INSTRUCTIONS AND GROUP VERSUS INDIVIDUAL REINFORCEMENT IN MODIFYING DISRUPTIVE GROUP BEHAVIOR¹

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Head Start children were matched into two groups on the basis of rates of disruptive behavior during rest periods. Attempts were made to modify their behavior using either individual or group token reinforcement procedures. While the reinforcement procedures reduced inappropriate behavior somewhat, the addition of instructions to the reinforcement reduced the inappropriate behavior to near zero for both groups. Instructions alone, however, were ineffective in controlling behavior. Type of reinforcement (group or individual) did not produce differential effects. While experimental control over the target behavior was demonstrated, there was little carryover from the experimental room to the regular classroom. Even when treatment was introduced into the regular class, follow-up results showed that with time the target behavior approximated pretreatment levels. The results suggest that (a) the combination of instructions and reinforcement is much more effective than either one of these alone, (b) behavior change is specific to the environmental contingencies, and (c) the group reinforcement technique, which is much more easily implemented, was at least as effective as individual reinforcement in the present study.

Instructions and reinforcement have been used to modify behavior in a variety of situations but only a few studies have investigated the effect of instructions with and without reinforcement: Ayllon and Azrin (1964) with schizophrenic patients; Agras, Leitenberg, Barlow, and Thompson (1969) on astasia-abasia and claustrophobia; Leitenberg, Wincze, Butz, Callahan, and Agras (1970) on avoidance of social interaction and injurious situations; Agras, Leitenberg, and Barlow (1968) on agoraphobia; Leitenberg, Agras, Barlow, and Oliveau (1969) and Oliveau, Agras, Leitenberg, Moore, and Wright (1969) in the desensitization of fear of snakes; and Barlow, Agras, and Leitenberg (1970) in the covert sensitization of homosexuality. None of these studies investigated the effectiveness of instructions on group behavior.

The token economy has become a frequently used technique in the modification of behavior of groups of subjects. Typically, each subject receives a reward according to the number of tokens he has earned. Several studies (Evans and Oswalt, 1968; Patterson, 1965;

Patterson, Jones, Whittier, and Wright, 1965) suggest the efficacy of utilizing peer influence to supplement individual rewards in increasing appropriate behavior. Wolf and Risley (1967) found that a group consequence technique (the subject earned rewards for his peers as well as for himself) was more effective than individual consequences in controlling the subject's disruptive classroom behavior. While group consequences were shown to be more effective with a single subject, no studies investigated the relative efficacy of group *versus* individual reinforcement contingencies on the behavior of a group of subjects. In one study (Barrish, Saunders, and Wolf, 1969), group consequences (giving or withholding of privileges based upon the appropriateness of the behavior of the group as a whole) were successfully employed to modify disruptive behavior, but these authors made no comparison with a group under individual reinforcement contingencies.

The purpose of the present investigation was to assess the effects of instructions, as well as group and individual reinforcement contingencies, in modifying the behavior of groups of subjects. The study is presented in three phases: (a) Phase I—determination of base rates of inappropriate rest-period behavior and the initiation of reinforcement conditions (group and individual), (b) Phase II—

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the addition of instructions, and (c) Phase III—the generalization of results and the instigation of treatment in the regular classroom.

METHOD

Subjects

The study was conducted in a rural Head Start center in a deprived area of Mississippi. Six children from a class of 19 were divided into two matched groups on the basis of high rates of disruptive behavior during initial observation periods. Each group consisted of two male and one female Negro students (5 yr, 5 months to 6 yr, 1 month).

Measures

A dichotomous behavior classification was devised; all rest-period behaviors were considered as either appropriate or inappropriate. Appropriate behavior consisted of the subject remaining on his mat (at least entire trunk of body had to be in contact with the mat; hands and feet, if not in contact with other persons or objects, could be off the mat) and making no verbalizations. All other behaviors were classified as inappropriate.

Data were recorded by means of a time-sampling technique. Each minute of data collection was divided into four 10 sec intervals of observation separated by 5-sec intervals in which the experimenters recorded data and/or dispensed reinforcement. Each subject was observed at least once per minute on a random schedule for twenty 10-sec intervals. For each subject, the number of intervals of inappropriate behavior was recorded. If one instance of inappropriate behavior occurred, that interval was considered inappropriate; that is, not more than one inappropriate response was scored per 10-sec interval.

