*A SELF-EVALUATION TOKEN SYSTEM versus AN EXTERNAL
EVALUATION TOKEN SYSTEM ALONE IN A RESIDENTIAL
SETTING WITH PREDELINQUENT YOUTH¹*

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This study compared the effects of self-evaluation and adult-dispensed tokens on room-cleaning behavior of six predelinquent youths in a residential token-economy setting. The self-evaluation token system proved to be as effective as the external adult-administered system in increasing room-cleaning behavior and was more effective in maintaining performance after contingencies were withdrawn. The self-evaluation token system increased resistance to extinction, compared to the external token system, and appeared to be a useful component for a traditional token-economy system.

DESCRIPTORS: self-evaluation token system, token economy, residential treatment center, room-cleaning behaviors, predelinquents

Since the introduction of token reinforcement programs by Ayllon and Azrin (1968), such systems have been demonstrated to be effective and useful for modifying and maintaining various behaviors in a wide variety of settings, including clinical (*e.g.*, Kazdin and Bootzin, 1972), classroom (*e.g.*, McLaughlin, 1976, O'Leary and Drabman, 1971), and residential (*e.g.*, Phillips, 1968). However, when token programs have been withdrawn, the maintenance of behavior change typically deteriorates, leading several critical reviewers to suggest that self-regulation and self-evaluation procedures be incorporated into token programs (Bandura and Perloff, 1967; Kazdin and Bootzin, 1972; O'Leary and Drabman, 1971).

O'Leary and Drabman (1971) outlined a number of procedures that might maintain appropriate behavior after a token program has been withdrawn. They suggested that self-evalu-

ation and self-reinforcement skills be taught and utilized within a token program. Further, Kanfer and Duerfeldt (1967) proposed that learning to monitor one's own behavior and to observe one's actions with some degree of objectivity and accuracy are essential prerequisites to initiating useful self-regulatory behaviors. Self-evaluation procedures have also proven effective in maintaining academic behaviors (Crow and Mayhew, 1976; Felixbrod and O'Leary, 1973, 1974; Glynn, Thomas, and Shee, 1973; McLaughlin, 1976; O'Leary and O'Leary, 1972) and in laboratory settings (Bandura and Perloff, 1967; Johnson and Martin, 1973).

Several studies indicate that the abrupt introduction of self-evaluation procedures may be effective in maintaining the target behaviors. Kaufman and O'Leary (1972) found that 14-year-old students in a psychiatric hospital school maintained appropriate behavior for seven days following a teacher-administered token program after they were given full responsibility for evaluating their own behavior. In a followup study with behavior disorder and childhood schizophrenic children, Santogrossi, O'Leary, Romanczyk, and Kaufman (1973) reported that self-evaluation of disruptive behavior in a classroom did not reduce that disruptive behavior. After a teacher-administered token program that had

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successfully reduced the children's disruptive behavior, the students were given full responsibility for evaluating and determining their own consequences. Within four days, the children began to behave disruptively while simultaneously evaluating their behavior as appropriate and rewarding themselves accordingly. In both studies, the self-evaluation phase had been abruptly transferred to the students and the effects were only short lived.

Success with self-evaluation and control procedures with disruptive children, however, has been shown by instituting a "matching" phase between termination of the external token system and total self-evaluation, rather than an abrupt switch (Drabman, Spitalnik, and O'Leary, 1973). Disruptive children in an after-school remedial reading class were taught to match a teacher's evaluation of their behavior in the context of a token reinforcement program. A crucial variable demonstrated by Drabman *et al.* (1973) related to success in maintaining accurate evaluation and appropriate behavior appeared to be the institution of the "matching" procedure. The shaping procedure and fading techniques used were effective in teaching relatively honest and accurate self-evaluations. By adding the process of learning to evaluate one's own behavior accurately and being rewarded accordingly, appropriate behavior was maintained.

The present study attempted to establish and maintain accurate self-reporting and evaluation of behavior in six predelinquent youths. In addition to learning accurate self-evaluation, appropriate room-cleaning behavior was placed under contingencies in order to increase it to criterion levels. By utilizing self-evaluation to determine consequences in order to increase the desired behavior, this process extended beyond the Fixsen, Phillips, and Wolf (1972) study, which determined that accurate self-observation by itself did not increase room-cleaning behavior. Through the method in the present study, both accurate self-evaluation and appropriate room-cleaning behavior were achieved and maintained.

