DOCUMENT RESUME

ED 084 752 EC 060 631

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TITLE Positive Reinforcement and Response Cost Procedures in a Token Reinforcement Program in a Special Education Class.
PUB DATE [73]
NOTE 36p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Adjustment (to Environment); Adolescents; *Behavior Change; *Educable Mentally Handicapped; *Exceptional Child Research; Mentally Handicapped; *Operant Conditioning; *Positive Reinforcement

ABSTRACT

Compared in a junior high class of 12 educable mentally handicapped children were the effects on adaptive behaviors of a token reinforcement program involving only positive reinforcement and a token reinforcement program additionally involving response cost. The token reinforcement response cost condition allowed students to earn points for positive behaviors but lose points for negative behaviors, while the token reinforcement without response cost condition allowed students to earn points for positive behaviors but did not penalize negative behaviors. Target behaviors included talking, noise, and disturbing others. Both experimental conditions increased the occurrence of appropriate classroom behaviors, but no differences were observed between the two token conditions. (DB)

WPA, 1973



# POSITIVE REINFORCEMENT AND RESPONSE COST PROCEDURES IN A TOKEN REINFORCEMENT PROGRAM IN A SPECIAL EDUCATION CLASS[1]

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In the last decade there has been much interest in the development of techniques derived from behavioral principles for use in the classroom to improve academic performance and social behavior (e.g., Hall, Lund, and Jackson, 1968; Lindsley, 1964; and Skinner, 1968). Token reinforcement programs in particular have received considerable attention (cf. Kazdin and Bootzin, 1972; and O'Leary and Drabman, 1971) because of their apparent effectiveness in improving the academic and social skills of students who do not seem to respond to ordinary classroom reinforcers such as grades and teacher approval.

While the efficacy of token reinforcement programs of one variant or another in modifying maladaptive classroom behavior of diverse subject populations and ages has been demonstrated quite adequately, fewer studies have systematically compared the effects of differing token economy schemes with the same subjects. Some investigators (Phillips, Phillips, Fixsen, and Wolf, 1971) have suggested that an important dimension requiring clarification in the arrangement of token economies involves the relationship between the tokens and behavior. Token programs may be entirely "positive" with tokens awarded for appropriate behavior and no penalty for undesirable responses. On the other hand, the economy may involve only "negative" contingencies, where the individual starts with a fixed number of tokens and then systematically loses them for inappropriate responses. Or the

token program may be "mixed" with opportunities both to earn tokens for appropriate behaviors and to lose them for the corresponding negatively sanctioned responses.

Behavior modifiers employing token programs in classroom settings traditionally have emphasized the "positive" model. Occasionally time-out procedures (e.g., the child is removed from the room and therefore the opportunity to earn tokens for a short time) are cited as additional control measures (e.g., Birnbrauer, Wolf, Kidder, and Tague, 1965), but quite often there has been a reluctance to use a token loss contingency (Ayllon and Azrin, 1968; Vernon, 1972). This reluctance is due no doubt to the observation that the use of traditional types of punishment (e.g., the presentation of aversive stimuli such as physical punishment, shock, and unpleasant auditory feedback) seems to condition fear-arousing responses and avoidance of the punishing agent and situation as well as the suppression of the negatively sanctioned behavior (Azrin and Holz, 1966.) Moreover, while punishment establishes a link between the punished response and aversive consequences in the environment, it gives no cue to the appropriate response.

In contrast to the presentation of aversive stimuli, the withdrawal of positive reinforcement as a result of negatively sanctioned behavior seems to suppress those responses without the attendant emotional responses. Laboratory studies, for example, have shown that response cost contingencies where tokens exchangeable for money are removed for disapproved behavior suppress that behavior (Weiner, 1962), and similar suppressive results have been reported in token programs in applied settings (Phillips, 1968). Furthermore, Bandura (1969) has suggested that the use of withdrawal of positive reinforcers for undesired behavior adjunctive to positive reinforcement for appropriate behavior (the "mixed"

model) may be superior to simply ignoring the negatively sanctioned behavior (the "positive" model), if the inappropriate response is being maintained by rewards dispensed by someone other than the change agent. In the mixed model, for example, the personal penalty of losing tokens and, therefore, some kind of material reward or privilege would be pitted against the reinforcing effects of peer approval. Despite these speculations regarding the relative advantages and disadvantages of each arrangement, only two studies appear to have compared directly a system of positive reinforcement only with one involving positive reinforcement and response costs within the same group of subjects, and the results were opposing with respect to the differential effects of reward versus cost procedures and concomitant side effects. But more central to our present concern, neither of these studies was conducted in a classroom setting nor with retarded individuals.[3]

Boren and Colman (1970) observed a deterioration in appropriate social behavior when a mixed contingency system was substituted for a positive system in a psychiatric ward for delinquent service men. In an effort to increase attendance at the unit meetings, a contingency was imposed calling for a fine to be levied for nonattendance in addition to positive reinforcement in the form of tokens for attendance. The imposition of the fine resulted in increased disruption on the ward, and only when the fine was rescinded was order restored.

In contrast to Boren and Colman's (1970) results, Phillips, et al. (1971) found that the mixed model was the most efficient and the positive model the least efficient in modifying some aspects of predelinquent adolescents' interest in current events (operationally defined as watching a television evening news program each night). The data indicated that only one condition, the response cost plus positive arrangement, resulted in all the subjects watching the newscast

each evening. Furthermore, the negative contingency condition was less efficient than the mixed but more effective than any of the several variants of positive only contingencies.

Phillips, et al. (1971) speculated that while a positive contingency arrangement may be more effective in increasing appropriate behaviors that have an initially low baseline rate, and a negative contingency most efficient in eliminating inappropriate behaviors with a high baseline rate, a mixed arrangement may be most effective in maintaining behavior at a certain desired level. Because the control of disruptive behavior in the classroom seems to be precisely a problem of maintaining appropriate behavior at a high level rather than shaping new responses (most individuals would seem to have "study" behaviors present in their repertoire even though emitted perhaps only sporadically), systematic investigation of positive reinforcement plus response cost procedures compared to positive reinforcement alone in a classroom setting seems indicated.

Moreover, while behavior modifiers have deemphasized the notion of diagnostic classification, a mixed contingency token system might be especially effective with retarded subjects. Vernon (1972) suggested that the use of a token economy can create sensitivity to the existence of behavior-reinforcement contingencies. He noted that the average adult and most children are aware of approval or disapproval for their actions and adjust their behavior accordingly. Mentally retarded individuals, on the other hand, often do not seem to use the cues which society offers as guides for their behavior (Leland and Smith, 1965). Theoretically then, a mixed contingency token arrangement with its salient cues for inappropriate responses as well as for socially sanctioned ones should be well suited for dealing with mentally retarded children in classroom settings. At the same time these children would seem to be especially apt candidates for this sort

of token system because they are caught in the middle of the current disillusionment with traditional special education programs, and indeed, the very criteria for such placement.

Placement in self-contained classes has been the usual educational arrangement for mildly retarded children and adolescents. However, the early enthusiasm about the potential of special education classes for improving the academic achievement of EMR children has not been supported very well by subsequent experimental verification of the efficacy of such programs (Guskin and Spicker, 1968; Kirk, 1964; and Quay, 1963). Furthermore, the common notion that social and personal adjestment of retarded children is often better in special classes than in regular classes has little empirical support (Gardenr, 1966). There is in fact increasing concern that special class placement and its attendant stigma may have a devastating effect on the retarded individual in terms of its impact on his self-esteem and his teacher's expectations regarding his abilities (Jones, 1972).

These concerns and others have prompted educators to examine the apparent processes whereby individuals are placed in special classrooms (e.g., Mercer, 1971), and some have noted that the presence of behavior problems, in addition to mental retardation, may well be the crucial factor in teachers and administrators' decisions to refer students for special class placement. Mercer (1971) has reported that there are a number of mildly retarded individuals (as determined by psychometric tests) who have failed to come to the attention of school officials and yet remain quite comfortably in regular classes, apparently because they do not present behavior problems and thus maintain low visibility. Moreover, EMR students ultimately targeted for special programs exhibit more behavior problems than their retarded peers who remain in regular classes (Kirk, 1964). These observations, taken together, suggest that visibility in terms of social behavior is certainly related to placement in special classes.

