INTRINSIC REINFORCERS IN A CLASSROOM TOKEN ECONOMY¹

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An inexpensive, easily managed token economy was used in a normal classroom for one academic year, and data were collected for the entire academic performance in spelling, language, handwriting, and math for that year. During a baseline period, assignment completion was variable. The introduction of a token economy with a point exchange every five days increased assignment completion and decreased variability of performance. An application of a token economy that had a point exchange averaging four days was accompanied by an assignment completion rate that approximated 100%. A reinforcement contingency for which quiet behavior rather than for assignment completion was eased quiet behavior was accompanied by a marked diminution of assignment completion. A reintroduction of the token reinforcement for assignment completion system increased assignment completion again.

Many studies have used token reinforcement programs for the management of classroom behavior (Birnbrauer, Wolf, Kidder, and Tague, 1965; McKensie, Clark, Wolf, Kothera, and Benson, 1968; O'Leary, Becker, Evans, and Saudargas, 1969). In these studies, token reinforcers were dependent upon back-up reinforcers such as candy, toys, and comic books which are not intrinsic to the natural classroom. The cost for such token programs can be an important factor when considering whether or not to employ such a program. Wolf, Giles, and Hall (1968) estimated an average cost of \$250 per subject. Other studies, more appropriately tutorial programs than classroom settings, have reported much lower costs (Staats and Butterfield, 1965; Staats, Minke, Goodwin, and Landeen, 1968).

Most of the past studies that employed token programs took place in non-typical educational settings such as: (a) an adjustment room (O'Leary and Becker, 1967); (b) a remedial

classroom (Wolf, *et al.*, 1968), or (c) a special education class (Zimmerman and Zimmerman, 1962). Also, in most cases the number of subjects receiving reinforcement contingencies was small when compared with the typical classload in a public school.

Recently, cost-free group contingencies natural to the classroom have been studied. Osborne (1969) used a free-time contingency to eliminate out-of-seat responses in a classroom of six. Barrish, Saunders, and Wolf (1969) employed a game technique that reduced out-of-seat and talking-out behavior in a class of 24.

The present paper investigated the effects of various contingencies on assignment completion for an entire class. The methods used were: (a) dependent on cost-free back-up reinforcers in the form of privileges, (b) employed in a public school setting, (c) applied to the total class, (d) managed by a single teacher.

METHOD

Subjects and Setting

Members of a combination fifth and sixth grade classroom located in a low socioeconomic area of Spokane, Washington were used. The class size ranged from 25 to 29. The senior au-

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thor was the teacher of the class for the duration of the study.

Target Behavior

Assignment completion in spelling, language, handwriting, and math was selected for study. Assignment completion was defined as the completion of all the exercises or tasks requested by the teacher in each of the four areas listed above.

Token Economy

The mechanics of a token economy were explained to the class. Token reinforcers were points. The subjects earned points for desirable behaviors and lost points for undesirable behaviors. The teacher often used praise when awarding points. Point removal was done in a calm, matter-of-fact manner. Activities that were naturally available in the school served as back-up reinforcers.

Points awarded. Table 1 shows the number

Table 1
Behaviors and the number of points that they earned or lost.

Behaviors That Earned Points	Points
1) Items correct	6 to 12
2) Study behavior 8:50-9:15	5 per day
3) Bring food for animals	1 to 10
4) Bring sawdust for animals	1 to 10
5) Art	1 to 4
6) Listening points	1 to 2 per lesson
7) Extra credit	Assigned value
8) Neatness	1 to 2
9) Taking home assignments	5
10) Taking notes	1 to 3
11) Quiet in lunch line	2
12) Quiet in cafeteria	2
13) Appropriate noon hour behavior	3
Behaviors That Lost Points	Points
1) Assignments incomplete	Amount squared
2) Gum and candy	100
3) Inappropriate verbal behavior	15
4) Inappropriate motor behavior	15
5) Fighting	100
6) Cheating	100

of points that could be earned for various activities. In some instances, the number of points earned could vary. For example, Table 1 shows that a student could earn from 6 to 12 points for working the items in an assignment correctly. This was due to the fact that the assignments at the end of the study units in the textbooks varied in length, and that a subject might answer some items incorrectly. If a 10-item assignment were answered with all 10 items completed and with nine correct answers, then the subject was given nine points. If the same assignment were done with only nine of the questions answered, then it was considered incomplete. An incomplete assignment was never given points, no matter how much of the partially completed assignment was correct.

In the case of study behavior for the 25-min period between 8:50 and 9:15 a.m., the student earned one point per 5-min period of study. Similarly, the amount of food and sawdust brought for the rats that were kept in the classroom determined the number of points awarded to a subject. Other variable awards shown in Table 1 were on the basis of quality of performance.

Penalties. In general, the penalty for an undesirable behavior was severe, as may be seen in Table 1. This was done in an attempt to prevent a payoff following a week in which the student engaged in such behavior. The values of the penalties were determined a year earlier in a similar token economy and simply represent values which, along with point values for desirable behavior, seemed to control the students' behavior in that earlier token economy.

