JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1982, 15, 85-96 NUMBER 1 (SPRING 1982)

TEACHER POPULARITY AND CONTRAST EFFECTS IN A CLASSROOM TOKEN ECONOMY

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There is a common fear that the use of a token economy in one classroom might harm pupil performance in situations where the contingencies are not in effect. This study investigated potential contrast effects on measures of children's productivity and attitudes toward teachers. Six children with reading deficits participated. A multiple baseline design was used to assess the effects of a token economy which was systematically introduced across three teachers. Dependent measures included two rating forms of teacher popularity and work rate on a programmed reading series. The results indicated that the token system was effective in increasing the children's productivity and that no consistent behavioral contrast effects occurred. Furthermore, children's attitudes toward teachers did not appear to be influenced by the token economy until only one teacher was not delivering tokens. At this point, her popularity declined until she also delivered tokens. The token economy manipulation appeared to have a specific, desirable effect on the targeted behavior (i.e., work rate) and had minimal negative or positive "side effects" on teacher popularity.

DESCRIPTORS: token economy, teacher popularity, behavioral contrast, sociometric status

There are many published reports documenting the positive effects of classroom token economies (e.g., Ayllon & Azrin, 1968; Kazdin, 1977). However, investigation of their social validity has been largely neglected. For example, very little is known about the influence of token economies on children's attitudes toward their teachers, their school work, or the interaction of teacher popularity and the effectiveness of token economies. Furthermore, there has not been any systematic assessment of possible negative effects a token economy may have on the performance and attitudes of children in situations where the contingencies are not in effect. Given that token economies are frequently implemented only in selected portions of children's school days, such an assessment is extremely important. A question often asked by teachers is "What will happen to the performance of children in my class, if they participate in a token economy in another class?"

Lending credence to teachers' concerns are the findings of a study by Meichenbaum, Bowers, and Ross (1968) which reported a negative effect associated with the introduction of a token economy. Behavior problems of institutionalized adolescent girls decreased when a token economy was introduced during the afternoon, but they increased during the morning when the token economy was not in effect. Similarly, other studies have reported desired change in a treated setting, but an opposite change in another, untreated, setting (Johnson, Bolstad, & Lobitz, 1976; Lovaas & Simmons, 1969; Wahler, 1975).

Obtaining undesired changes in settings or classes in which the token economy is not in effect is similar to phenomena studied by experi-

The authors thank Susan Anderson-Smith, Nancy Hoelter, and Jeanne Chandler for their patience and conscientious professional assistance in serving as teachers during this lengthy study. The contributions of the first and second authors were equal. Requests for reprints should be sent to Ronald S. Drabman, Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, 2500 N. State St., Jackson, Mississippi 39216.

mental psychologists, labeled behavioral contrast. There is a large body of literature examining the effects of multiple schedules of reinforcement with infrahumans (see Schwartz & Gamzu, 1977, for a review of the research), but only a handful of studies have investigated contrast effects in humans (O'Brien, 1968; Waite & Osborne, 1972). A recent review of behavioral contrast emphasized its importance for behavior therapy and the need to extend investigations of the effect to applied settings (Gross & Drabman, 1981).

A recent study by Koegel, Egel, and Williams (1980) investigated potential contrast effects in behavioral treatment programs with severely handicapped children. Children were observed in settings during a baseline period in which no specific reinforcement contingencies were in effect. Following baseline, contingent positive reinforcement was used in one setting while the other setting remained in the baseline condition. Their results showed that the use of contingent reinforcement in one setting was associated with a decrease in the target behavior in another setting in which the contingency was not in effect. These authors also found that inappropriate behaviors also increased in an untreated setting when time-out was contingently applied in a therapy setting. Thus, the results of this study demonstrate the presence of contrast effects in extra-therapy settings when behavioral interventions are used in a therapy setting.

Behavioral contrast effects with a token economy were also investigated by Simon (1978). A classroom for profoundly hearing-impaired children was divided into three work stations during their math period. Following a baseline condition, a token economy was introduced in all three work stations. Tokens were then removed from two of the three stations. During this phase, the rate of responding at the non-token stations returned to baseline levels. There was also an increase in response rate at the station that continued to offer tokens. In a final phase of the study, tokens were again delivered in all three work stations. During this phase, work rate decreased at the station which maintained the opportunity to earn tokens throughout the study. These results demonstrated that compensatory increases in work rate occurred despite the fact that reinforcement remained unaltered at that station. This study shows that the effectiveness of a token economy can be influenced by surrounding levels of reinforcement.

