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GENERALIZATION OF OPERANT CONDITIONING
OF VERBAL OUTPUT IN THREE-MAN
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GENERALIZATION OF OPERANT CONDITIONING OF VERBAL OUTPUT
IN THREE-MAN DISCUSSION GROUPS

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ABSTRACT

The present study investigated the generalization of verbal operant conditioning using a group discussion paradigm. The hypotheses were:

Hypothesis A: Verbal output of Target Ss would increase with the presentation of positive reinforcers for talking and punishment for silence.

Hypothesis B: Later testing of Target Ss in new groups would show generalization of increased verbal output.

Hypothesis C: Later testing of Target Ss in new groups would show the reinforced Target Ss being rated as performing a greater degree of leadership function than non-reinforced Target Ss.

Hypothesis D: The degree of generalization of verbal output would be a function of time, with Target Ss retested one day later showing more generalization than Target Ss retested one week later.

Ss were female volunteers from an introductory psychology course. Twenty-four groups of three Ss were tested in a soundproofed room, with a hooded panel containing a red and green light situated on the table in front of each S.

Ss were assigned to either a Reinforced or Non-Reinforced treatment, and each group met on three successive days for 30 minutes each day. On Day 1 no reinforcement was presented, in order to establish the operant level of verbal output for each S. Ss who spoke the least amount of time within their respective groups were selected as the Target Ss (N = 24). On Days 2 & 3, Ss under the Reinforced treatment were instructed that they would receive a green light when they

facilitated the group discussion and a red light when they hindered the group process. Actually Target Ss were positively reinforced (green light) for talking and punished (red light) for silence, while Non-Target Ss were punished for talking. Ss under the Non-Reinforced treatment received neither positive reinforcement or punishment.

On Day 4, which occurred either one or seven days after Day 3, Target Ss were assigned to new groups with Ss who had not participated in the first discussion group. Target Ss received neither positive reinforcement or punishment during Day 4. At the end of Day 4, Ss ranked each other on a sociometric questionnaire concerned with leadership.

Hypothesis A was supported by the results, with Target Ss showing an increase in verbal output under the Reinforced treatment ($F_{2, 44} = 20.93, p < .01$), and no change under the Non-Reinforced treatment ($p > .05$).

Hypothesis B was not supported, with Reinforced Target Ss showing no significant difference ($p > .05$) in verbal output from Non-Reinforced Target Ss on Day 4. However, Target Ss showed a significant increase of verbal output from Day 1 (First Group) to Day 4 (Second Group), for both the Reinforced and Non-Reinforced treatments ($F_{1, 20} = 22.77, p < .01$).

Hypothesis C was not supported. Reinforced Target Ss did not show a significant difference ($p > .05$) between Day 1 (First Group) and Day 4 (Second Group) in leadership function, whereas Non-Reinforced Target Ss showed a significant increase ($F_{1, 20} = 8.71, p < .01$) in leadership function.

Hypothesis D was not supported. Target Ss who were retested one day later showed no significant difference ($p > .05$) from Target Ss

retested one week later.

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CHAPTER I

STATEMENT OF PROBLEM

One of the first studies to apply verbal operant conditioning (VOC) procedures in a group situation was by McNair (1957). He studied the effect of a bell-tone, defined by the instructions as signifying approval, on the rate of verbalization in an 18-person discussion-type group. Subjects (Ss) were shown pictures depicting interpersonal situations and instructed to talk about them. The results indicated that the rate of verbalization was influenced by the reinforcer and varied as a function of the reinforcement schedule.

Cieutat (1959) studied the effects of nonverbal gestural cues on rates of verbalization in a seminar-type situation. Positive reinforcement consisted of the experimenter (E) and a confederate directing attention toward S, that is, E and the confederate looked at and gave occasional nods to S. Negative reinforcement consisted of E and the confederate showing inattention, that is, S was ignored. Cieutat found a positive relationship between the amount of time S spoke and attention, and a negative relationship between time and inattention.

