview. Under this condition, Interview-1 was administered prior to Interview 2, wherein there were questions pertaining to the first part of the experiment, namely the initial conditioning task. Interview 2 dealt with questions related to the generalization task.

Group 2: HC-2

Instructions given to this group were similar to those received by Group 1, except that at the end of the generalization task the second postconditioning interview dealing with the generalization task was presented prior to the interview dealing with the simple conditioning task.

Group 3: HN-1

The procedure followed for this group was exactly similar to that of Group 1, except that there was no color-naming task between the trials.

Group 4: HN-2

An identical procedure as Group 2 was used with the exception that there was no color-naming between the trials.

Group 5: NC-1

Under this condition Ss were reinforced for making sentences with neutral verbs. As in all the groups, E said nothing during the first 15 trials. On trials 15-75, E said 'good' every time S made a sentence with the neutral verb. The intertrial period of eight seconds was occupied with color-naming. At the end of the generalization task, S was given the postconditioning interview. Questions pertaining to the initial conditioning session were presented prior to the questions dealing with the generalization task.

Group 6: NC-2

Instructions given were similar to those received by Group 5, except that at the end of the generalization task, Interview 2 was given prior to Interview 1.

Group 7: NN-1

The procedure followed for this group was identical with that of Group 5, with the exception that there was no color-naming activity between the trials.

Group 8: NN-2

A similar procedure as Group 6 was used, except that there was no color-naming between the trials.

At the end of the conditioning task, the following procedure was adopted for the generalization task which applied to all Ss.

Each S was informed that the experiment could not be carried on for a while as E had to attend to some computations, but during that time S could participate in another short experiment and earn additional credits.

This second phase of the experiment consisted of the generalization task. Ss were taken to another room, and were asked to follow the instructions they found in the folder placed on a table. The instructions were as follows:

> This is an experiment being conducted by Dr. Oakes, Chairman of the Psychology Department, who is collecting some data for research purposes in the area of Personality development. There is no likelihood of anybody's identity being revealed and if you wish you may not even write your name.
>
> All that you are required to do is to write a story for each of the two pictures that you see inside the folder. Please indicate in your stories something about the past, present and the future of the characters. Each story should be at least one page long. We are not interested in your literary style, so please start immediately. You will be allotted approximately 15-minutes.
>
> Your stories must be at least three-fourths of a page long. Thank you for your cooperation.

At the end of the 15-minute period E returned and led S back to the room where the conditioning session had been conducted. In this final phase of the experiment, postconditioning interviews were conducted in

the manner indicated earlier. Ss were requested to write their answers. It should be noted that when answering questions to Interview 2 (which dealt with the generalization task) Ss were asked not to write their names in order to maintain the facade of anonymity.

At the conclusion of the experiment S was urged not to communicate with any of his friends concerning any aspect of the experiment.

Scoring Procedure: Initial Condition Session: The dependent variable in the conditioning phase of the experiment was the number of sentences constructed with the reinforced verb, i.e., either the hostile or neutral verb, depending on the treatment condition. For certain analyses, only the hostile verbs were scored in all groups. The first 15-trials were used for determining the operant rate of responding.

Awareness of the response reinforcement contingency for the conditioning session was assessed on the basis of postconditioning Interview 1. Interview protocols of each S were given to two judges for independent ratings. Though the interview used in the experiment was not identical to the one used by Dulany (1962), yet it was classified into categories laid down by him, namely Reinforcement Hypothesis (RH), and Behavioral Hypothesis (BH), and Behavioral Intention (BI). Instructions given to judges for determining the above categories can be found in Appendix 4. The agreement between the ratings of the two judges was 95 per cent, 92 per cent, and 86 per cent for RH, BH, and BI respectively. In an analysis made on the conditioning data, the combined scores of the ratings of the two judges were correlated with the conditioning scores on

the last block of trials after a covariance adjustment for operant rate was made.

Scoring Procedure for the Generalization Task:

TAT Stories: Each story was read carefully, and all verbs (except for the auxiliary) were picked out. These verbs (about 700) were given to two judges for rating on a 5-point neutrality-hostility continuum. A score of 1 indicated the least amount of hostility and a score of five, the maximum. The correlation of the ratings of the two judges was .70. The combined score value of the two judges on each of the verbs was assigned to the relevant verbs in the stories. The sum of these values served as the dependent variable for the generalization task.

Assessment of Awareness: On the basis of Interview 2, which dealt with items pertaining to awareness of the generalization task, two judges made independent ratings on two aspects: the first relating to the degree of awareness of the influence of the conditioning task and the second, the degree of awareness of the relationship between the two experiments. Instructions given to judges to determine these two aspects are found in Appendix 5. The degree of agreement between the two judges on these two aspects was 96 per cent and 93 per cent respectively.

Chapter IV

Results

The results of the experiment will be presented in five parts: a) analysis of the conditioning data independently of the incidence of awareness. b) a comparison of the performance of aware and unaware Ss on the conditioning task. c) analysis on the generalization task. d) incidence of awareness on the conditioning task and its influence on the generalization task. 3) a comparison of the performance of aware and unaware Ss on the generalization task.

Analysis of the Conditioning Data Independently of the Incidence of Awareness

The 75-trial series was divided into five blocks of I5 trials each. The number of sentences emitted by each S (using the response class that was to be reinforced) during the first I5 trials was used as the operant rate of emission of the reinforced response class.

Table I shows that the main effect of response class (A) was significant at the .0I level, implying differential performance curves for the two classes of response used in the study, namely, hostile and neutral verbs.

Insert Table I here

Table 1

Table of Analysis of Variance and Covariance of the Conditioning Data

Source of variance	df	MS	F
Between Ss	95		
A'-Response class	1	70.08	7.18**
B'-Intertrial	1	3.541	
AxB	1	0.666	
Error	91	9.670	
Within Ss	288		
C-Blocks of trials	3	46.470	18.58**
AxC	3	29.62	11.84**
BxC	3	-	
AxBxC	3	2.70	
Error	276	2.50	

*-significant at .05 level
**-significant at .001 level

The significant increase over blocks of trials (C) indicates that there is an increase in the rate of the reinforced response class as a function of trials; however, the significant A x C interaction denotes that this increase in the emission rate of the two response classes is not identical. From Figure 2 it may be observed that there is a higher emission rate for the neutral verbs over blocks of trials compared to the hostile verbs.

Insert Figure 2 here

From Table I it may also be observed that the variable of intertrial activity (B) had no effect on the acquisition rate of the reinforced response class, though a glance at Figure 2 shows that the group reinforced for neutral verbs seems to perform slightly better under a non-intertrial condition, whereas for the hostile group, the effect seems to be in the opposite direction. However, this difference is not statistically significant.

Another analysis was made on the conditioning data where the dependent variable was the emission of hostile responses regardless of the direction of reinforcement.