The purpose of the present study was to further extend our knowledge of contrast phenomena in applied settings. In particular, it examined the possibility of observing contrast effects when a token economy program was introduced into only part of the school day of learning disabled children. Changes in the productivity of the children were measured to detect any contrast effects due to the systematic introduction of token reinforcement. A second purpose of the study was to assess the relationship between the introduction of a token economy and changes in children's attitudes toward their teachers and school work.

Specifically, the following questions were addressed:

1. Will the introduction of a token economy produce negative behavioral contrast (i.e., adversely affect productivity in classes which do not use tokens)?
2. Will children's attitudes toward a teacher of their work become more positive in a class that uses a token economy?
3. Will the children's attitudes toward teachers who do not use tokens become more negative when a token program is introduced into another part of their school day?
4. Will the initial popularity of the teachers influence the effectiveness of the token economy?

METHOD

Participants

Six children aged 8 yr, 1 mo to 12 yr, 4 mo (mean = 10 yr, 1 mo) participated in this study.

Each child attended a private nonprofit elementary school for the learning disabled. These five boys and one girl were referred by their teachers because they needed additional help with reading. All the children were at least 1 yr below grade level on the Stanford Achievement Test. Specific age, sex, WISC-R, IQ, and Stanford Reading Achievement Score information for each child is presented in Table 1. These children had not participated in other research projects.

Table 1

Age, sex, WISC-R IQ and Stanford Achievement scores for each subject at the start of the experiment.

Student	*Age*[a]	*Sex*	*I.Q.*	*Reading Achievement*
1	12:4	M	64	1.6
2	8:1	M	91	1.5
3	11:8	M	86	2.3
4	10:10	M	92	2.8
5	9:2	M	87	2.1
6	8:7	F	65	1.9

[a]Ages are given in years:months.

Design

A multiple baseline design was used to evaluate the effects of token reinforcement on attitudes as well as to test for the presence of contrast effects. The experimental manipulation, token reinforcement, was systematically introduced across three teachers. In a baseline condition all three teachers conducted classes without token reinforcement. In Phase A, one teacher offered tokens and back-up reinforcers contingent upon a certain number of correct work items while the other two teachers continued in the baseline condition. During the next phase, A + B, teacher A continued to give tokens, teacher B started the use of token reinforcement and teacher C continued in the baseline condition. For the final phase, A + B + C, all three teachers used token reinforcement in their classes.

Dependent Measures

In order to demonstrate the validity of the token reinforcement system used in this study, productivity measures were collected. The Sullivan Programmed Readers (McGraw-Hill, Webster Division, 1968, Series #61351-613513) were used as reading books for the study. Each item required approximately the same time to complete, allowing for the calculation of an average value for the number of correctly completed items per minute for each child.

Attitudes were measured by responses to two rating forms. A free-choice teacher rating form which consisted of a photograph of the teacher to be rated and three questions: 1) "How much do you like this teacher?"; 2) "How good a teacher is she?"; and 3) "How much did you like today's class?" Each question was followed by a 10-point rating scale.

The second attitudinal measure was a forced-choice rating form which included two questions: "If our school could hire only *one* of the women teaching you in the special reading class, which one should it be?" and "If we could hire *two* of them, who should the second one be?" The children were instructed to respond to these questions by circling the picture of the teacher they selected. Both rating forms were used to provide measures that would be sensitive to attitudinal differences. The free-choice form tapped the children's attitudes toward individual teachers and did not require the children to compare the teachers to each other. With this scale it was possible to rate all teachers very highly. To provide further information, the children responded to the second form by rank ordering their preferences for teachers.

Procedure

In order to determine initial reading level, the children were given a test booklet consisting of the four tests that appear in each workbook of the Sullivan Readers. Reading assignments during the study were based on pretest performance. If the children made more than three errors on a test, it was marked as a failure, and the children were assigned to the section of the

Sullivan Reader that immediately preceded the first failed test.

The experimental reading classes were conducted in the same room and at the same time each day. The children worked for 15 min under one teacher (T1) followed by a 5-min break and a 15-min work period under a second teacher (T2). Three females who attended local colleges served as teachers in this study. They were not informed of the purpose or design of the study. The teachers' activities during the class consisted of answering children's questions and correcting their papers. There were no differences in activities between the first and second sessions of each day. The teachers never taught twice on the same day, and the schedule of the teachers was varied, thus they were not associated with specific days of the week. The three teachers were rotated so that they served as T1 and T2 an equal number of times. Due to illness, there were some days on which only a single teacher was present. This occurred 6, 3, and 7 times for teachers A, B, and C, respectively.

