

*FEEDBACK IN CLASSROOM BEHAVIOR MODIFICATION:
EFFECTS ON THE TARGET AND HER CLASSMATES¹*

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A behavior modification program that employed feedback with no additional contingencies was initiated and withdrawn in an ABAB design on a target child within a classroom. The disruptive behavior of the target child as well as that of her peers was monitored. Additionally, the sociometric status of the target child was recorded. Finally, the positive and negative comments made to the target by her teacher and her peers were related to initiation and withdrawal of the feedback contingency. Results indicate that (1) feedback alone may be an effective behavior modification procedure, (2) the disruptive behavior of the target's classmates changed, even though they were not directly treated, (3) sociometric status of the target was altered by behavioral contingencies, (4) positive comments by classmates to the target increased, and (5) negative comments from the teacher to the target child decreased.

Behavior modification with children in the classroom has had remarkable success (O'Leary and Drabman, 1971). However, several theoretical and practical questions remain to be answered. An important theoretical question involves the part that feedback plays in a successful behavioral program. Feedback can be defined as information provided to the subject about the appropriateness of his response. Usually, classroom programs involve feedback to the subjects plus some other behavioral intervention such as backup rewards contingent on

certain types of feedback. Drabman (1973) showed that with an entire classroom of very disruptive children, feedback alone may not be an effective control. But many behavior modification studies involve only a single disruptive child. Is it possible that in some of these studies, feedback alone without the additional contingency would have been sufficient to ensure the behavioral change? For example, in Patterson's studies (*e.g.*, Patterson, 1965; Patterson and Brodsky, 1966; Patterson, Jones, Whittier, and Wright, 1965), where a hyperactive child earned points exchangeable for candy for him and his classmates, what would have happened if the child had earned only points and not candy? Another example was provided by Ramp, Ulrich, and Dulaney (1971), who put a light on a student's desk. Ignition of this light (feedback) indicated to the student that his time in delayed punishment was increased. Might the student have behaved just as well simply to avoid the negative feedback? Was the additional punishment necessary?

Related to this is another theoretical issue. Can classmates of a target child be used as untreated controls or are they also indirectly affected by the treatment? Patterson *et al.* (1965)

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suggested that controls in the same classroom might not be appropriate. Bolstad and Johnson (1972) tried to use classmates as an untreated control and found that the classmates seemed to change, even though they were not involved in the experimental manipulation. Kazdin (1973) found with retarded children in special two-person groups, each group with a tutor, that behavioral consequences to one could affect the other. Because Bolstad and Johnson (1972) did not attempt to verify their conclusions experimentally, and Kazdin (1973) used retarded children in special circumstances, the question of the untreated classmates' change needs to be investigated further.

These theoretical questions intertwine with some very important practical considerations. Often, teachers and school psychologists do not initiate needed behavioral programs because they are afraid of possible negative effects to the untreated children. Although negative effects have not been reported in the behavioral literature, very little is known about the effects of behavioral procedure on the target's classmates. Besides the question of the classmates' behavior, there are also important unanswered questions regarding the relationships between the target child and his peers. For example, does the target child's sociometric status change as a result of the contingency system? Or, does the verbal behavior of the target's classmates towards the target change when the contingencies are introduced?

The present study sought to provide rudimentary answers to these theoretical and practical questions. A behavior modification program that employed feedback with no additional contingencies was initiated and withdrawn in an ABAB design on a target child within a classroom. The disruptive behavior of the target child, and that of her peers, was monitored. Additionally, the sociometric status of the target child was recorded. Finally, the positive and negative comments made to the target by her teacher and her peers were related to initiation and withdrawal of the feedback contingency.

METHOD

Subject

A 10-yr-old female, Charlotte, was brought to the attention of the authors by school authorities because of inappropriate behavior in her classroom. Her teacher and principal reported that she was the most disruptive child in her class and that she had no friends. In general, she was teased or ignored by her classmates. Independent observation confirmed the initial reports provided by the teacher and principal.

Teacher

The teacher was regularly employed by the private school that Charlotte attended. She taught Social Studies to Charlotte and 12 other similarly aged students from 8:45 to 9:30 A.M. every day. The students went individually on to their next class after 9:30.