Insert Table 2 here

Table 2 indicates a significant effect of the direction of reinforcement (A), implying that Ss receiving reinforcement for hostile verbs

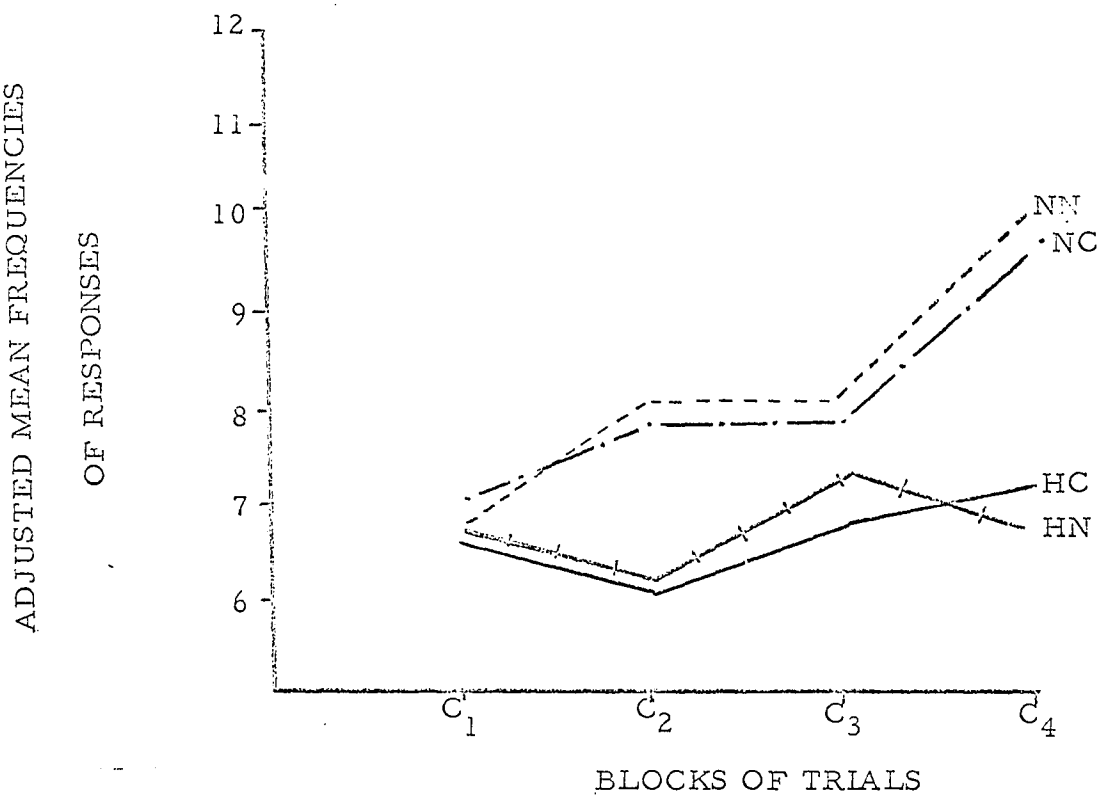

Fig. 2. Conditioning Data of the Hostile and Neutral Groups with Color-Naming (HC & NC) and Non-Colornaming (HN & NN).

Table 2

Summary of Analysis of Covariance on the Conditioning Data

Source of variance	df	MS	F
Between Ss	95		
A'-Direction of reinforcement	1	346.285	35.795**
B'-intertrial activity	1	.645	-
A' x B'	1	3.518	-
Error	91	9.674	-
Within Ss	288		
C-blocks of trials	3	29.621	11.829**
A x C	3	46.472	5.559**
B x C	3	2.694	1.07
A x B x C	3	-	-
Error	276	2.504	

**-significant at .001 level

emitted more of them, compared to a group reinforced for neutral verbs. A significant A x C interaction which is more clearly indicated in Figure 3 shows that Ss receiving reinforcement for hostile verbs increased their emission rate of this class of response over blocks of trials, whereas those who were being reinforced for neutral verbs declined in performance.

Insert Figure 3 here

A Comparison of the Performance of Aware and Unaware Ss on the Conditioning Task

As the order in which the post-experimental interviews were given to Ss did not produce any considerable affect on the incidence of awareness (12 Ss receiving Interview 1 prior to Interview 2 showed awareness, and 11 Ss given Interview 2 prior to Interview 1 gave indication of awareness), it was decided that this variable did not in any way affect the determination of awareness.

Having obtained independent ratings from two judges on the categories of awareness as classified by Dulany (1962), namely, Reinforcement Hypothesis (RH), Behavioral Hypothesis (BH) and Behavioral Intention (BI), correlations were computed between scores received by Ss on each of these categories and the adjusted scores on the final block of trials of the conditioning task.