In a series of studies by Shapiro (1963), Shapiro & Morningstar (1963), Levin & Shapiro (1962), and Leiderman & Shapiro (1963), it was found that reinforcement in a group situation can modify such responses as the order of speakers in conversation, the number of initiations individuals make to one another, and decision-making activity. Under different reward conditions there were resulting changes in the various behaviors. Walker & Heyns (1962) found that the presentation of differential reward can make groups appear as "individualist" or

"conformists." In a study by Bachrach, Candland, & Gibson (1961), they stated that the same variables which apply to the individual conditioning situation also apply to the group situation, such as prior history of reinforcement, reinforcing stimulus, schedule and amount of reinforcement, behavior upon which reinforcement is contingent, and the change in rate of response.

An important procedure for investigating the effects of positive reinforcement and punishment on rate of verbalization in a free operant situation was developed by Oakes, Droge, & August (1960). They presented nonverbal reinforcers and withheld these reinforcers after conditioning had been established. The reinforcement was a light flash, with one-half of the Ss being instructed that the flash indicated psychological insight, while the other half of the Ss were instructed that the flash indicated a lack of psychological insight. Ss were presented a clinical case history to discuss. Oakes et al. found that the light was a very effective reinforcer, and it was reported that some Ss who received the positive reinforcer reached the point where they appeared to be talking simply for the purpose of talking, and that some Ss who received the punishment reached the point where they appeared to be talking with a great deal of hesitancy. In one case a punished S, upon receiving a light flash, stopped in the middle of a sentence and remained silent for the next 20 minutes. Also, the authors reported that positively reinforced Ss frequently made comments at the end of the session indicating that the discussion had been very interesting, while the punished Ss usually left the session quietly and looking either dejected or relieved.

In a second study by Oakes, Droge, & August (1961), they presented to 18 groups of four Ss a problem situation in which there were alternative solutions. Ss were reinforced with a light flash for each statement that was favorable about one preselected solution, or unfavorable about the other two solutions. Ss' later choices of one of the solutions indicated that the preselected solution was most frequently chosen. Also, the proportion of favorable statements about the preselected solution increased during the 30 minute discussion.

Oakes (1962a) demonstrated the influence of prestige as a reinforcer. He found that the most effective reinforcer in the group discussion was when Ss were instructed that the light signified psychological insight as judged by statements made by a professional team that originally worked with the patients, while the least effective reinforcer was a light signifying agreement or disagreement with statements made by a group of laymen during a previous discussion of the case. In another study, Oakes (1962b) reinforced responses falling into each of Bales' 12 categories. He found that conditioning, as measured by frequency of responses falling into the reinforced category, was found only for the category of "gives opinion." Aiken (1965a), in an experiment in which the initially most submissive group member was positively reinforced for speaking and the others punished, an Interaction Process Analysis was made of the operant and conditioning discussions. The analysis suggested a differential change in the interaction categories, contingent upon the type of reinforcement. The experimental treatment seemed to produce a tense leader with a quite diffident style.

In a series of studies by Hastorf (1965), a group of four men discussed, in one sitting, three problem-solving cases. At the end of the first problem-solving case, Ss were asked to rank-order each other on amount of talking, best ideas, guiding the discussion, and group leader. A summed rating was obtained and S who ranked third in the hierarchy, that is, next to bottom, was selected as the Target S. During the second problem, E attempted to influence the behavior of Ss so that Target S would be chosen as the leader of the group. In general, Target Ss were positively reinforced for talking, and punished for remaining silent, while the other three Ss were punished for talking. Hastorf found that this session (Acquisition Period) led to a significant increase in both output and the sociometric ranking of Target S. In the third session (Operant 2), there was a significant drop in both the output and the sociometric rank of Target S. However, Target Ss' output and sociometric rankings did not fall to their original position, but remained significantly above the original position. This study will be referred to as Condition A.

Under another experimental treatment (Condition B), Hastorf presented the reinforcers by a programmed machine based upon verbal output, in order that Ss were reinforced the same number of times as Ss under Condition A. E was not allowed to make any selection of the verbal behavior that would be positively reinforced or punished. The conditioning of Target S under Condition B was similar to that of Condition A.