Baseline. During this phase, none of the teachers used token reinforcement in her class. Teachers were asked to provide feedback and praise for correct work. No other specific instructions about how to conduct their classes were given to the teachers except to encourage the children to complete as many items as possible. At the end of each class, the teachers marked each child's work and recorded the total number of items completed and the number of correct items completed. These procedures are analogous to the behavior of teachers in most elementary classroom settings.

Following each class, the children were taken to another room where a teacher's aide administered the rating forms. The following instructions were read by the aide:

> "The three women who are teaching you in this special reading class are studying to be teachers. We would like to know how good you think they are in case we want to hire one of them. So, I would like you to answer the questions on these papers. You do not have to put your name on the question sheets and the teachers will not be told how you have rated them, so don't worry about that.
>
> To answer the questions, you circle the score you give the teacher on a scale of 0 to 10. Now, we want you to be honest about your ratings and to think about the questions. The scores you give do not have to be all 10's or all 0's. For example, the worst teacher you could ever have might get a 0 score, a bad teacher might get a score of 2 or 3, most teachers might get a score of 5 or 6, a really good teacher might get a score of 7 or 8, and the best teacher you could ever have might get a score of 10. You do not have to rate the teacher with the same score on all questions and you can change your mind from day to day. Any questions?
>
> Now, please rate ___ on the questions on the paper. She is the teacher you were just with."

Children completed free-choice ratings after each class for the teacher who had just taught them. Forced-choice ratings were conducted after all three teachers had an opportunity to teach, approximately once every 2 days. Baseline data were collected for 18 days.

Phase A. On the nineteenth day, Teacher A was instructed to begin token reinforcement for correct responses in the readers. She read to the class the following instructions:

> "Today we are going to be doing something new. I'm going to give each of you a goal—a number of answers in your reading booklet that you must get right. If you reach the goal, then you get a token. With the token you can buy some good things on your break. On the poster (point) you can see some of the things you can buy. I'm also going to give you the opportunity to get a second token for a higher number of correct answers. With two tokens you can get two prizes. So work as hard and as carefully as you can."

Each child was given an index card showing how many items he or she needed to answer correctly in order to earn either one or two tokens. In order to obtain one token, a child had to perform 33% *above his individual mean*

correct/minute from Teacher A's baseline phase. In order to earn two tokens the figure was 50%. Thus, point totals to earn tokens were individually determined. The teacher who delivered tokens was encouraged to remind children periodically that they were on a token economy and that they had done x number of items so far and needed to complete y number of items to earn a token. Also the poster displaying the back-up reinforcers served as a reminder that during this class they could earn tokens. No child evidenced any difficulty in discriminating those periods in which tokens were in effect.

At the end of the 15-min work period, the teacher scored each child's performance and recorded the number of items completed and the number of items completed correctly. She then distributed tokens based on the number correct. Children were sent to the teacher's aide to complete the rating forms and then to the experimenter to exchange tokens for candy or toys. Tokens could not be saved, they had to be spent that period. On days when the "token" teacher was T1, the children who earned the rewards ate their candy or played with their toys while waiting for the second period to begin. When the teacher delivering tokens was T2, rewards were kept in the principal's office for children to pick up after school. This was done to avoid any interference with the children's performance in their regular classroom (i.e., eating candy in front of classmates).

The teachers not delivering tokens (teachers B and C) were aware that one teacher was on the token economy, due to comments made by the children. These teachers were instructed to tell children that class would be taught as usual, without tokens. In accordance with the multiple baseline design, Teachers B and C continued baseline during the 25 days of Phase A.

Phase A + B. In this phase, Teacher B was instructed to introduce the token economy in her class. The criteria for tokens remained the same as it had been under Teacher A in order to minimize confusion for the children. In this phase, children might receive tokens both in the T1 and T2 periods or only in the T1 or T2 period. All other procedures were the same as in Phase A. Phase A + B lasted for 20 days.

Phase A + B + C. In the last phase, Teacher C was included in the token economy, so that children were receiving tokens in both the T1 and T2 periods each day. Again, the procedure was the same as in the other token phases. This phase lasted for 22 days.

RESULTS

Reliability

Each teacher's recordings of the reading work-rate measure (i.e., number of items completed correctly per minute) were checked by an independent rater for 10% of the sessions within each phase. Pearson product moment correlations calculated between the teacher's and independent rater's recordings were as follows: Teacher A = .99, Teacher B = .99, and Teacher C = .99. Uniformly high correlation coefficients were also obtained from reliability checks on the scoring of the teacher rating forms (x = .98).