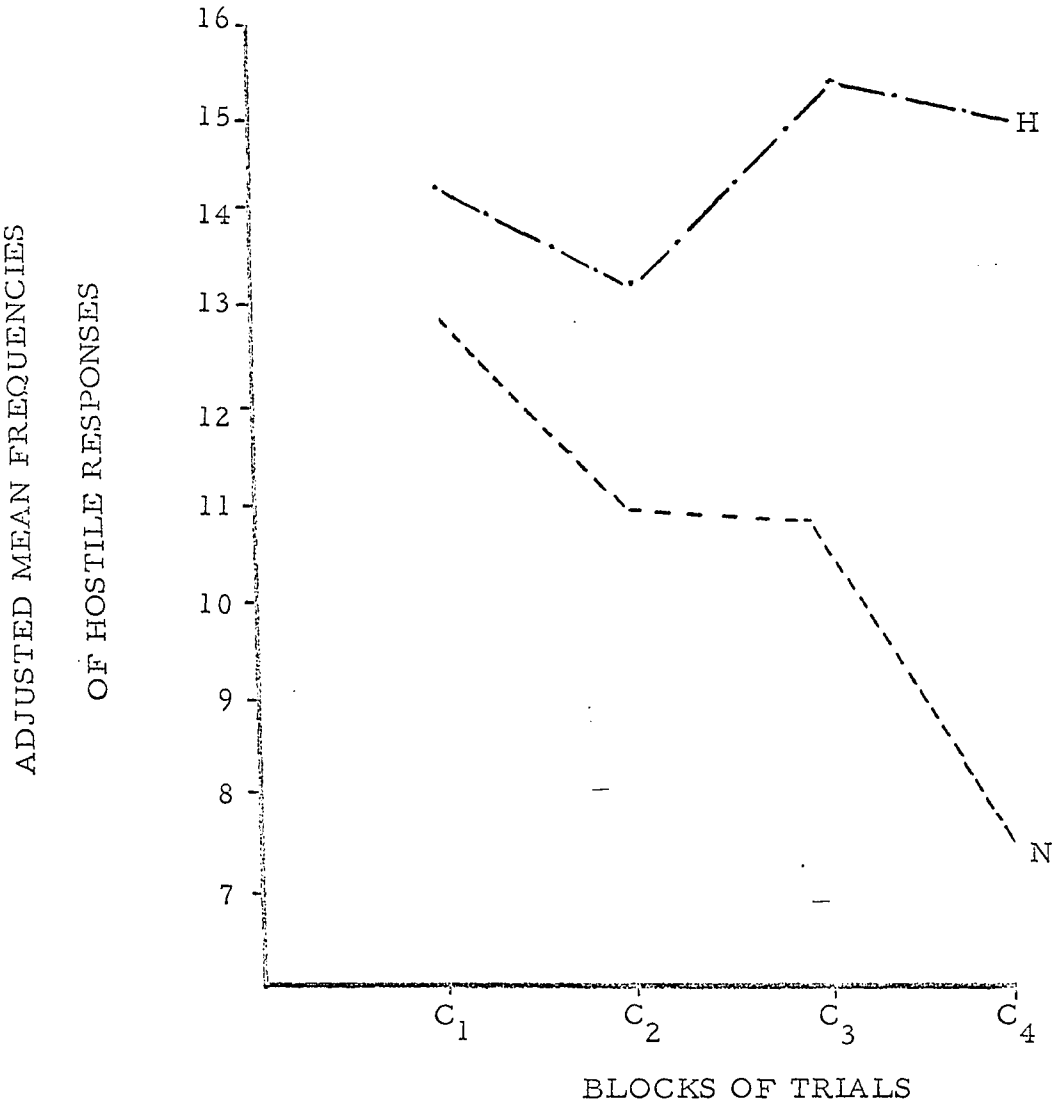

Fig. 3. Emission of Hostile Responses as a Function of Trials for Groups Reinforced for Hostile (H) and Neutral (N) Verbs

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Insert Table 3 here

Table 3 gives the summary of correlations obtained between classification of awareness as made by Dulany and performance on the conditioning task. In terms of Dulany's (1962) theoretical framework, under the conditions of the present experiment Behavioral Intention should have the highest correlation with conditioning and Reinforcement Hypothesis the least. Such a relationship would be predicted on the basis of a cognitive interpretation of learning. However, the correlations obtained in the present study do not bear out Dulany's predictions, as BI has the lowest correlation with conditioning, and also the other correlations are rather random and meaningless in terms of cognitive theory.

Hence, in order to make some comparison between the performance of aware and unaware Ss another analysis was made, wherein the dependent variable was the emission of hostile verbs. In this analysis, Ss were dichotomized into two distinct categories, namely, those of 'aware' Ss and 'unaware' Ss. This separation of Ss into two categories was made on the basis of information obtained from ratings of the two judges on RH. S obtaining a score of 3 or less were considered as 'aware' and those with more than 3 were considered as 'unaware'. (The basis of such a judgment for dividing the aware and unaware Ss would appear justifiable if the description of RH category is read from

Table 3

Summary of Correlations Between Awareness and Conditioning

	RH	BH	BI
Hostile intertrial group	-.390*	-.345	-.182
Hostile non-intertrial group	-.328	-.288	-.214
Neutral intertrial group	-.629*	-.508*	-.321
Neutral non-intertrial group	-.211	-.418*	+.306

*-significant at the .05 level

Note - Due to scoring, a negative correlation indicates a positive relationship between the variables.

the appendix). The summary of the analysis of covariance appears in Table 4.

Insert Table 4 here

Table 4 indicates a significant main effect of direction of reinforcement (A) and blocks of trials (B), plus the A x D, A x B, and A x B x D interactions. The significant A effect implies a differential rate of emission of hostile verbs as a consequence of the direction of reinforcement given. In other words, Ss reinforced for hostile verbs emitted more of them compared to those reinforced for neutral verbs. The significant D effect is due to the overall decrease in the emission rate of hostile verbs which may be accounted for in terms of differences in conditioning of the two reinforced response classes, namely, the hostile and the neutral verbs. Had the reinforcement effect been equal for both the hostile and neutral verbs, an increase in one would have resulted in a proportionate decrease in the other, and hence the D effect would have remained non-significant. However, this was not the case. Neutral verbs conditioned better than the hostile verbs and as a result there was a significant decline in the overall emission of hostile verbs over blocks of trials.

The A x D interaction indicates that the performance of the reinforced response classes had a differential function on the emission rate of hostile verbs, namely, the neutrally reinforced group declined in the

Table 4

An Unweighted Means Analysis of Covariance on the Conditioning Task with Incidence of Awareness

Source of variance	df	MS	F
Between Ss	95		
A-Direction of reinforcement	1	234.494	26.098***
B-Aware vs. Unaware	1	2.632	-
C-Intertrial activity	1	1.864	-
A x B	1	36.208	4.029*
A x C	1	.545	-
B x C	1	24.154	2.688
A x B x C	1	.149	-
Error Between	87	8.985	
Within Ss	288		
D-Blocks of trials	3	20.816	8.630*
A x D	3	52.623	21.817***
B x D	3	.185	-
C x D	3	2.431	1.007
A x B x D	3	10.293	4.267*
A x C x D	3	2.114	-
B x C x D	3	1.609	-
A x B x C x D	3	2.246	-
Error within	264	2.412	

*-significant at the .05 level
***-significant at the .001 level

emission rate of hostile verbs compared to a group reinforced for hostile verbs. The significant A x B interaction shows differences in performance of groups reinforced for hostile and neutral verbs under conditions of aware and unawareness. The significant A x B x D interaction as represented in Figure 4 shows the learning curves of the aware and unaware groups over blocks of trials under differing reinforcement conditions.

Insert Figure 4 here

As can be observed from Figure 4, both the aware and unaware groups under the hostile condition of reinforcement maintain a higher emission rate of hostile verbs as compared to those reinforced for neutral verbs. However, the magnitude of increase in both the aware and non-aware groups under the hostile condition of reinforcement is not proportional to the decrease of hostile verbs in the neutral aware and unaware Ss. In this analysis again, as in all previous ones, there was no significant effect of intertrial activity.

In order to establish the reinforcement effect for the unaware group of Ss, another analysis was made only on the unaware Ss of the hostile and neutral conditions of reinforcement. As intertrial activity had not proven to exercise any influence in the earlier analyses, it was not included in the present one. The scoring method used was similar to the one used in the previous analysis, that is, the number of hostile