Under a third experimental treatment (Condition C), Hastorf programmed the reinforcement on the basis of time. In other words, Target S received about the same number of reinforcements as either Condition

A or Condition B, but the reinforcement was presented at certain times and contingent only on time. There were no significant changes in either verbal output or sociometric rank of Target Ss; therefore, it appears that increase in output and ranking is not merely a function of the number of reinforcements, but there must be some contingency between the reinforcer and talking.

A fourth treatment (Condition D) by Hastorf investigated the effect on Target S when the other three members were punished and Target S was not reinforced. There were no significant changes in Target S's behavior, although there was an increase in the amount of time when no one in the group was talking. Evidently the Target S did not fill the gap left by the other Ss.

In an experiment by Hastorf, Kite, Gross, & Wolfe (1965), it was found that when changes are perceived in another's behavior, attributing different causal relationships for the change will significantly affect evaluations of the person and his behavior. Ss listened to recordings of a three-person discussion group and rated the group members on two discussions. The two discussions are presented in order that one group member talks more frequently in the second discussion than in the first, while another member's verbal output decreases from the first to the second. The experimental Ss were instructed that during the second discussion "reinforcement lights" were used to encourage one member to talk more while the other two members were discouraged. Control Ss were instructed that the group did not receive "reinforcement." The results indicated that experimental Ss perceived less change in quality relative to perceived changes in amount of talking.

Extending the conditioning paradigm to a three-person discussion group, Aiken (1965b) had Ss rate each other on leadership, quality of ideas, participation, self-confidence, and influence. In a group guessing situation which followed, S with the lowest summed rating was reinforced for his guesses and the others for following him. A second discussion was employed to index generalization of the reinforcement effects. Conditioning was successful, and a relative measure of change indicated that interpersonal perceptions of the initially lowest rated S rose significantly between discussions.

As Krasner & Ullmann (1965) state, research of this type has major implications for clinical psychology. It demonstrates that much of clinical psychology can be considered to be applied social psychology, which should result in the further development of both areas of study. Also, this research should be valuable in the study of leadership and other variables related to group dynamics. It is apparent that one's behavior within a group can be influenced by environmental variables, and it would appear to be of prime importance to determine the degree to which these behavioral changes will be generalized to other situations.

In the present study, the group discussion paradigm was utilized in order to investigate the parameters of generalization of verbal operant conditioning. The hypotheses to be tested were the following:

- A. Verbal output of Target Ss would increase with the presentation of positive reinforcers for talking and punishment for silence.
- B. Later testing of reinforced Target Ss in new groups would show generalization of increased verbal output.

- C. Later testing of Target Ss in new groups would show the reinforced Target Ss being rated as performing a greater degree of leadership function than non-reinforced Target Ss.
- D. The degree of generalization of verbal output would be a function of time, with Target Ss retested one day later showing more generalization than Target Ss retested one week later.

CHAPTER II

METHOD

Subjects. The subjects were female volunteers from the Introductory psychology course at the University of Hawaii. Forty-eight groups were tested, with each group consisting of three Ss. Twenty-four of the Ss participated in two groups; therefore, a total of 120 Ss were tested. Ss were assigned to the groups on the basis of the times that they volunteered to participate in the experiment.

Apparatus. The subjects were seated around a small table in a soundproofed room. The room contained a table, three chairs, and three hooded panels each containing two signals lights. There was a one-way vision window between the experimental room and E's room. The hooded panel containing the two signal lights was situated on the table in front of each S, and the panels were designated North, South, and West in order that Ss were able to identify themselves by the name of their own panel. Each panel contained a red and green signal light. The signal lights were controlled by E in an adjoining room with E's panel buttons corresponding to S's panel lights, in order that when E pressed a panel button the corresponding light would flash on S's panel. A timer for each S was used in order that the total amount of time of talking for each S could be determined. E was equipped with monitor earphones in order that he would be able to hear the discussion and to flash on the panel lights at the appropriate times.

Procedure. The subjects were met by E in a separate waiting room and conducted to the experimental room. They were positioned around the table according to the alphabetical order of their last name, with the

first subject seated before the North panel, the second subject before the South panel, and the third subject before the West panel. Ss were assigned to either an experimental (Reinforced) or control (Non-Reinforced) treatment, and each group met on three successive days for thirty minutes each day.