Ironically, it is precisely such disruptive behaviors which have been especially amenable to modification by the use of a token reinforcement program. However, while token reinforcement programs have been shown to be effecrive in reducing baseline levels of maladaptive classroom behavior of both normal and retarded children, researchers have not made a precise delineation of which token procedures might be most effective in modifying classroom social behavior of retardates, nor have they demonstrated whether such programs can improve and maintain social behavior among EMR students in a special classroom at a level comparable to their normal peers in regular classes. Such comparisons would seem to be both warranted and perhaps even crucial, if token reinforcement systems are to play a significant remedial role in mildly retarded students' regaining, and retaining, access to regular classes.

Thus, the present study was designed as an attempt to examine the relative effectiveness of two major token contingency arrangements--positive reinforcement and positive reinforcement with response costs--in modifying the disruptive social behavior of mildly retarded adolescents in a junior high classroom. Additionally, its purpose was to assess the relative effectiveness of both of these token schemes in building up and maintaining a level of appropriate social behavior comparable to that which could be expected from students in a "normal" classroom in the same school.

## METHOD

### Subjects

Twelve members of a special education class in a junior high school, four girls and eight boys, served as subjects. Half were selected from a group which their teacher designated as the most disruptive and/or having the poorest study habits in the class; and half were randomly selected, all with the additional

requirement of better than average attendance records. The teacher was not informed of which students were included in the sample. Subjects ranged in age from 12 years, 6 months, to 16 years; and all had been in a class for educable mentally retarded students for at least five years.

A wide range of maladaptive behaviors was described by the subjects' present teacher and their cumulative folders. Four of the male subjects had frequently been sent to the office for open defiance of their teachers and fighting with other students and had been suspended as a consequence. The other students were not cited for similar instances of aggressive behavior, but nevertheless emitted responses which annoyed both the teacher and the rest of the class. They were variously described as "anxious", "immature", and "disorganized", as well as having "short attention spans" 'irrelevant" speech.

Eight students, four girls and four boys, were similarly selected from a so-called "normal" English class in the same school to serve as a comparison group. Half of these adolescents were described as often disruptive and failing for the term, while half were randomly selected.

Setting

The token reinforcement program was developed in a special education class of 18 students in a junior high school in Southern California during the second semester of the academic year. The class met for the first four periods of a six-period day. Although the token program was in effect for all four periods, observations were made only during the second and third hours which involved reading and math lessons respectively. At the beginning of each class period, a general assignment was given to the entire class with each student then expected to work independently at his own rate. The materials were presented in a traditional, non-programmed format; the teacher gave help as needed in class, collected the

materials at the end of the periods, and then corrected the work for return the following day. The teacher, Ms. A., had a teaching credential in special education and two years of teaching experience.

The comparison "normal" class was randomly selected from several that the principal had suggested as representative of the school. This ninth-grade English class was run similarly to the EMR class in that there was little formal instruction to the group as a whole. The course used a programmed text, and the students were expected to work independently, seeking help when they needed it. The single class rule that students not disturb others who were working was generally enforced by verbal reprimands.

Observation technique

Observations of the EMR subjects were made two periods a day, five days a week throughout the study. Each class period was divided into six equal time segments of eight minutes. During each segment the occurrence of specific disruptive or appropriate behaviors described below was scored for one subject on a ten-second interval time-sampling basis. Each minute was divided into six ten-second intervals, and the observer noted the occurrence of appropriate or inappropriate responses during that interval. The order in which the subjects were observed varied randomly within and over periods.

The normal subjects were similarly observed, i.e., on a ten-second interval time-sampling basis, during the third period when their class regularly met for three weeks during the last month of school.

The first experimenter served as one observer five days a week throughout the study. A senior in psychology at a nearby college who was paid for her help served as the second observer three days a week. Prior to the Baseline period the observers spent a week in the classroom to accustom themselves to the observa-

tion technique and the students to their presence. During the first week of the study, reliability checks were made by concurrent observation of the same subjects over both periods; thereafter, reliability checks were made for one period only each day with the order randomly varied.

Behavior definitions

The classes of behavior selected for observation were adapted from O'Leary and Becker (1967) who categorized behavior occurring with some frequency in the repertoires of problem children. Six categories of inappropriate behaviors were defined as follows:

Out of seat: The student breaks all contact with his seat without permission.

Talking: The student makes a verbal statement without permission, either speaking out in class without raising his hand or talking to his neighbors, if the vocalization is audible to the observer.

Noise: The student makes some type of operant sound other than a verbalization which is audible to the observer, sych as tapping pencils, beating on the desk top, stomping feet.

Disturbing others: The student touches another student or an article that the other student is holding or has on his desk. Also included is gesturing or posturing in the direction of another student in an attempt to get his attention.

Orienting response: The student orients his eyes and head in the direction of the window or open door (excluding a brief glance, as at a noise.)

Time off task: The student is engaged in some task other than the assigned one. Examples are staring into space for longer than thirty seconds, failing to follow instructions within one minute after they are given, doing math homework during reading class, or cleaning out one's desk without permission.

Appropriate behavior was defined as on-task responses, i.e., answering question of the teacher, raising one's hand and waiting for the teacher to respond, writing answers to or reading material which was assigned. Appropriate behavior had to occur for the full ten-second interval to be scored as such.

The observers recorded each category of behavior which occurred during the interval regardless of how many other categories had already been noted for that interval; Out of Seat, Talking, Noise, Disturbing others and Orienting were compatible with each other. No class of behavior was scored more than once during an interval, since it was found that Talking and Noise were not easily quantified as frequencies.

Experimental conditions

The five phases of the study in EMR class were as follows: Token$+_{-1}$ condition, Withdrawal of the token program, Token+ condition, and Token$+_{-2}$. In the comparison normal class, Baseline data only were gathered.

Baseline. During this phase the Ss were observed under normal classroom conditions for 13 days over a three-week period, with the teacher instructed to conduct class as usual. During the last week of the Baseline period in the special education class, the first experimenter met several times with the teacher to discuss behavioral principles and to outline how the token reinforcement program could be most conveniently implemented in her classroom.

Token$+_{-1}$ condition. At the onset of the positive reinforcement-response cost contingency token condition, the teacher explained that the class format was to be modified, loosely following a script prepared by the experimenter as follows:

> "Each period you will be able to earn points depending on how well you follow the class and school rules, and then you can exchange these points for certain things every few days.

> Here's how the program will work. You each will have a card with your name on it. At the end of each period I will stamp it with the number of points you've earned that hour. You can earn points according to how well you follow these class rules.

A sheet with each of the rules and the points possible was given to each student. (See Table 1 for an example.) After explaining the rules for which points could be earned, the teacher than continued:

> This means that if you follow all the rules, you will earn 10 points. Since there are four periods a day, you can receive up to 40 points every day.
>
> But you can also lose points if you fail to follow the rules. You can lose points for these things. (See Table 1 for example.)
>
> Let me show you how this could work. If, for example, you were talking to your neighbor, but you followed all the other rules, you would receive 8 points for staying in your seat, raising your hand before talking, leaving other people alone, and good hall behavior. However, since you talked to your neighbor during that class period, I would have to remove 2 of those points that you had earned, so that you would receive only 6 points for that period.

The teacher further explained that she would keep a record of each student's behavior and that the points would be awarded just before the bell rang to end each period.

The teacher was instructed to use liberal praise for appropriate behavior during the day. For the first week of the token program each was given a quiet warning when he misbehaved. Following a second offense during the same period, the teacher went to his desk and quietly told him that he would lose points, but the actual removal did not take place until the end of the period. At that time the teacher was instructed to compliment the students on the points that they had earned and to explain briefly why they lost points, if any. When a student lost points, the teacher was to cross out previously earned points with a red pen rather than simply subtract the points lost from the total earned for that period.