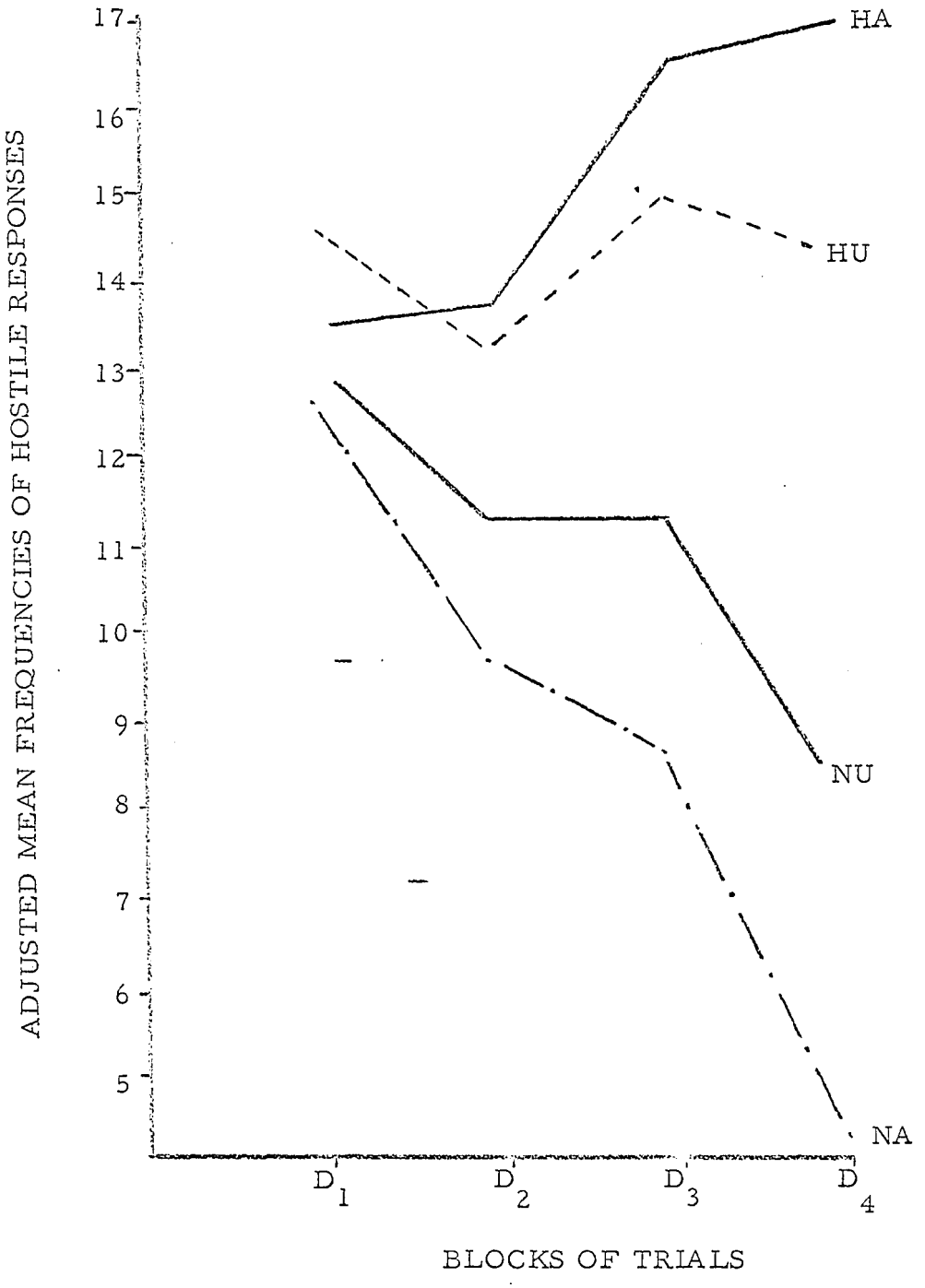

Fig. 4. Emission of Hostile Responses as a Function of Trials of Hostile Aware and Unaware (HA & HU) and Neutral Aware and Unaware (NA & NU) Groups

verbs emitted. A summary of the analysis appears in Table 5.

Insert Table 5 here

Table 5 indicates significant main effects of direction of reinforcement (A), blocks of trials (B), and the A x B interaction. The significant A effect results from a differing rate of emission of hostile verbs as a function of the direction of reinforcement. The significant main effect of blocks of trials is due to the overall decrease in emission of hostile verbs, the cause of which has been explained above in connection with an earlier analysis. The significant A x B interaction as represented in Figure 6 clearly indicates the reinforcement effect. Ss reinforced for hostile verbs maintain a higher emission rate of hostile verbs in contrast to those reinforced for neutral verbs who show a consistent decline in the emission of hostile verbs.

Insert Figure 5 here

A parallel analysis on the aware groups as graphically illustrated in Figure 6 reveals a similar reinforcement effect.

Insert Figure 6 here

Analysis on the Generalization Task

The dependent variable in this analysis was the sum of scores received by Ss on the verbs used in the stories. The analysis was made

Table 5

An Unweighted Means Analysis of Covariance of

the Unaware Groups

Source of variance	df	MS	F
Between Ss	72		
A-Direction of reinforcement	1	132.863	18.983***
Error	70	6.999	
Within Ss	226		
B-Blocks of trials	3	27.601	11.353**
A x B	3	20.957	8.620**
Error	220	2.431	

*-significant at the .05 level
**-significant at the .01 level
***-significant at the .001 level

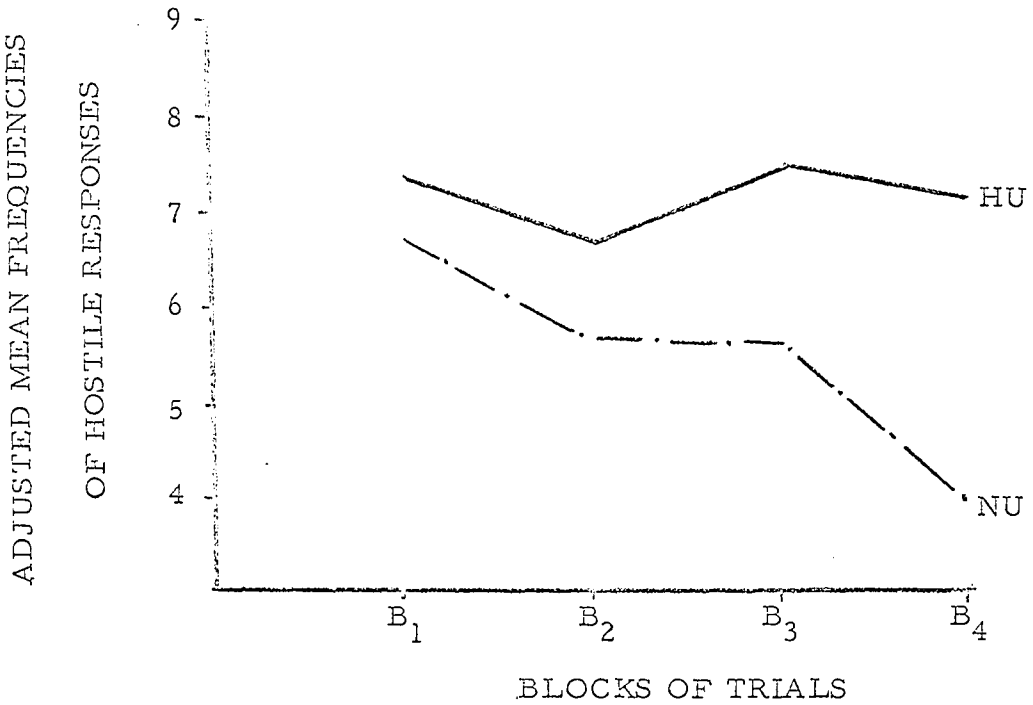

Fig. 5. Emission of Hostile Responses in the Unaware Groups Reinforced for Hostile (HU) and Neutral (NU) Verbs