Observation Procedures

Two undergraduates, enrolled in a practicum in research techniques, served as observers. They entered the classroom before the class began and stayed for the entire class period Mondays through Thursdays. Because of the undergraduates' schedules, observation did not take place on Fridays. Observations were made on a 20-sec observe, 10-sec record basis. Except for reliability checks, the observers were randomly assigned each day to monitor either Charlotte or her classmates for 5 min each in random order. The observation system used was similar to that developed by O'Leary and his associates for assessment of classroom behavior (Drabman, 1973; Drabman, Spitalnik, and O'Leary, 1973; O'Leary, Kaufman, Kass, and Drabman, 1970). It included the following categories of disruptive behavior:

- (1) Out of Chair: movement of the child from her chair when not permitted or requested by the teacher. No part of the child's body is to be touching the chair.
- (2) Touching: using material object as an

- extension of the hand to touch others' property.
- (3) **Playing:** child uses her hands to play with her own or community property when such behavior is incompatible with learning.
 - (4) **Noise:** child creating any audible noise other than vocalization.
 - (5) **Non-Compliance:** failure to initiate the appropriate response requested by the teacher.
 - (6) **Time off Task:** child does not do assigned work for entire 20-sec interval. For example, child does not write or read when so assigned.
 - (7) **Vocalization:** any unpermitted audible sound emanating from the mouth.
 - (8) **Orienting:** the turning or orienting response is not rated unless the child is seated and the turn must be more than 90° using the desk or teachers' position as a reference point.
 - (9) **Aggression:** child makes movement towards another person so as to come into contact with him, whether directly or by using a material object as an extension of the hand.

One of the major dependent measures was the mean number of these disruptive behaviors observed per 20-sec interval.

Positive and Negative Comments

Every word spoken specifically to Charlotte by either her peers or teacher was recorded by the observers. This was not a difficult task because the frequency was low. These comments were shown to two groups of naive college student judges who were told:

Charlotte is a little girl in the fourth grade, her teachers tell us that she is quite shy and has few friends; in fact, most of the children don't like her. I am going to show you a group of cards and on each card will be printed a comment made to Charlotte

by one of the children in her class [by her teacher]. I want you to put these cards in three stacks; one stack should contain those comments which reveal positive feelings towards Charlotte; the second should contain those comments which reveal negative feelings towards Charlotte and the third stack should contain those comments upon which you are unable to decide if they are positive or negative feelings. In making your decision please remember that Charlotte is considered a very unpopular little girl.

This description of Charlotte given to the judges helped put the teacher and student comments into context. This was an attempt to decrease the amount of comments on which the judges could not decide. The observers, who were present in the classrooms as the comments were made, also rated the comments. They agreed on 100% of the comments judged to be in either the positive or negative categories, although they placed far fewer of the comments into the "unable to decide" category. However, their proportions of positive and negative comments were about the same as that of the judges.

Sociometric Data

Twice each week (on Tuesdays and Fridays) the teacher was asked to read to the class, in random order, three sociometric questions:

- (1) If you were on Apollo 17 as an astronaut and you were going on a long, long trip to the moon, who would you want to take along? Remember to choose only one person that you would want to be with for a long time; a person you could get along with very well.
- (2) You are doing a hard job and you need someone who is very responsible and grown-up, who would you pick? Remember to pick only one person and to pick a very grown-up person.
- (3) If I asked you to help me pick a person

to receive today's happy face award, who would you pick? Remember to pick only one person and pick a very deserving person.

The children responded by coloring in the desk of the person they selected on a map of the class (Drabman, Spitalnik, and Spitalnik, 1974). Each child was allowed to vote only once per question and children could not vote for themselves.

Procedure

The four phases of this study were as follows: (a) Baseline I, (b) Feedback I, (a) Baseline II, (b) Feedback II.

Baseline I. (10 school, eight observation days). During Baseline I, no experimental manipulations were introduced. Before observers were introduced, the teacher had been asked to practise limiting her praise or disciplinary interactions to individual children. She was asked to continue this throughout the study. The teacher also began asking the sociometric questions twice weekly during Baseline I.

