EFFECTS OF IMPLEMENTING A TOKEN ECONOMY ON TEACHER ATTENDING BEHAVIOR

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After systematic attempts to increase a teacher's positive responding to her first-grade students, a token-economy system was implemented as a "last resort". On-task student behavior and relative frequency of positive and negative teacher comments were systematically observed. Data indicated that institution of the token system was associated with a relatively higher percentage of positive than negative comments. Termination and re-implementation of the token system caused reversals of the teacher's behavior.

DESCRIPTORS: token economy, teacher attention, classroom management, feedback, disruptive behavior, social reinforcement, primary classroom

The trend of research assessing the effectiveness of behavior modification in classroom settings has been toward demonstrating that teacher-applied contingencies can be used to modify rates of study and attending behaviors (Brodén, Hall, and Mitts, 1971; Hall, Lund, and Jackson, 1968; Walker and Buckley, 1968).

Obviously, the teacher occupies a central role in determining the success of any behavioral implementation. However, teachers who volunteer for behavior-modification endeavors, may well be more responsive to the idea that evaluative research and systematic modification of their own behavior are an integral part of the educational process than are teachers who possess more firmly developed and longer standing conceptions regarding the meaning and goals of education. Attempts to develop behavior changes in teachers antagonistic or apathetic toward behavioral approaches are often ineffective because of subtle sabotage or a consultant's inability to apply effective reinforcers for shaping adaptive changes (Kuypers, Becker, and O'Leary, 1968).

Instructing teachers to change their teaching styles and providing systematic feedback has proven useful for a limited subset of teachers. This strategy obviously cannot be applied to teachers who lack the requisite behavioral skills to profit from such training or who see no reason to change their behavior. This type of intervention has two additional problems, even for teachers who show enthusiasm toward the use of behavior modification. First, by focusing upon the teacher, such instruction may cause teachers to view even objectively collected feedback data as threatening. Second, participation in workshops may alter verbal behavior patterns within these settings, without generalization to the classroom.

In response to these problems, researchers have begun to examine the effects that treatment strategies designed to remedy problem pupil behavior (*e.g.*, token systems) have on the teacher who administers the system. While training teachers to provide more praise and less punishment does produce positive changes in pupil study behaviors, praise *by itself* is generally less effective than a token economy (Brodén, Hall, Dunlap, and Clark, 1970; McLaughlin and Malaby, 1971). One possible yet unexplored reason for the effectiveness of token-economy systems is that such programs cause

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teachers to monitor carefully their own behavior. Self-monitoring appears to be associated with increases in the rates that teachers praise pupils (Cooper, Thomson, and Baer, 1970; Thomas, 1971).

Only one study (Mandelker, Brigham, and Bushell, 1970) has examined the effects of implementing a token economy on teacher behaviors. The authors demonstrated that the token system was functionally related to increases in contacts with individual kindergartners who were receiving tokens. However, these results occurred as a function of observing teacher behavior both during periods when tokens were dispensed and at other times, and a major portion of the variability was due to the token dispersal procedure itself. Furthermore, since pupil data were not collected, the authors were able only to speculate as to whether a relationship existed between the program interventions and appropriate student behaviors. The present study attempted to clarify these questions by investigating the effects of implementing a total classroom token economy on the relative frequency that a teacher directed positive and negative comments toward her students during periods when tokens were *not* being dispensed. Additional data were collected on appropriate and inappropriate student behaviors of the entire class.

METHOD

Subjects and Setting

The study was conducted in a transitional classroom of 15 students. According to school officials, all the youngsters were exhibiting academic and social deficiencies deemed sufficiently severe to prevent their promotion into a regular second-grade classroom. The teacher was a middle aged woman with 23 yr of teaching experience.

Procedure

One or two observers collected data throughout the morning reading period, which lasted

about 48 min. Observations were conducted intermittently on both teacher and pupils by time sampling. The teacher was observed for two consecutive 5-sec intervals and her behaviors coded at the end of each. Three children were then observed one at a time for 5 sec and their behaviors recorded. Each child in the class was observed according to a predetermined order, which remained constant throughout the study. Five seconds were allowed for the observers to locate the child triads after the teacher was observed. A new cycle of observing the teacher and pupils began after each child was observed once, and repeated until the class period terminated.