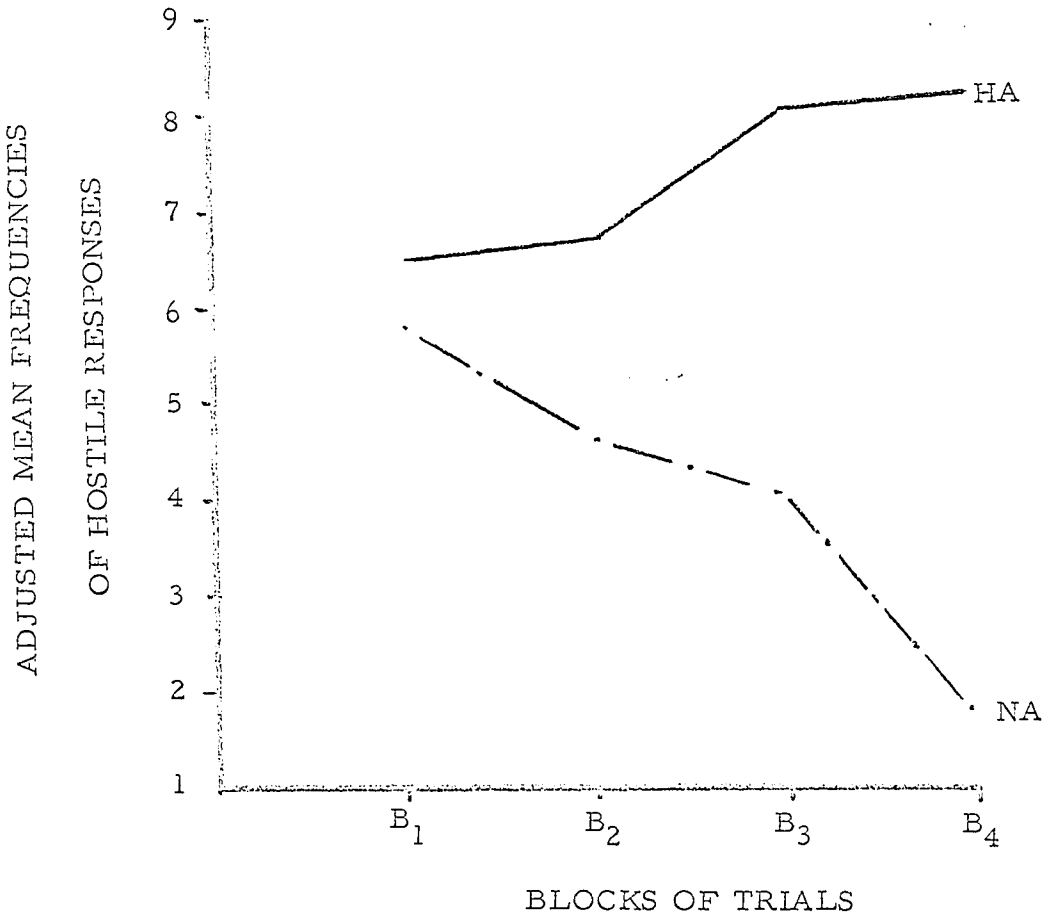

Fig. 6. Emission of Hostile Responses in the Aware Groups Reinforced for Hostile (HA) and Neutral (NA) Verbs

on the basis of conditions Ss were in the conditioning session.

Insert Table 6 here

As Table 6 reveals, the only significant main effect in this analysis was the response class, which indicates that Ss reinforced for hostile verbs in the conditioning session received higher scores (the greater the number of hostile verbs, the higher would be the score on the stories), compared to the groups of Ss reinforced for the neutral verbs. As in all previous analyses so far, intertrial activity did not interfere with the generalization task.

Incidence of Awareness on the Conditioning Task and its Influence on Generalization

Next in the analysis of the data, an attempt was made to determine whether there would be a difference on the generalization task between Ss who had been aware on the conditioning task and those who had not been so aware.

Insert Table 7 here

Table 7 shows that awareness on the conditioning task had no effect as far as the generalization task is concerned. The only significant effect in this analysis is the class of response Ss were reinforced for in the original conditioning session.

A further analysis with respect to the generalization task was made

Table 6

Summary of Analysis of Variance Task on the Generalization

Source of variance	df	MS	F
A-Intertrial activity	1	142.59	-
B-Response class	1	5148.01	11.23**
A x B	1	78.84	-
Error	92	458.29	-

**-significant at the .01 level

Table 7

Summary of Analysis of Variance of Awareness on the Conditioning Task and its effect on Generalization

Source of variance	df	MS	F
A-aware vs. unaware	1	452.64	
B-intertrial activity	1	.31	
C-class of response	1	4160.95	8.82**
A x B	1	251.53	
A x C	1	16.17	
B x C	1	6.10	
A x B x C	1	120.53	
Error	88	471.63	

**-significant at the .01 level

of the ratings of Dulany's awareness categories, namely, RH, BH, and BI on the conditioning task and scores on the generalization task. None of the obtained correlations reached a significant level, implying that these three categories of awareness do not exercise any influence on generalization. Table 8 gives the summary of correlations obtained.

Insert Table 8 here

A Comparison of Performance of Aware and Unaware Ss on the Generalization Task

Even though an attempt had been made in the experiment to disguise the purpose of the second phase of the experiment which dealt with the generalization task, Interview 2 was an attempt at determining if Ss had seen through the facade. Thus Interview 2 sought to determine whether Ss were aware of the influence of the conditioning session while writing the stories, and also whether Ss saw some relationship between the two experiments. (In the scoring procedure an account is given as to how these two aspects of awareness were determined).

However it was only possible to do this analysis on the group of Ss who had been in the hostile condition during the conditioning session as there were very few Ss in the neutral group who were aware either of

Table 8

Summary of Correlations Between Awareness Measures on Conditioning and Generalization

	RH	BH	BI
Hostile intertrial group	+.010	-.013	+.062
Hostile non-intertrial group	+.112	+.230	+.020
Neutral intertrial group	+.020	-.010	+.060
Neutral non-intertrial group	+.005	-.054	+.007

Note - Due to scoring procedures, a negative correlation indicates a positive relationship between the variables.

any influence of the first experiment or of any relationship between the two experiments. (There were only two Ss who were aware of some influence and none who saw through any relationship.)

Thus Table 8 gives the summary of the analysis of variance on the awareness data of the generalization task for Ss reinforced for the emission of hostile verbs in the conditioning session.

Insert Table 9 here

As Table 9 shows, there is no difference in the extent of generalization between Ss who were either aware of any influence of the first experiment or of the relationship between the two experiments, and those who were not so aware. None of the obtained F-ratios were significant.

Table 9

Summary Table of Analysis of Variance on the Awareness Data of the Generalization Task

Source of variance	df	MS	F
A-relationship	1	800.253	1.434
B-influence	1	493.838	-
A x B	1	271.805	-
Error	44	557.701	-

Chapter V

Discussion of Results

This study was designed to investigate two important issues that exist today in the field of verbal operant conditioning: first, the question of whether what is learned within the context of a simple conditioning situtation can be generalized to another situation; and second, how important the role of cognitive variables is in these two processes.