Reading Work Rates

The average work rates of the group as well as for each individual child are presented in Table 2. The mean number of correct items per minute of the group increased for each teacher with the introduction of the token program. The children worked at an average rate of 2.07 correct items per minute for Teacher A during her baseline phase, then increased to averages of 3.39, 3.63, and 3.51 in subsequent token phases. The two baseline phases for Teacher B resulted in averages of 2.65 and 2.54 correct items per minute. Work rate averages increased to 3.34 and 3.12 correct per minute during the phases when she used the token system. Finally, the average work rates of the children for Teacher C were 2.08, 2.74, and 2.71 correct per minute during her three baseline phases. The average rose to 4.00 correct per minute when she introduced the token system to her class-

Table 2

Group	Phases			
	Baseline	*A*	*A + B*	*A + B + C*
A	2.07	3.39	3.63	3.51
B	2.65	2.54	3.34	3.12
C	2.08	2.74	2.71	4.00
S_1				
Teacher A	1.75	2.75	3.24	3.20
Teacher B	2.30	2.10	3.00	2.71
Teacher C	1.26	1.96	2.21	4.14
S_2				
Teacher A	1.14	2.16	3.01	3.36
Teacher B	1.04	1.44	2.55	3.19
Teacher C	1.12	1.84	1.97	3.90
S_3				
Teacher A	3.54	5.53	4.96	5.02
Teacher B	4.70	3.85	4.98	5.35
Teacher C	3.39	4.29	3.05	6.22
S_4				
Teacher A	5.22	8.11	7.45	4.98
Teacher B	5.47	5.50	6.35	4.45
Teacher C	4.66	7.14	5.77	6.01
S_5				
Teacher A	1.39	1.69	2.37	2.50
Teacher B	2.01	1.18	1.77	1.67
Teacher C	1.54	1.70	1.79	2.31
S_6				
Teacher A	.92	1.50	1.25	1.54
Teacher B	1.17	1.36	1.32	1.41
Teacher C	1.01	1.49	1.17	1.70

room. These data clearly indicate that the token economy system had an incremental effect on the children's work rates for each teacher.

Work Rate Contrast Effects

Phases during which some teachers were using the token system, and others were not, were examined for possible behavioral contrast effects on work rates. Specifically, the work rate data were examined for changes in rate in nontoken classrooms as a result of either preceding or following a token economy class on the same day. As can be seen in Table 3, there was no detectable contrast effect; however, there appeared to be a slight generalization effect for Teacher C which is reflected in a rise from 2.3 to 2.6 when she was T1 and from 1.9 to 2.5 and 2.7 when she was T2.

Table 3

Mean correct items/minute for non-token teachers preceding (T1) or following (T2) a token teacher.

	Phases		
	Baseline	*A*	*A + B*
Teacher B			
T1	2.6	2.4	—
T2	2.5	2.6	—
Teacher C			
T1	2.3	2.6	2.6
T2	1.9	2.5	2.7

Individual student data provided in Table 2, and the group data displayed in Table 3, both indicate that work rates in nontoken classes did not decrease when tokens were used in another classroom. However, it may be argued that averaging data from many sessions only provides information about sustained contrast effects and may mask transient effects. In order to examine possible transient contrast effects, work rates for each session were examined for each child. Individual student data are presented in Figure 1. Work rates for Teacher C, the last teacher to deliver tokens, did not decrease during phases in which other teachers delivered tokens. However, there was a slight decrease in work rates for three students (S 1, 3, 4) for sessions conducted by Teacher B when Teacher A began tokens (phase A). Although the performance decrement of these three children may be interpreted as contrast effects, it is difficult to explain the absence of contrast effects for children's performance in classes conducted by Teacher C.

Ratings of Teachers

Free-choice ratings. The average student ratings of each teacher across study phases are presented for each question in Table 4. No systematic behavioral contrast effects were apparent for any of the questions across these teacher ratings after the introduction of tokens. Although variability in ratings across phases was noted for each teacher on some questions, this did not appear to be a function of the reward system. The lack of impact on free-choice ratings was

