

THE APPLICATION OF OPERANT CONDITIONING TECHNIQUES IN A SECONDARY SCHOOL CLASSROOM¹

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The effects of teacher praise and disapproval on two target behaviors, inappropriate talking and turning around, were investigated in a high school English class of 25 students. The contingencies were applied to all students in the experimental class utilizing a multiple baseline experimental design in which the contingencies were aimed first at decreasing inappropriate talking behavior and then at decreasing inappropriate turning behavior. Observations were made of both student and teacher behavior. The results demonstrated that the combination of disapproval for the target behaviors and praise for appropriate, incompatible behaviors substantially reduced the incidence of the target behaviors in the experimental class. Observations of these behaviors in a control class of 26 students taught by the same teacher revealed no particular changes. The findings emphasize the importance of teacher-supplied social contingencies at the secondary school level.

Numerous studies have reported the effectiveness of operant conditioning techniques in modifying the behavior of children in various situations. Harris, Wolf, and Baer (1964), in a series of studies on pre-school children, described the effectiveness of contingent teacher attention in modifying inappropriate behavior. Hall and Broden (1967), Patterson (1965), Rabb and Hewett (1967), and Zimmerman and Zimmerman (1962) have demonstrated the usefulness of teacher-supplied contingent social reinforcement in reducing problem behaviors and increasing appropriate behaviors of young children in special classrooms. Becker, Madsen, Arnold, and Thomas (1967); Hall, Lund, and Jackson (1968); and Madsen, Becker, and Thomas (1968) extended these techniques into the regular primary school classroom and demonstrated their effectiveness there. In all of the above studies, only a limited number of children were studied in each situation, usually one or two per classroom.

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Thomas, Becker, and Armstrong (1968) studied the effects of varying teachers' social behaviors on the classroom behaviors of an entire elementary school classroom of 28 students. By observing 10 children per session, one at a time, they demonstrated the effectiveness of approving teacher responses in maintaining appropriate classroom behaviors. Bushell, Wrobel, and Michaelis (1968) also applied group contingencies (special events contingent on earning tokens for study behaviors) to an entire class of 12 preschool children.

There has been an effort to extend the study of teacher-supplied consequences to larger groups of preschool and elementary school subjects in regular classrooms, but no systematic research investigating these procedures has yet been undertaken in the secondary school classroom. Cohen, Filipczak, and Bis (1967) reported the application of various non-social contingencies (earning points, being "correct", and taking advanced educational courses) in modifying attitudinal and academic behaviors of adolescent inmates in a penal institution. But there is no record of investigations into the effects of teacher-supplied social consequences on the classroom behavior of secondary school students in regular classrooms.

At present, the usefulness of contingent teacher social reinforcement in the management of student classroom behaviors is well documented on the preschool and primary elementary school levels, particularly when the

investigation focuses on a limited number of children in the classroom. Systematic replication now requires that these procedures be extended to larger groups of students in the classroom and to students in the upper elementary and secondary grades. The present study sought to investigate the effects of teacher-supplied social consequences on the classroom behaviors of an entire class of secondary school students.

METHOD

Subjects

Students. The experimental group was a low-track, junior-senior English class containing 25 students (12 boys and 13 girls). At the beginning of the study the ages ranged from 16 to 19 yr (mean 17.11 yr); I.Q.s ranged from 77 to 114 (mean 94.43). Approximately 80% of the students were from lower-class families; the remainder were from middle-class families. The control group was also a low-track, junior-senior English class of 26 students (13 boys and 13 girls). The ages ranged from 16 to 19 yr (mean 17.04 yr); I.Q.s ranged from 73 to 111 (mean 91.04). About 76% of these students were from lower-class families, 16% were from middle-class families and 4% were from upper-middle to upper-class families. The experimental class met in the mornings for a 70-min period and the control class met in the afternoons for a 60-min period.

