

CASE STUDY

A Self-Control Procedure for the Maintenance of Nondisruptive Behavior in an Elementary School Child

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A 10-year-old boy with a history of high rates of disruptive behavior was provided with a self-maintained control regimen. Care was taken to establish the effectiveness of all proposed external reinforcers, using a reversal design, before the subject was allowed to administer them. A matching procedure was used to train the subject in self-evaluation before the self-control procedure was initiated. Reinforcer effectiveness and self-evaluative competency having been established, the subject was provided with a self-control procedure designed to ensure honesty, peer support, a high level of appropriate behavior, and his continued adherence to the regimen for an indefinite period, with little teacher intervention. The subject enthusiastically adhered to this regimen until his school year ended, and a high level of appropriate behavior was maintained.

In a recent compilation of summaries of behavior modification studies, over three-fourths of those studies listed that dealt with disruptive classroom behavior reported no follow-up (Breyer & Axelrod, 1973). Of the dozen studies that reported some follow-up, most included only the "subjective" reports of teachers. Holland recently chided behavior modifiers for inducing behavioral changes and then expecting these

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changes to be maintained when the experimental conditions have ceased and the subject is confronted with his preexperimental environment (Holland, Note 1). It must be considered that in an applied study the behavior modifier has not done his job unless he has produced lasting changes or at least looked for the long-term effect of his intervention.

A variety of recent studies have demonstrated some success in behavior maintenance using self-control procedures. Drabman, Spitalnik, and O'Leary (1973) successfully taught disruptive school children to evaluate their own behavior using a matching procedure. They reported a reduction in disruptive behavior even when the children were the only sources of evaluation, and generalization of appropriate behavior outside the immediate experimental situation. These results have been replicated by Anderson, Fodor, and Alpert (1976). Turkewitz, O'Leary, and Ironsmith (1975) reported finding generalization of appropriate behavior within the experimental setting with several children between ages 7 and 11, although generalization was not found outside this setting. Glynn, Thomas, and Shee (1973) reported some success in maintaining a high level of on-task behavior using a self-control procedure with elementary school children, though the rate of on-task behavior dropped when the self-control procedure was no longer in effect. A replication with second graders (Thomas, 1976) found a high level of on-task behavior maintained for several months using self-control techniques, even though the subjects had no history of external reinforcement.

Several published studies have noted problems with self-control procedures, but this may be due to a lack of control or inadequate design. For instance, Santogrossi, O'Leary, Romanczyk, and Kaufman (1973) reported that, given the opportunity to determine points earned, adolescent boys from a psychiatric hospital school overrated their levels of appropriate behavior and were frequently disruptive. Yet, in the seven study phases described, experimental control over the target behaviors was clearly demonstrated only in one phase, the first phase in which only the teacher evaluated and rewarded the subjects. No reversal or multiple baseline procedure was employed to corroborate the effectiveness of the points being awarded, and, in fact, the authors comment that midway through the study, "subjects claimed they no longer valued the prizes available to them" (p. 283). Although self-determination of points was shown to be ineffective and troublesome, it was not clearly demonstrated in the study that the points were functional reinforcers. Studies that have preceded self-control procedures with clear demonstrations of experimental control using standard empirical procedures and external reinforcement (Bijou, Peterson, & Ault, 1968) have shown both the efficacy and efficiency of self-control procedures (e.g., Kaufman & O'Leary, 1972; Glynn et al., 1973; Drabman et al., 1973).

The present study attempted to maintain nondisruptive behavior using a supplementary or "prosthetic" (cf. Lindsley, 1964) self-control procedure with the following characteristics: (1) Care was taken to establish the effectiveness of all proposed external reinforcers before the subject was allowed to administer them. (2) The subject was trained in self-evaluation before self-administration was allowed. (3) The subject was left with a self-maintained procedure designed to ensure a high level of appropriate behavior and his continued adherence to the program for an indefinite period. (4) The procedure was designed so that little supervision by the teacher would be necessary (cf. Walker, Hops, & Johnson, 1975). The primary aim was to determine whether a convenient, self-maintained control procedure could effectively maintain good behavior for a long period of time.

METHOD

Subject and Setting

The subject, a 10-year-old fifth grader named Ike, was bussed in daily from an inner city environment to an elementary school in a nearby suburb. There were 17 people in his class, most of whom were from the local middle-class neighborhood. The class was run informally with some management problems on the part of the teacher. With few exceptions, children could leave their seats, talk to neighbors, or even leave the room without permission, although doing so would occasionally lead to a reprimand.