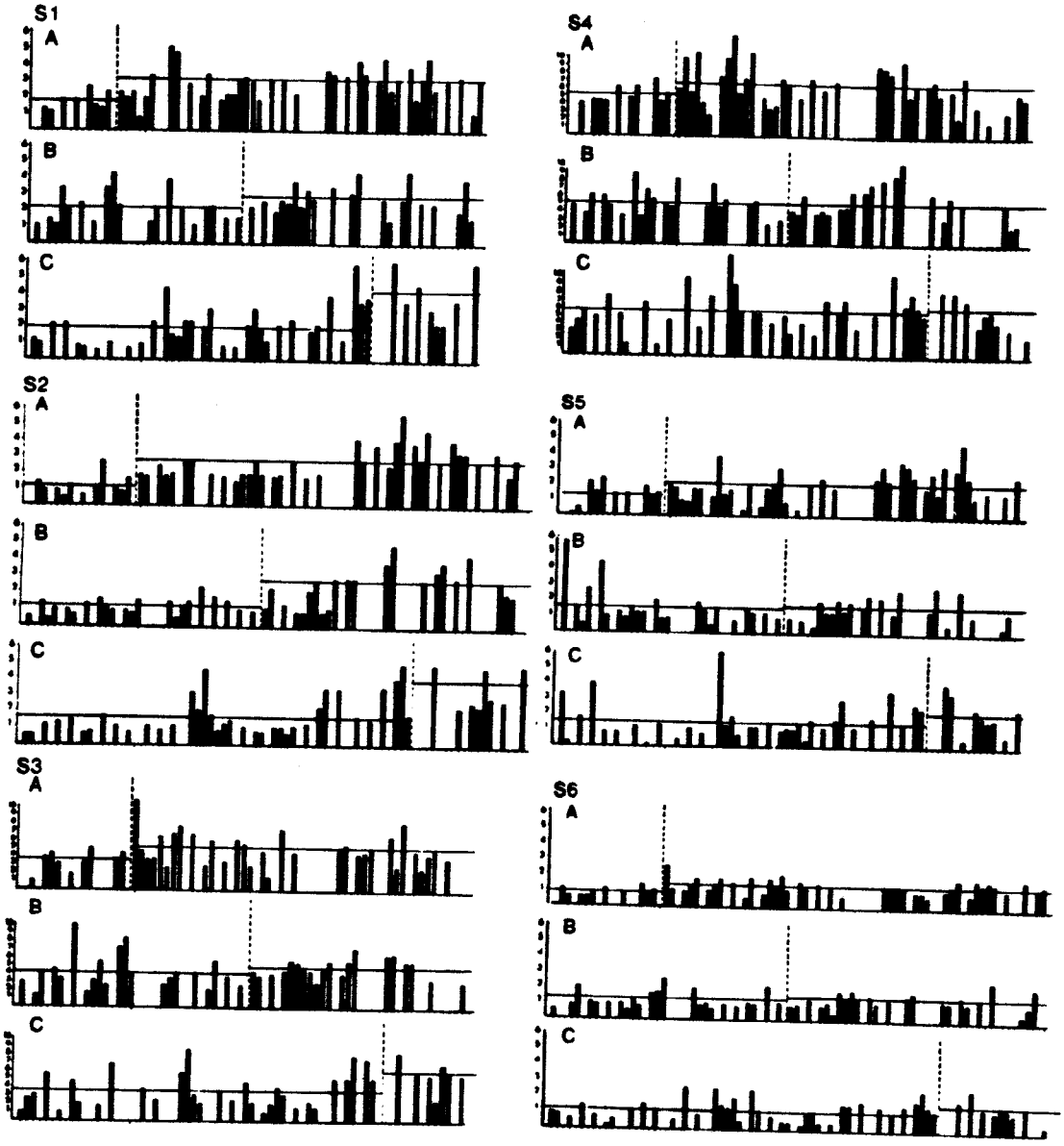

Fig. 1. Session-by-session changes in work rates (number of items correctly completed per minute) for Teachers A, B, and C across phases of the study. Note that each child was present in only two classes in any one day, thus blank spaces appear on the graph for the teacher who did not hold class that day.

most apparent in the relatively small range within which all ratings fell. The lowest average rating on the 1- to 10-point scale given to any teacher on any question across all phases was 7.7 and the highest average rating was 9.3.

Forced-choice ratings. The children's forced-choice ratings of the three teachers provided periodic rank-order information contrasting each teacher with the others. The rank-order was determined by using a weighting system such that each teacher was given two points for each "hire first" choice and one point for each "hire second" choice. Each time a teacher was not chosen, she received a zero. The points were summed for each teacher after every forced choice rating session and a percentage of the

total points possible was derived. The average percentages of the weighted forced-choice ratings of the six children are presented in Figure 2.

There appears to be no effect of tokens on forced-choice ratings when only one teacher of the three was utilizing a token system. Teacher C, who was the most preferred at the beginning of the study, suffered in her forced-choice ratings only when she was the sole teacher *not* awarding tokens. This effect of decreased ratings was reflected in the A + B tokens phase. Ratings of Teacher C dropped from baseline averages of 60.2% and 59.3% to a low of 38.1% during the A + B phase. Also, both Teachers A and B seemed to benefit from Teacher C's loss of popularity during this phase, as reflected in their increased average ratings (+7.4% and +13.8%, respectively).