Teacher. The teacher was 23 yr old, female, middle class, and held a Bachelor's degree in education. She had had one year's experience in teaching secondary level students, which included a low-track English class. She taught both the experimental and control classes in the same classroom and utilized the same curriculum content for both. She stated that she had been having some difficulties in controlling classroom behavior in both classes and volunteered to cooperate in the experiment in the interest of improving her teaching-management skills. She stated that she had been able to achieve some rapport with these students during the two months that school had been in session. She described the students, generally, as performing poorly in academic work and ascribed whatever academic behaviors she was able to observe in them as being the result of her rapport with them. She stated that she was afraid that she would destroy this rapport if

she attempted to exercise discipline over inappropriate classroom behaviors.

Procedures

The basic design utilized was the common pretest-posttest control group design combined with the use of a multiple baseline technique (Baer, Wolf, and Risley, 1968) in the experimental class.

Target behaviors. Both classes were observed for two weeks to ascertain general occurrence rates of various problem behaviors that had been described by the teacher. Inappropriate talking and turning around were selected as target behaviors because of their relatively high rate of occurrence. Inappropriate talking was defined as any audible vocal behavior engaged in by a student without the teacher's permission. Students were required to raise their hands to obtain permission to talk, either to the teacher or to other students, except when general classroom discussions were taking place, in which cases a student was not required to obtain permission to talk if his statements were addressed to the class and/or teacher and were made within the context of the discussion. Inappropriate turning was defined as any turning-around behavior engaged in by any student while seated in which he turned more than 90 degrees in either direction from the position of facing the front of the room. Two exceptions to this definition were made: turning behavior observed while in the process of transferring material to or from the book holder in the bottom of the desk was considered appropriate, as was any turning that took place when a student had directly implied permission to turn around. Examples of the latter exception would be when the class was asked to pass papers up or down the rows of desks, or when students turned to look at another student who was talking appropriately in the context of a recitation or discussion.

Observation and recording. Behavior record forms were made up for recording observed target behaviors in both classes. A portion of the form is illustrated in Fig. 1. The forms for the experimental class contained 70 sequentially numbered boxes for each behavior; the forms for the control class contained 60 sequentially numbered boxes for each behavior (covering the 70- and 60-min class periods, respectively). The occurrence of a target behavior during any minute interval of time (*e.g.*,

during the twenty-fifth minute of class time) was recorded by placing a check mark in the appropriate box for that interval (*e.g.*, box 25) beside the behavior listed. Further occurrences of that behavior during that particular interval were not recorded. Thus, each time interval represented a dichotomy with respect to each behavior: the behavior had or had not occurred during that interval of time. A daily quantified measurement of each behavior was obtained by dividing the number of intervals that were checked by the total number of intervals in the class period, yielding a percentage of intervals in which the behavior occurred at least once. Time was kept by referral to a large, easily readable wall clock whose minute hand moved 1 min at a time.

Behaviors were recorded daily during all conditions by the teacher. Reliability of observation was checked by using from one to two additional observers (student teachers and the senior author) who visited the classes twice per week. Students in this particular school were thought to be quite accustomed to observers, due to the large amount of classroom observation done there by student teachers from a nearby university. Except for the senior author and teacher, other observers were not made aware of changes in experimental conditions. Reliability was assessed by comparing the behavior record forms of the teacher and observers after each class period in which both teacher and observers recorded behavior. A percentage of agreement for each target behavior was computed, based on a ratio of the number of intervals on which all recorders agreed (*i.e.*, that the behavior had or had not occurred) to the total number of intervals in the period. Average reliability for talking behavior was 90.49% in the experimental class (range 74 to 98%) and 89.49% in the control class (range 78 to 96%). Average reliability for turning behavior was 94.27% in the experimental class (range 87 to 98%) and 90.98% in the control class (range 85 to 96%).