This research provides considerable support for the view that reinforcement exerts a significant influence over S's usage of a particular response class. This influence not only remains unique to the conditioning task, but pervades to other situations in the absence of reinforcement. Results of the present investigation also suggest that cognitive processes are not essential either for the explanation of performance in the conditioning task or for generalization, thus lending strong support to the automatic-strengthening interpretation of conditioning as stated by Skinner (1951; 1957).

However, in order to justify the statements made above, each of the five hypotheses set out to be investigated by the author will be discussed in view of their consistence with either the Reinforcement theory of conditioning or the Cognitive theory of conditioning.

Hypothesis I. There will be no significant differences in the

performance curves of the conditioning task between Ss reinforced for hostile verbs and those reinforced for neutral verbs. Also there will be no significant difference in conditioning between Ss who intertrial activity has been occupied with color-naming and those who had no intertrial activity. However, intertrial activity might interfere with awareness.

The first part of the hypothesis which suggested no difference in the emission rate of the two classes of response was not confirmed. This unpredicted outcome does no damage either to the Reinforcement theory or the Cognitive theory of conditioning. From Figure 2, it can be observed that the emission rate of hostile verbs over blocks of trials is less than the neutral verbs, which is contradictory to what Buss & Durkee (1958) found. They reported that intensely hostile verbs were learned at a faster tate than the neutral verbs, but females produced fewer responses than males. In another experiment conducted by Ferguson & Buss (1960), where they manipulated for aggressiveness of the E, sex of the S, and sex of the E, it was found that aggressiveness of the E was the only factor that significantly affected conditioning. In Sarason & Campbell's (1962) study it was observed that highly anxious Ss emitted a significantly greater number of hostile verbs than those who were low on the anxiety scale. Thus it appears that personality factors may be responsible for the differences in conditioning of the two response classes. Since this experiment did

not control for any of factors reported as affecting the conditioning of the hostile verbs and also in the absence of a proper control group, nothing definite can be concluded about the differential reinforcement affect found in the present study. However, if Buss & Durkee are correct in claiming that sex of the Ss is important in determining the degree of hostility that is going to be emitted in the conditioning task, it is interesting to note that a majority of Ss in this experiment were females.

Though there were differences in the rate of emission of the two reinforced response classes, yet, in both hostile and neutral groups, the direction of reinforcement had a significant influence in the determination of the emitted responses. This is evident from the A x C interaction (Table 2) and from the graphical representation of the data (Fig. 3). From Figure 3, it can be observed that Ss reinforced for hostile verbs show an increase in the emission rate of such responses over blocks of trials, whereas Ss reinforced for neutral verbs show a significant decline in their emission rate of hostile responses. Thus, this demonstrates the reinforcement effect.

The second part of this hypothesis, which stated that there would be no difference in conditioning between Ss whose intertrial activity was occupied with color-naming and those who had no intertrial activity, proved to be correct. The rationale underlying the inclusion of an interfering task was an attempt at inhibiting the hypothesis-forming

processes that go on during the intertrial period, and also to curb the retrospective tendencies of S during conditioning. As is observed from Table I, there was no significant B x C interaction, which means there were no significant differences in conditioning between the intertrial and the non-intertrial groups. This outcome is more favourable to the Reinforcement theory of conditioning, because if under conditions created to interfere with the cognitive processes and conditions which provided ample scope for forming hypotheses no difference are found, one would tend to suspect studies which attribute conditioning solely to mediating processes.

The final part of this hypothesis, which had stated that intertrial activity might interfere with awareness, was not found to be supported. As can be observed from Table 3, the correlations between categories of the awareness variables RH, BH, and BI and conditioning for the intertrial group is not less than of the non-intertrial groups. This finding is contradictory to what Dixon & Oakes (1965) found, where the intertrial activity interfered with the correlations between awareness and conditioning. These differences in finding may be explained on the basis of differences in the measures of awareness used. Dixon & Oakes used Dulany's questionnaire for the assessment of awareness, whereas in this study a modified version of Speilberger's (1962) questionnaire was used. There were also differences in the classes of response reinforced. Dixon & Oakes reinforced the use of 'I' and 'we',

which might have proven simpler to comprehend compared to the one used in the present investigation. However, in spite of differences in the obtained correlations between awareness and conditioning in this study and in the Dixon & Oakes study, there were no differences in amount of conditioning between the intertrial and non-intertrial groups in both the studies.

Hypothesis 2. Though performance curves on the conditioning task of aware Ss might show a higher emission rate, yet the unaware Ss will show an improvement in the acquisition rate of the reinforced response class. Correlations predicted by Dulany between awareness and the three awareness measures, RH, BH, and BI will not be significant.

Table 4 of the analysis of variance of the aware and unaware Ss indicates a difference in conditioning between those who were aware of the response reinforcement-contingency and those who were not. The aware Ss do perform at a slightly higher level in contrast to those who are not aware as illustrated in Figure 4. The reinforcement effect for the unaware Ss only is clearly evident by the A x B interaction indicated in Table 5 and graphically represented in Figure 5.

The cognitive theorists would not expect the 'unaware' Ss to increase their rate of responding, as they assume that any gain in performance on the conditioning task is mediated by awareness of a response reinforcement-contingency. Also, considering the large percentage of

Ss who were unaware compared to those who were aware (only 23 per cent), the slight increase in the performance of the aware Ss would not be too disconcerting for the reinforcement theorists.

Correlations as predicted by Dulany between conditioning and the three awareness measures, RH, BH, and BI, were not supported by the data. Dulany (1962) has presented results which indicate that the higher level of RH, BH, and BI reported by Ss, the greater is the conditioning. Dulany's theory also predicts that RH and BH should affect performance only through BI. In consistency with his theory, Dulany's investigations have found BI to be most strongly related to response selection.

However, in the present investigation, none of the correlations (see Table 3) between BI and conditioning are significant. The obtained correlations seem rather random and unsystematic. This finding is contrary to Dulany's theory, but it should be mentioned, however, that Dulany's questionnaire was not the one that was used in the present study (three judges agreed on the classification made). Thus the results are not too crucial for the Dulany theory.

Hypothesis 3. Awareness of the conditioning task will bear no significant relationship to the generalization task. In other words, irrespective of the incidence of awareness on the conditioning task, there will be no difference in generalization tendency among those who were able to verbalize the correct response-reinforcement contingency

and those who were not able to. Also correlations between RH, BH, and BI, and the generalization task will be non-significant.

This hypothesis was totally confirmed. No differences in generalization were found between Ss indicating awareness on the conditioning task and those who were unaware. As can be observed from Table 6, the only significant effect is the response class, that is, Ss reinforced for hostile verbs in the conditioning task used more verbs indicating hostility than those that had been reinforced for neutral verbs.

Though the cognitive theorists have thus far restricted their investigations to the simple conditioning situation, one would expect from their theoretical orientation that if there is any generalization it should be for only those Ss who are aware of the response-reinforcement contingency in the conditioning task, as there would be no learning taking place among Ss who were not aware. And since the present results have shown that awareness of the conditioning task is not necessary for generalization one would question findings which have shown a positive relationship between awareness and conditioning, which might very well be the result of the simplicity of the contingency involved in the conditioning task.