On the first day, the conditions were the same for all of the groups, with no reinforcement being presented, in order to establish the operant level of verbal output for each S. The Ss' output score for the first day was measured according to the amount of time each S spoke during the 30 minute discussion, and Ss who spoke the least amount of time within their respective groups were selected as the Target Ss. There were 24 Target Ss in the experiment, with 12 Target Ss tested under the Reinforced treatment and 12 Target Ss under the Non-Reinforced treatment.

The following instructions were presented to the Reinforced groups at the beginning of the first day, and to the Non-Reinforced groups at the beginning of the first day, and to the Non-Reinforced groups at the beginning of the first, second, and third days:

This research is concerned with the process of group discussion. In the adjoining room there will be two social psychologists who are skilled in the process of group discussion and they will be listening to your discussion, therefore it is necessary that you identify yourself each time that you speak. Use no names for this identification, but identify yourself by the name of the panel before you each time you speak. Do it this way: say "I'm North," or "South, I think that . . . etc." You may talk about anything--the topics are entirely up to you. Please make no comments until you have been given the signal to begin. When you are ready, please look up. When everyone is ready to start, the green light before you will flash on and you may start the discussion. The discussion should be conducted normally with the exception that you must identify yourself each time before you speak. You will have about 30 minutes for the discussion.

The Reinforced groups received the following instructions at the beginning of the second and third days:

You held one discussion yesterday. This research is concerned with the influence of feedback on group discussion. In many group discussions the chairman does not really give the members any feedback on how they are doing--all he does is direct the discussion, call on people, and maintain proper order. You are going to be a feedback group and you're going to be given information on how you are doing. In the other room there will be two social psychologists who are skilled in the process of group discussion and they will let you know how you are functioning as a group member. Whenever you make a contribution to the discussion which is helpful in facilitating the group process your green light will flash on. When you behave in a way which will eventually hamper or hinder the group process your red light will go on. It is necessary that you identify yourself each time that you speak . . . (same as the first instructions).

On the second day, Target Ss under the Reinforced condition were not reinforced for the first five minutes of the discussion. During the last 25 minutes, Target Ss were positively reinforced (green light flashed) while they were talking and punished (red light flashed) whenever they were silent for more than one minute.

On the third day, Target Ss under the Reinforced condition continued to be positively reinforced and punished under the same contingencies as the second day. The other two Ss (Non-Target Ss), for both the second and third days, were punished whenever they spoke for more than 45 seconds.

The fourth session occurred either one or seven days after the third day. Thus, one-half of Ss were required to meet on four successive days, while the other half met on three successive days and one week later for the fourth day.

On the fourth day, the Non-Target Ss who had participated in the

three previous discussion were required to fill out a sociometric questionnaire and then they were dismissed. The Target Ss were assigned to new groups with Ss who had not participated in the first discussion groups. All of the groups were presented the standard instructions that were given to the groups tested on the first day. Therefore, one-half of the Target Ss were tested one day after the third session, and the other half were tested seven days after the third session. At the end of the 30 minute discussion, all three Ss were sent to separate rooms and asked to fill out a sociometric questionnaire. The Target Ss were required to fill out two questionnaires, one for the first discussion group (first three days) and the other for the second group (fourth day).

The sociometric questionnaire, on which Ss ranked each other, consisted of the following questions: (a) Who would you say talked the most? (b) Who would you say had the best ideas? (c) Who would you say did the most to guide the discussion? (d) Who would you say was the group's leader? (e) Who would you say enjoyed the experiment the most? (f) Who would you say you liked the most?

CHAPTER III

ANALYSIS OF RESULTS

In order to test for conditioning of verbal output of the Target Ss, the amount of time that the three Ss spoke was summed for each three-person group, and the Target S's score was expressed as a percentage of the amount of talking time. This insured that the verbal output score of the Target S was in proportion to the total verbal output of the group; therefore, the use of percentages acted as a control for the varying degrees of silence within each group. Target Ss were originally selected on the basis of being the least verbal person within each group, and they showed a mean score of 17.25% of the total time spoken. Thus, the Target Ss were able to show a maximum increase of verbal output from 17.25% to 100%, and a maximum decrease from 17.25% to 0%, which resulted in the criterion scores tending to be positively skewed. In order to make the distribution of the scores more closely resemble a normal distribution, an arc sine transformation was performed, and Hartley's test of homogeneity of variance was made. An $F_{\max, 8, 11}$ of 6.15 ($p > .05$) indicated that the variances of the criterion groups were not significantly heterogeneous.