The points were exchangeable for materials which the teacher could order through the school store--composition books, colored pencils and chalk, water colors, bookmarkers, piggy banks and beads--as well as edibles. About once a week a new backup reinforcer was introduced; other items were decks of cards, rock and sport magazines, and certificates for special lunches which the students cooked and ate themselves in their kitchen, as well as access to free time and games.

During the initial four days, the students were eligible for the reinforcers at the end of fourth period each day. Thereafter, points were exchanged for backup reinforcers twice a week. For this condition there were 17 observations over a four-week period.

Withdrawal condition. For this phase of the study, the students were told that the school system was running low on funds, and the token system would have to end since there was no more money for prizes. The teacher emphasized that she was pleased with how well the class had been working in the last few weeks and that she expected them to continue to do as well. The students were allowed to spend their remaining points, and then the cards and prize tables were removed from the room. This phase lasted for one week during which there were observations on five days.

Token+ condition. For the positive reinforcement token arrangement condition of the study, the students were informed that some money had finally been found and that the token program could be started again, but that the rules would be slightly changed. There would no longer be any fines; in fact, a student who earned all ten points for the period would receive a bonus of 5 points so that he could earn 15 in all, or a possible 60 for the day. Because the classwork had slumped during the Withdrawal phase, the class rules were changed somewhat so

that points could be earned for the behavior shown in Table 2.

The teacher was again instructed to praise the students for improvement and to attend to appropriate behavior during class. Points were exchanged for backup reinforcers once a week, and the prices were adjusted upward slightly so that more points were necessary to obtain a reward. Observations were made on twelve days over a four-week period.

Token$_{-2}^{+}$ condition. During the final phase of the study the positive reinforcement and response cost contingencies were reinstated to note whether the effect for this condition was reliable and whether differences between the two token conditions might be due to differences in the number of points possible, since the Ss expressed a preference for the condition in which they could earn more points although the buying value was virtually the same in both.

The students were told that again penalties would be levied for failing to follow the rules. The procedure was the same as the Token$_{-1}^{+}$ condition except that there were 15 points possible for each period and a fine of 5 points was given for inappropriate responses. Five observations were made over a two-week period.

## RESULTS

### Reliability

The reliability of the observations was checked by calsulating the inter-observer agreement on simultaneous but independent observation records. The two records were compared interval by interval, and an agreement was scored if the same behavior category, or categories was recorded in the same interval by each observer. Reliabilities were calculated by dividing the number of intervals in which there was agreement by the total number of agreements plus disagreements.

Inter-observer agreement in the special education class ranged from 67 to 100 percent during the Baseline period with a mean of 94 percent. During the token

reinforcement program, agreement ranged from 81 to 100 percent with a mean of 94. In the normal class one reliability check was made with agreement ranging from 78 to 97 percent for each child and a mean of 89 percent.

Classroom Behavior of EMR Students with Token Reinforcement

The dependent measure reported was the percentage of intervals in which a particular category of behavior was observed. Percentages, rather than frequencies, of intervals were reported since the length of the observation period for each child varied with the length of the period and the number of children present that day. The data are presented for Period 2 (data for Period 3 were omitted since the results were highly similar to Period 2).

The occurrence of Appropriate behavior among the EMR subjects as a group is shown in Figure 1. During the Baseline period the students behaved appropriately an average of 75.4 percent of the time; on only one of the observation days did Appropriate behavior for the group rise above 90 percent. During the Token$\pm_1$ conditionthe mean on-task behavior increased to 92.3 percent, an increment of 16.9 over the Baseline mean; an average of 90 percent per day or better was observed on 14 of the 17 days of this condition. For the two days on which there was a substitute teacher and the token program was not in effect, Appropriate behavior dropped to 48 and 43 percent. Withdrawal of the token program caused only a 4.3 percent drop to an average of 88.0 percent on-task behavior. Somewhat surprising perhaps, there were no differences between the token systems themselves (Token$\pm_1$ =92.3; Token+ $\bar{X}$=94.8; and Token$\pm_2$ $\bar{X}$=89.8).

Individual graphs of the percentage of Appropriate behavior per observation period for the 12 Ss drawn from the special class are shown in Figures 2-7; these data are a composite of the behaviors observed in Periods 2 and 3 since each S was randomly observed in one of the two classes each day and responses were similar in both. Subjects 5, 13, 14, and 15 were selected from the group designated as most disruptive.

The data for nine of the twelve Ss closely approximated the results from the group means discussed earlier; the token system increased the occurrence of Appropriate behavior with no difference between the two conditions. Three students in the sample--Ss 5, 14, and 15--did not appear as responsive to the token reinforcement program; their on-task behavior fell below 90 percent at least twice as often as the other students' behavior. Subjects 5 and 15 sat next to each other and often collaborated on their work. At the teacher's insistence, S 15 was removed from the token program after Day 44, following a series of incidents culminating in his feigning illness to leave school one day. Subject 14, unlike the rest of the class, was given individual assignments since his achievement level lagged several years behind. Consequently, he was required to wait for long periods of time as the teacher instructed the other students; these periods without a work assignment may have accounted for the greater variability in his Appropriate behavior.

Changes in individual categories of inappropriate behavior for the special class are shown in Table 3. Talking, as well as Time off Task behavior, each initially occurring 9.5 percent of the time, accounted for much of the maladaptive classroom behavior observed during the Baseline period. These responses were reduced during the Token$\pm_1$ condition to averages of 3.3 and 1.5 percent respectively. Slight decreases were also observed for Out of Seat, Orienting, and Noise responses with the token economy. As the previous data showed, however, there was no reliable diffence between the Token + and the Token$\pm$ conditions. Also, it is quite apparent that Talking responses were most affected by the removal of the program.

In summary, in the special education class and for eight of the twelve Ss observed, the introduction of the token reinforcement program increased the occur-

rence of appropriate classroom behavior over the averages observed during the Baseline and Withdrawal periods. No differences, however, were observed as a function of the two Token conditions.

Comparison of Adaptive Behavior Levels in Normal and EMR Classrooms

Figure 8 shows the mean occurrence of Appropriate behavior for the EMR class during the first eight days of the Baseline condition and for the group of students in the normal class during a similar "baseline" period. There was some overlap between on-task behavior in the special class and that in the normal class, but interestingly enough, the mean for the special class was higher ($\bar{X}$=72.1 vs. $\bar{X}$= 60.4 for the normals.)

An examination of the daily behavior of individuals in the normal class showed that one of the Ss, chosen from the group that the teacher had named as the most disruptive, failed to exhibit any appropriate behavior on any of the days on which he was observed. He either roamed about the room talking to other students or slept at his desk. When his data are eliminated, the means more accurately reflect the behavior of the other students in the normal sample (see Figure 9 for the adjusted curve in comparison with the EMR class). With this adjustment the normal and the EMR students exhibited more similar levels of Appropriate behavior ($\bar{X}$=68.1 percent for normals vs. $\bar{X}$=72.1 percent for the EMRs).

As shown in Table 4, Time off Task and Talking were the most frequently occurring inappropriate behaviors in both the EMR and normal classrooms. However, the means of each response were higher for the normals. Time off Task behavior occurred an average of 18.9 percent of the time in the regular class, whereas EMR students exhibited non-task behavior in 12.2 percent of the intervals during the Baseline period. Normal students were observed to talk without permission in 16.9 percent of the intervals; in the special class the students spent 9.7 percent

of the observed time talking. Comparisons of the other inappropriate behavior measures yielded only small differences (see Table 4).

