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REINFORCEMENT THERAPY IN THE CLASSROOM[1]

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Teachers were trained in the systematic use of attention and praise to reduce the disruptive classroom behavior of four first-grade children. Observation measures showed a significant improvement from baseline to treatment for these children and no significant changes for same-class controls. While the amount of teacher attention to target children remained the same from baseline to treatment, the proportion of attention to task-relevant behavior of these children increased. Psychological tests revealed no adverse changes after treatment.

Reinforcement techniques have been demonstrated to be quite effective in altering behavior in the laboratory situation (Krasner and Ullmann, 1965), and recently there have been increasing attempts to extend these methods to treatment in "real-life" situations. Of considerable importance is the potential usefulness of reinforcement therapy in the school classroom (*e.g.*, Clarizo and Yelon, 1967; Hall, Lund, and Jackson, 1968; Woody, 1966).

Zimmerman and Zimmerman (1962) eliminated disruptive classroom behavior in two emotionally disturbed boys by removing the social consequences of maladaptive behavior. Quay, Werry, McQueen, and Sprague (1966) reported on the use of conditioning techniques in a small special class with conduct problem children. A program in which public school teachers were trained to manage classroom behavior problems by the contingent use of teacher attention and praise has been described by Becker, Madsen, Arnold, and Thomas (1967).

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While these applications of reinforcement methods are certainly encouraging, several legitimate questions are often raised by psychologists and teachers concerned with treating disruptive classroom behavior. One critical area of concern is the generalization of treatment effects. First, when a child's disruptive behavior is successfully reduced, what are the effects on other aspects of his observable behavior and on his psychological test functioning? Second, how are other pupils in the class affected when the teacher concentrates on treating deviant behavior in one or two specific children?

The present study further explored the effectiveness of the teacher as a therapeutic agent, but it also attempted to assess the generalized effects of reinforcement therapy. Thus, teachers were trained to eliminate deviant behavior by differentially reinforcing the target children's desirable and undesirable classroom behavior. Control procedures were instituted to ascertain the effects of the reinforcement therapy procedures on the psychological adjustment of target and non-target children.

METHOD

Subjects

Twelve first-grade Negro children in an urban public school were assigned to three groups.

The Experimental Group (Group E) consisted of four behavior problem children. Three boys presented a high frequency of disruptive classroom behaviors, such as inappropriate talking and running around; one girl was highly withdrawn and inattentive.

These target children were selected from three separate classrooms, on the basis of teachers' referrals and direct observations.

Control Group CI (Group CI) consisted of four children, matched for sex with the Group E children and selected at random from the three teachers' class lists. Thus, for each target child, a control child in the same classroom was also studied.

Control Group CII (Group CII) consisted of three boys and one girl, selected randomly from the classroom of a fourth first-grade teacher. These pupils provided a baseline for test-retest changes in psychological test performance, independent of any experimental manipulations.

Apparatus

All treatment was carried out in the classroom. For two of the experimental subjects, two small (4-in.) electrically operated signal lights were used in six special-treatment sessions (after Patterson, 1965).

Procedure

For five weeks, the frequency of various deviant classroom behaviors of Group E and Group CI children was coded by trained observers. Deviant behavior was calculated as the percentage of 30-sec intervals in which the child exhibited any behavior which was not task-relevant. These observations constituted the baseline measure of deviant behavior.

At week six, the experimental treatment phase was instituted and continued for seven weeks (until the end of the school year). In the treatment phase, teachers systematically ignored deviant behavior and reinforced, with attention and praise, task-relevant productive behavior. Regular classroom observations of the Group E and Group CI children were continued throughout the study; the Group CII children were not observed at any time.

All three groups were administered a battery of psychological tests, both during baseline and at the conclusion of the seven-week experimental treatment phase.

Observers and observations. Three female undergraduates were trained to observe and record classroom behavior. The observers sat in the rear of the classroom; they did not interact with or respond to the children. Each Group E child was observed for four 15-min periods per week; each Group CI child was observed for two 15-min periods per week. During the observation period, the child was watched for the first 20 sec of each 30-sec interval of time; in the remaining 10 sec, the observers recorded the behaviors that had occurred. The observation periods were randomized throughout the school day to assure an adequate time-sampling. Inter-observer reliability checks were made periodically.

Table 1 shows the categories of behavior rated. These included gross and fine motor behaviors, aggression, deviant talking, nonattending, and disobeying, thumbsucking, and relevant appropriate behaviors such as hand-raising, task-oriented behavior, and so forth. In addition, the teacher's attention to children, as well as the nature of her comments, was coded.

Teachers and training sessions. Three female teachers were initially informed that their behavior problem children would be observed for five weeks, at which time the investigators would again meet with them to discuss some techniques for modifying these behavior problems. None of the teachers was given any further information at this time. At no point were the teachers told that the same-class control children were being observed.