Ike was considered to be the most disruptive student in his class. Although the room was almost constantly noisy, Ike's voice was often conspicuous. He roamed around the room frequently, bothering others and getting little work done. Repeated attempts by the school psychologist over a 4-month period to have the teacher deal with Ike more effectively proved to be unsuccessful. The teacher and school psychologist finally agreed to implement a systematic program of behavior modification in order to improve Ike's behavior and work habits.

Procedure

Even after a few days of baseline observation, it became clear that Ike's classroom was "nonsupportive" for the target behaviors (see below) that had been selected; that is to say, "good" behavior was not likely to produce reinforcement. Furthermore, although the passive cooperation of the teacher was assured, it appeared that much could be gained by leaving Ike under the control of contingencies that would be minimally burdensome for the teacher to maintain. Since self-control skills can be effective without teacher-maintained contingencies, they were deemed appropriate to Ike's situation. In addition, an effort was made to establish conditions that would provide Ike with some peer support by making group consequences contingent upon his good behavior. Yoking individual and group consequences has been shown to have useful effects (Jones & Kazdin, 1975; Barrish, Saunders, & Wolf, 1969).

The study consisted of seven phases, lasting 37 school days, over a period of just over 2 months. Observation periods were broken up into 0.5-hr intervals, and three or four intervals were usually monitored on each day. After the initial baseline phase, no possible day of observation passed without at least one interval of monitoring. The seven phases were as follows: (1) baseline, (2) contingent reinforcement, (3) noncontingent reinforcement, (4)

contingent reinforcement, (5) social reinforcement, (6) self-evaluation matching, and (7) postexperimental conditions. A formal 6-week follow-up was also performed, as well as frequent informal follow-ups. The first four phases amount to a conventional reversal (ABAB) design. Noncontingent reinforcement was preferred to simple withdrawal of reinforcement for the reversal period (Phase 3) to avoid possible complicating effects of the punishing aspects of withdrawal. Such a procedure has been shown to be an effective and empirically valid reversal procedure (Bijou, Peterson, Harris, Allen, & Johnston, 1969; Hart, Reynolds, Baer, Brawley, & Harris, 1968; Ayllon & Azrin, 1965; O'Leary & Drabman, 1971). Once the reversal design indicated that the points that had been employed were functional reinforcers, the effects of social reinforcement and the subject's ability to accurately evaluate his own behavior were assessed (Phases 5 and 6). Finally, given the effectiveness of the reinforcers and the subject's self-evaluative competency, he was observed under circumstances in which he evaluated his own behavior and administered his own reinforcers on an ongoing basis (Phase 7).

Three categories of behavior were simultaneously monitored for all phases, and the behaviors within each category were defined in detail:

(1) Talking-out was audible vocalizations distinguishable at a distance of 10 ft and not solicited by an authority figure (such as the teacher or librarian). A continuous-measure recording procedure was used. Instances were delimited by 5 sec of silence.

(2) In-seat behavior was all behavior occurring while the seat of Ike's pants was in contact with the seat of his chair. The proportion of each 0.5-hr interval spent in-seat was recorded using a stopwatch.

(3) On-task behavior was reading, writing, hand raising, or otherwise engaging in specified tasks. On-task behavior was recorded using the momentary time-sampling method, with six check times per interval, on one of two preset variable-interval schedules (Powell, Martindale, & Kulp, 1975). "Looking in the right direction" (or "paying attention") was *not* recorded as on-task, since it necessarily involves covert processes to which the monitors did not have access; this accounts for what appears to be relatively low rates of on-task behavior but does not effect *changes* in those rates under different experimental conditions, which are the more useful data (see Discussion below).

College psychology students served as monitors for the study (see below). Monitors were seated at a table on one side of the classroom during observation periods and were otherwise absent from the room. The monitors showed Ike a card on which his points were broken down by category after every monitored interval, except during the self-evaluation phase, when he was asked for his estimate first. They did not interact with Ike or other class members other than to show Ike his card.

Phase 1. Baseline. Nineteen intervals were monitored over a period of 8 days. Ike had the opportunity to engage in a number of class activities, such as working on math modules or reading workbooks, and participating in specified ways during special activities such as music or Spanish sessions.

Phase 2. Contingent reinforcement. Ike was informed that he had been observed and was given the opportunity to enter into an agreement whereby he would earn valuable points if he were "especially quiet," "stayed seated a lot," and faithfully worked on his assignments. Twenty-nine intervals over a period of 8 days were monitored during this phase. Ike was told that he could purchase things such as time to play a game with the school psychologist or a "Happy-Gram" (a note of praise) to be sent home to his mother.

Phase 3. Noncontingent reinforcement. Ike was told that he would continue to earn 30 points (the proceeds of a pretty good day) each day whether he lived up to his contract or not. He was also told that "we are pleased with your behavior so far, and we certainly hope that you will continue to be especially quiet, to stay seated, and to do your work." Thirteen intervals over 4 days were monitored.