The addition of the token reinforcement program to the special education classes brought the mean percentage of Appropriate behavior well above that observed in the normal classroom. Figure 10 shows the average percent of intervals in which Appropriate behavior occurred in the EMR class during the Token_ condition plotted against the average observed in the normal class during the "Baseline." On-task behavior in the EMR class ($\bar{X}$=94.8) was much more frequent than in the regular class for either all eight Ss in the normal sample ($\bar{X}$=60.4 percent) or for the adjusted group ($\bar{X}$=68.1 percent). It is also interesting to note that the EMR students whose behavior was least affected by the token program still displayed a greater percentage of task-relevant responses than did the most disruptive student in the normal class.

To summarize then, it appears that a token reinforcement program in a special education class in this particular junior high increased the adaptive behavior of the EMR students in terms of appropriate classroom behavior, as compared to their baseline behavior. But more interestingly, this increase in the percentage of appropriate behavior came on top of an already higher level of on-task behavior in the EMR class than that occurring in the normal class during the baseline periods.

## DISCUSSION

It is apparent that the implementation of a token reinforcement program in a special education classroom is effective in raising and maintaining very high levels of appropriate social behaivor among EMR students--even when their initial base rates of appropriate behavior are quite high--in this particular school setting. However, manipulation of the token-behavior arrangement in terms of

imposing positive reinforcement plus response cost or positive reinforcement only has little differential effect on the frequency of occurrence of adequate adaptive behavior in the classroom.

At least a couple of factors may have accounted for this non-differential effect of the procedures. First, it may have been that the aversive consequences, i.e., withdrawal of tokens, did not occur at the most effective time in the behavior sequence. Laboratory studies would suggest that response inhibition is greatest when the punishing stimulus occurs immediately after the negatively sanctioned behavior. In the present study, this was not the case in most instances. During the first weeks the teacher gave a warning and then a quiet announcement that the individual breaking the rules would lose points. The actual removal, however, occurred at the end of class, which in some cases was as much as forty minutes after the negatively sanctioned behavior occurred. A more immediate consequence, such as points being removed from the offender's card on the spot or the delivery of tickets of some sort payable at the end of the classhour might have been more effective in reducing an undesirable response. In the class under investigation, there was a great deal of sniggering and interruption in on-task behavior when a student received a reprimand. Because of this observation and reports from other studies that obvious reprimands can actually increase disruptive behavior (e.g., Thomas, et al., 1968), an immediate, highly visible means of token removal was not used.

The second and perhaps more important reason for no apparent differences between the two token conditions was that there may well have been a ceiling effect on the occurrence of the desired behaviors. In conversations with the teacher prior to actual observation, she reported frequent and serious disruptive acts on the part of several pupils. Direct observations, however, failed to confirm these

reports. Even before token conditions were imposed, the students in the special class exhibited higher frequencies of appropriate behavior than has been reported for normal classes in this same school and those reported by other investigators who have developed classroom token programs. In fact, the Baseline means in the EMR class in this study corresponds to averages obtained during token conditions in a number of other studies (e.g., Broden, et al., 1970; O'Leary, et al., 1969). Therefore, this restricted range could have contributed to the lack of differentiation in the assessed effectiveness of the two token systems.

Perhaps the most significant finding in the present investigation is that the comparison appropriate behavior in normal and special education classes in a school system in California has revealed that even prior to the implementation of the token program, EMR students exhibited a higher level of acceptable behavior than their normal counterparts. And it is worth re-emphasizing that after the introduction of the token systems, appropriate behavior for the majority of the EMR students increased and remained at exceedingly high levels for the duration of the study.

Even if it were to be granted that these classes of EMRs and normals and their teachers might be atypical, the fact remains that most of the students in these EMR classes did not show maladaptive responses vis a vis O'Leary and Becker's (1967) classification of classroom behavior problems. These inappropriate behaviors (e.g., the inability to work independently or aggressive acts toward peers or the teacher) quite closely parallel current notions of impaired adaptive behavior. Adaptive behavior has been defined as the degree to which the individual successfully copes with his environment in terms of his ability to function independently and to meet culturally imposed standards of personal and social behavior (Heber, 1961; Leland, Shellhaas, Nihira, and Foster, 1967).

If one is to adhere to the American Association on Mental Deficiency's criteria for mental retardation ("subaverage general intellectual functioning which originates during the developmental period and is associated with impairment of adaptive behavior" (Heber, 1961, p.3) ), as indeed recent California statutes have emphasized, then it would not seem appropriate for the EMR students to have been labeled mentally retarded.

Unfortunately, at this point in their academic careers in public school, it would appear impossible to ascertain whether these so-called EMR children actually exhibited maladaptive social behaviors which led to their being assigned the label or whether they were, in fact, separated solely on the basis of their intelligence test scores (rather than a documented combination of both criteria) very early-on. As is self-evident, by the time they have reached junior high school, and given the time wasted and the curriculum restrictions endured in special classes, reassignment to regular classes has become virtually impossible--regardless of the effectiveness and efficiency of token reinforcement procedures in shaping up their socially adaptive classroom behaviors.

However, on the optimistic side, if the kinds of procedures which have been effected in the present study with junior high school aged students can be shown to lead to high levels of appropriate social behaviors, it would seem reasonable to suggest that these same kinds of procedures might be much more effective and probably more easily implemented with younger children who might be expected to have less variegated behavioral repertoires--before they too have been victimized by teacher expectancies and similar labeling processes.

Of course, the ultimate test of usefulness of the token economy as a remedial tool in any situation is whether behavior which was shaped using token reinforcement can be maintained when the token support is withdrawn. Unfortunately

in the present study, the semester ended before there was an opportunity to attempt to fade out the program. Presumably, reinforcers occurring naturally in the school environment, such as cooking privileges, access to an art corner, or free time could have been substituted gradually for the material reinforcement. At the same time the periods between opportunities to exchange points for backup reinforcement could have been lengthened along with raising the standards of behavior necessary to earn points. Moreover, withdrawal of the token economy without concomitant decreases in appropriate behavior may be more successful if the students themselves are first given the responsibility of keeping daily behavior records and actually awarding points to themselves. Self-reward is only beginning to be systematically investigated by researchers interested in contingency management (e.g., Kaufman and O'Leary, 1972), and it may prove to be an important aspect of the internalization of behavioral standards.

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TABLE 1

List of Class Rules

Each period you may earn points for following these class rules:

| Points | |
|---|---|
| +2 | Stay in your seat. |
| +2 | Keep quiet during class. No talking or noise. |
| +2 | Raise your hand before speaking. |
| +2 | Leave other people and their things alone. |
| +2 | Be courteous in the halls between classes. |

You lose points for breaking the rules:

| | |
|---|---|
| -2 | Being out of your seat when not allowed. |
| -2 | Talking and noise during class. |
| -2 | Speaking out without raising your hand. |
| -2 | Bothering other people and their things. |
| -2 | Poor hall behavior. |
| -2 | Talking back to the teacher. |

TABLE 2

Revised Class Rules

Each period you may earn points for following these class rules:

| Points | |
|---|---|
| +2 | Stay in your seat. |
| +2 | Keep quiet during class. |
| +2 | Leave other people and their things alone. |
| +2 | Have all your supplies for class. |
| +2 | Work the whole period. |

If you earn all 10 points for the period, vou will receive a bonus of 5 points.