In addition, two aspects of the teacher's be-

havior were recorded during all conditions by the observers when present: (a) the number of inappropriate talking or turning instances that occasioned a verbal reprimand from the teacher, and (b) the number of direct statements of praise dispensed by the teacher for appropriate behaviors. These behaviors were recorded by simply tallying the number of instances in which they were observed on the reverse side of the observer's form. Reliability between observers was checked by computing a percentage of agreement between them on the number of instances of each type of behavior observed. Average reliability for reprimand behavior was 92.78% in the experimental class (range 84 to 100%) and 94.84% in the control class (range 82 to 100%). Average reliability for praise behavior was 98.85% in the experimental class (range 83 to 100%) and 97.65% in the control class (range 81 to 100%).

Baseline Condition. During the Baseline Condition, the two target behaviors and teacher behaviors were recorded in both the experimental and control classes. The teacher was asked to behave in her usual manner in both classrooms and no restrictions were placed on any disciplinary techniques she wished to use. The Baseline Condition in the experimental class was continued for 27 class days (approximately five weeks) to obtain as clear a picture as possible of the student and teacher behaviors occurring.

Experimental Condition I. This first experimental condition began in the experimental class on the twenty-eighth day when the teacher initiated various social consequences contingent on inappropriate talking behavior aimed at lowering the amount of this behavior taking place. The procedures agreed upon with the teacher for the application of social consequences were as follows:

(1) The teacher was to attempt to disapprove of all instances of inappropriate talking behavior whenever they occurred with a direct, verbal, sternly given reproof. Whenever possible, the teacher was to use students' names when

Minute No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Talking																						
Turning																						

Fig. 1. Portion of behavior record form used to record incidence of target behavior.

correcting them. The teacher was instructed not to mention any other inappropriate behavior (*e.g.*, turning around) that might also be occurring at the time. Examples of reprimands given were: "John, be quiet!", "Jane, stop talking!", "Phil, shut up!", "You people, be quiet!". It was hypothesized that these consequences constituted an aversive social consequence for inappropriate talking.

(2) The teacher was asked not to threaten students with or apply other consequences, such as keeping them after school, exclusion from class, sending them to the Assistant Principal, *etc.* for inappropriate talking or for any other inappropriate behavior.

(3) The teacher was to praise the entire class in the form of remarks like: "Thank you for being quiet!", "Thank you for not talking!", or "I'm delighted to see you so quiet today!" according to the following contingencies: (a) During the first 2 min of class, praise at the end of approximately each 30-sec period in which there had been no inappropriate talking. (b) During the time in which a lecture, recitation, or class discussion was taking place, praise the class at the end of approximately each 15-min period in which no inappropriate talking had occurred. (c) When silent seatwork had been assigned, do not interrupt the period to praise, but praise the class at the end of the period if no inappropriate talking had occurred during the period. (d) At the end of each class make a summary statement concerning talking behavior, such as: "Thank you all for being so quiet today!", or "There has been entirely too much talking today, I'm disappointed in you!", or, "You have done pretty well in keeping quiet today, let's see if you can do better tomorrow!".

The concentration of praising instances during the first 2-min of class was scheduled because the baseline data revealed inappropriate talking as particularly frequent at this time.

Although the teacher continued to record instances of turning behavior, she was instructed to ignore this behavior in the experimental class during Experimental Condition I. In effect, baseline recording of turning behavior continued during this Condition. No changes were made in the teacher's behavior in the control class.

Experimental Condition II. After Experimental Condition I had been in effect in the experimental class for 26 class days and had

markedly reduced talking behavior (see Results), Experimental Condition II was put into effect on the fifty-fourth day of the study. In this condition, the contingent social consequences for talking behavior in the experimental class were continued and, in addition, the teacher initiated the same system of contingent social consequences for turning behavior, with the aim of reducing the amount of this behavior occurring. This subsequent provision of similar consequences, first for one behavior and then for another, constitutes the multiple baseline technique.