The goals of this study were to determine the effects of self-evaluation, as compared to an external token system, and to demonstrate a method of establishing accurate self-evaluation and management of appropriate behavior in predelinquent youths. The objectives of the study were to establish for each youth accurate self-evaluation of room-cleaning behavior and to establish and maintain appropriate room-cleaning behavior.

METHOD

Subjects and Setting

The subjects were six predelinquent male youths who had been placed by Florida State agencies or committed by the Juvenile Court to the Living and Learning Center, a family style residential rehabilitation program in Fort Lauderdale, Florida. The program was based on the Achievement Place model (Fixsen, Phillips, and Wolf, 1973; Phillips, 1968; Phillips, Phillips, Fixsen, and Wolf, 1971, 1972; Wolf, Phillips, and Fixsen, 1972; Achievement Place: Phase II, Note 1), and the residence was staffed by professional teaching parents who had received training and certification from the Achievement Place program at the University of Kansas.

The six youths' ages averaged 13 yr and four months and ranged from 10 yr 11 months to 15 yr four months. At the time of the study, the six youths' length of stay at the Living and Learning Center averaged 13 months.

The treatment program at the Living and Learning Center was based on a token economy. The youths earned points for engaging in appropriate social, academic, and self-care behaviors and lost points for inappropriate behaviors (*e.g.*, cursing, incomplete homework, inadequate personal hygiene). At daily and weekly intervals, the points were used to purchase a variety of privileges in the home, such as snacks, leisure television, allowance, and permission to leave the center.

Recording and Reliability

Target behaviors. The area of behavior considered the dependent variable during this experiment was room-cleaning behavior. Fifteen definitions (modified from Fixsen *et al.*, 1972) specifying the degree of cleanliness or the placement of objects in the room were composed for areas of each youth's room (see Table 1 for definitions).

Observations. Using the 15 room-cleaning definitions, an adult observer recorded whether or not each area of a youth's room met each of the defined criteria. Room-cleaning was recorded every day while the youths were at school. During baselines, the youths were not told at any time that their rooms were being checked.

At least once during each experimental phase, another adult observer independently recorded room cleanliness. This second observer was not

aware of any other experimental procedures. The two adult observers' records were compared and scored item by item, for the number of agreements across all the youths' rooms and chores. The total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100 to obtain the percentage of interobserver agreement as a reliability check among observers.

At least once during each experimental condition, two adults' independent observations of room cleaning were compared and scored, item by item, for the number of agreements across all the boys' rooms. The number of reliability checks made were three during Baseline I, two during Self-evaluation I, one during Baseline II, two during Self-evaluation II, and two during Baseline III. For the nine reliability checks made, interobserver agreement ranged from 84% to 95%, with a mean of 90%.

Table 1
The Definitions Used to Measure the Cleanliness of Each Boy's Room

1. The bed should be made with two sheets, one pillow with case, and the bed spread. (NOTE: there should be no additional blankets on top of the bed)	ing on the cross bar, and all non-folded clothes should be in the closet on hangers, and shelf straight.
2. None of these objects should be visible except the bedspread while looking at the level of the steel frame that runs around the lower edge of the bed or while looking down at either end of the bed.	9. Shoes should be on the closet floor with the toes or heels touching a wall and the sides of a pair of shoes touching in one place. All shoes must face the same direction.
3. There should be no objects greater than 0.25 by 0.25 by 0.25 in. on the bedspread (this includes blankets).	10. Objects greater than 0.25 by 0.25 by 0.25 in. should not be on the closet floor without permission.
4. The bedspread should be tucked in under the mattress completely around the bed and no part of the bedspread should hang through the bed springs longer than 2 in. which is the level of the steel frame.	11. All clean clothes that are folded should be put away in the drawers properly. All other objects in the drawers must be arranged in an orderly fashion.
5. The pillow must be within 6 in. of the head of the bed and centered within 6 in. of the center of the mattress.	12. The dresser top must be clear of all objects greater than 0.25 by 0.25 by 0.25 in. except for lamps, clocks, and other objects that have permission to be left out and be dusted.
6. The bedspread must be tucked at least one inch under the pillow so that it makes a straight line across the bed. The line should not be more than 3 in. from a 90-degree angle with the edge of the bed.	13. All of these objects must not be within 2 in. of the edge of the dresser top and must not extend out over the edge.
7. There should be no wrinkles greater than 6 in. long, 1 in. wide, and 0.5 in. high on the entire bedspread including the sides.	14. The back of the dresser must be within 6 in. of the wall and one end should not deviate from the other more than 3 in. The head of the bed should be at least 6 in. but not more than 18 in. from the wall.
8. All the hangers should be in the closet and hang-	15. No clothes or personal objects may be laying on the floor or placed inappropriately on any furniture.