Three types of rating checks were made throughout the study. These were:

(1) *Inter-rater agreement*: the two experimenters observed the same subjects simultaneously but independently and rated their behavior. The reliability check involved computing the percentage of agreements per-subject-per-interval as compared to the total number of observations. Agreements involved both observers recording at least one inappropriate behavior or both recording no inappropriate behavior. During the course of the study (62 sessions), 14 such checks were made

and agreement ranged from 0.90 to 1.00 (mean = 0.97).

(2) *Naive rater*: since raters who are aware of the experimental goals may reach a high level of agreement and both be biased in their ratings, on six occasions naive and independent raters were substituted for the second experimenter to make reliability checks. The naive raters, six students from an introductory psychology class, were instructed in the rating techniques and were given examples of appropriate and inappropriate behavior. No further information was given the naive raters. If they happened to be rating during experimental conditions in which instructions were given to the subjects, the raters remained out of the room until after the instructions were completed. The results of these checks ranged from 0.93 to 1.00 (mean = 0.98).

(3) *Time-sampling validity check*: to check the validity of the assumption that behavior observed at fixed spacings in time adequately represents behavior occurring during the entire session, subjects were chosen randomly and observed on a continuous basis by one experimenter while the other experimenter was engaged in the regular time-sampling procedure. This technique allowed for comparisons between a subject's behavior rated continuously over 80 intervals by one experimenter and 20 time-sample intervals rated by the second experimenter. The correlation between 12 continuous ratings and the time-sample ratings was 0.95, indicating that the time samples were indeed accurate estimates of the subjects' behavior.

PHASE I

Experimental Conditions

Baseline in regular class. The teacher and her aide were instructed to go about their regular activities as if the experimenters were not present. On the basis of data recorded in this 11-day period, the six subjects who displayed the most frequent inappropriate behavior were assigned randomly to two matched groups: "individual contingency group" and "group contingency group." The mean number of intervals of inappropriate behavior was 17.56 for the individual contingency subjects and 18.63 for the group contingency subjects.

Baseline in experimental room. An additional baseline session was conducted to check

the validity of the assumption that the data obtained in the regular class were a valid estimate of inappropriate behavior and that the matching had provided two groups of subjects with equivalent amounts of inappropriate behavior. During Days 12 to 15, the subjects were taken in groups into a vacant classroom for 10-min observation periods. The order of groups observed first was randomly determined each day. The subjects in one group were brought with their mats into the experimental room, the door was closed, nothing further was said by the experimenters, and the collection of data was begun. For each subject, the number of intervals in which at least one inappropriate behavior occurred was recorded. When the period was over, the subjects were sent back to their classroom and the next group was brought in.

Token training and token reinforcement in experimental room. To demonstrate the value of the tokens in buying the back-up reinforcers (toys), the subjects were introduced to the token system. Individual contingency subjects were brought into the experimental room and shown an array of 10 cent toys. They were told they would get a toy if they played a game. They were shown a box containing 100 ping pong balls. At the other end of the room there were three clear plastic bins, each labelled with a subject's name. Each subject was shown his bin and was told that if he filled up his own bin with balls, he could get a toy to take home. The subjects took to the game readily and soon completed the task. After the subjects chose their toys and left the room, the group contingency subjects were brought in. Similar instructions were given these subjects but only one bin was present. The three subjects had to fill this one bin simultaneously and then each could choose his own toy.

Appropriate behavior was reinforced with tokens during Days 16 to 23. Each group was brought into the experimental room for a 10-min period. Each day, the group that went first was randomly determined. When the subjects entered the room (Day 16) they were reminded of the game they had played the preceding day and were told that they could get a toy if they got enough ping pong balls in their bin. All subjects received a toy on the first day. From then on, the criterion for receiving a toy was to earn more balls than on

the preceding day. The subjects were informed that from then on one of the experimenters would put the balls into their bin(s). The experimenters went to the side of the room, said nothing more, and began data collection.