The procedures agreed upon for providing reprimands for inappropriate turning behavior were the same as those for talking behaviors, except that the teacher referred to "turning" instead of "talking" in her reproofs. She could now also mention both behaviors in her reproof if a student happened to be doing both. The procedures regarding the application of praise contingent on not turning around were also the same as before, except that the higher frequency of praising during the first 2 min of class was not used. Also, the teacher could now combine her positive remarks about not talking and not turning if such were appropriate to existing conditions. Finally, since inappropriate talking behavior had been reduced considerably by this time, the procedure of praising every 30 sec during the first 2-min of class was dropped. As before, no changes were made in the teacher's behavior in the control class.

RESULTS

Because data were not collected on individual students, it is not possible to specify exactly how many students were involved in either inappropriate talking or turning behavior. The observers and teacher agreed that over one-half of the students in both classes were involved in inappropriate talking behavior and that about one-third of the students in both classes were involved in inappropriate turning behavior.

Talking Behavior

Figure 2 indicates the daily percentages of intervals of inappropriate talking behavior in the experimental and control classes throughout the study. During the Baseline Condition in the experimental class and the equivalent period in the control class (Days 1 through 27),

the average daily percentage of inappropriate talking intervals was 25.33% in the experimental class and 22.81% in the control class. The two classes were thus approximately equivalent with respect to the amount of inappropriate talking behavior in each before the experimental interventions were made in the experimental class. As can be seen, the introduction of the contingencies in Experimental Condition I on Day 28 immediately reduced the percentage of intervals of inappropriate talking behavior in the experimental class. From this point on, the amount of inappropriate talking behavior in the experimental class continued to decrease and finally stabilized at a level below 5%. Meanwhile, the control class continued to manifest its previous level of inappropriate talking behavior. In the period from Day 28 through Day 62, when the study was concluded, the average daily percentage of inappropriate talking intervals in the control class was 21.51%, compared with an average of 5.34% in the experimental class.

Turning Behavior

The results obtained with the second target behavior, inappropriate turning around, can be seen in Fig. 3, which indicates the daily percentages of intervals of inappropriate turning

behavior in both classes during the study. During the Baseline Condition in the experimental class and the equivalent period in the control class (Days 1 through 53), the level of inappropriate turning behavior was slowly increasing in both classes. The average daily percentage of inappropriate turning intervals during this time was 15.13% in the experimental class and 14.45% in the control class. As with talking behavior, the two classes were roughly equivalent in the amount of inappropriate turning behavior observed before experimental interventions were made. The introduction of Experimental Condition II contingencies on Day 54 again immediately reduced the percentage of inappropriate turning intervals in the experimental class. This behavior continued to decrease during the remaining days of the study. In the control class, the level of inappropriate turning behavior remained essentially the same. In the period from Day 54 through Day 62, the average daily percentage of inappropriate turning intervals in the control class was 17.22% and in the experimental class was 4.11%.

Teacher Behavior

During the Baseline period on talking behavior, the average number of instances of in-