Teacher behaviors were classified as belonging in one of three categories; "positive responses", "negative responses", and "other" teaching behaviors. Criteria for positive and negative teaching behaviors were adapted from the Behavioral Observation Schedule of Pupils and Teachers (BOSPT: Breyer and Calchera, 1971). Positive teacher behaviors included two categories from the BOSPT schedule: verbal reward and verbal feedback. Both types of statements involved teacher delivery of praise to the child. The difference between them was largely a matter of degree, with "verbal reward" being scored whenever the statement interrupted the flow of class interaction (*e.g.*, "Very good. I like the way you are working right now.") "Verbal feedback" was scored whenever a praise statement (*e.g.*, "Good.") did not disrupt the interaction.

Commensurate with Hall *et al.* (1968), pupil behaviors were coded as being representative of on- or off-task. Operational definitions were developed by having the teacher explain what was considered to be appropriate and inappropriate pupil behaviors. Off-task behavior was defined as any behavior that did not match explicit directions provided by the teacher. Off-task behavior was originally categorized as being either passive or disruptive. Examples ranged from staring out the window when an assignment was to be completed (passive) to

hitting or poking a neighbor (disruptive). On-task was defined as being appropriate to the task the child was supposed to be doing at the time. Examples of on-task behaviors included doing an assignment, raising hands to volunteer a response, and appropriate talking in response to a question by the teacher.

Negative teacher behaviors were also composed of two BOSPT categories, verbal correction and verbal prohibitory statements. Verbal correction was scored whenever the teacher corrected an erroneous pupil response; verbal prohibitory was scored whenever a pupil was reprimanded in such a manner as to disrupt the ongoing academic class interaction. "Other" teacher behavior (reading to the children) was scored in the absence of positive or negative behaviors.

Reliability

One observer reliability check was conducted during the reversal phase of the study and two were conducted during each of the other phases, yielding a total of nine checks over the five conditions. During these sessions, two observers seated approximately 15 ft (4.5 m) apart recorded behaviors during the entire reading period. Percentages of observer agreement were calculated by taking the number of intervals in which there was an agreement that the behavior occurred and dividing this by the number of agreements plus disagreements, thus eliminating inflated agreements due to inclusion of intervals in which no behavior was recorded. These figures were multiplied by 100 to convert them to percentages. Separate computations were performed on the pupil and teacher data. Percentages of observer agreement for the pupil data ranged from 83% to 97% ($M = 91\%$) and for the teacher data, from 81% to 93% ($M = 84\%$).

Experimental Phases

The study was divided into five conditions spread over 44 sessions.

Baseline condition. Baseline data on positive

and negative teacher behaviors and on- and off-task pupil behaviors were collected for 10 sessions. During this period, the teacher was instructed to engage in those classroom behaviors that she was accustomed to performing.

Praise and ignore. Baseline data collected on teacher and pupil behavior were presented to her. She was also provided with a two-page written paper entitled "Some Teaching Considerations" (Breyer and Pollack, 1971) and a list of approval comments from Madsen and Madsen (1970). She was told to select two or three new comments each day and to direct these toward individual class members when they were behaving appropriately. A goal of 15 positive comments per hour was agreed upon as a criterion level for teacher performance. In addition, it was agreed that she would lower the rate of her negative comments as much as possible, to at least 50% of her baseline level. Verbal feedback concerning teacher and pupil behavior was given throughout this phase. The experimenter discussed the data with the teacher for 15 to 20 min every other day to provide feedback and encouragement.