In order to better understand this drop in popularity, forced-choice data for individual students were examined. Cumulative graphs of the number of points each teacher accrued are presented separately for each child in Figure 3. Lines with the greatest slope indicate the most popular teacher. A decrease in popularity is indicated by a straight line on the graph. As can be seen in Figure 3, Teacher C received the highest ratings from five of the six children.

Table 4

Mean teacher free-choice ratings on three questions across multiple baseline phase.

	Phases			
	Baseline	*A*	*A + B*	*A + B + C*
Q1: "How much do you like this teacher?"				
Teacher A	8.0	8.6	8.3	8.4
Teacher B	8.2	8.6	8.4	8.8
Teacher C	8.7	8.8	8.4	9.1
Q2: "How good a teacher is she?"				
Teacher A	7.7	8.2	8.2	8.7
Teacher B	7.7	8.1	8.3	8.5
Teacher C	8.4	8.4	8.4	9.0
Q3: "How much did you like today's class?"				
Teacher A	8.3	8.5	8.2	8.5
Teacher B	8.4	8.6	8.3	8.6
Teacher C	9.3	8.7	8.9	9.2

The effects of tokens on teacher popularity were observed for four of the students (S1, S2, S5, and S6). These effects can best be observed in phase A + B, in which the previously low ratings of Teacher B increased. However, Teacher C, who was most preferred at the beginning of the study, suffered in her forced-choice ratings. This corresponds to the decrease noted in Figure 2. When Teacher C was the only teacher not awarding tokens, her popularity decreased. However, it must be noted that two of the students (S3 and S4) exhibited sustained preference for Teacher C, independent of the presence of tokens in other classes. In fact, ratings of all three teachers completed by these two children were not affected by the presence or absence of a token economy.

DISCUSSION

Consistent with earlier studies (e.g., Ayllon & Azrin, 1968; Kazdin, 1977), the present study demonstrated that a token system implemented in a small classroom of children with reading problems was effective in increasing the pupils' work output. Of greater interest, however, was the overall finding that no behavioral contrast effects resulted from the token program for half the students and only mild transient contrast effects for the other half. These results are discrepant from the results of studies discussed in the introduction of this paper. Failure to obtain large contrast effects may be a function of the discriminability of the two reinforcement schedules. Anecdotal reports of the children's comments (i.e., questioning teacher C and requesting that she use tokens like the other teachers) strongly suggest that the children discriminated between the token and non-token conditions. Also, obvious visual cues reminding the children that they were receiving tokens were always present during phases in which a teacher delivered tokens. Furthermore, no child who did not earn a reward ever pleaded ignorance. Finally, no teacher or experimenter ever reported that they suspected any child did not