As far as the relations between RH, BH, and BI and the conditioning task are concerned, one can see from Table 7 that none of the obtained correlations were significant. In other words, it appears that none of the cognitive processes as suggested by Dulany seem to affect

generalization. It would be interesting to perform another similar study using Dulany's questionnaire.

Confirmation of this hypothesis weakens the cognitive position on conditioning, as awareness as a variable seems to be totally irrelevant for the explanation of generalization.

Hypothesis 4. Awareness of the relationship between the conditioning task and the generalization task, and also awareness of the extent of influence as a result of participation in the conditioning task will not result in significant differences on the generalization task as compared to those Ss who were unaware of both the relationship and the influence aspect.

Confirmation of this hypothesis was also obtained, as Table 8 indicates. None of the main effects of relationship or of influence of the conditioning task while performing on the generalization task reached significance.

This implies that even though a response class was acquired as a result of participation in the first experiment and was influencing the content of the stories written by Ss yet this learning was at an unaware level. Results of this hypothesis complement the conclusions of the previous one where the relationship between the conditioning task and awareness was investigated indirectly. In the case here, an attempt, by direct interrogation, was made to find if Ss were aware of what they were doing. Despite the fact that some Ss who had participated in the

conditioning session under the hostile condition are aware of what they were doing in the second experiment, yet no differences in generalization were found among aware and unaware Ss. This total process of initial learning and later generalization seems not to be mediated by conscious cognitive processes.

Hypothesis 5. Intertrial activity on the conditioning task will have no affect on the generalization task.

This hypothesis was also confirmed. It can be observed from Tables 6 and 7 that intertrial activity on the conditioning task did not have any inhibiting effect on generalization.

Taking this study in its total perspective, it was clearly demonstrated in this investigation that the application of operant conditioning procedures to verbal behavior resulted in significant increases in the rate of emission of reinforced verbal responses in a simple conditioning situation as well as in its generalization to a different situation in the absence of additional reinforcement. In contrast to the findings of the cognitive theorists (e.g. Dulany, 1962; Speilberger, 1962; etc.) on verbal conditioning, a significant increase in the emission rate of the reinforced response class for unaware Ss was obtained. These findings support the Reinforcement theory of conditioning, which states that the probability of a response is increased directly through reinforcement. It also further strengthens this position by the demonstration of generalization of the acquired response class to a different situation which

was not mediated by cognitive processes.

The utilization in the present investigation of intensive interviewing procedures takes into consideration the criticisms usually levelled against studies which indicate conditioning without awareness, as being a function of insensitive interviewing procedures.

In conclusion, one might say that the results of this investigation support the Reinforcement theory of verbal conditioning. More experiments of this nature would add further light to the issue of awareness and its relationship to verbal conditioning.

Chapter VI

Summary and Conclusion

The present study investigated the relationship between generalization and awareness in verbal operant conditioning. The theoretical position of the writer was that awareness was not necessary for demonstrating either conditioning or later generalization to another situation.

Maximal and minimal conditions for interference with S's formulation of awareness hypotheses were provided. The reinforced classes of responses were hostile and neutral verbs, and it was predicted that on a generalization task (TAT Cards) classes of responses previously reinforced would tend to be manifested. It was also hypothesized that interfering conditions would not affect either conditioning or generalization. On the basis of post-conditioning interviews based on both the conditioning and generalization task (order effect was controlled) it was further predicted that the relationship between generalization and awareness would be incidental.

The following are the salient features of the investigation: 1) there were significant differences in performance curves on the conditioning task between Ss reinforced for hostile verbs and Ss reinforced for neutral verbs. 2) Although the aware Ss on the conditioning task showed superior performance as compared to those who were unable to

verbalize the response-reinforcement contingency, yet the unaware Ss also showed a significant change in their emission rate over blocks of trials. 3) Correlations between measures of awareness, RH, BH, and BI with conditioning scores were found to be non-systematic, compared to what one would predict from Dulany's theory. 4) Awareness on the conditioning task had no influence on the generalization task. 5) Correlations between RH, BH, and BI, of the conditioning task with generalization were all nonsignificant. 6) Awareness of the relationship between the generalization and conditioning tasks, and awareness of the influence of the conditioning task while doing the generalization task had no affect on generalization. 7) Intertrial activity did not result in any decrease in performance scores for either the conditioning task or for the generalization task.

The obtained results were discussed in view of their consistence to the Reinforcement theory of conditioning and the Cognitive theory of conditioning. The results were found to be more consistent with the Reinforcement theory of verbal conditioning which states that awareness (or verbalization of the correct contingency) is not an essential precondition for the modification of verbal behavior either for conditioning or for generalization. That is, reinforcement has direct strengthening effects, and mediating processes are not required to account for gains in performance in the conditioning task or in the manifestation of the reinforced response class in another different situation.

APPENDIX I

List of Verbs

Hostile Verbs

libeled
bickered
tortured
harmed
shot
hissed
hurt
slapped
inflicted
irritated
slaughtered
slayed
jeered
smashed
maligned
squelched
scowled
nagged
pestered
poked
provoked
punished
quarreled
rebelled
strangled
rebuked
terrorized
tormented
resented
scolded
eliminated
harassed
punched
persecuted
frightened
mutilated
forced
murdered
exasperated
mauled
massacred
mangled
embittered
maddened
lynched
disliked
killed
spited
squabbled
disagreed
infuriated
defied
teased
hated
fractured
enraged
criticized
condemned
detested
destroyed
despised
cursed
vexed
crushed
bit
bullied
argued
avenged
annoyed
assaulted
assassinated
aggravated
abused
sneered

Neutral Verbs

relaxed
subtracted
phoned
elected
raised
predicted
heard
outlined
embroidered
surfed
sprinkled
celebrated
enrolled
learnt
navigated
paraded
gifted
portrayed
enthroned
ordained
toured
derived
visited
deposited
computed
nominated
vacated
softened
elaborated
sprayed
soothed
saluted
leased
inscribed
impressed
relayed
described
managed
educated
translated
responded
insured
donated
doted
compiled
strolled
began
compared
broadened
applied
rejoined
escorted
hired
multiplied
adjoined
inclined
specified
passed
invented
flattered
decorated
fed
recited
bounced
interpreted
charted
assigned
scanned
jingled
cruised
polished
enlarged
paved
contributed
retired

APPENDIX 2

Interview 1

I'd like to ask you some questions about the experiment that you just participated in. In answering these questions, it is important for you to think back to when you were going through the cards.

1. Did you usually give the first sentence that came to your mind?

2. How did you go about deciding which of the two verbs to use?

3. Did you think you were using certain kinds of verbs more often than others? b) Which kind? c) Why?

4. What do you think the purpose of this experiment was?

5. While going through the cards did you think you were supposed to make your sentences in any particular way or that you had to change the way in which you made your sentences? b) In what way?