Procedures

Design elements and experimental conditions. The experiment consisted of several experimental conditions involving Monday through Friday room-cleaning behaviors. The procedures were not in effect on weekends because many of the youths were away from the center. A description of the condition follows:

Baselines (I, II, III). During these phases, there were no scheduled consequences for room-cleaning behavior. The independent observer simply recorded the cleanliness of the room. During these periods, the residential token economy was maintained and reinforcement, including recreation, was available for other behaviors.

Instructions. During this phase, instructions as to the behaviors comprising room cleanliness were given. These instructions were verbally explained, demonstrated, and practiced by each youth, along with a written copy being posted centrally in the residence. There were no scheduled consequences for room cleaning.

External token system. Under this condition, a youth's behavior concerning room cleaning was always under externally determined consequences. An external agent, the teaching parent, administered a daily point consequence, which was determined by the observer's evaluation of the youth's room-cleaning behavior. For example, a youth who completed 10 of the defined behaviors would receive 10 points. The youth was given daily feedback and rationales as to why some areas received points and others did not.

Self-evaluation token system. Under this condition, a youth completed an evaluation of his own room cleanliness by using the list of definitions used by the observers. He received two types of points, which were related to his accuracy of evaluation and the degree of room cleanliness. "Accuracy points" were determined by the number of agreements, item by item, between the youth's own evaluation and that of the independent adult observer. For instance, if a youth's evaluation of his room only matched that of the

observer's evaluation on eight items, he would receive eight points, with the maximum being 15 points, which would reflect 100% accuracy in self-evaluation. Initially, points were also awarded by an external agent as in the External token system for the degree of room cleanliness. After a youth reached an 80% criterion of accuracy from comparison with the adult observer's evaluation for at least two consecutive days, then his own evaluation determined the number of points he received for his own behavior. The youth was then required to maintain an 80% level of accuracy of his evaluation. Until this level of accuracy was reached, the youth's evaluation and the adult observer's evaluation were compared daily. After accuracy had been maintained, a youth was told that his comparisons with the adult observer's evaluation would be made on a random spot-check basis, and if his evaluation failed to match the adult observer's evaluation at the 80% criterion level, he would lose "accuracy points", a reinforcement opportunity, and return to the daily matching procedure until accuracy was again achieved. If 80% accuracy was maintained through the initial stages of self-evaluation and through the spot checks, then the matching procedure was faded completely from this condition and total self-evaluation was in operation. Through such a matching and fading procedure, it has been shown (Drabman *et al.*, 1973) that youths learn and maintain accurate evaluations of their behavior while maintaining high levels of the behavior. Santogrossi *et al.* (1973) demonstrated and warned against a procedure in which a youth is allowed to determine the number of points to be received without being required to be accurate in self-evaluation. Therefore, a youth's self-evaluation was not used to determine points until an 80% level of accuracy was reached. After "spot-checking" for accuracy, the youths were informed that no more checks would be made on room cleanliness. In this condition, a youth had to evaluate accurately his own behavior and determine the appropriate consequences, as opposed to the External token system in which the

evaluation and determination of consequences were controlled by the Teaching Parent.

Treatment group and sequence. The six youths were randomly assigned to two treatment groups of three youths each, which received the experimental conditions in one of the following sequences:

1. Sequence A group received Baseline I, Instructions External tokens, Baseline II, Self-evaluation II, and Baseline III.
2. Sequence B group received Baseline I, Instructions, Self-evaluation I, Baseline II, Self-evaluation II, and Baseline III.

The three youths in the Sequence A group received both the External token and the Self-evaluation condition to allow comparison among themselves of their performance under both treatment. The three youths in the Sequence B group received the Self-evaluation condition twice to allow comparison with the Sequence A youths during their External token condition. This type of sequencing allowed for a counter-balanced design in which subjects could be compared in various conditions. Self-evaluation I and Self-evaluation II did not differ in their matching and fading procedures, but it should be noted that Self-evaluation II lasted approximately twice as long as Self-evaluation I.