TABLE 3

Average Percentages for Specific Behavior Classes
For Each Experimental Phase in Ms. A's Class

| Behavior Classes | Baseline | Token+$_{-1}$ | Withdrawal | Token+ | Token+$_{-2}$ |
|---|---|---|---|---|---|
| Appropriate | 75.4 | 92.3 | 88.0 | 94.8 | 89.8 |
| Time off Task | 9.5 | 3.3 | 4.0 | 2.3 | 6.4 |
| Out of Seat | 1.9 | 0.5 | 0.4 | 0.3 | 1.1 |
| Orienting | 4.0 | 1.8 | 1.8 | 0.6 | 1.0 |
| Noise | 2.5 | 0.4 | 1.0 | 0.3 | 0.2 |
| Disturbing Others | 0.5 | 0.4 | 1.0 | 0.3 | 0.2 |
| Talking | 9.5 | 1.5 | 6.0 | 1.3 | 1.8 |

TABLE 4

Average Percentages for Specific Behavior Classes
For Normal and EMR classes in the Baseline Condition

| Behavior Class | EMR | Normal |
|---|---|---|
| Appropriate | 72.1 | 60.4 |
| Time Off Task | 12.2 | 18.9 |
| Out of Seat | 1.4 | 5.2 |
| Orienting | 4.2 | 4.9 |
| Noise | 1.8 | 1.0 |
| Disturbing Others | 0.6 | 3.3 |
| Talking | 9.7 | 16.9 |

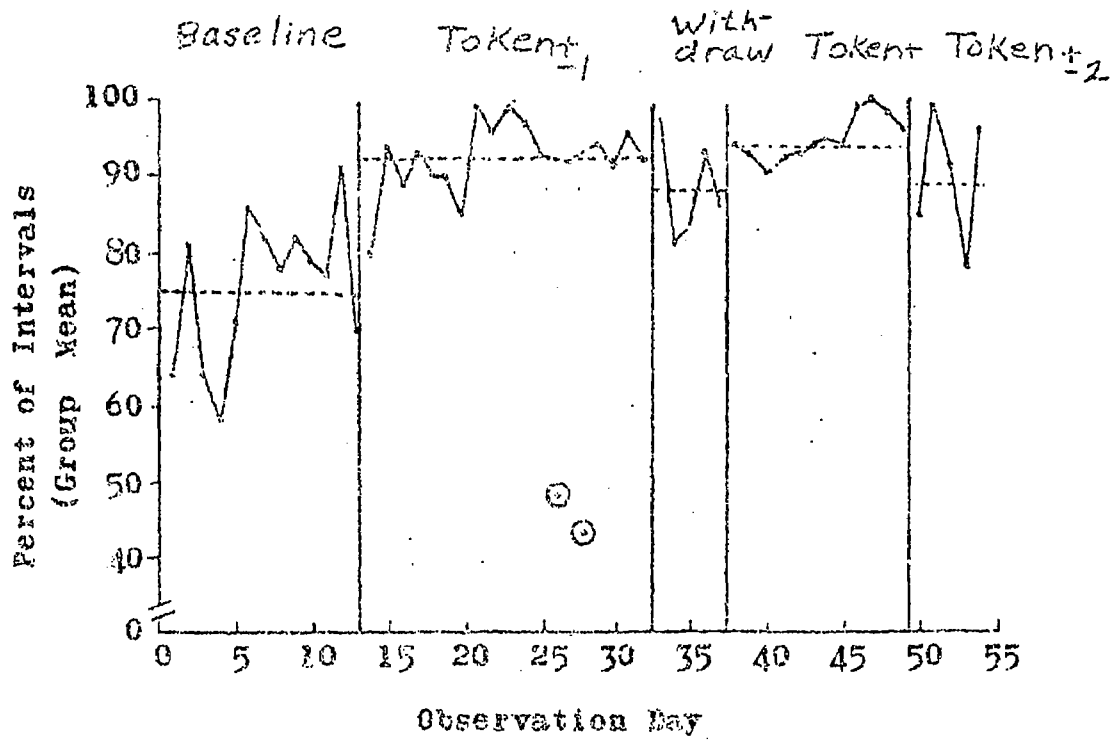


Figure 1. Mean percent of intervals of Appropriate behavior for the subjects in Mr. A's class under each treatment condition.

⊙ Substitute Teacher

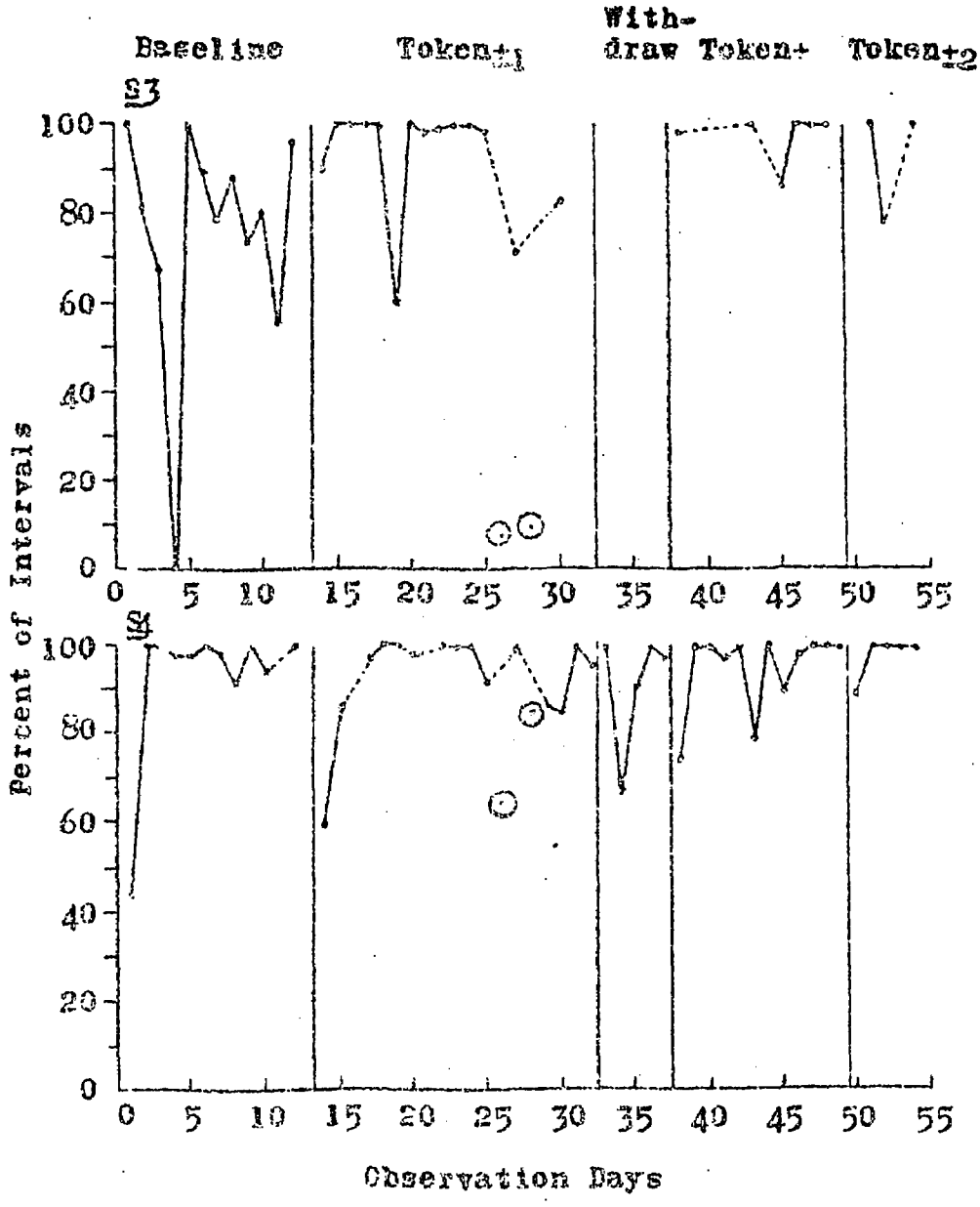


Figure 2. Mean percent of intervals of Appropriate behavior for S3 and S4 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