A 2 x 3 analysis of variance was made of the transformed scores in order to test for conditioning of verbal output. This was a two factor design in which all of the B treatments (Days 1, 2, & 3) were administered to the same Ss, but with both A treatments (Reinforced vs. Non-Reinforced) administered to different Ss. Table 1 shows that there was a significant Days effect, with $F_{2, 44} = 13.49$, $p < .01$. However, the significant A x B interaction ($F_{2, 44} = 9.37$, $p < .01$) indicated that the

simple effects for A and B should be examined. Table 2 shows that there was a significant B effect (Days 1, 2, & 3) for the Reinforced group ($F_{2,44} = 20.93$, $p > .01$), but no significant B effect for the Non-Reinforced group. This indicates that the Target Ss under the Reinforced treatment showed a significant difference in verbal output between Days 1, 2, & 3, whereas Target Ss under the Non-Reinforced treatment showed no significant difference. In order to determine which groups under the Reinforced treatment accounted for the significant difference, the Newman-Keuls method was performed to test the difference between the means of Days 1, 2, & 3. Table 3 shows that there was a significant difference between Days 1 & 2 and Days 1 & 3, but no significant difference between Days 2 & 3. This indicates that Target Ss showed a significant increase in verbal output from Day 1 to Day 2, and that this increase was maintained for Day 3.

In order to test for generalization of verbal output of the Target Ss under the Reinforced treatment, a $2 \times 2 \times 2$ analysis of variance was made. This was a three factor design in which both of the C treatments (Day 1 vs. Day 4) were administered to the same Ss, but with both A treatments (Reinforced vs. Non-Reinforced) and both B treatments (One Day vs. One Week) administered to different Ss. For the C treatment, Day 1 was the first day of testing in the initial group (First Group), and it was a measure of the operant level of Target Ss; Day 4 was the fourth day of testing in which Target Ss participated in a newly formed group (Second Group). For the A treatment, the Reinforced Target Ss had been reinforced during Days 2 & 3, while the Non-Reinforced Target Ss had not been reinforced. For the B treatment, One Day means that

Target Ss were tested in the Second Group one day after Day 3, and One Week means that Target Ss were tested in the Second Group one week after Day 3. Table 4 shows that the only significant difference occurred between Day 1 (First Group) and Day 4 (Second Group) in which $F_{1,20} = 22.77$, $p < .01$. Therefore, Target Ss showed a significant increase in verbal output when they were placed in the Second Group, regardless of whether they had been reinforced or non-reinforced during Days 2 & 3, or whether they were placed in the Second Group one day or one week after Day 3.

A $2 \times 2 \times 2$ analysis of variance was made of the sociometric scores of Target Ss in order to test for the influence of reinforcement upon leadership functions. This was a three factor design in which both of the C treatments (Days 1-3 vs. Day 4) were administered to the same Ss, but with both A treatments (Reinforced vs. Non-Reinforced) and B treatments (One Day vs. One Week) administered to different Ss. Table 5 shows that there was a significant C effect ($F_{1,20} = 11.52$, $p < .01$) and a significant A x C interaction ($F_{1,20} = 6.29$, $p < .05$). An analysis of the simple effects (Table 6) indicates that the Non-Reinforced Target Ss showed a significant decrease in sociometric rank when comparing their performance during Days 1-3 with Day 4, with $F_{1,20} = 8.71$, $p < .01$. Thus, Target Ss under the Non-Reinforced treatment were rated as performing more leadership functions in the Second Group (Day 4) than in the First Group (Days 1-3). There were no other significant simple effects.

Chi Square values were computed from six 3×3 contingency tables between the four sociometric questions that comprised the sociometric scores used in the analysis. Each of the four sociometric questions

was found to be significantly related to each other ($p < .01$). Also a significant relationship was found between the Talked Most question and the verbal output scores ($\chi^2 = 61.52$, $df = 4$, $p < .01$), which indicated that Ss showed a high degree of accuracy in ranking each other on amount of talking.