Because of high rates of inappropriate behavior during baseline, shaping appropriate behavior was considered to be necessary, and the following procedures were used. For the individual contingency subjects, if a subject met criteria at any particular instant, a ping pong ball was placed in his bin. Five such instances were allowed per period for shaping the desired behavior, after which appropriate behavior had to be displayed for a whole interval in order for a subject to obtain reinforcement. In other words, after a subject had received five reinforcements for instances of appropriate behavior, no reinforcement was given after any interval in which an inappropriate behavior occurred. The same shaping procedure was employed for the group contingency subjects, except that all subjects had to meet the above criteria for appropriate behavior at the same time. If any of the subjects were behaving inappropriately, no reinforcement was given. Both groups were observed on a continuous basis for reinforcement purposes during the 10-min session. Since each minute was divided into four intervals of observation, the subjects, therefore, had 40 intervals per period in which they could obtain reinforcement. However, rates of inappropriate behavior were still obtained by means of time sampling.

When the period was over, the subjects who met criteria were notified that they had obtained enough balls, and toys were exchanged for the balls. Subjects who did not receive toys were informed that they could play the game the next day and might be able to win a toy then.

After the first day, the following instructions were read to the subjects when they entered the experimental room (Days 17 to 23);

"You remember how we play this game. Steve puts the balls in the bin and if you get enough balls, you can trade the balls for a toy. Yesterday you did (or did not) get enough balls for a toy. If you get enough balls today, you will get to choose a toy."

RESULTS

The group data for all three phases of the study are presented in Fig. 1. During the 11 baseline sessions in the regular classroom, rates of inappropriate behavior were extremely high (mean = 18.1/20). When the subjects were divided into groups and observed in the experimental room, the rates remained high and with the exception of one session, in which one of the group contingency subjects fell asleep, it appeared that the matching procedures had, in fact, produced comparable groups.

As can be seen in Fig. 1, after eight sessions of reinforcement the number of intervals of inappropriate behavior decreased somewhat, but the day-to-day variability of the behavior increased. Method of reinforcement (individual or group) did not appear to produce differential results. Superstitious behavior (*i.e.*, the subjects telling each other what to do) that was incompatible with appropriate behavior occurred. The subjects' verbalizations to one another indicated that they were not aware of the reinforcement contingencies. In addition, the subjects verbalized to the experimenters that they would be "good" in order to get a toy, but it was apparent that they did not know what behaviors were "good" in terms of the experimenters' criteria. Qualitatively (*i.e.*, in terms of noise level and physical activity), the reinforcement appeared to have affected a change. However, in terms

of the strict, pre-defined criteria for appropriate behavior there was less evidence of change.

PHASE II

Experimental Conditions

Instructions added to reinforcement. On Days 24 to 27, instructions concerning the exact criteria for appropriate behavior and the contingencies for reinforcement were given. Both groups were given the following instructions:

"Now let me tell you what you must do to get Steve to put the balls in your bin. If you lie on your mat, with your head down, do not talk or make any noise, and do not play with any toys or anything else, then Steve will put the balls into your bin. Remember, head down on mats, no talking or making noise, no playing with anything, and then Steve will put a ball in your bin."

The subjects were then asked if they could tell the experimenter what they must do in order to obtain a reward. Reinforcement and data collection were the same as in the prior condition of Phase I.

Return to baseline in experimental room. This condition (Days 28 to 31) was identical to the baseline condition in the experimental room in Phase I. No instructions and no rewards were given.

Fig. 1. Mean intervals of inappropriate behavior as a function of instructions and group and individual reinforcement.

Instructions only, experimental room. This condition (Days 32 to 34) was carried out to assess the effects of instructions alone. The following statement was read to the subjects when they entered the room:

"Let me tell you what you must do. Lie on your mat with your head down, do not talk or make any noise, and do not play with any toys or any things. Remember, heads down on mats, no talking or making noise, no playing with anything."

No reinforcement was dispensed and the apparatus was absent from the room.

Reinforcement and instructions in the experimental room (Days 35 to 39). Reinforcement and instructions were reinstated.

RESULTS

As can be seen in Fig. 1, the addition of instructions to the reinforcement produced immediate and marked effects. Not only was the mean frequency of intervals of inappropriate behavior decreased, but so was the variability.