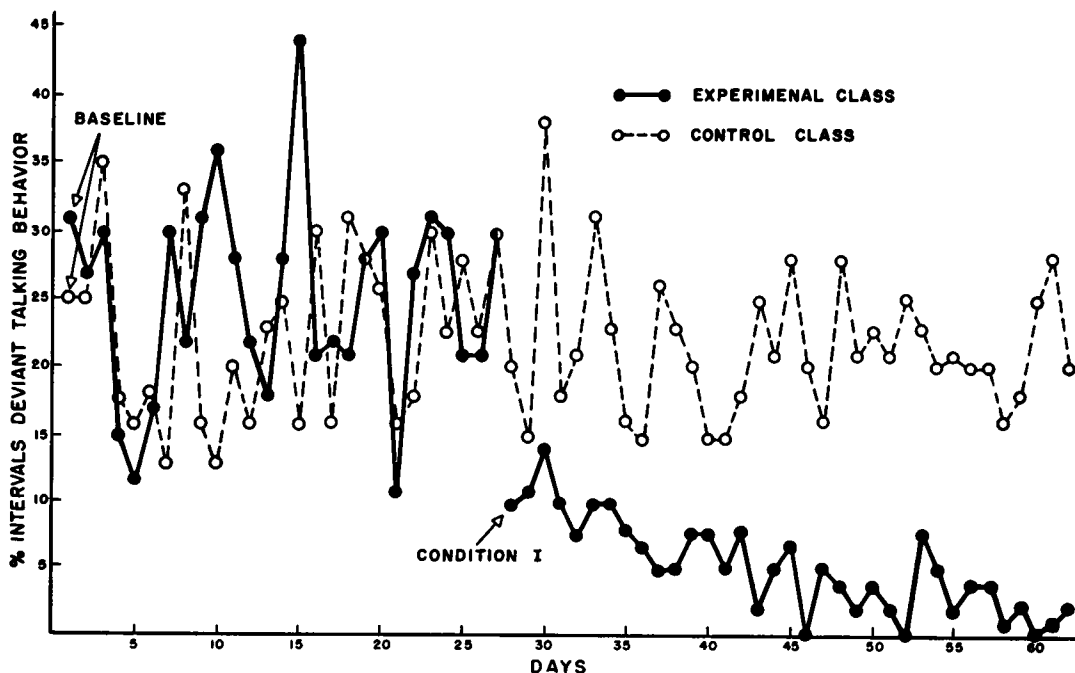


Fig. 2. Daily percentages of intervals of inappropriate talking behavior in experimental and control classes during Baseline and Experimental Condition I periods.

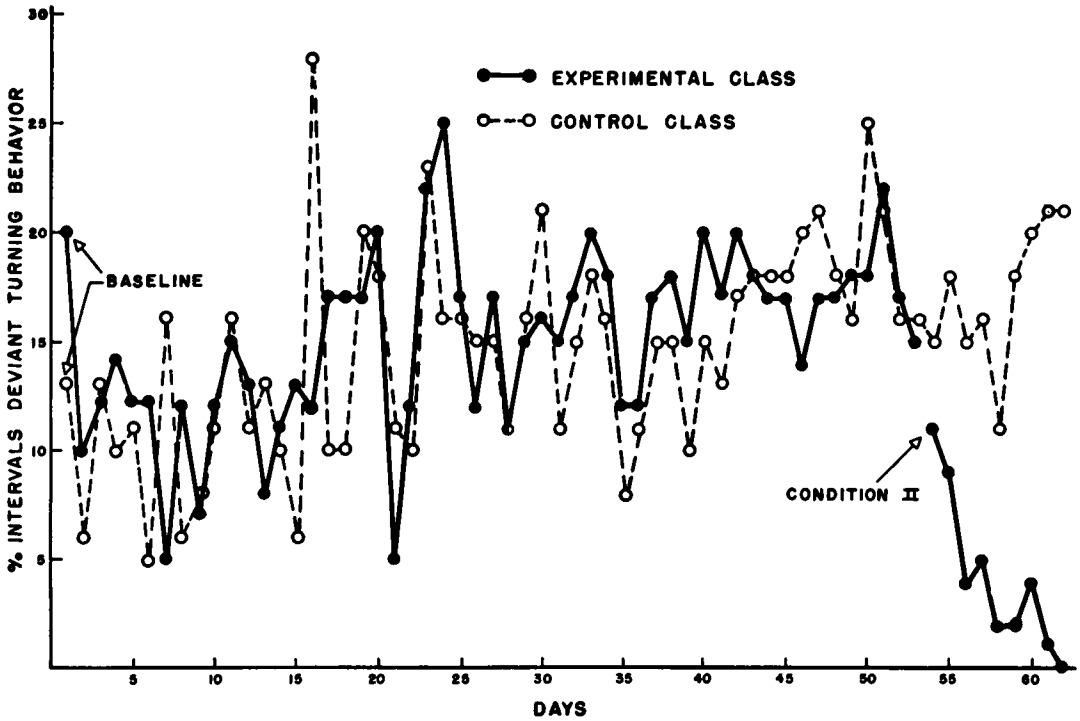


Fig. 3. Daily percentages of intervals of inappropriate turning behavior in experimental and control classes during Baseline and Experimental Condition II periods.