After baseline measurements had been completed, the investigators began a series of four weekly seminar-discussions with the three teachers. These sessions were devoted to discussions of behavior modification and the progress of the target children. The seminars included a general introduction to operant conditioning, reinforcement and punishment procedures, schedules of reinforcement, and selected aspects of the experimental literature relating to these and other topics (*e.g.*, Ullmann and Krasner, 1965).

It was first necessary to help teachers identify and specify deviant behaviors. Throughout the treatment phase of the study, the investigators visited the classrooms and pointed out behavior problems. Thus, rather than: "He's always bad", teachers soon learned to define inappropriate behavior in more specific terms: "He is frequently out of his seat and he blurts out without being called on." It was also necessary to indicate to teachers which behaviors were to be reinforced when. Thus, for two of the behavior problem boys, six special 30-min treatment periods were conducted, in which an experimenter-controlled

Table 1

Classroom Behavior Rating Schedule (after Becker *et al*, 1967)

Motor Behaviors (at seat)

Rocking in chair; moving chair in place; sitting out of position; standing while *touching* chair or desk.

Gross Motor Behaviors (not at desk)

Getting out of seat; running; jumping; skipping; *not touching* desk or chair.

Aggression

Hitting; punching; kicking; slapping; striking with object; throwing object at another person; pulling hair; disturbing another's books, desk, etc.; destroying another's property. Do *not* rate unless act is committed.

Deviant Talking

Carrying on conversation with other children; blurts out answer without being called upon; making comments or remarks; crying; screaming; laughing loudly; coughing loudly, singing, whistling; any vocal noise.

Non-Attending and Disobeying

Does something different from that which he has been directed to do or is supposed to do; includes "daydreaming"; *Note:* the above to be rated *only* when other classes are inappropriate (no other symbol may appear in interval). Note: Ignoring teacher's *direct* question or command may be rated in addition to other categories.

Thumb Sucking (and other objects)

Thumb or finger sucking; sucking such objects as a pencil, *etc.*

Relevant Behavior

Time-on-task; answering question; listening; following directions. Important: *Must* include *entire* 20-sec interval, except orienting response of less than 4-sec duration.

Hand Raising

Raises hand to ask or answer question; do *not* rate if child blurts out without being acknowledged. *Note:* may be rated with task-relevant behavior.

Teacher Attention

Teacher attends to the Subject *during* the 20-sec interval.

Positive Comments

"Good", "fine", "nice job" are said by teacher to Subject during the 20-sec interval.

General Reprimand

Teacher issues a *general* reprimand to the class or a group of students.

Negative Comments

"Shut up", "sit in your seat," "you're a bad boy," etc. are said by teacher to Subject during the 20-sec interval.

signal light on the child's desk was used as a reinforcer for sustained task-relevant behavior. The main purpose of this procedure was to bring the child's behavior under experimental control and allow the experimenter to indicate to the teacher the types of behaviors to be reinforced.

The principal therapeutic tool was the contingent use of teacher attention. The teachers were instructed to extinguish deviant behaviors by ignoring them, and to strengthen task-relevant behaviors by attending to and praising them. The need for immediacy, consistency, and contingency in reinforcement therapy was stressed. That is, the teacher was instructed to give *immediate* attention in a *consistent* manner, *contingent* upon the child's exhibiting task-relevant behavior.

A fourth female teacher, from whose classroom Group CII was chosen, did not participate in the seminar-discussions; at no time was she informed of the nature of the study.

Tests and measures. The measure of deviant classroom behavior was the direct observations described above; these included both the target behaviors and other types of deviant behavior.

In the baseline period, and again at the conclusion of the seven-week treatment period, each of the 12 children was tested individually by an independent examiner on the following battery of tests: four subtests of the WISC, the Draw-A-Person Test, and a projective questionnaire designed to measure attitudes toward school and feelings about self.

The Comprehension, Mazes, Digit Span, and Block Design subtests of the WISC were used to reflect the child's ability to pay attention to a task, and his general scholastic functioning. In the DAP Test, the child was asked to draw a picture of a person, using standard art paper and crayons provided by the tester. Such drawings have been used as measures of a child's adjustment, maturity, and self-image. Finally, the child was shown a photograph of a Negro child of the same sex and comparable age; the facial expressions in these pictures

were judged by the authors to be "neutral". Twenty questions were asked about this child's feelings toward himself and toward school (*e.g.*, "Is his teacher nice to him?" "Do the other kids in school like him?" "Does he like school?").

All children were given both sets of tests by the same examiner, who was not informed of experimental conditions.