The reinforcement condition of Phase I and the reinforcement plus instructions condition of Phase II did not appear to produce differential effects between the two groups. However, during the return to baseline in the experimental room there appeared to be a substantial difference. The mean intervals of inappropriate behavior for the individual contingency group increased to approximately 75% of its pretreatment baseline rate, whereas the group contingency group returned to its maximal pretreatment level (100%). The immediacy of the return, or approximate return, to baseline levels suggests the specificity of the treatment techniques.

Instructions without reinforcement produced no change in the group contingency group and a slight initial but gradually dissipating change in the individual contingency group. Following this condition, reinforcement with instructions was re-instituted and the results were similar to the earlier combination of reinforcement and instructions.

PHASE III

Baseline in regular classroom. To assess the carry-over effects from treatment in the experimental environment to behavior in the nat-

ural milieu, Days 40 to 49 involved baseline observations in the regular classroom. This condition was identical to the first observation condition in Phase I. Classmates who were not subjects were present during this time, as were teachers.

Reinforcement and instructions in the regular class. On Days 50 to 56, the treatment, consisting of instructions plus reinforcement, was transferred to the regular classroom situation. After all children were given mats, experimental subjects were taken into another room. One group was chosen at random, given instructions, brought into the classroom, and received reinforcement as before. The subjects who won toys were informed and then all subjects were taken back to the vacant room. The remaining group was then brought into the classroom and given its experimental treatment.

Return to baseline in regular class. Follow-up observations (Days 57 to 62) were again carried out in the regular classroom situation.

RESULTS

As can be seen in Fig. 1, when the subjects were returned to the regular classroom and treatment was discontinued, inappropriate behavior gradually increased over the 10 observation sessions until pre-treatment levels were approximated. However, it should be noted that this increase was more gradual than that experienced in the return to baseline conditions in the experimental room of Phase II. Secondly, the day-to-day variability in behavior also increased. While treatment in the experimental room resulted in initial improvement, which gradually extinguished in the regular classroom, it was felt that initiating treatment in the regular class might aid in affecting and maintaining changes in the classroom. The data indicate that treatment in the regular classroom did not produce as dramatic and immediate effects as did similar treatment in the experimental room. Observations indicated that teachers and other children in the classroom engaged the subjects in behavior that was antagonistic to the experimenters' criteria (*i.e.*, other children hitting the subjects, teachers directing subjects to move their mats and engaging them in conversation, *etc.*). Although the treatment in the classroom was effective in reducing inappropriate behavior, pre-treatment levels of dis-

ruptive behavior were approximated when treatment was discontinued.

DISCUSSION

Although the criteria for appropriate behavior were quite stringent when compared to the usual teacher definitions of "good" behavior, it was found that the subjects could meet the strict requirements when informed what they were. That is, the instructions were successful in prompting specific behaviors that could then be reinforced. This finding is consistent with Ayllon and Azrin's (1964) finding with hospitalized mental patients that their reinforcement procedures were not effective unless reinforcement was accompanied by instructions, and with Baron, Kaufman, and Stauber's (1969) hypothesis that when instructions about the desired response are omitted, substantial numbers of subjects may fail to acquire the response despite scheduling of reinforcing contingencies deemed favorable for acquisition. The instructions-alone phase indicated that although instructions can be used to prompt very specific behavior in young children, consistent reinforcement is needed to maintain it. This finding, which is also consistent with Ayllon and Azrin's (1964), suggests that teachers can require very specific behaviors of their pupils if they follow appropriate responses to their requests with consistent reinforcement.

The over-all results of the treatment and follow-up conditions point to the specificity of treatment effects. That is, experimental manipulations resulted in demonstrable control over the behavior, but even when carried out in the regular classroom these changes were not lasting. This finding suggests that unless the teachers are trained in the reinforcement techniques and take control of the program, discrimination rather than generalization will take place.

Although the individual contingency and group contingency groups responded similarly during the three reinforcement plus instructions conditions, the general absence of any inappropriate behavior precluded a more "powerful" test of the relative effectiveness of individual and group reinforcement. That is, the dramatic behavior changes (to near-zero levels) for both groups resulted in what might be called a "cellar effect". If group reinforce-

ment contingencies can be shown in follow-up studies to be at least as effective as individual reinforcement, as was demonstrated in the present study, such a procedure would be much more efficient in classrooms and other group settings, i.e., it is much easier to dispense one reinforcer to the class than to dispense one to each class member.

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