Privileges. The points a subject earned were exchanged weekly (or, see Token II) for the privileges shown in Table 2. Activities that were naturally available in the school served as back-up reinforcers. The privileges were determined by the subjects themselves. One class period at the beginning of school was devoted to asking which activities the subjects considered to be privileged. The subjects then ranked the privileges in terms of their desirability. That

ranking determined the relative number of points assigned to the privileges.

The most desirable privilege cost the most; the least desirable privilege cost very few points. In any event, by including the categories of Special jobs and Special projects, which could be

Table 2
Weekly Privileges

Privilege	Price in Points	
	Sixth	Fifth ^a
1) Sharpening pencils	20	13
2) Seeing animals	30	25
3) Taking out balls	5	3
4) Sports	60	40
5) Special writing on board	20	16
6) Being on a committee	30	25
7) Special jobs	25	15
8) Playing games	5	3
9) Listening to records	5	2
10) Coming in early	10	6
11) Seeing the gradebook	5	2
12) Special projects	25	20

^aPrivilege costs were determined separately for the two grades. Also, fifth-grade children were in the room less time per day than were the sixth-grade children.

chosen by a subject in any given week, and by allowing the subject to choose whatever privileges he wished, the experimenters felt some confidence in the reinforcing properties of the privileges before the token system was introduced.

Mechanics of the token economy. Since the variable of major interest in this study was the number of assignments completed, availability of points was primarily associated with that behavior and with behaviors compatible with it. Assignments were usually made daily for math, spelling, and language; there were three assignments per week for handwriting. However, these numbers could vary. Assignments that were due the following day, and assignments to be corrected during a given day were listed on the chalkboard. The student was expected to complete each assignment by class time. At the beginning of each class, papers were corrected. Each student graded his own paper. Corrections were made in pencil if the assignment were in

ink or, at least, in some medium other than that used to complete the assignment. At the end of the correction period, the teacher called subjects one at a time to his desk and awarded points for the number of items correct in the assignment, providing it was complete, and gave bonus points for neatness.

The student recorded these points on a special record form on which he kept his point totals. An example of this form is shown in Figure 1. If the assignment were incomplete, he was told to subtract the appropriate number of points. The student could, however, make up the assignment to remove the penalty, but the make-up would not earn points for correct answers. Approximately 50% of the incomplete assignments were made up over the period of the year.

The teacher also recorded the points earned and lost in his grade book in order to cross-check the honesty of the students. Only one student in the course of the year failed to subtract points for an incomplete assignment.

Points were exchanged for privileges each Monday morning. A student was made banker for each of the privileges. Each banker subtracted the necessary number of points from a student's point total and initialed it. At the end of the period, he turned in a list to the teacher of the names of students who purchased privileges. This list enabled the teacher to control the use of privileges.

By having students keep all of their own records and make all of the transactions, and by including relatively simple checks on the system, the token economy was very easy to manage. No more than 20 to 25 min per week were devoted to the system by the teacher.

Experimental Conditions

The experimental design involved a baseline, three token conditions variously arranged, and a quiet-behavior contingency. The data for each academic assignment were collected and recorded in the gradebook.

Baseline. Normal rates of assignment completion were recorded daily. The baseline condition

Points Earned							Points Lost
Language							Assignments
Spelling							
Handwriting							Talking
Science							
Social Studies							
Reading							Break
Math							
Notes							Gum
Taking Home Work							
Sawdust for Rats							
Food for Rats							Library
Quiet Behavior							
Spelling Test							Out-of-Seat
Study							
Other							
						Total	Total Lost

Name _____

Row _____

Fig. 1. Point chart used by students to record points earned and lost.

was in effect for the first six weeks of school. During the baseline condition, traditional control techniques were used: (a) staying after school to finish work; (b) parent and student conferences; (c) lectures to the class and individual students on the merits of completing as-

signments. During this condition, standard letter grades were used to grade assignments.

Token I. During this condition the token economy was introduced. Completed assignments and other desirable behaviors as shown in Table 1 were awarded points. Undesirable be-

haviors were penalized. This condition lasted 75 days.

Token II. This was similar to Token I except that point-exchange days were variable rather than fixed. The time between exchange varied from two to six school days with a mean of 4.25 days. The exchange schedule was as follows: 4, 3, 5, 4, 3, 6, 5, 4, 3, 6, 5, 2. Point values for privileges were increased proportionately if the time between exchanges was greater than five days, and decreased if the exchange occurred in less than five days. Token II was employed twice, once after Token I, and once after the Quiet-Behavior period for an additional 11 days.

Quiet Behavior. The teacher informed the class that assignment completion in language, spelling, math, and handwriting would no longer receive points, but letter grades. The students could still earn or lose points for the other behaviors in Table 1. In addition, a new category of quiet behavior was added to the economy and students could earn approximately the same number of points from this contingency that they had from assignments during Token II. Point-exchange days were again variable with the mean of four days between point exchange,

as in Token II. The Quiet-Behavior contingency was in effect for 17 days.