During the first week of both token economies, the youths had only to average the required number of points. They received recreation on Tuesday evening depending on their average over the preceding Friday, Monday, and Tuesday. They received recreation on Thursday evening based on their average for Wednesday and Thursday. After the first week, at least the specified points had to be earned *each* day. For example, failure to earn the specified points on Friday meant no recreation on Tuesday afternoon. Importantly, it was rare for a youth not to earn recreation during any of the token phases. A recreation "menu" was formulated with the youths, which allowed for some to participate in various sports (*i.e.*, basketball, football, soccer) or an optional activity, such as attending a

movie, depending on what they considered reinforcing at that time. As no formal recreation period existed before this study, and had been requested by all the youths in the program, it had enough desirable qualities to increase the behaviors desired under each condition. Reinforcement was all or none, so that earning at least a specified number of points allowed a youth to participate in the entire recreation period.

In the External token system, a youth had to earn a specified number of room-cleaning points to attend the recreation period. For all youths, these points were completely separate from the usual points used to operate the residence, and were called "recreation points". Other points received during the day for behaviors other than room cleaning did not count toward recreation. In effect, this study operated a token economy within a token economy by using a separate system of recreation points.

In the Self-evaluation token system, a youth had to earn points in two areas to attend recreation. He had to earn a certain number (12) of accuracy points and also earn a certain number of points (12) for room cleanliness. During the "spot check" phase, 80% accuracy had to be maintained to receive reinforcement. This ensured that accuracy of evaluation was achieved, as well as improvement of room-cleaning behavior.

RESULTS

Figures 1A and 1B show the individual performances of the six youths, three of whom received Sequence A (External tokens/Self-evaluation I) and three of whom received Sequence B (Self-evaluation I/Self-evaluation II). Breaks and missing data points on particular graphs are due to illnesses, holidays, or short absences from the program. For all youths, the 60-day period of Baseline II is represented by three samples of 10 days taken at the beginning, middle, and end of this period. By comparing the youths within each sequence group, it can be seen that there are no major variations among the youths

Fig. 1a. The number of room-cleaning items that were correct as reported by an adult observer for three Sequence A youths.

Fig. 1b. The number of room-cleaning items that were correct as reported by an adult observer for three Sequence B youths.

throughout the experimental conditions. Therefore, the daily scores for youths in each sequence group were averaged and are presented in Figure 2 for Sequence A and Sequence B separately.

As shown in Figure 1, under Baseline I conditions, out of the 15 items possible for this period, the daily cleanliness of the youths' rooms averaged 3.5 items correct for Sequence A and 3.2 items correct for Sequence B. When instructions were provided and demonstrations of the desired behavior were required, measured behavior increased substantially for the following day, but rapidly fell over the next seven days to original baseline levels for both Sequence A and Sequence B groups. It should be noted that a return to baseline was not immediate, partially due to a residual effect which occurs from a room that has been thoroughly cleaned remaining so for a short period of time without any further maintenance from the youth.

When the External token condition was initiated for the Sequence A group, room cleanliness gradually increased to an average of 12.0 items correct. During this same time period, the Sequence B group began the Self-evaluation I condition and room cleanliness increased to an

average of 13.0 items per day correct. When both treatment conditions were terminated, differences occurred between the groups in the Baseline II period that followed. Sequence A group decreased to an average of 7.2 items per day correct during the first 10 days of this period, 6.1 items per day correct during the middle 10 days, and 7.4 items per day correct during the final 10 days. There was an average of 6.8 items per day correct (slightly above Baseline I level) over the total 60-day period of Baseline II. Sequence B group, however, decreased only slightly when Baseline II was instituted. During the first 10 days of this period, they averaged 12.7 items per day correct, 11.6 items per day correct during the middle 10-day period, and 11.4 items per day correct during the final 10 days. Their average number of items per day correct during the 60-day Baseline II period was 11.9, compared to the previous Baseline I level of 3.2 items. When the Self-evaluation II condition was initiated, both groups increased, Sequence A averaging 13.3 items per day and Sequence B averaging 14.1 items per day correct. These levels are higher than those obtained in both previous treatment conditions. After 40 days of the Self-

Fig. 2. The mean number of room-cleaning items that were correct as reported by an adult observer for Sequence A youths combined and Sequence B youths combined.

evaluation II condition, Baseline III was instituted for both groups. During the 22 days of this final baseline period, Sequence A averaged 12.0 items per day correct, and Sequence B averaged 13.1 items/day correct. Both groups averaged slightly less than the levels obtained during Self-evaluation II, but remained at a higher level than any previous baseline period. Sequence A did not return to previous baseline levels, as had occurred following the external token treatment condition, but maintained a much higher level in the Baseline III period that followed the Self-evaluation II condition.