appropriate talking per class period that received some type of verbal reprimand from the teacher was 25.76% in the experimental class and 22.23% in the control class. The majority of these verbal responses took the form of saying, "Shhh!". On occasion, observers noted that the teacher corrected students directly, using their names. On several occasions she made general threats, stating that she would keep people after school if talking did not subside; however, she was never observed to carry out this kind of threat. During this period there were no observations of the teacher's dispensing any praise for not talking. During Experimental Condition I, the teacher disapproved of an average of 93.33% of inappropriate talking instances per class period in the experimental class. In the control class during this time, she disapproved of an average of 21.38% of inappropriate talking instances per class period. She also praised on an average of 6.07 occasions per experimental class period, contingent on not talking, during this time. With two exceptions, she was not observed directly to praise not talking in the control class.

During the Baseline period on inappropriate turning behavior, the average percentage

of inappropriate turning instances per class period that received verbal reprimands from the teacher was 12.84% in the experimental class and 13.09% in the control class. Most of these were simple instructions, like, "Turn around!", and she used the student's name in most cases. During Experimental Condition II, the average percentage of inappropriate turning instances per class period that occasioned disapproving responses from the teacher was 95.50% in the experimental class and 18.50% in the control class. In addition, she praised on an average of 5.75 occasions per experimental class period, contingent on not turning. In the control class she was not observed to provide any such praise for not turning.

DISCUSSION

The results indicate quite clearly that the statements of praise and disapproval by the teacher had consistent effects on the two target behaviors observed in the experimental class. Both behaviors decreased. That the statements were, in fact, responsible for the observed modifications in behavior was demonstrated

through the multiple baseline procedure in which the target behaviors changed maximally only when the statements were applied. The use of the control class data further substantiates this contention. The observations of teacher behavior in the study provide evidence that the program was being carried out as specified in the two classrooms.

The design of the study does not make it possible to isolate the separate effects of the teacher's statements of praise and disapproval on the students' behaviors. It is possible that one or the other of these was more potent in achieving the observed results. In addition to the possibility that statements of praise or disapproval, in themselves, might have differed in their effectiveness in modifying behavior, the different manner in which these two types of statements were delivered may have resulted in differing effects. The design, it will be remembered, called for disapproving statements to be delivered to individual students, while praise was delivered to the class as a whole. This resulted in a sudden onset of numerous disapproving statements delivered to individual students when Experimental Condition I was put into effect. The observers agreed that the students seemed "stunned" when this essentially radical shift in stimulus conditions took place. The immediate and marked decrease in inappropriate talking behavior at this point may have resulted because of this shift. The phenomenon can be compared to the sudden response rate reductions observed in animals when stimulus conditions are shifted suddenly. The decrease in inappropriate turning behavior observed when Experimental Condition II was put into effect, while immediate, was not of the same magnitude as that observed previously. Perhaps some measure of adaptation to this type of stimulus shift had taken place. Regardless of the possible reasons for the immediate effects observed when the experimental conditions were put into effect, it is also true that the direction of these effects was maintained thereafter in both experimental conditions. The combination of praise and disapproval undoubtedly was responsible for this.

Assuming that praise statements were functioning as positive reinforcers for a majority of the experimental class, they may have operated not only directly to reinforce behaviors incompatible with inappropriate talking and turn-

ing but also to generate peer-group pressure to reduce inappropriate behavior because such statements were contingent on the entire class' behavior. Further studies are needed to investigate the effects of peer-group contingencies on individual behavior.