RESULTS

Figure 2 shows the per cent of assignment completion for the total class in the four academic areas under the various experimental conditions. During the first 28 days before token procedures were introduced, the class completed from 69 to 94% of the assignments given. Pre-token records show variability in each area. When Token I was introduced, a noticeable change in variability of performance occurred in spelling, language, and handwriting. Performance in math tended to remain variable, but the mean per cent completed assignments was higher during Token I than it was in the Baseline period.

With the introduction of the variable point-exchange contingency of Token II, assignment completion increased. A majority of 100% data points were found in all four academic areas. Consequently, as Figure 2 shows, the variability evidenced in the first two conditions was virtually eliminated.

Fig. 2. Per cent of assignments completed in spelling, language, handwriting, and math under each experimental condition for fifth and sixth grades combined.

The Quiet-Behavior condition resulted in reduced rates of assignment completion. Completion rates ranged from 69 to 99%. The rates tended to show recovery as the condition remained in effect, but assignment completion was variable throughout the condition.

The reapplication of Token II again generated high completion rates for the four academic areas. The data shown in the second Token II are for the last three weeks of the academic year.

Figure 3 shows a comparison between the student with the best and the student with the worst assignment completion records for the year. A mid-way student was not shown due to the relatively low incidence of non-completion of work. Figure 3 shows rather clearly that the effects of such an economy are greatest for so-called poor students. The effects of changing the contingencies for points was dramatic for the poor student for each of the four academic areas.

Inasmuch as assignment completion played such an important role in earning points, a reliability check was made. Three other teachers in the school were given 100 papers and asked to judge the completeness of the assignment ac-

cording to the criteria used, *i.e.*, whether or not, say, a 10-item assignment had 10 answers. There was 100% agreement among the judges.

DISCUSSION

Token procedures significantly increased assignment completion. The experimental design illustrated that high rates of academic completion could be generated and maintained, and that when points and fines were no longer contingent, completion responding decreased. The reapplication of token contingencies increased completion again.

The only analysis of the token system itself involved the manipulation of point-exchange days. The control exerted over assignment completion by the variable-point exchange contingency is perhaps analogous to the control exerted by variable schedules of reinforcement over simple operants with infrahumans in a free-operant paradigm. Figure 2 showed that responding under the variable contingency became stable. It has been widely reported in the literature that variable schedules produce more

Fig. 3. Per cent of assignments completed in spelling, language, handwriting, and math under each experimental condition for the student with the lowest completion record in the classroom (S1) and the student with the highest completion record in the classroom (S2).

stable rates of responding than fixed schedules (Ferster and Skinner, 1957). The present design is perhaps lacking in that Token II was not followed by Token I, but the virtual elimination of variability under Token II suggests that one may entertain the possibility of true schedule effects.

One point of interest is the amount of behavior represented in the study. The study was not of short duration nor restricted to isolated behaviors. Instead, the data shown in Figure 2 represent the entire output for an academic year in the four classes reported. Figure 2 represents approximately 12,500 individual assignments. Completion of assignments at a rate of approximately 100% over 30 assignment days as in Token II, is rather more significant than would be short-term control of a restricted class of behavior.

There are, of course, individual differences with respect to the amount of control exerted by the token economy. Figure 3 shows these differences dramatically. The student with the worst record of assignment completion for the year was influenced much more by the economy than was the best student. When the contingencies were changed, so that points were readily available in the absence of academic performance, the academic performance declined in the poor student. Further, the performance did not return to the previous levels that he had shown under token conditions. There is no way to assess the effects that the token system may have had on the good student as the effects were measured here. His academic completion rate was very high from the beginning. Other types of measures might show an effect on his behavior.

Reactions to the token program were obtained from the class. The program was favored by the students. Twenty students rated the economy favorably; only five rated it unfavorably. Those who liked the token economy made statements such as: "I completed my work on time easier", "I liked to earn the privileges", and "It made school fun". Negative comments included: "I don't like losing points for not doing my work",

"The fines were too high", and "Privileges cost too much".

The methods used in this study have definite practical implications for several reasons: (a) the back-up reinforcers were in the natural classroom environment and were cost-free, (b) the study took place in a typical classroom setting, (c) the number of students that received group contingencies was comparable in size with most classloads in a public school, (d) significant gains in academic completion were obtained without specially made assignments for individuals or programmed instruction, (e) the token economy was manageable by one teacher, requiring, on the average, some 20 min per week more than usual to record points, fines, privileges, *etc.* Further, the use of the Quiet-Behavior procedure eliminated the necessity for a reversal procedure, which is sometimes unpleasant to the teacher. (Packard, 1970)

Token reinforcement programs have been used widely in a variety of special settings, but an analysis of their effects on assignment completion behavior for an entire class is not common. These methods using reinforcers natural to most classrooms can be implemented by teachers without expense or drastic instructional changes.

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