Accuracy of Self-evaluation

During the initial stages (approximately 10 days) of the Self-evaluation I condition for Sequence B youths, "accuracy points" were given daily for the percentage agreement between the youth's self-evaluation and the adult observer's report of cleanliness. Each youth immediately reached the criterion of 80% (which allows for three disagreements). For the next five days, accuracy of the youth's self-evaluation was only spot checked and accuracy points awarded only once at a randomly selected time. During this short period in which a youth thought his accuracy would be spot checked only once, comparisons were recorded daily without the youth's knowledge, and accuracy averaged 93%. The accuracy points contingency never had to be re-employed. During the remaining 10 days of this period, youths were informed that no more accuracy points were to be given and no accuracy points were awarded to youths, who now reported the level of cleanliness of their rooms without knowing it was being checked by an external observer, and was considered total self-evaluation. The third youth missed portions of Self-evaluation I (see Figure 1B) due to illness, but returned to complete this experimental condition successfully by achieving accuracy and room cleanliness. Daily comparisons made during this total self-evaluation period showed that the youths maintained accuracy of agreement above 80%.

In the Self-evaluation II treatment condition, percentage of agreement between individual reports and the adult observer was determined daily, and all six youths immediately reached and remained above the 80% accuracy level throughout this treatment period. Sequence B youths quickly reached and maintained higher levels of accuracy, averaging 93%, because they were used to a Self-evaluation system and had previously been rewarded for accuracy in Self-evaluation I. Sequence A youths quickly developed accuracy in Self-evaluation II and most reported vicarious acquisition of the system through interaction with Sequence B youths when Self-evaluation I was initiated earlier. No return to accuracy points contingency was necessary for either group. Initially, the youths were interested and curious about the differences between the groups, but once they understood the simple structure of the Self-evaluation system their interest dropped, and little was expressed verbally concerning room cleaning and self-evaluation. During the last 20 days of the Self-evaluation II condition, all youths determined the level of cleanliness of their rooms without any external contingencies for accuracy and honesty. Daily comparisons, made without the knowledge of the youths, showed that all maintained the 80% criterion level of accuracy.

DISCUSSION

Under external reinforcement contingencies and self-evaluation training, room-cleaning behavior increased to an appropriate level. Under Instructions and External token conditions, room-cleaning behavior increased to an appropriate level, but returned rapidly to near baseline levels when consequences (tokens for room cleaning) were not given. Comparison of data from baselines and the self-evaluation conditions reveals that self-evaluations were effective in increasing and maintaining room-cleaning behavior for all youths. When the self-evaluation conditions were terminated, youths did not return to previous baseline levels over a period of

60 days (Baseline II) for Sequence B youths and 22 days (Baseline III) for all youths. These long baseline periods represent an adequately long test of resistance to extinction on performance standards.

It would appear evident from these results that the addition of teaching self-evaluation within a token system was more effective than an externally imposed token system alone in maintaining appropriate levels of behavior after treatment conditions and their contingencies were withdrawn. The component that seems to account for this difference consisted of the contingencies provided in the Self-evaluation token system for accurate and honest reporting of one's own behavior. Through the use of "accuracy points", all youths learned to report accurately the actual cleanliness of their rooms above an 80% level of agreement with an independent observer. Though this design did not provide comparison with a group where accurate self-evaluation was not required, earlier studies (*e.g.*, Santogrossi *et al.*, 1973; Fixen *et al.*, 1972) demonstrated that reinforcing inaccurate self-evaluation decreased performance significantly. In the External token system, youths never had to report actively the level of cleanliness of their rooms, but passively received the judgement of an external observer. However, when youths took an active role in evaluating their own room-cleaning behavior, the behavior was maintained beyond the treatment conditions. The implications of these findings support suggested changes in present token economy systems (Kazdin and Bootzin, 1972) to include a self-evaluation component. Through arranging the contingencies to require an individual to evaluate self behavior accurately and honestly, maintenance of behavior after termination of reinforcement is increased. A specific application of this finding would be to include a self-evaluation phase as described earlier to maintain appropriate behaviors beyond residential token-economy settings. At present, a self-evaluation system would seem to be an aid in overcoming one of the major problems in token-economy treatment by increasing resist-

ance to extinction for desired behaviors in the natural environment once the subject is away from the contingencies and stimulus controls of the token economy.

REFERENCE NOTE

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