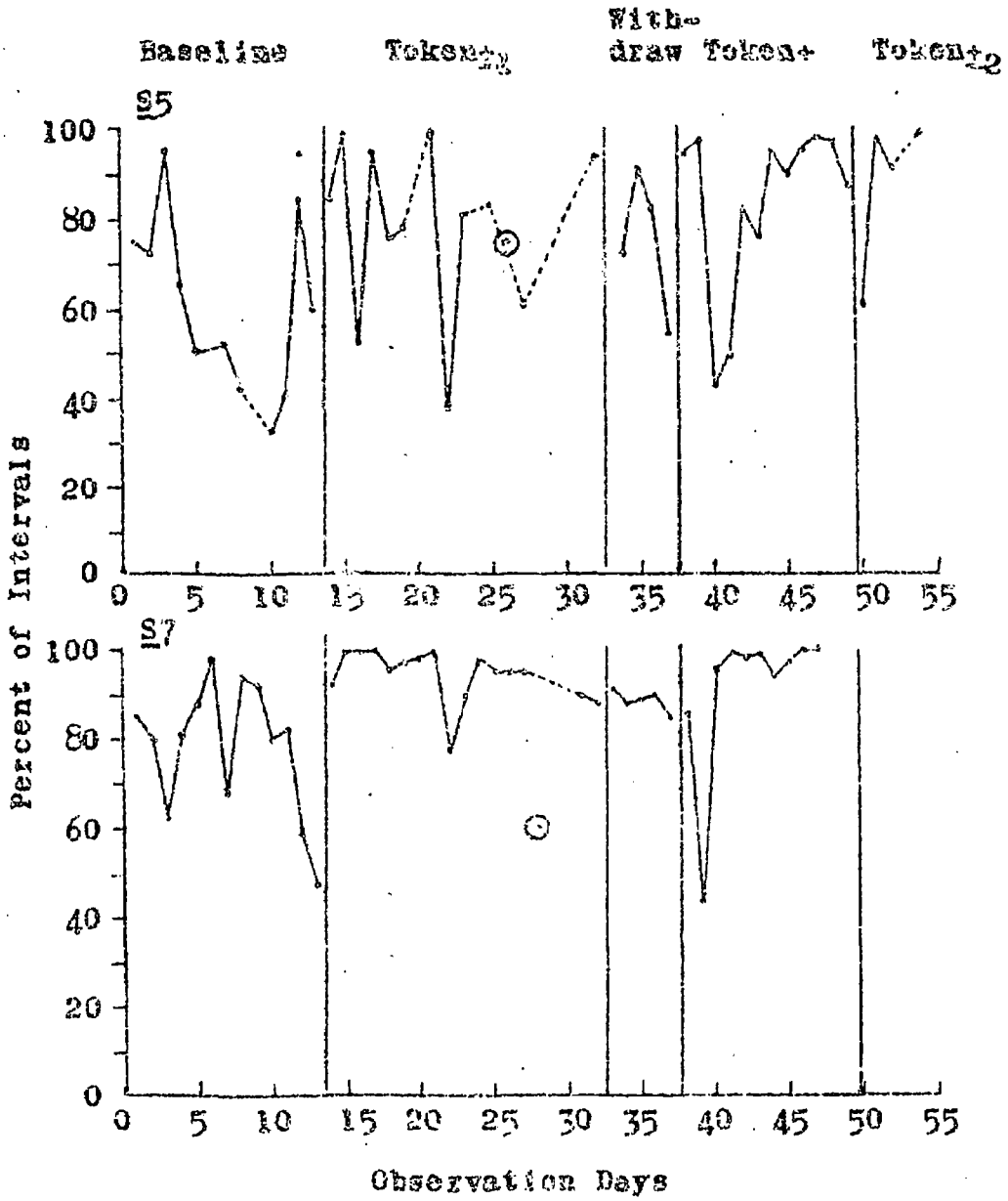


Figure 3. Mean percent of intervals of Appropriate behavior for S5 and S7 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

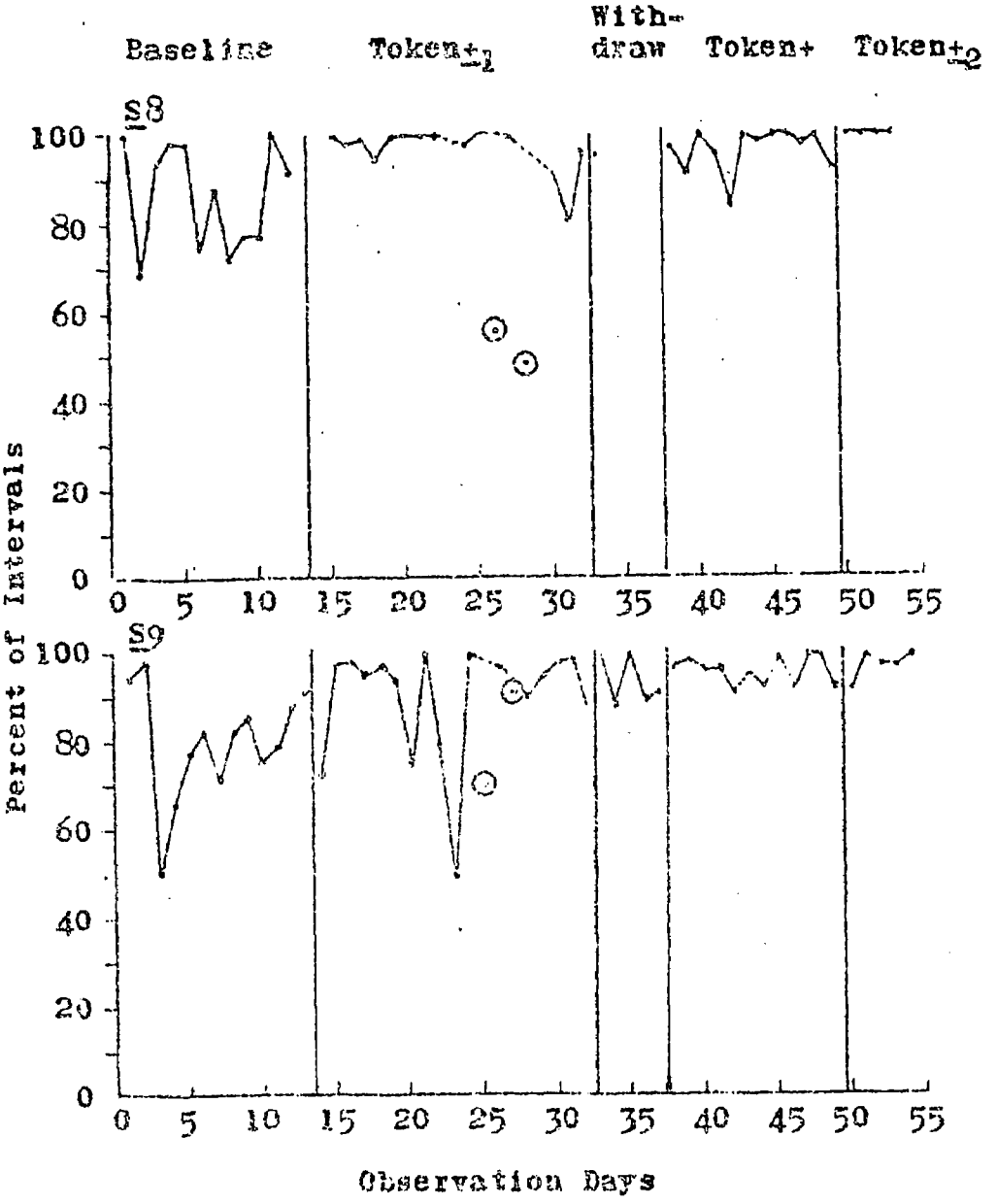


Figure 4. Mean percent of intervals of Appropriate behavior for S8 and S9 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