Feedback I. (18 school, 13 observation days). During this phase, a timer was placed in the classroom. The teacher set it to ring after the initial 15 min of class and then after each succeeding 10 min. Therefore, it rang four times during a class session. The teacher explained to Charlotte that she would give Charlotte a rating each time the timer rang. These ratings would be from zero, for very poor behavior, to 10, for very good behavior. At the end of the class, the teacher would quietly tell Charlotte her total score for the day. The rest of the class was not informed of this procedure. Since teacher behavior was being monitored, the teacher was not instructed how to determine the ratings or whether to praise or reprimand Charlotte when delivering feedback. The teacher was asked to rate Charlotte on how well she thought Charlotte had behaved during the rating period. When the timer rang, the teacher would reset the timer, walk over to Charlotte, and quietly

inform the child of that period's rating. Sociometric questions were continued in this phase.

Baseline II. (Eight school, seven observation days). This phase replicated Baseline I. The timer was removed from the class and feedback discontinued. Charlotte was simply told "we are not going to use the timer any more, but I expect you to continue being good." Sociometric questions continued to be asked.

Feedback II. (11 school, nine observation days). This phase replicated Feedback I. The timer was brought back into the classroom and feedback began again. Charlotte did not ask why the timer was returned and the teacher did not mention it. The sociometric questions were also continued in this phase.

Reliability of Observation

Before entering the classroom, the observers were trained with a group of observers for other projects for 10 weeks in simulated classroom conditions. Observers were not allowed to enter the classroom until their average reliability with randomly assigned partners was above 65%. When both observers recorded the same disruptive behavior within a 20-sec interval, a perfect agreement was recorded. The ratio of the number of perfect agreements over the number of agreements plus disagreements served as a percentage measure of reliability. Baseline I was not initiated until the observers had been in the classroom for several days. Reliability was normally calculated for 5 min daily on each of two randomly chosen children. Reliability for the 47 school and 37 observation days study averaged 86%.

RESULTS

Disruptive Behavior

Figure I shows the average number of disruptive behaviors for Charlotte and her classmates. Charlotte, who was the most disruptive child in the class, averaged 1.39 disruptive behaviors per 20-sec interval during Baseline I. The rest of the class averaged 0.714 disruptive behaviors per

interval. After the Feedback I contingency was initiated, Charlotte's inappropriate behavior decreased markedly to 0.498; her classmates also decreased their average, to 0.550. Return to Baseline II brought Charlotte's disruptive behavior up to 1.77 and also raised the average of the other pupils to 0.780. The Feedback II contingency lowered Charlotte's behavior to 0.370 disruptive behaviors per 20-sec interval and lowered her classmates' average to 0.503. In general, as Figure 1 shows, Charlotte was more disruptive than her peers during baseline conditions and less disruptive than her peers during treatment phases. This was true even though her classmates' behavior also was changing when treatment was initiated and withdrawn. Although only Charlotte was exposed to the

contingencies, repeated measures analysis of variance indicated that the changes in her classmates' disruptive behavior were significant ($F(3,33) = 4.04; p < 0.05$).

Sociometric Ratings

During the two-week Baseline I phase, the sociometric questions were administered five times. Charlotte received a total of two votes. During the four-week Feedback I phase, the sociometric questions were administered eight times. Charlotte received 11 votes. For these two phases, a normal approximation to the binomial indicated that the proportion of votes attained in the treatment phase surpassed the level of significance required by a one-tailed test, but failed to reach the level required by the more