Phase 4. Contingent reinforcement. Partly as the result of his own urging ("I've had nothing to work for *this way*"), Ike was told that he would earn points only for engaging in the specified behaviors. Eighteen intervals over a period of 5 days were monitored.

Phase 5. Social reinforcement. An announcement was made to Ike's class that: (1) Ike could earn special points by staying seated alot, doing his work, and being especially quiet; and (2) that if he earned at least 25 points each day for each of several days, the whole class would get an extra recess period. Monitoring was conducted as during the previous phase. Fifteen intervals were monitored over a 4-day period.

Phase 6. Self-evaluation matching. Ike was told that he would earn 3 extra points after every interval that he could guess his points, within 1 point of what had been computed. (He could earn a total of 10 per interval at this time.) Eleven intervals over a period of 3 days were monitored.

Phase 7. Postexperimental conditions. It having been established that Ike could accurately evaluate his behavior (see below), the following situation was established: Ike was given a booklet containing one page for every class day. He was told that every morning and every afternoon, he could fill in a blank on the page, giving himself one number between 1 and 10 for the morning, and another number for the afternoon. After filling in the booklet, he could bring it to his teacher. If the teacher agreed with his figures, he signed his name beside one or both. With that signature, Ike's points doubled. (The teacher was told that if he disagreed with Ike's estimate, he was to leave the space blank, with minimal fuss. Ike still kept the points he had awarded himself.) Ike was told that he could then total his points for the day and fill in a red line on a thermometer diagram posted in front of the classroom, to a point corresponding to his points gain. Upon reaching 100, the half-way mark on the thermometer, he would earn game time, and upon reaching 200, he would earn more game time, and the entire class would earn an extra recess period. The class was so informed. His booklet was stocked with enough pages to last for several months, and the school psychologist was provided with several thermometer diagrams. The point scale was designed so that a thermometer would "spill over" in 2 to 3 weeks.

Reliability

Two trained college psychology students served as monitors. One student or the other monitored each interval, and 15 intervals (13% of the total number monitored) were monitored by both monitors simultaneously to establish probable interobserver agreement for the rest of the data. Agreement was high for all three behavior classes observed. (For talking out, $r = .99$; for in-seat behavior, $r = 1.0$; and for on-task behavior, $r = .96$.) On-task behavior was recorded using the standard I-I method for which several methods of computing reliability are available, although none considered without fault (Repp, Deitz, Boles, Deitz, & Repp, 1976; Bijou et al., 1969; Hawkins & Dotson, 1975). Dividing the number of agreements by agreements plus disagreements yielded coefficients ranging from .50 to 1.0 with a mean of .94.

RESULTS

Reversal phases (1 to 4). Ike spoke out an average of 14.3 times/0.5-hr interval during the baseline period. The average frequency of talking-out dropped to 2.6 times/0.5-hr interval during the first period of contingent reinforcement, rose again substantially during the noncontingent reinforcement period (reversal phase), and then dropped when reinforcement was contingent upon appropriate behavior once more (Fig. 1). It was concluded that talking-out had come under experimental control.

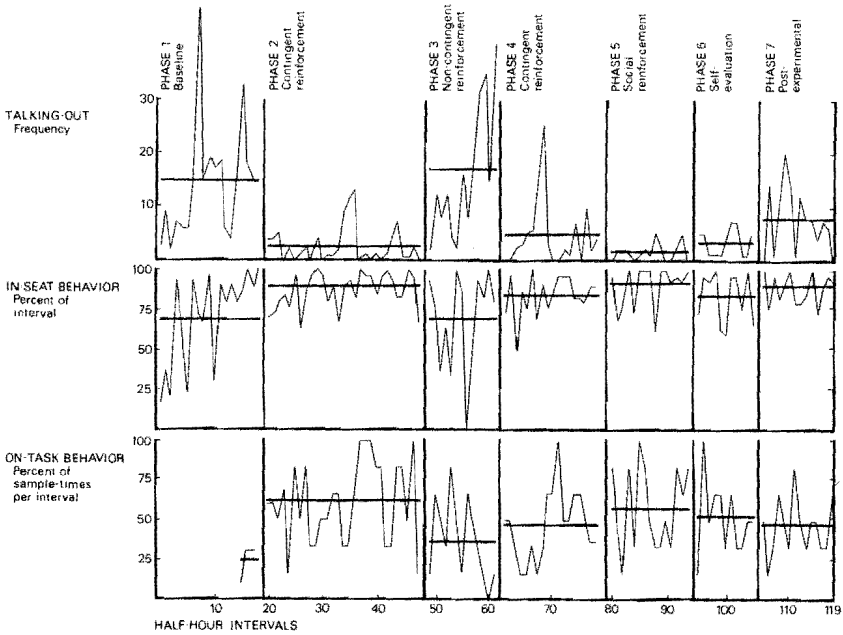


FIG. 1. Rates of talking-out, in-seat, and on-task behaviors (horizontal lines signify means).