CHAPTER IV

DISCUSSION OF RESULTS

Hypothesis A was supported by the results, that is, Target Ss under the Reinforced condition showed a significantly greater verbal output than Non-Reinforced Target Ss. The mean verbal output for Reinforced Target Ss for Day 1 (Operant Level) was 16.5%, Day 2 was 29%, and Day 3 was 28% (see Figure 1). The Non-Reinforced Target Ss showed a mean verbal output score for Day 1 (Operant Level) of 18%, Day 2 was 18%, and Day 3 was 22%. The analysis of the results indicated that the Reinforced condition was effective in increasing verbal output during Day 2; however, the continued presentation of the reinforcer during Day 3 did not result in an additional increase in verbal output. It is possible that the Reinforced condition during Day 3 may have resulted in the maintenance of Target Ss' verbal output at the Day 2 level, and if Day 3 had been a Non-Reinforced condition there may have been a significant decrease from Day 2 to Day 3. Hastorf's (1965) experiments suggest that a decrease in verbal output would have occurred; however, the design of the present experiment did not allow for an investigation of this problem.

The scores of the individual Target Ss (see Tables 7 & 8) suggest that the Reinforced treatment was an effective reinforcer for practically all of the Target Ss. Only one of the Reinforced Target Ss (S #9R) failed to show an increase of verbal output for both reinforced days (Days 2 & 3) when compared with the non-reinforced day (Day 1 or Operant Level). However, nine of the twelve Non-Reinforced Target Ss failed to show an increase in verbal output for both Days 2 & 3.

The Non-Reinforced Target Ss showed no significant differences

between Days 1, 2, & 3 (Table 2). Within the Non-Reinforced groups, the three Ss showed consistent verbal output scores between Days 1, 2, & 3, with Days 1 & 2 having $\chi^2 = 34.00$ ($p < .01$), Days 1 & 3 having $\chi^2 = 16.50$ ($p < .01$), and Days 2 & 3 having $\chi^2 = 28.50$ ($p < .01$). Eleven of the twelve Non-Reinforced Target Ss failed to show an increase or decrease greater than 10% when Day 1 was compared with Days 2 & 3, with the exception being Target S #24C, who had a score of 23% on Day 1, 37% on Day 2, and 58% on Day 3 (see Table 8).

Hypothesis B was not supported by the results, that is, Reinforced Target Ss did not show significantly greater verbal output than Non-Reinforced Target Ss in the Second Group (Day 4), see Figure 1. Target Ss showed a significant increase of verbal output from the First Group (Day 1) to the Second Group (Day 4), for both the Non-Reinforced and Reinforced treatments ($F_{1,20} = 22.77$, $p < .01$). The Non-Reinforced Target Ss showed a mean verbal output score of 18% for Day 1 and 36% for Day 4, while the Reinforced Target Ss showed a mean score of 16.5% for Day 1 and 29% for Day 4. The Reinforced and Non-Reinforced Target Ss did not significantly differ from each other. These results indicate that the initially least verbal member of a three-person discussion group showed an increase in verbal output when he participated in a newly formed group. The Second Group (Day 4) consisted of a Target S who had previously spent three days in the same sort of discussion group and two Ss who had not previously been in any such discussion group. The results indicate that the increase of verbal output of the Target Ss in the Second Group was a result of their previous experience in the experiment, without the prior reinforcement acting as a contributing factor.