RESULTS

Classroom Behavior

Reliability of observations. Inter-observer reliability of the observation periods was determined by the percentage of intervals in which the observers agreed perfectly as to whether deviant behavior had occurred. The mean percentage perfect agreement of the 31 reliability checks was 81% (SD = 21.6).

Behavior observations. Figure 1 shows the amount of deviant behavior in the behavior problem children and their same-class controls during baseline and during treatment. In the five-week baseline period, the Group E children showed 74% deviant behavior, while the Group CI children showed 37% deviant behavior, a difference significant at $p = 0.002$ ($t = 5.14$; $df = 6$).[2] There was no overlap among subjects in the two groups.

For the last five weeks of treatment, Group E showed 57% deviant behavior, a decrease from baseline significant at $p = 0.03$ ($t = 3.91$; $df = 3$). During this same period, Group CI showed 41% deviant behavior, a slight, though not significant increase from baseline ($t = 0.32$; $df = 3$). The groups no longer differed significantly, although the deviant behavior in the target children was not decreased to the level of their controls by the end of school.

None of the specific categories of deviant behavior showed an increase in either Group E or Group CI, nor did teachers report any new behavior problems. Hence, the reduction in the target disruptive behavior was not followed by an increase in other classroom deviance.

Teacher attention. The principal therapeutic intervention used in the experiment was teacher attention to task-relevant behavior. However, as shown in Fig. 2, the observed improvement in the experimental children

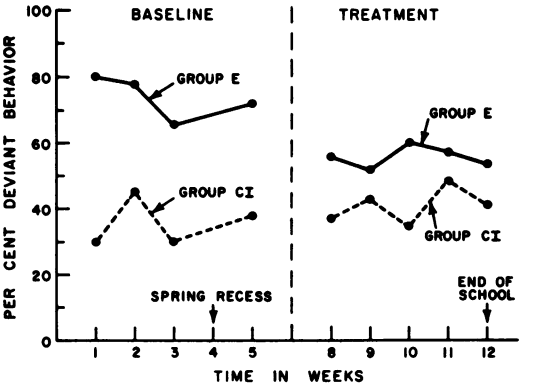

Fig. 1. Deviant behavior of Group E and Group CI.

cannot be attributed simply to increased teacher attention, since there was no significant change from baseline to treatment in the *amount* of attention to target children ($t = 0.07$; $df = 3$). Teachers did increase significantly from baseline to treatment in the *proportion* of their attention to target children that was directed towards task-relevant behavior ($t = 3.46$; $df = 3$; $p = 0.04$).

Nevertheless, it appears that the teachers did not thoroughly master the contingent use of their attention to task-relevant behavior, and

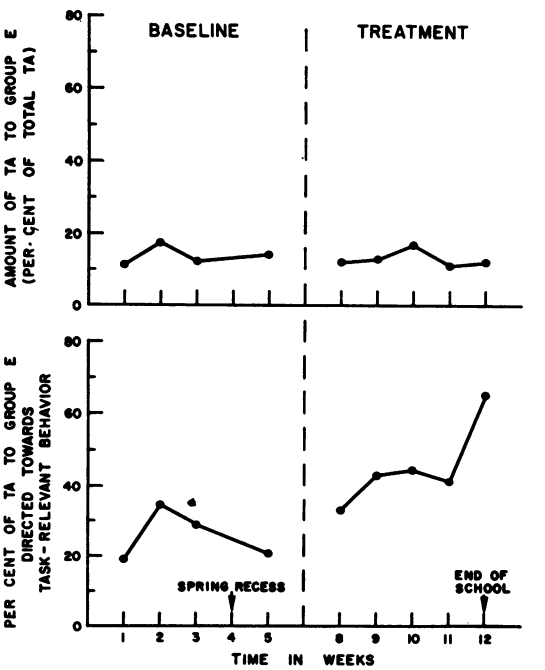

Fig. 2. Teacher attention to Group E: Amount of TA directed towards Group E and per cent of attention to Group E directed towards task-relevant behavior.

[2]All statistical tests of significance are two-tailed.

that further improvement in the target children might have been possible. For instance, the change in deviant behavior for Group E reported above did not include observations taken during the special treatment sessions with two children. For these two experimental children, the deviant behavior during the special signal-light reinforcement periods decreased dramatically to an average of 18%. Yet there was apparently little generalization to other times.

Although the teachers did not increase their attention to target children, the data suggested that they decreased their attention somewhat to Group CI children; there was a slight, but not significant decrease in the amount of teacher attention from baseline to treatment ($t = 2.49$; $df = 3$, $p = 0.09$). The proportion of teachers' attention directed toward task-relevant behavior did not change from baseline to treatment for Group CI ($t = 0.11$; $df = 3$).