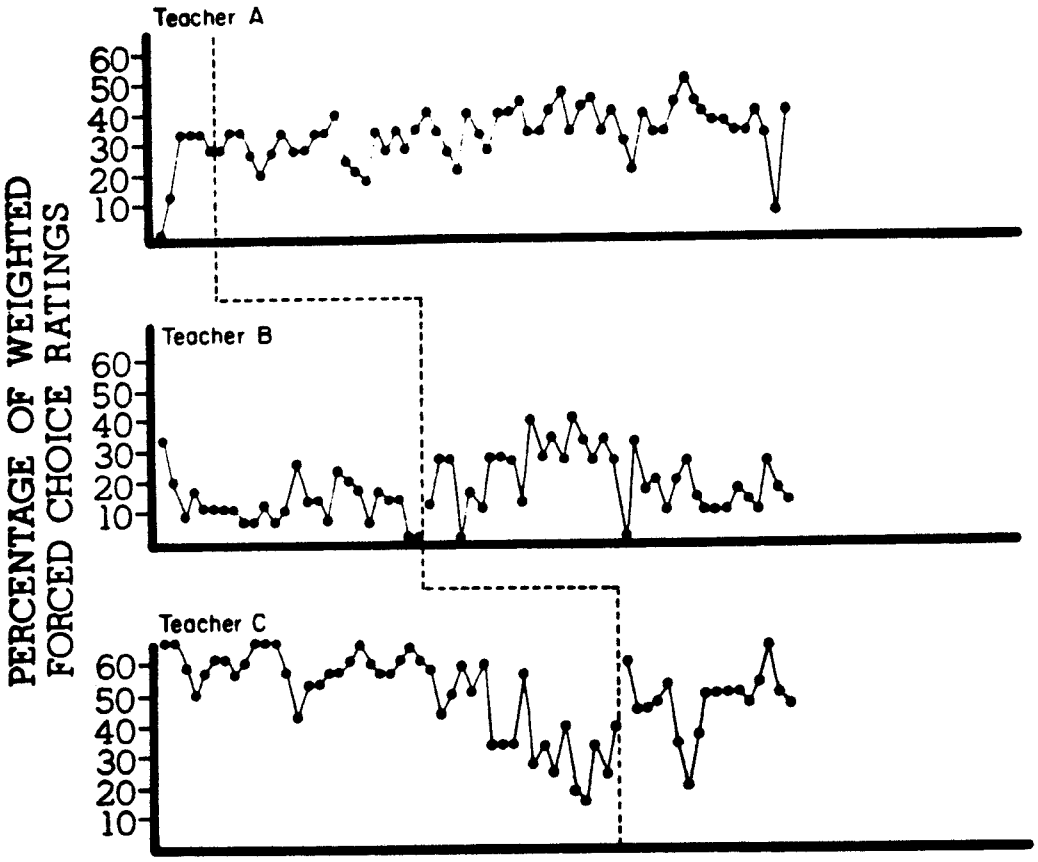

Fig. 2. Percentage of weighted forced-choice ratings for Teachers A, B, and C.

understand which reinforcement schedule was in operation.

Related to this, however, is the question of the relative strength of the token economy. The token program used in this study was designed to mirror procedures that might actually be used in a school. The rewards, while significant, were modest (e.g., candy). It is possible that if the differences in the classrooms had been accentuated by the use of extremely potent rewards within the daily token economy (e.g., record albums) a more significant contrast effect would have been found.

Another potential explanation for the failure to observe contrast effects is the type of children who participated. These children were referred for academic difficulties, not behavior problems. Most studies that reported findings of contrast effects used subjects who were referred for behavior problems (e.g., Meichenbaum, Bowers, & Ross, 1968) or severely handicapped children who typically exhibited a variety of behavior problems (e.g., Koegel, Egel, & Williams, 1980). Subjects with high rates of inappropriate behaviors may readily engage in behaviors incompatible with those the experimenter is attempting to improve. The children in the present study exhibited numerous off-task behaviors (e.g., talking to others, playing with objects in the room). However, they were easily redirected to the task. Although no data were collected on the frequency of redirections needed, all teachers in all phases of the study did redirect children whenever they were off-task.

The results of this study have important practical implications for the acceptance and use of token economies in special classrooms. The common fear that the use of tokens in one