Hypothesis C also was not supported by the results, that is, Reinforced Target Ss did not show lower sociometric rankings (greater leadership function) than Non-Reinforced Target Ss in the Second Group (Day 4), see Table 5. There was a significant Days effect, that is, Target Ss were given significantly higher sociometric rankings (less leadership function) for the First Group (Days 1-3) than for the Second Group (Day 4). Moreover, the significant A x C interaction indicates that there was a differential effect between the Reinforcement vs. Non-Reinforcement treatment and First Group vs. Second Group treatment upon the sociometric rankings (see Figure 2). The Reinforced Target Ss did not show a significant difference between the First Group and Second Group, whereas the Non-Reinforced Target Ss showed a significant decrease in sociometric ranking (greater leadership function) from the First Group to the Second Group. This means that the Non-Reinforced Target Ss were rated as performing a greater degree of leadership function in the second discussion group than in the first discussion group. The results of the sociometric scores are consistent with the results of the verbal output scores, that is, there were no significant differences between the Reinforced and Non-Reinforced Target Ss in the Second Group for either the sociometric scores or verbal output scores. Also, for the Non-Reinforced Target Ss, the increase in verbal output from the First Group to the Second Group is consistent with the decrease in sociometric scores (increase in leadership function) from the First Group to the Second Group.

Hypothesis D also was not supported by the results, that is, the degree of generalization of verbal output and sociometric rankings was

not a function of time, as Target Ss who were retested one day later showed no significant difference from Target Ss retested one week later (see Tables 4 & 5). These results indicate that under a Non-Reinforced treatment, the initially least verbal member of a discussion group will tend to show an increase in verbal output when he participates in a newly formed group (Second Group), regardless of whether he is placed in the Second Group one day or one week after participating in the First Group. Since there was no significant difference between One Day and One Week, the effect of the previous experience appears to be effective over a period of time of at least one week. Although the previous experience of the Target Ss in the experiment appears to have been a significant factor in increasing verbal output in the Second Group, the present study does not make it possible to isolate the specific factors affecting the change in verbal output. A few of the possible factors that could account for the Non-Reinforced Target Ss' increase in verbal output in the Second Group would be the following: (1) Target Ss participation in the first discussion group, (2) Target Ss participation in an experiment for three days prior to the testing in the Second Group, (3) Target Ss familiarity with the physical surroundings of the experimental room.

The results of the present experiment appear to have some general implications for behavioral change within a group situation. The proportion of verbal output of an individual seems to remain highly consistent within the same discussion group from day to day. However, an individual's verbal output can be significantly increased within the same group by establishing the proper reinforcement conditions. The

optimal condition appears to be one where the Target Ss are punished for remaining silent and positively reinforced for talking, and the Non-Target Ss are punished for talking (Hastorf, 1965). E observed that the presentation of punishment appeared to be of primary importance in the early stage of the discussion, because it seemed to elicit a verbal response from a previously silent individual and to reduce the amount of talking of the Non-Target Ss. Some of the Target Ss, after receiving one or two punishments for remaining silent for a period of one minute, appeared to show signs of anticipation of the punishment if they continued to remain silent, such as frequent glances at the panel light and increased physical activity. It appeared to E as though Target Ss quickly learned the punishment contingency and were quite effective in avoiding punishment, which was supported also by an average of only five punishments being presented on both Days 2 & 3, and an average of 40.5 positive reinforcements on both Days 2 & 3. In addition, the Non-Target Ss under the Reinforced treatment, after receiving one or two punishments for talking for more than one minute, appeared to shorten the length of time that they spoke, which was supported by an average of only 2.2 punishments being presented on both Days 2 & 3.

The proportion of an individual's verbal output within a discussion group will also increase if he is placed in a newly formed group with subjects who have not been in the first discussion group, without his having been reinforced in the first group. The Target S received prior experience with discussion groups, while the Non-Target Ss did not receive prior experience. Therefore, the results of the present experiment indicate that there are two possible procedures that could be used

in order to increase the level of an individual's verbal output in a discussion group. One procedure would be to establish the proper reinforcement contingencies for the Target S within a discussion group, and the other procedure would be to give the Target S prior experience in discussion groups.

The results suggest that individuals have an upper threshold for verbal output within a discussion group. Target Ss showed an increase in percentage of verbal output of approximately 100% under the different experimental conditions. For example, the Reinforced Target Ss showed an operant rate of 16.5% for Day 1, with Days 2, 3, & 4 showing scores of 29%, 28%, & 29%, respectively. Thus, Target Ss showed an increase in verbal output when they were reinforced on Day 2; however, continued reinforcement for Day 3, as well as placing the Target Ss in a new group, did not result in a change from the Day 2 level. The Non-Reinforced Target Ss showed a verbal output score of 18% on Day 1 (First Group) which increased to 36% on Day 4 (Second Group).