6. Did you notice anything about the E while going through the cards?

7. Do you remember her saying 'good' occasionally?

8. What did her saying 'good' mean to you?

9. Did you try to figure out what made her say 'good' or why or when she was saying 'good'?

10. Did you think there was any purpose to her saying 'good'?

11. While going through the cards did you think her saying 'good' had anything to do with some special types of verbs you used to make your sentences with?

12. There were about 75 trials in the experiment, when did this idea occur to you?

13. Were you aware of its influence on your selection of verbs?

14. Do you at any time during the course of the experiment consciously decide that since the E was saying 'good' in response to some particular class of verbs that you were going to try and make all your sentences with those class of verbs?

APPENDIX 3

Interview 2

1. How did you go about making stories to the pictures you saw?

2. Did you enjoy writing the stories?

3. Did your participation in the first experiment influence you in any way as you were writing the stories? b) In what way?

4. While you were writing the stories did you think that these two experiments were related? How?

5. How did this recognition affect the content of your stories? Please indicate very specifically?

APPENDIX 4

Instructions to Judges for Interview I

1. The Ss were told to make sentences with either one of the two verbs that were exposed to them. One verb was neutral and the other hostile. Examples of neutral verbs are escorted, strolled, cruised, polished, etc. The hostile verbs included verbs, as jeered, assaulted, assassinated, rebelled, etc.

2. The correct response for one group is neutral verbs and for the other group it is hostile verbs.

3. The reinforcement for the correct response was the E saying 'good' each time S emitted the appropriate verb (depending on the group he belonged) after the first fifteen trials of the experiment.

4. Each interview is to be categorized into one of the various levels in each of the three categories: Report of Behavioral Hypotheses, Report of Reinforcement Hypotheses, Report of Behavioral Intentions. A description of these categories is given on a separate page.

5. In order to reach a level of accuracy in report categorization, each report should be read through before any attempt at categorization is made.

6. Questions 1, 3, (excluding the c- which deals with the 'why' is relevant for the BH), 4, 6, 7, 8, 9, 10, and 11 determine the level of RH. Questions 3-C (dealing with 'why') and 5 determine levels of behavioral hypotheses. Questions 2, 12, 13 and 14 determine the level of BI.

7. Answer to some of the questions indicated above may not be found in the interviews (as asking those latter questions was irrelevant when Ss had not indicated positive responses on the preceding questions), so the levels of RH, BH, and BI should be determined from whatever is available.

Interview Questions

RH 1. Did you usually give the first sentence that came to your mind?
3a. Did you think you were using certain kinds of verbs more often than others? b- Which kind?
4. What do you think the purpose of this experiment was?

6. Did you notice anything about the E while going through the cards?
7. Do you remember her saying 'good' occasionally?
8. What did her saying 'good' mean to you?
9. Did you try to figure out what made her say 'good' or why or when she was saying good?
10. Did you think there was any purpose to her saying 'good'?
11. While going through the cards did you think her saying 'good' had anything to do with some special types of verbs you used to make your sentences with? What type?

BH 3-C. Why do you think you were using certain kinds of verbs?
5. Did you think you were supposed to make your sentences in any particular way or change the way in which you made your sentences? In what way?

BI 2. How did you go about deciding which of the two verbs to use?
12. In the 75 trials that were there when did the idea occur to you?
13. Were you aware of its influence on your selection of verbs? In what way?
14. Did you at any time during the course of the experiment consciously decide that since the E was saying 'good' in response to some particular class of verbs that you were going to try and make all your sentences with those class of verbs?

Interview I - Dulany's Categories for Measures of Awareness

The description of categories into which the report is to be categorized are given below. Please use the category number to classify the report.

Report of Reinforcement Hypotheses: The subject .....

1. reports the significance of the contingent stimulus- that it signified that the preceding was correct or what E wanted or would agree with. It is described as having some selective reinforcement value, not as a general encouragement to continue.
2. reports the distribution but not the significance of the contingent stimulus-that it followed the response class E designates as correct.
3. reports the occurrence but neither the significance nor the distribution of the contingent stimulus.
4. does not report the occurrence of the contingent stimulus.

Report of Behavioral Hypotheses: The subject .....

1. names the correct response class and calls it correct or describes it as what he is supposed to do or what the E wants him to do.
2. names as correct (or as what he is supposed to do or as what E wants him to do) some response class that is positively, but imperfectly correlated with the correct response class.
3. does not name the correct response class as correct. He may report that he does not know the correct response class, that there is not a correct response, or he may report some uncorrelated and irrelevant response class as correct. e.g. to match the verb with some colors or symbols on the cards; to make longer sentences etc.
4. names as correct some response class that is uncorrelated but partially incompatible with the correct response class-e.g., right-left alternation or position preference when the correct response is randomly distributed right and left.
5. names as correct some incorrect response class that is negatively correlated with the correct response class. e.g., using pleasant or neutral verbs more frequently when the correct response is hostile verbs or viceversa.

Report of Behavioral Intentions: The subject .....

1. reports intention to produce the response class E designates as correct.
2. reports intention to produce some response class that is positively, but imperfectly correlated with the correct response class.
3. reports no particular intention or reports intention to produce some irrelevant response class.
4. reports intention to produce some response class that is uncorrelated but partially incompatible with the correct response class.
5. reports intention to produce some response class that is negatively correlated with the correct response class.

APPENDIX 5

Instructions to Judges for Interview 2

1. During the conditioning phase of the experiment, one group of Ss had been reinforced for emitting sentences with the hostile verbs and the other group with the neutral verbs.

2. At the end of the conditioning session, Ss were asked to write stories to two TAT cards, in order to test for generalization. However, the purpose of this phase of the experiment was disguised from the Ss, an attempt having been made to lead them into believing that this was another experiment.

3. A post-conditioning interview concerning this part of the experiment was given to all the Ss. Questions 1 and 2 are irrelevant for any analysis. Questions 3, 4, and to some extent 5, are to be evaluated to provide information on the two broad categories indicated below. On the judges' evaluation sheet, please put an X under the two columns depending on the sub-category you think that the interview falls.

HAVE FUN AND THANK YOU VERY MUCH

I. Information on the Influence of the First Experiment:

a. S indicates being influenced in writing his stories as a result of participation in the first experiment. Moreover, this influence is in the appropriate direction, that is, if S had belonged to the hostile (neutral) group, he states a tendency to use more of the hostile, unpleasant, or morbid words. Note however, that S is not required to state any awareness of the response-reinforcement contingency of the first experiment.

b. S states he is influenced, but the nature of this influence is either irrelevant or incorrect. For example, S may state, it was easier to make stories as a result of participating in the first experiment; words that appeared in the first part reoccured in the stories; etc.

c. S states he is not aware of any influence of the first experiment.

II. Statement of the Relationship Between the Two Experiments:

a. S states correct relationship between the two experiments. For example, since E had reinforced unpleasant verbs in the first experiment, she wanted the stories to deal with violence; E wanted more pleasant stories since she had encouraged the use of pleasant words in the first experiment; etc.

b. S states an irrelevant or incorrect relationship between the two experiments. For example, assessment of personality traits in two different situations; study of childhood complexes through the two experiments; etc.

c. S states of there being no relationship between the two experiments.

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