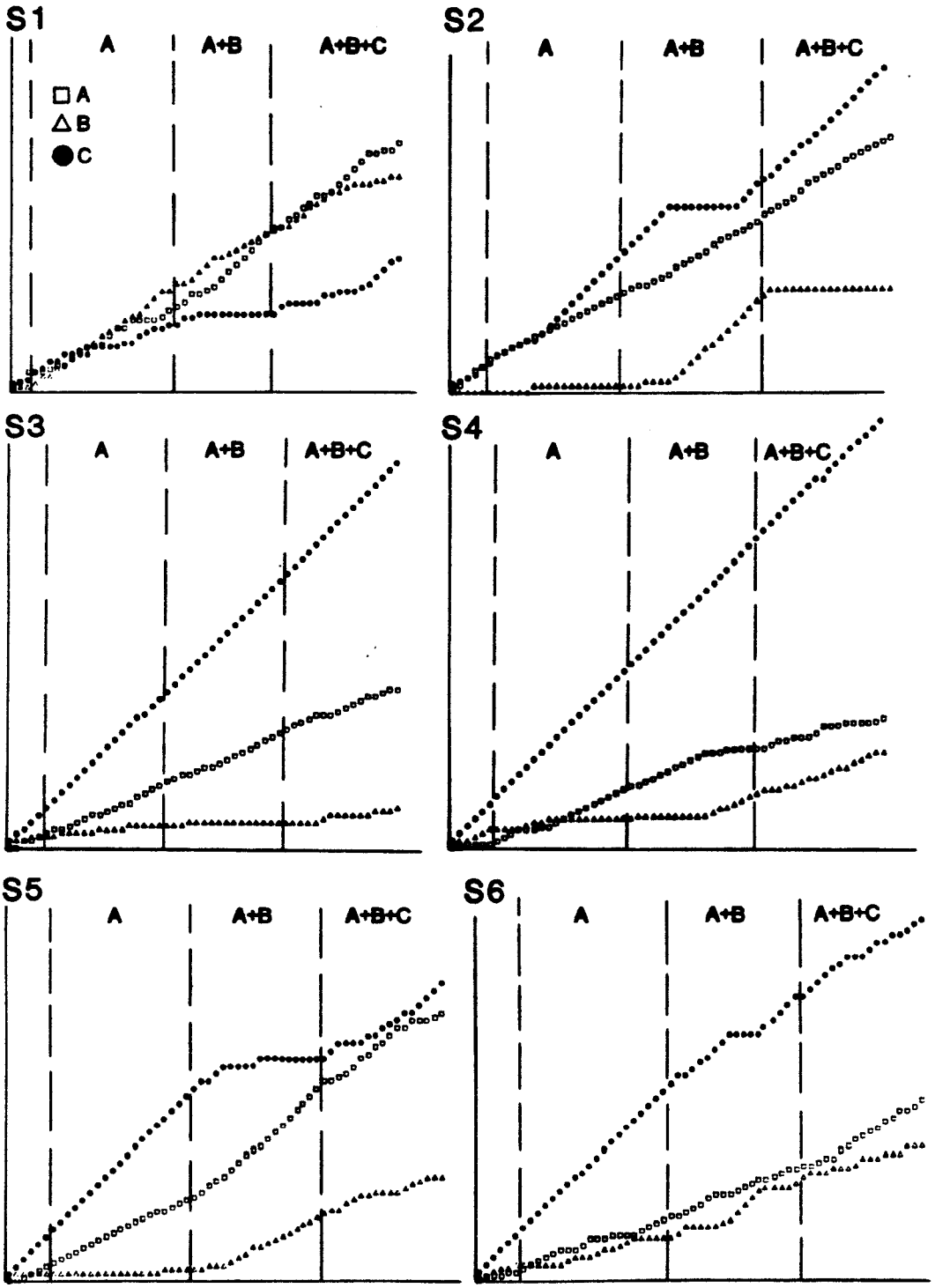

Fig. 3. Session-by-session forced-choice ratings of Teachers A, B, and C completed by each child.

classroom might harm pupil performance in non-token classrooms was not supported. Student performance across the three classrooms improved in a similar fashion once tokens were implemented, and no significant or consistent performance decrements occurred. Furthermore, teacher popularity was generally unaffected by the implementation of tokens until one teacher (the most popular) was the *only* teacher not delivering tokens. At that point, her forced-choice ratings declined in relation to the teachers delivering tokens. However, her free-choice popularity remained the same. The results suggest that the use of tokens in one or more classrooms is innocuous unless the teachers not delivering tokens are in the minority.

The children in the present study rated Teacher C to be more likeable and popular from the beginning, and this popularity remained fairly consistent until she was the only teacher not delivering tokens. The exact reason for this teacher's initial popularity is not clear; however, informal observations indicated that she was very patient and noncritical, smiled frequently, and delivered more social praise for work performance. Additionally, she commonly allowed more disruptive behavior to occur in her classroom. Interestingly, the children were very eager for her to begin tokens, as the two other teachers had done. During the A & B token phase, they frequently asked her, "When are you going to start tokens?"

Teacher B was selected less often by the children as a teacher they wanted hired by the school. During phases of the study in which she delivered tokens, her forced-choice ratings increased. However, the children's average ratings of this teacher were still below those of the other two teachers. Also, relative to Teachers A and C, there was less of an increase in productivity when Teacher B implemented a token economy. Teacher popularity seems to have been an important component of the effectiveness of the token economy. That is, the implementation of a token system can have a positive effect on teacher popularity and the popularity of the teacher also influences the effectiveness of a token economy.

The methodology used in this investigation of a clinically significant problem closely resembled "true" contrast effects as they would be manifested in applied settings. The only generalization of changes in work rate resulting from the implementation of tokens was observed in Teacher C's classroom once Teacher A delivered tokens. This could be considered setting (Class V) generalization (Drabman, Hammer, & Rosenbaum, 1979). Overall, these findings support the efficacy of a token system in specifically improving pupil work rate. Behavioral contrast effects, when found, were not of applied significance. The results of this study also suggest that the initial popularity of teachers influences the effectiveness of a token economy. The interaction between popularity and success of token economies has received very little attention and is clearly an area that merits further investigation. The information obtained from this investigation of student performance and attitudes in token classrooms provides teachers and educators with important additional confirmation of the effectiveness of token systems. It should aid in their planning and implementation of incentive programs in selected classrooms with a larger, standard school curriculum.

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Received August 18, 1980
Final acceptance June 29, 1981