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Table 1
Summary of 2 X 3 Analysis of Variance of
Transformed Verbal Output Scores

Source	df	MS	F
Between Subjects	23		
Reinforcement (A)	1	.3068	2.74
Ss Within Groups	22	.1119	
Within Subjects	48		
Days 1, 2 & 3 (B)	2	.2455	13.49*
A X B	2	.1706	9.37*
B X Ss Within Groups	44	.0182	

*p < .01

Table 2
Summary of Analysis of Variance of Simple Effects for
Reinforced and Non-Reinforced Treatments

Source	df	MS	F
Days for Reinforced (B for A_1)	2	.3810	20.93*
Days for Non-Reinforced (B for A_2)	2	.0351	1.29
Within (MS_B X Subjects Within Groups)	44	.0182	

* $p < .01$

Table 3
Newman-Keuls Test of Differences between Days
for Reinforced Treatment

	Day 1 (B_1)	Day 3 (B_3)	Day 2 (B_2)
Ordered Means	.8233	1.1146	1.1466
Differences Between Means	Day 1	Day 3	Day 2
	Day 1	.2913*	.3233*
	Day 3		.0320

* $p < .01$

Table 4
Summary of 2 X 2 X 2 Analysis of Variance of
Transformed Verbal Output Scores

Source	df	MS	F
Between Subjects	23		
Reinforcement (A)	1	.1426	1.08
One Day vs. One Week (B)	1	.0254	.19
A X B	1	.2662	2.02
Subjects Within Groups	20	.1317	
(Error Between)			
Within Subjects	24		
Days 1 & 4 (C)	1	1.4504	22.77*
A X C	1	.0434	.68
B X C	1	.0003	.005
A X B X C	1	.2243	3.52
C X Subjects Within Groups	20	.0637	
(Error Within)			

*p < .01

Table 5

Summary of 2 X 2 X 2 Analysis of Variance of Sociometric Scores

Source	df	MS	F
Between Subjects	23		
Reinforcement (A)	1	.00	.00
One Day vs. One Week (B)	1	1.88	.25
A X B	1	9.64	1.29
Subjects Within Groups	20	7.47	
(Error Between)			
Within Subjects	24		
Days 1-3 & 4 (C)	1	68.88	11.52**
A X C	1	37.64	6.29*
B X C	1	4.38	.73
A X B X C	1	5.66	.95
C X Subjects Within Groups	20	5.98	
(Error Within)			

*p < .05

**p < .01

Table 6
 Summary of Analysis of Variance of Simple
 Effects for Sociometric Scores

Source	df	F
Days for Reinforced (C for A_1)	1, 20	.20
Days for Non-Reinforced (C for A_2)	1, 20	8.71*
Reinforcement for Days 1-3 (A for C_1)	1, 20	1.43
Reinforcement for Day 4 (A for C_2)	1, 20	1.37

*p < .01

Table 7

Percentages for Verbal Output Scores of Reinforced Target Subjects

Subjects	Day 1	Day 2	Day 3	Day 4
2R	9	33	26	49
4R	9	26	20	14
5R	21	28	41	70
7R	9	31	26	14
9R	18	18	14	18
11R	9	23	20	10
13R	27	51	37	42
15R	14	24	30	13
17R	29	35	32	36
19R	8	20	15	22
23R	28	40	40	37
25R	20	28	41	24

Table 8

Percentages for Verbal Output Scores of Non-Reinforced Target Subjects

Subjects	Day 1	Day 2	Day 3	Day 4
6C	21	14	27	34
8C	17	27	17	11
10C	18	16	15	53
12C	11	9	11	12
14C	24	27	26	31
16C	22	16	20	66
18C	16	21	25	42
20C	25	16	22	63
21C	10	10	20	28
22C	8	8	8	41
24C	23	37	58	44
26C	24	16	17	16

Fig. 1. Mean percentage talking time of Target Subjects under three experimental conditions.

Fig. 2. Mean sociometric rank of Target Subjects.

(Note: Greater rank value indicates less
leadership function.)