Token I. At the end of the 10-session praise-and-ignore phase, the teacher was told that there had been some improvement in class performance, but that a stronger intervention procedure would be necessary if additional improvements were to be realized. A nine-session token economy system was, therefore, implemented. The teacher observed and scored each of the children for task-oriented behavior on a variable-interval schedule of 8 min. Task-oriented behavior included listening, seatwork, voluntarily reading aloud, or activities previously identified as appropriate by the teacher. She circulated among the students after every second interval and scored the number of points each child had earned for the two intervals. When she approached them, she was instructed to write the point total on tally sheets placed on each child's desk. The observers who had access to the prepared observational schedule, would unobtrusively signal the teacher if she failed to

record behaviors within 1 min of the designated time.

Each child could earn three points every time he was observed engaging in task-oriented behavior. It was also possible for a student to earn five points for satisfactory completion of daily assignments and three bonus points for producing a superior paper. These points could be redeemed at the "Good-Study Store" for prizes ranging in cash value from 5¢ to \$1.50. Points had a sliding monetary value in relation to the cost of the items. Two points were redeemable for a penny for objects costing less than 25¢. Prizes costing from 26¢ to 50¢, could be purchased at a ratio of three points for every 2¢. Objects in the 51¢ to 75¢ range were sold at a ratio of four points for every 3¢. A penny per point was established as an appropriate ratio for prizes worth more than 75¢. The children, therefore, could obtain more value for their points if they saved them for more expensive items. Points were traded for back-up reinforcers at the end of each school day, immediately before the children went home.

In addition to using the token system, the teacher was told that any of the things she had learned during the praise and ignore condition that she had found useful could also be employed. However, no systematic behavioral feedback was provided during this phase and the second token condition. Observations during this phase specifically excluded any behaviors emitted by the teacher or pupils whenever the teacher was circulating among the students. The procedure was employed to avoid contamination of the data by inclusion of "forced" approval comments emitted while the teacher was tallying points.

At the end of the nine-day period, the students were informed that the "Good-Study Store" was closing and they were to redeem all of their points for prizes on the last day.

Reversal. During the reversal condition, the teacher was asked to carry out the same procedures she had previously employed during the praise-and-ignore condition. The consultant

again met with her for two 15- to 20-min sessions every other day to provide behavioral feedback. This phase lasted five days.

Token II. The same conditions existing for Token I were re-established. This phase lasted for 10 days.

RESULTS

Effects of Treatment on Pupil Behavior

The effects of the treatment manipulations were assessed by computing daily percentages of on-task behavior for the entire class. Since 95% of all off-task behaviors involved passive inattentiveness, this category was combined with the disruptive off-task designations for purposes of analysis. As Figure 1 indicates, implementation of the various manipulations produced systematic changes in this measure. During baseline, appropriate task-oriented behavior occurred between 40% to 68% of the reading period. Across the 10-day period, the class averaged 56% of the time on-task. While the variability during this phase was greater than during any subsequent phase, the class atmosphere was generally quiet, with few loud disruptions occurring. Inappropriate behaviors usually took the form of passive inattentiveness.

Instructing the teacher to use positive statements was associated with a gradual but steady increase in appropriate class behavior for eight consecutive days. The teacher, however, reported considerable discomfort while using the suggested procedures and frequently expressed the opinion that she could not effectively "motivate" her class by using the techniques provided by the consultant. This manipulation increased on-task behavior to an average of only 64%.

Introduction of the token economy immediately raised the level of appropriate behavior to 86%, which averaged 73% during the nine-day period. The reversal phase decreased appropriate behavior to a level equivalent to the praise-and-ignore condition (63%); re-instatement of the token procedures again led to a sudden and sizable increase in this measure, which stabilized

Fig. 1. Percentages of on-task behavior during treatment phases.

at between 70% to 75% of the rating intervals. Comparable ranges and averages of on-task behavior were found for both token phases.

Effects of Treatment on Teacher Behavior

For purposes of parsimony, the two categories of positive and negative teacher comments were combined, because each subclass manifested similar tendencies in comparison with the experimental phases. Percentages of positive and negative teacher comments are found in Figure 2. During baseline, the typical mode of teacher response was essentially negative. She was 10 times more likely to reprimand or admonish unacceptable behavior than to praise desired activities. On five of the 10 baseline days, no positive comments of any type were made.