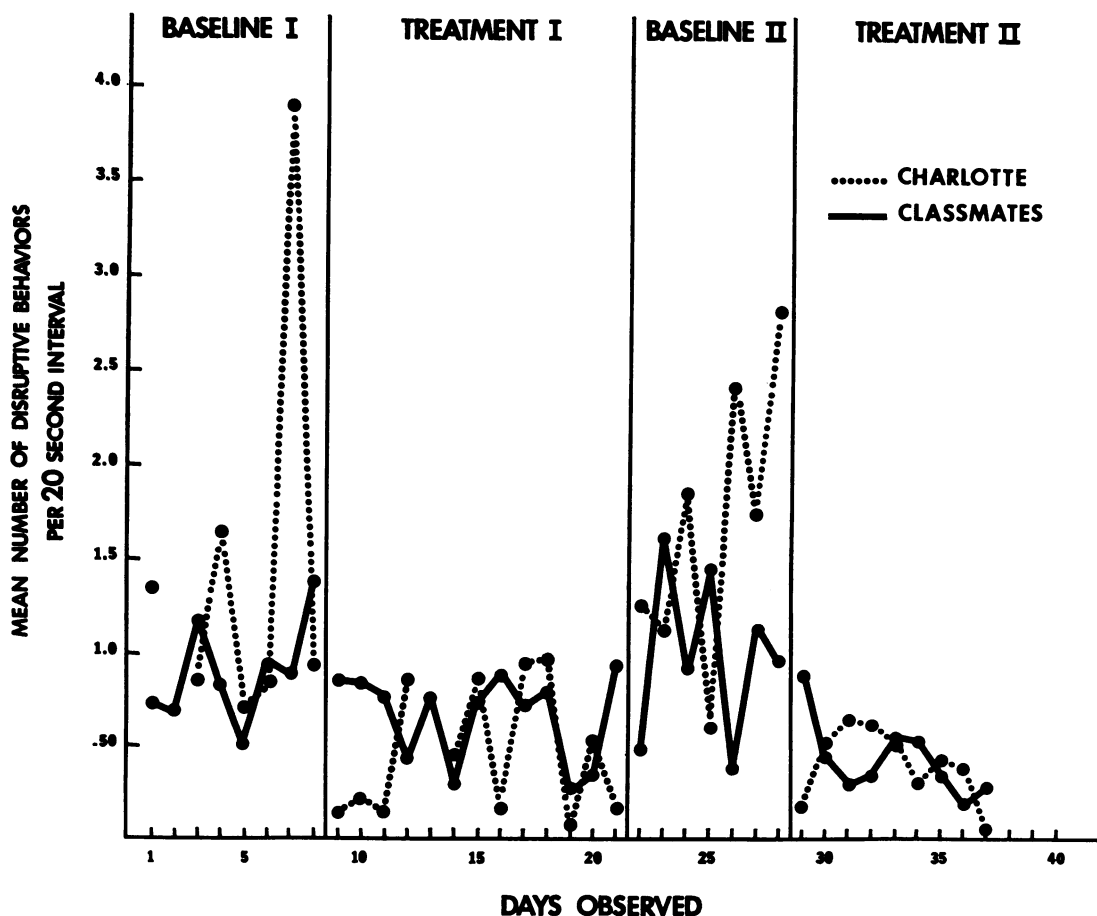


Fig. 1. Mean number of disruptive behaviors per 20-sec interval for Charlotte and her classmates across days observed. Missing data points indicate that Charlotte was absent that day.

appropriate two-tailed test ($z = 1.67$; $p < 0.10$). Importantly, however, all 11 of these votes occurred during the last 2.5 weeks (five presentations) of the Feedback I phase. For these last 2.5 weeks, during which Charlotte established a continued pattern of appropriate behavior, the proportion of votes obtained during Feedback I was significantly greater than the proportion obtained during Baseline I ($z = 2.15$; $p < 0.05$). The sociometric questions were administered twice during the one-week return to Baseline II. Charlotte did not receive any votes during this phase. Around this time, the children reported being very bored by the questions and began to color in their maps before the teacher read the questions. Their responses also became much less variable. Sociometric questions were administered four times during Feedback II. Charlotte failed to receive any votes during this phase. The votes Charlotte did receive in Phases I and II were approximately equally distributed among the three sociometric questions.

Positive and Negative Comments

Classmates. The comments spoken individually to Charlotte were recorded by the observers. Ten college students were asked to sort the randomly ordered classmate comments into positive comments, negative comments, and comments on which they could not decide. The greatest number of positive selections for any classmate comment spoken in a baseline phase was six of the possible 10. Six votes, therefore, were used as a conservative criterion of a positive or negative comment. Thus, only comments on which at least six judges agreed were used in the analysis. The classmates' positive and negative comments were divided into those spoken during baseline or feedback phases. The frequency of positive comments averaged 0.14 per class period during baseline and 0.76 per period during feedback phases. Statistically controlling for the differential opportunity to emit comments during the baseline and feedback phases, a normal approximation to the binomial revealed that the proportion of positive comments spoken

to Charlotte by her peers was significantly ($z = 2.50$; $p < 0.05$) greater during the feedback phases.

Negative comments directed towards Charlotte from her classmates did not significantly change with the contingencies ($z < 1$). The frequency of negative comments averaged 1.36 per class period during baseline and 1.00 per period during the feedback phases.