Although it appears that the statements of praise and disapproval by the teacher functioned as positive reinforcers and punishers, respectively, an alternative possibility exists. These statements may have been operating primarily as instructions that the students complied with. It is conceivable that had praise statements, for example, been delivered as instructions independent of the occurrence of inappropriate behavior the same results might have been obtained. Also, it should be noted that results obtained in other studies (Lovaas, Freitag, Kinder, Rubenstein, Schaeffer, and Simmons, 1964; Thomas, Becker, and Armstrong, 1968) indicate that disapproving adult behaviors do not have a unitary effect on children's behavior. What would appear to be punishing types of statements are sometimes found to function as positive reinforcers. Informal observations indicated that this seemed to be the case in this study, at least as far as one student was concerned.

Several comments may be made regarding the practical aspects of the present approach. The study further exemplifies the usefulness of the multiple baseline technique, which makes it unnecessary to reverse variables in order to demonstrate the specific effectiveness of the experimental variables. Many teachers and school administrators will undoubtedly find this approach more acceptable in their schools. The notion of reversing variables to reinstitute what is considered to be maladaptive or inappropriate behavior is extremely repugnant to many educators who are more interested in "getting results" than in experimental verification of the results obtained.

The study differs from most previous operant research in classrooms in that the focus was on recording and modifying target behaviors without specific regard to the individual students involved. Most earlier studies have focused on observing the behavior of one student at a time. With this approach, it takes considerable time to extend observations to an entire class and usually this is not done. While observations of an entire class are not always necessary from a practical point of view (*i.e.*, only a

few students are involved in inappropriate behaviors), the present approach does seem feasible when the number of students involved in one or more classes of inappropriate behavior is large. From an experimental point of view, this study was deficient in not providing more exact information as to the number of students actually involved in the target behaviors. Once this facet is determined, however, the essential approach seems quite feasible and practical.

It might be argued that a group-oriented approach will not function in the same way with all members of the group. This is potentially possible, if not probable. However, two practical aspects should be considered. In the first place, such an approach could conceivably remediate the total situation enough to allow the teacher to concentrate on those students who either have not responded or who have become worse. Secondly, perhaps a general reduction in inappropriate behavior is all the teacher desires. In this study, for example, the results obtained were, according to the teacher, more than enough to satisfy her. She did not, in other words, set a criterion of eliminating the target behaviors.

A significant practical aspect of this study was the amount of difficulty encountered by the teacher in recording behavior and delivering contingent praise and disapproval. It might be asked how she found time to teach when she was involved in these activities. Perhaps the best judge of the amount of difficulty involved with these techniques is the teacher herself. She reported that, initially, recording behaviors was difficult. The task did take considerable time and did interrupt her on-going teaching. On the other hand, the large amount of talking and other inappropriate behaviors occurring at the beginning of the study also interrupted her teaching. She felt that as the study went on she became more accustomed to recording and it became easier for her to accomplish. She pointed out that the fact that she usually positioned herself at her desk or rostrum also made recording somewhat easier because the forms were readily available. This was her usual position in the classroom; she did not change to make recording easier. Considerable time was required to deliver contingent praise and disapproval at the beginning of the experimental conditions. This also tended to interrupt teaching tasks as far as the teacher was concerned. However, she felt that

this state of affairs did not last long because the target behaviors declined so immediately and rapidly. The overall judgment of the teacher was that the procedures of recording and dispensing contingent consequences did, indeed, interfere with her teaching but that the results obtained more than compensated for this. When the levels of inappropriate behavior had been lowered she felt she could carry out her teaching responsibilities much more efficiently and effectively than before. She felt strongly enough about the practicality and effectiveness of the techniques to present information and data on the study to her fellow teachers and to offer her services as a consultant to those who wanted to try similar approaches in their classrooms.

The senior author held frequent conferences with the teacher after class periods. The aim was to provide her with feedback regarding her performance in class. She was actively praised for appropriate modifications in her classroom behavior and for record-keeping behavior. Likewise, she was criticized for mistakes in her application of program contingencies.

Finally, the data of this experiment are considered significant by reason of the strong implication that teacher praise and disapproval can function to modify the behavior of high-school level students. This potentially extends the implications of earlier research accomplished on the pre-school and elementary levels.

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