Training and feedback by the consultant during the praise-and-ignore condition led to a slight three-fold increase in positive comments, but did not appreciably reduce the frequency of negative statements, despite the avowed inten-

tion of the teacher to do so. The high degree of variability in these data support the teacher's reported inability effectively to utilize the material and suggestions provided by the consultant.

Implementation of the token system produced an immediate and strong reversal of the relative frequencies with which praise and reprimands were administered by the teacher. Throughout this phase, the average number of positive comments made per day was double that of the previous two phases, while a 50% reduction in negative comments occurred. More negative than positive comments were made on only two of the nine Token I days, as compared to 19 of 20 days in the first two phases. The teacher reported being much more comfortable while administering this system than she had been in the praise-and-ignore condition, since she perceived the focus of the program as being the students rather than herself. Removal of the token contingencies led to a return to a more punitive

Fig. 2. Percentages of positive and negative teacher comments during treatment phases.

orientation, with only a slight (3%) decrease in negative comments compared to the first two phases. Token II was associated with increases in positive comments and decreases in negative statements consistent with those found during Token I.

While time-sampling data cannot be analyzed in such a way as to elucidate specific causal sequences between teacher comments and pupil behavior, inspection of both figures suggests that, over time, these variables may be systematically related. For example, delivery of fewer negative comments by the teacher was associated with increases in appropriate pupil behavior on 24 of the 44 days of the study. Pearson product-moment correlations between percentages of positive and negative teacher comments and pupil on-task behavior were computed to deter-

mine whether such systematic relationships existed. A strong negative relationship ($r = -0.66$, $p > 0.01$) between negative comments and on-task behavior and an even stronger relationship between positive comments and appropriate behavior ($r = 0.84$, $p > 0.01$) were found. The frequency of positive and negative teacher comments was also inversely related to a significant extent ($r = -0.62$, $p > 0.01$). The extent of these relationships is especially interesting in that teacher and pupil behaviors were interlocked in a predictable manner despite the effects of any particular treatment phase.

DISCUSSION

The data suggest that a systematic teacher-focused program involving feedback and specifi-

cation of objective behavioral goals was insufficient to achieve desired changes in teacher behavior. It is possible that the habits accrued from 23 yr of teaching were too strongly ingrained to be modified by this simple set of procedures. An alternative explanation argues that teacher behavior was unchanged because the feedback procedure did not incorporate an adequate amount of "pay-off" for the teacher. That slight changes in subjects' behaviors do not effectively modify the behavior of "behavioral engineers" has been documented in other contexts (Loeber, 1971; Pomerleau, Bobrove, and Smith, 1973). Implementation of a token economy may have led to more noticeable pupil behavior changes and, hence, more positive comments from the teacher.

These findings replicate and extend the outcome reported by Mandelker *et al.* (1970), who found that a token system raised the frequency of teacher contacts with her kindergarten students. The most compelling support for the Mandelker *et al.* findings is based on observations that involve teacher contact both when she dispensed tokens and at other times. Close inspection of Figure 4 in the Mandelker study indicates that, when token-related teacher contacts are partitioned out, little change in nontoken contacts was observed across the experimental conditions. The present study suggests that a token system can influence the quality of a teacher's contacts with her students at times other than when she dispenses tokens.

Several qualifications of the present results should be noted. First, this study was not designed to investigate the causal nature of the relationship between changes in teacher and student behavior within the various experimental phases. One interpretation of the data is that the teacher made more positive comments because the students emitted more appropriate behaviors to which she could respond under the token conditions. However, she may have maintained a similar ratio of positive comments to appropriate behavior during all phases of the study. The observation system did not allow determination

of specific functional relationships between teacher and student behaviors.

Second, the effectiveness of the token manipulation may have been increased by the preceding instructional-feedback condition, which may have sensitized the teacher to the types of comments she was emitting. Williams, Long, and Yoakley (1972) demonstrated that token systems involving contractual and proclamation formats (which were not preceded by a feedback phase) effect changes in student behavior without influencing teacher behavior in a reliable manner. These authors, however, explicitly stated that no attempt to manipulate teacher behavior was made, whereas this strategy was central to the present study. This difference may have accentuated the reactive effect of the feedback condition on subsequent phases in the present study.