Teacher. Teacher comments were categorized in a similar manner to classmates' comments. A different set of 10 college-student judges was used for the teacher comments. Teacher positive comments directed towards Charlotte were extremely rare in either baseline or treatment conditions. The frequency of teacher-initiated positive comments was zero per class during the baseline phases and 0.10 per class during the feedback phases. They did not occur at a rate that would be consistent with statistical analysis. The frequency of teacher-initiated negative comments was 0.71 per class session during the baseline phases and 0.24 per class during the feedback phases. A normal approximation to the binomial indicated that the proportion of negative comments delivered to Charlotte by her teacher was significantly less during the feedback conditions ($z = 2.11$; $p < 0.05$).

DISCUSSION

The present results indicate that feedback may play an important role in behavioral procedures involving a target child within a classroom. Frequency of teacher praise remained very low throughout the study. Additionally, the college-student observers reported that the teacher delivered feedback "accurately, but with little emotion". Therefore, feedback alone was probably responsible for Charlotte's behavior change. We do not feel that feedback is something qualitatively different from other forms of verbal reinforcement or punishment. Certainly, operationally it is not. The point is that both clinical and experimental uses of behavior modification often assume that feedback is necessary but not suffi-

cient for behavioral change. This study has demonstrated that such an assumption may not be tenable. Feedback may be both necessary and sufficient for behavior change. In the future, single-target behavioral studies that include feedback plus some other variable may be unsatisfactory unless they contain a control that can adequately isolate the effects of feedback alone. Without this control, the relative contribution of feedback to the treatment remains unclear.

As a cautionary note, Ayllon and Azrin (1964) demonstrated that instructions alone were able to modify the behavior of hospitalized patients. But, the effects were short lived. Without backup reinforcement, the patients began to revert to their inappropriate behavior. It is possible that the effects of feedback might also be transient. If the treatment phases had been longer than 18 and 11 school days, the effects of feedback might have disappeared. Although the data cannot answer this question, the teacher reported that using the feedback system led to Charlotte's continued good behavior throughout the remainder of the school year. Perhaps the changes in teacher and student verbal behavior are partially responsible.

The second theoretical question raised was whether classmates could be effectively used as untreated controls in behavior modification research. The answer seems to be: "No". The disruptive behavior of Charlotte's classmates was significantly altered, even though none of them was directly involved in the treatment procedure. Using classmates as untreated controls may lead to inaccurate assessment of the treatment's effectiveness.

On the more practical side, Charlotte's sociometric status did change with the original initiation and withdrawal of the feedback contingency, but did not recover when treatment was again instituted. However, the lack of recovery seemed to be more a function of the inadequacy of the assessment instrument, rather than actual change in the pupil's attitudes towards Charlotte. The children reported boredom with the task and began to fill out the maps in a stereotypic

manner before the questions were even asked. Future studies combining behavior modification and sociometric methods should probably use a wider variety of questions. However, it is important that all questions that are asked during treatment should also be asked during baseline. Even slight variations may not be comparable.

Probably the most interesting findings had to do with the comments made to Charlotte by her teacher and peers. Similar to earlier research (Drabman, 1973), Charlotte's improved behavior did not automatically lead to more positive comments from her teacher. Teachers must be instructed (and probably monitored) if they are to provide appropriate verbal reinforcement. The teacher did use fewer negative comments when Charlotte was better behaved during the feedback phases. In contrast, the pupils did emit more positive comments to Charlotte during the treatment phases, although they did not significantly decrease their negative comments. Perhaps this is a hopeful sign. Ideally, one may want a child to receive both positive and negative comments from classmates. A child who receives only positive or only negative comments from classmates might not be considered an appropriate playmate. The optimal combination of positive and negative comments remains a question for future research. However, even when Charlotte was one of the best-behaved children in the classroom, she still received more negative than positive comments. Pupils may model their overall ratio of comments on that of the teacher. If this is true, training teachers to show approval becomes even more critical.

Finally, it is not known how often behaviorally oriented clinical or school psychologists are guilty of using a more powerful technique when a less powerful one would be effective. What is the probability that if Charlotte were brought to a behaviorally oriented therapist, he would have initiated a more costly and time-consuming treatment procedure such as a token economy? The present results indicate that a precautionary measure should be taken before initiating the more-powerful treatment procedure. Therapists

should first attempt to change behavior without major environmental manipulations. Only when the data indicate that a more radical technique is called for should one be used.

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