Psychological Tests

On the pre-treatment WISC, the behavior problem children were significantly lower than the controls on the Mazes subtest ($t = 2.71$; $df = 10$; $p < 0.03$); the groups did not differ on the other sub-scales. The changes in WISC scores after treatment were minimal and did not significantly differentiate the groups, although Group E tended to decrease on the Comprehension subtest relative to Group CII ($t = 2.14$; $df = 6$, $p = 0.08$).

The pre-treatment DAP drawings of the behavior problem children were generally like those of the control children, except that the Group E drawings were significantly smaller in size ($t = 2.85$; $df = 10$, $p < 0.02$). This variable has been considered an indicator of anxiety (Ward, 1968).

The pre and post-treatment drawings were scored on all those variables considered in the drawing literature to be suggestive of adjustment or maturity. No significant differences between groups in change scores were found on any single variable or on a combination score. Emotional adjustment, rated by two judges uninformed as to the order and conditions in which the drawings were produced, showed no consistent effects. Similarly, changes on the projective questionnaire did not differentiate the groups.

DISCUSSION

One focus of the present study was to ascertain the generalized effects on the target child of treating a specific behavior; especially studied were the deleterious effects on the child's classroom behavior and psychological test functioning. The data provide no evidence for adverse changes in the children as a consequence of teachers' employing reinforcement techniques or as a result of specific deviant behaviors being reduced.

On the other hand, the target children did not show the generalized improvement in psychological test functioning found by Baker (1968) with enuretic children treated by conditioning. Yet, the present treatment did not produce the distinctive cure which results with enuretics. Also, enuresis is usually an "involuntary" behavior, the alleviation of which is a considerable relief for the child. Deviant classroom behavior is in some sense "voluntary"; it is emitted for environmental gains, such as the teacher's attention, and may be more a discomfort to others than to the child himself. If attention is withdrawn from such an operant, the child will attempt other behaviors to regain attention. Whether the end result is new maladaptive behavior or generalized improvement may depend on what the teacher now reinforces.

A second focus was the generalized effects of reinforcement therapy on the class. No support was found for the argument that behavior of other pupils in a class deteriorates when the teacher's attention is somehow diverted from them in treating behavior problem children. Although teachers did slightly decrease the amount of attention given to control children, there was no significant increase in the control children's deviant behavior. This is particularly encouraging since the treatment was carried out in the last weeks of the school year when, according to teachers, disruption in the classroom typically rises. It appears, nonetheless, that in future treatment programs, more stress should be placed on the teacher maintaining normal relations with non-target children.

The principal reinforcer employed was contingent teacher attention. It is assumed that the decrease in deviant behavior in the target children resulted from the greater proportion of attention that teachers paid to these chil-

dren's task-relevant behavior. It is recognized that the observed relationship between an increase in the proportion of teacher's attention to task-relevant behavior and an increase in such task-relevant behavior may have been artifactual; that is, if task-relevant behavior increased for some other undetermined reason and amount of teacher attention remained the same, then an increase in proportion of attention to task-relevant behavior would have also been found. Yet, it seems most likely that modified use of teacher attention was primary, especially in view of other reports indicating the functional role of teacher praise in increasing appropriate behavior in the classroom (Madsen, Becker, and Thomas, 1968).

The treatment procedures were not uniformly successful with all target children. Most notably, the withdrawn and inattentive behavior of one child changed very little. This behavior seems less under the control of teacher attention than more acting out behaviors; also, the latter are easier for the teacher to define, to notice, and to respond to correctly. Treating withdrawn behaviors may require better training in behavior shaping. In general it seems possible that more behavioral improvement could have been effected in all of the target children if the teachers had been more thoroughly trained. It is clear from the results of the special treatment sessions, in which the deviant behavior of two of the children dropped to 18%, that the full effectiveness of the reinforcement techniques was not realized at all times. It is likewise possible that a longer treatment period would have provided more time for the teachers' therapeutic skills to take effect.

Yet, the significant decrease in disruptive behavior in the target children, and the absence of adverse changes in these or other pupils, indicate that teachers can be trained as effective "therapists", using reinforcement techniques in the classroom. This finding, consistent with the conclusion reached by Becker *et al.* (1967), has important implications for in-classroom management of behavior problems. First, the availability to teachers of a set of techniques for controlling the disruptive behavior of students is of obvious advantage in terms of smoother classroom functioning. In addition, being taught to manifest productive task-relevant classroom behavior is worthwhile to the child himself. A child who is hyperactive or otherwise deviant in school necessarily misses many of the learning experiences which normally accrue to an attentive, actively participating pupil. A final consideration is that *in situ* amelioration of maladaptive behavior somewhat obviates the educational and financial disadvantages involved in removing a child from the classroom in order to attempt therapeutic rehabilitation.

While the results of this limited study are themselves encouraging, future research should continue to look beyond the specific behaviors being treated, and consider the generalized effects of reinforcement therapy.

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