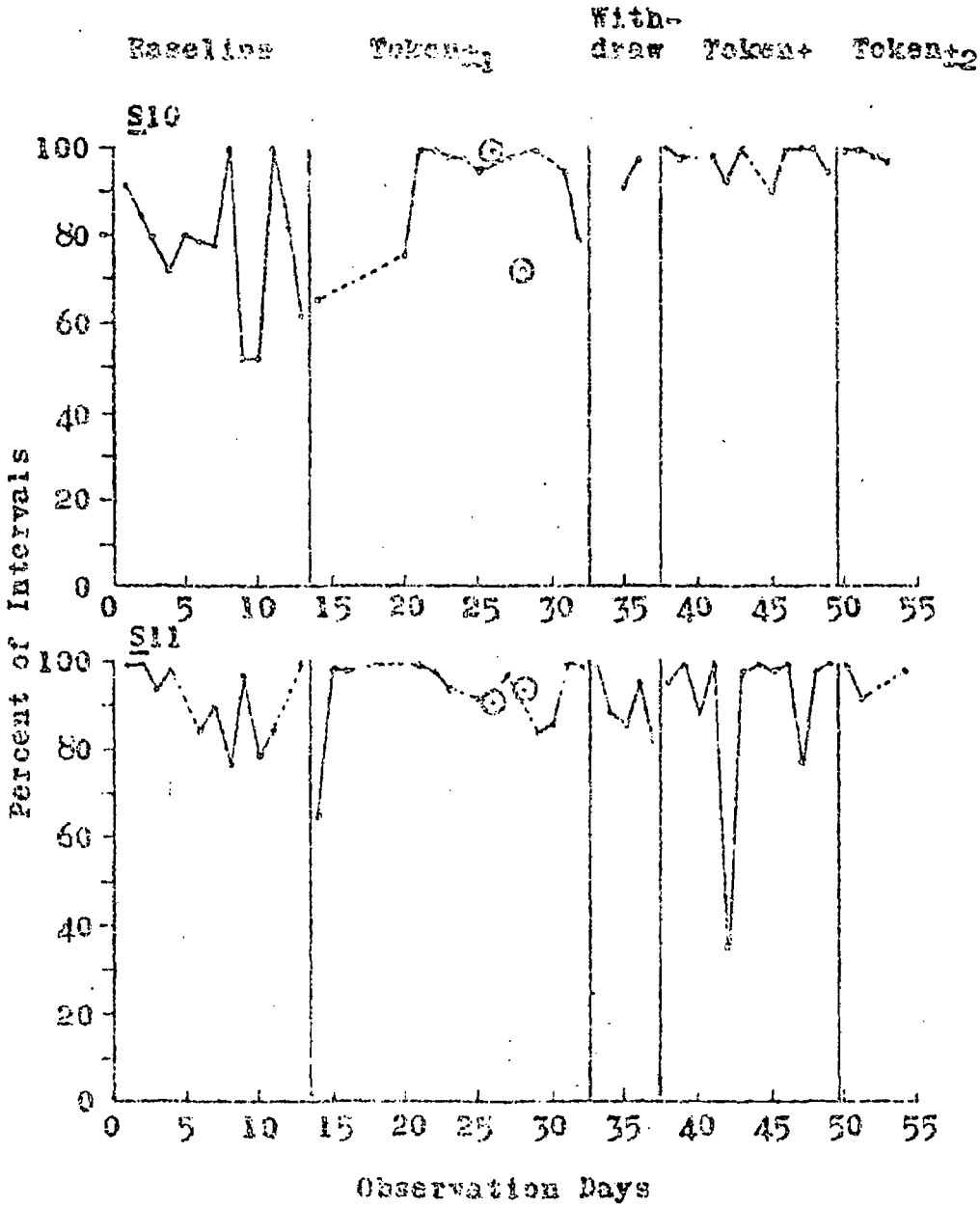


Figure 5. Mean percent of intervals of Appropriate behavior for S10 and S11 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

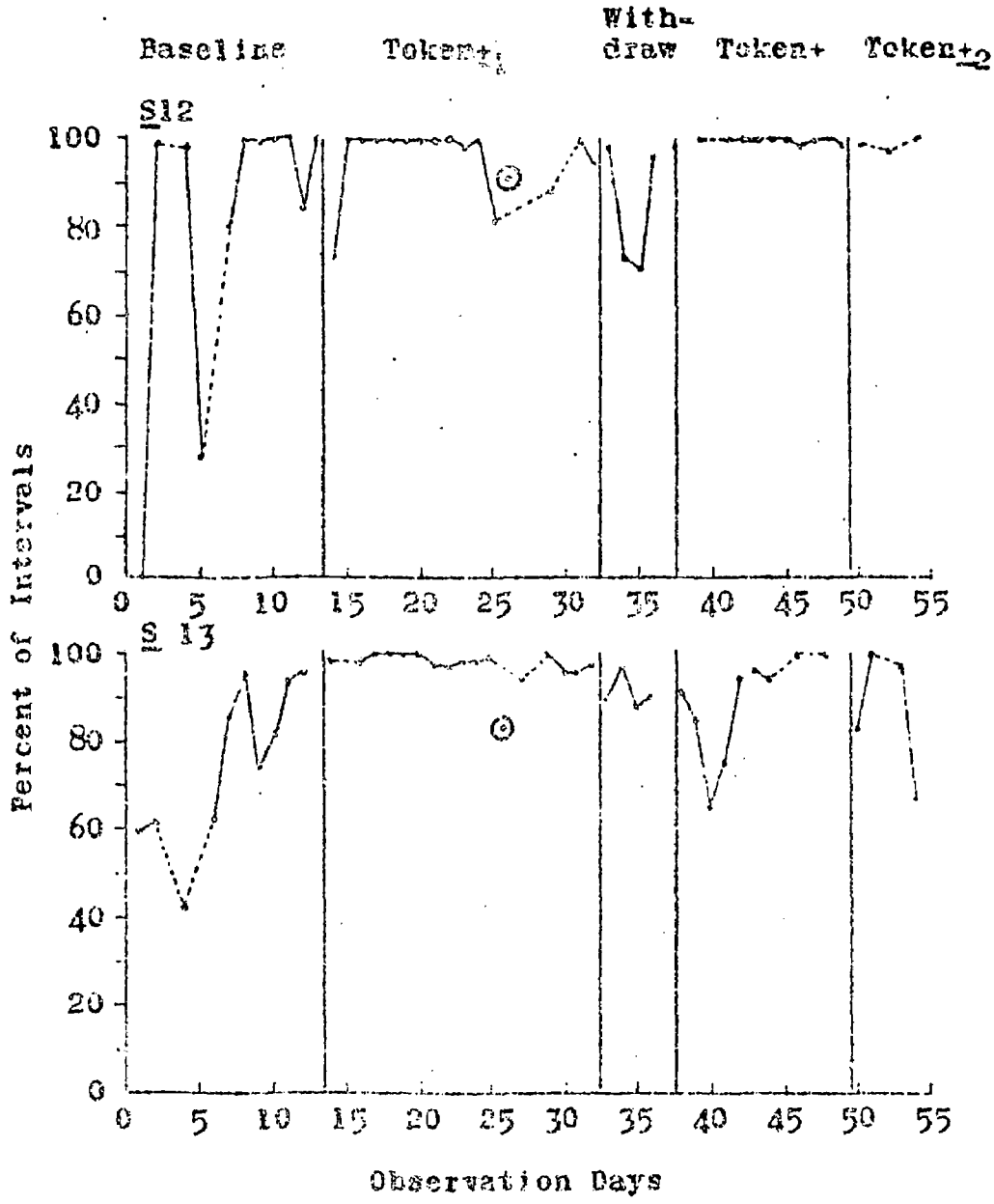


Figure 6. Mean percent of intervals of Appropriate behavior for S12 and S13 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