During baseline, Ike remained in his seat an average of 70% of the time monitored. When receiving points became contingent upon remaining in his seat, his average time seated rose to 89% of each interval. During the reversal phase the average dropped to the baseline level and then rose predictably during the second contingent reinforcement period, again indicating that experimental control had been attained. Time out-of-seat was cut in half during the contingent reinforcement periods. (It should be noted that no distinction was made between authorized time out-of-seat and unauthorized time out-of-seat. If Ike got up to get a piece of paper or help from his teacher, that time was recorded as out-of-seat, so that a perfect in-seat score should not be expected.)

On-task behavior data were incomplete during the baseline period (Fig. 1), but four intervals were monitored over a period of 3 days and indicated that Ike was working an average of 25% of those intervals. Although the trend in the data during the first four phases indicates that some control had been attained over on-task behavior, the monitoring procedure may not have been a representative measure of Ike's on-task behavior (see below).

Phase 5. Social reinforcement. Appropriate behaviors remained strong

during this period. Ike remained in his seat 91% of the intervals monitored, spoke out only an average of 1.5 times/0.5 hr, and was on-task about 57% of the times sampled. Peer support was frequently conspicuous during this phase.

Phase 6. Self-evaluation matching. Conditions returned to those of the first experimental period (Phase 2) again for 3 days, during which time Ike could earn extra points for accurately estimating the amount of points he earned. Observer figures were highly correlated with Ike's estimates ($r = .93$). There was no consistent tendency to guess either above or below the actual figure. Appropriate behaviors remained strong during this phase.

Phase 7. Postexperimental conditions. Ike's rate of talking-out rose to 7.5/0.5-hr interval under these special conditions (see above). This rate was about half the rate evident during the baseline period. In-seat behavior remained at the 89% level of the first experimental period, and on-task behavior dropped slightly to about 47% of the times sampled, about double the rate during baseline period. Although some recidivism was evident, Ike voluntarily stuck to the contrived self-control regimen (filling out his booklet, seeking the teacher's signature, coloring in the thermometer diagram) and did not slip back to the performance levels of the reversal period, even though he was his own controller.

Having Ike's points double when the teacher agreed with his self-evaluation amounted to an "honesty" contingency. This was done to make it more likely that Ike's estimates would remain accurate, although whether this was necessary or even effective is an experimental question. The teacher agreed with Ike's estimates about two-thirds of the time through the end of the school year.

A formal follow-up was conducted 6 weeks after the end of the postexperimental phase. Four intervals were monitored over a period of 1 day, and performance levels were even slightly better than they had been during the last formal phases of the study. Average rate of talking-out was 3.8 times/0.5 hr, time in-seat again matched the 89% level of the first experimental period, and Ike was on-task 58% of the times sampled. Informal checks indicated that Ike had continuously remained less disruptive than he had been at the study's outset while he adhered to the self-control regimen. In total, Ike followed the contrived self-control regimen for more than 2 months past the end of Phase 7 of the study, until the end of his school year.

DISCUSSION

Drabman et al. (1973) point out that "Although the efficacy of a variety of behavior modification treatment procedures with children has been well documented . . . , behavioral programs which demonstrate long-range effectiveness are rare" (p. 10). This study demonstrates encourag-

ing results for at least one approach to the problem of long-range maintenance, and that is the supplementary or "prosthetic" self-control regimen. Even in a nonsupportive classroom environment, such a regimen had a significant effect upon the maintenance of nondisruptive behaviors in the present study.

So-called "attentive" behaviors were not recorded as on-task in an effort to ensure recording accuracy. One drawback to this procedure is that it yields relatively low rates of on-task behavior, too low in the present instance to be a useful indicator of change. Replications must also be attempted for different individuals, and the long-term effects of the regimen in maintaining appropriate behavior must be determined.

Ideally, more sweeping changes might have been made in Ike's overall classroom environment or in his teacher's behavior. Given that such changes were not possible in the present instance, it is encouraging to note that a significant change was induced in Ike's behavior in spite of his environment, that the procedure used to maintain these changes was under Ike's own control, that he enthusiastically adhered to it for more than 2 months (until his school year ended), and that its maintenance involved little teacher intervention.

REFERENCE NOTE

1. Holland, J. *Behaviorism: Part of the problem or part of the solution?* Paper presented at the NYU Conference on Behaviorism, New York, November 1975.

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