In summary, this study demonstrated that a token system can systematically alter the positive and negative responses of a teacher to her students. Increases in praise comments were associated with improvement in attentive student behaviors, although the precise functional relationships between these two classes of behavior remain to be determined. The study also raises questions about the behavior-altering efficacy of various components of a token system. Future research might profitably compare the influence that a token economy and instructional-feedback procedures independently exert on teacher behavior, and investigate the impact that teaching systematic observational skills has on improving teaching style.

REFERENCES

- Baer, D. M. Behavior modification: you shouldn't. In E. A. Ramp and B. L. Hopkins (Eds.) *A new direction for education: behavior analysis—1971*. Lawrence: University of Kansas Press, 1971. Pp. 358-367.
- Breyer, N. L. and Calchera, D. A behavioral observation schedule for pupils and teachers. *Psychology in the Schools*, 1971, 8, 330-337.
- Breyer, N. L. and Pollack, B. Behavioral consultation within the existing public school system.

- School Applications of Learning Theory*, 1971, 4, 2-13.
- Broden, M., Hall, R. V., Dunlap, A., and Clark, R. Effects of teacher attention and a token reinforcement system in a junior high school special education class. *Exceptional Children*, 1970, 36, 341-349.
- Broden, M., Hall, R. V., and Mitts, B. The effect of self-recording on the classroom behavior of two eighth-grade students. *Journal of Applied Behavior Analysis*, 1971, 4, 191-200.
- Cooper, M. L., Thomson, C. L., and Baer, D. M. The experimental modification of teacher attending behavior. *Journal of Applied Behavior Analysis*, 1970, 3, 153-157.
- Hall, R. V., Lund, D., and Jackson, D. Effects of teacher attention on study behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 1-13.
- Kuypers, D., Becker, W. C., and O'Leary, K. D. How to make a token system fail. *Exceptional Children*, 1968, 35, 101-109.
- Loeber, R. Engineering the behavioral engineer. *Journal of Applied Behavior Analysis*, 1971, 4, 321-326.
- Madsen, C. H. and Madsen, C. K. *Teaching/discipline: behavioral principles toward a positive approach*. Boston: Allyn & Bacon, 1970.
- Mandelker, A. V., Brigham, T. A., and Bushnell, D. The effects of token procedures on a teacher's social contacts with her students. *Journal of Applied Behavior Analysis*, 1970, 3, 169-174.
- McLaughlin, T. F. and Malaby, J. E. Development of procedures for classroom token economies. In E. A. Ramp and B. L. Hopkins (Eds.), *A new direction for education: behavior analysis—1971*. Lawrence: University of Kansas Press, 1971. Pp. 29-40.
- O'Leary, K. D. and Drabman, R. Token reinforcement programs in the classroom: a review. *Psychological Bulletin*, 1971, 75, 379-398.
- Panyan, M., Boozer, H., and Morris, N. Feedback to attendants as a reinforcer for applying operant techniques. *Journal of Applied Behavior Analysis*, 1970, 3, 1-4.
- Pomerleau, O. F., Bobrove, P. H., and Smith, R. H. Rewarding psychiatric aides for the behavioral improvement of assigned patients. *Journal of Applied Behavior Analysis*, 1973, 6, 383-390.
- Thomas, D. R. Preliminary findings on self-monitoring for modifying teaching behaviors. In E. A. Ramp and B. L. Hopkins (Eds.), *A new direction for education: behavior analysis—1971*. Lawrence: University of Kansas Press, 1971. Pp. 102-114.
- Walker, H. M. and Buckley, N. K. The use of positive reinforcement in conditioning attending behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 245-252.
- Williams, R. L., Long, J. D., and Yoakley, R. W. The utility of behavior contracts and behavior proclamations with advantaged senior high school students. *Journal of School Psychology*, 1972, 10, 329-338.

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