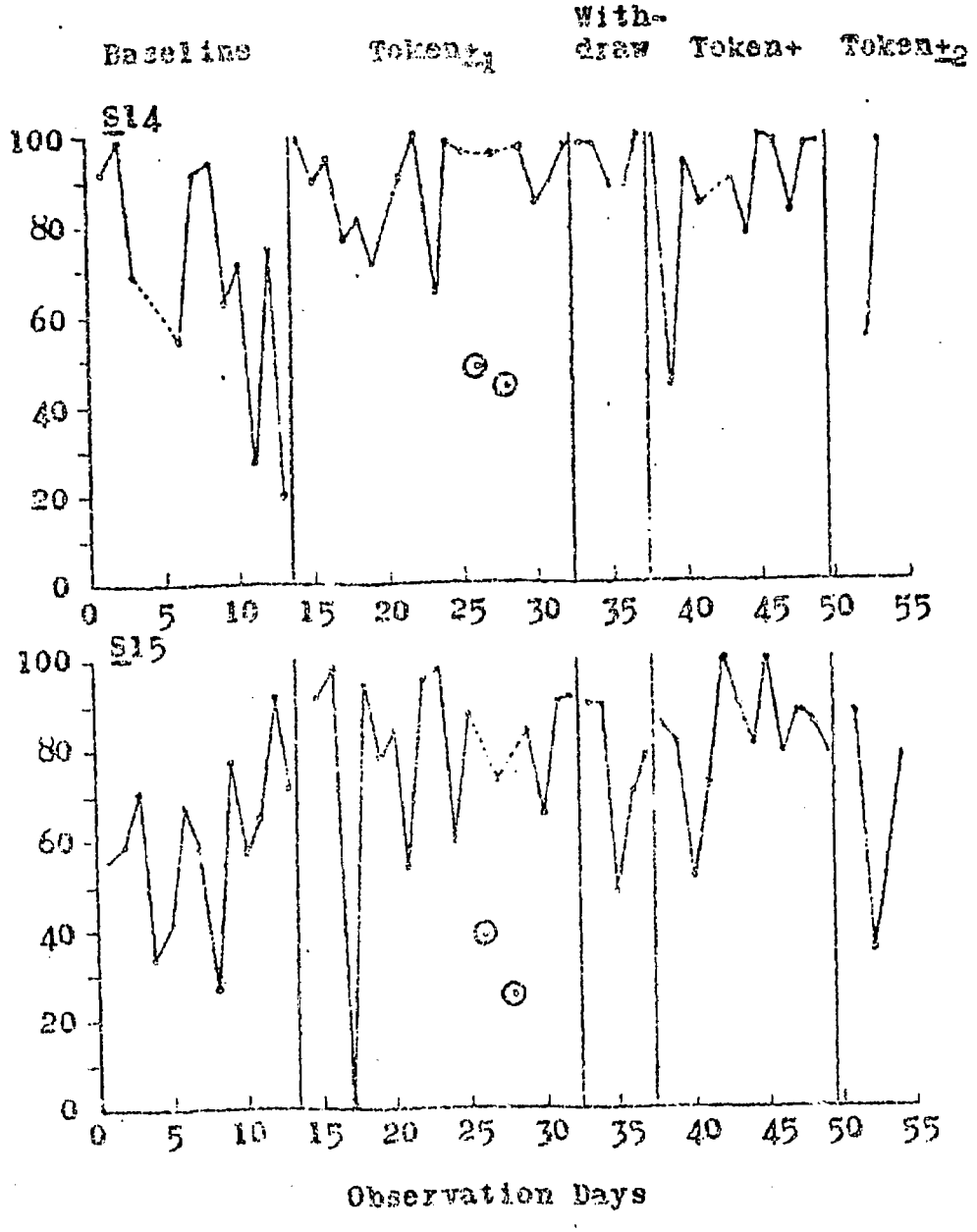


Figure 7. Mean percent of intervals of Appropriate behavior for S14 and S15 in Ms. A's class under each treatment condition.

⊙ Substitute Teacher

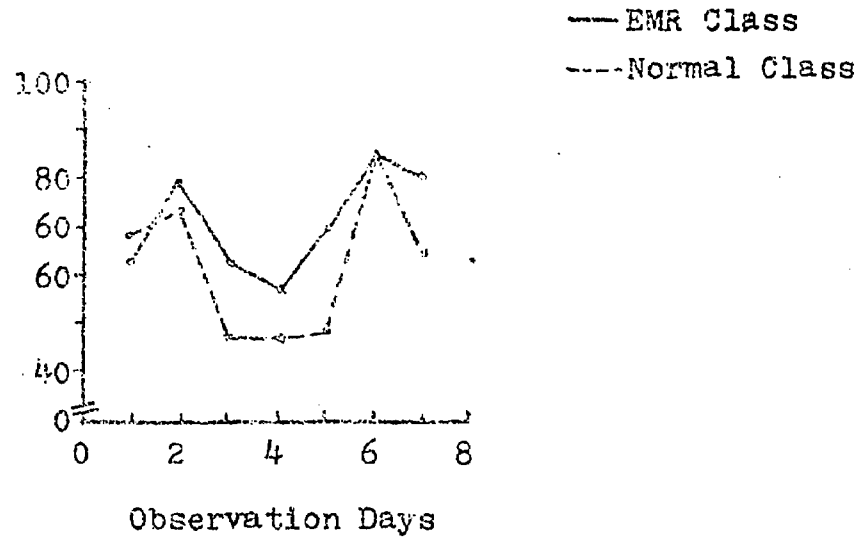


Figure 8. Mean percent of intervals of Appropriate behavior in the EMR and normal classrooms during the Baseline condition.

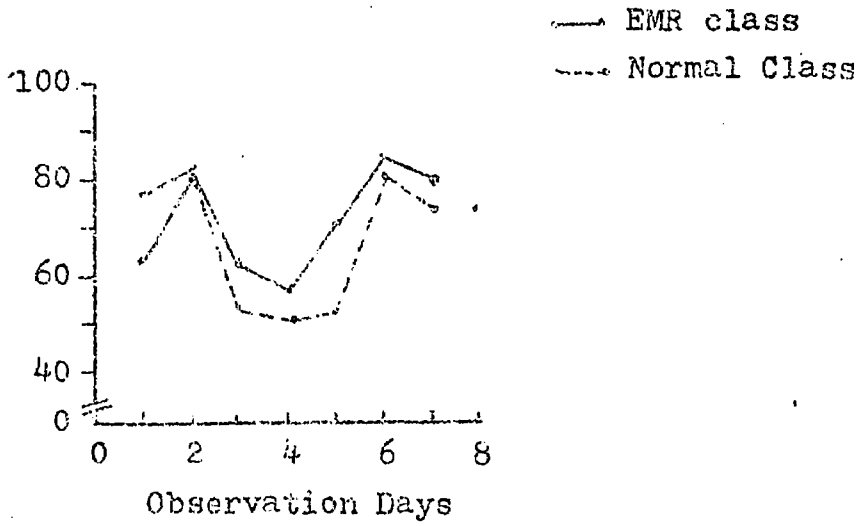


Figure 9. Adjusted mean percent of intervals of Appropriate behavior in the EMR and normal classrooms during the Baseline condition.

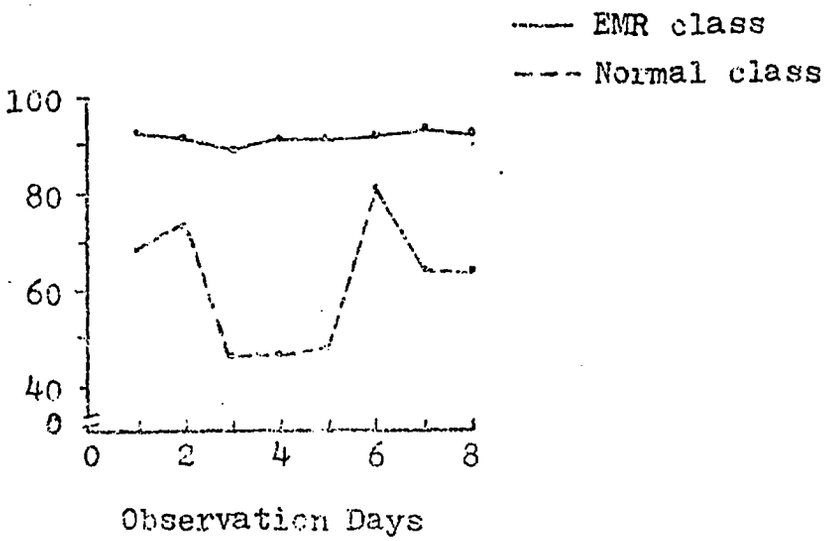


Figure 10. Mean percent of intervals of Appropriate behavior in EMR classrooms with token reinforcement and a a normal class in the Baseline condition.