Analysis of outcome variables of a token economy system in a state psychiatric hospital: a program evaluation

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Received 10 May 2000; received in revised form 4 October 2000; accepted 4 December 2000

Abstract

This study describes the outcome of a token economy treatment applied to 2 distinct patient populations on the same unit of a state psychiatric hospital: individuals with a dual diagnosis of mental retardation and a DSM-IV Axis I diagnosis of either (a) a severe behavior disorder (BD) or (b) a serious and persistent psychiatric disorder (PD). Results showed that patients in the PD group were more likely to complete the treatment (17/20) than those in the BD group (17/31) who were more likely to be terminated from the program (14/31). Individuals who did not complete the program were distinguished early, within the first 3 weeks of treatment. These noncompleters received significantly more fines and earned significantly fewer tokens than those who completed the program. At an average of 2.7 years post-discharge, there was no difference in the proportion of PD (12/16) and BD completers (9/11) and BD noncompleters (3/7) remaining in the community. These data show that diverse populations of patients can be treated within the same token economy program, thereby improving cost effectiveness. Future research should be directed toward characterizing those patients (e.g., BD) less likely to succeed when they enter treatment, and determining if modifications in the program can improve that outcome. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

A token economy (TE) is a type of behavioral therapy which uses some form of exchange unit (token) which is administered to an individual contingent on the

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Table 1
List of diagnoses for patients in current study

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients with diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct disorder</td>
<td>23</td>
</tr>
<tr>
<td>Psychotic disorder NOS</td>
<td>11</td>
</tr>
<tr>
<td>Oppositional defiant disorder</td>
<td>10</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>9</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>6</td>
</tr>
<tr>
<td>Pervasive developmental disorder</td>
<td>4</td>
</tr>
<tr>
<td>Autistic disorder</td>
<td>2</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>1</td>
</tr>
<tr>
<td>Major depression</td>
<td>1</td>
</tr>
<tr>
<td>Schizoaffective disorder</td>
<td>1</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>1</td>
</tr>
<tr>
<td>Intermittent explosive disorder</td>
<td>1</td>
</tr>
<tr>
<td>Obsessive compulsive disorder</td>
<td>1</td>
</tr>
<tr>
<td>Attention deficit/hyperactivity</td>
<td>1</td>
</tr>
<tr>
<td>Tourette syndrome</td>
<td>1</td>
</tr>
<tr>
<td>Developmental reading disorder</td>
<td>1</td>
</tr>
<tr>
<td>Cognitive disorder NOS</td>
<td>1</td>
</tr>
<tr>
<td>Developmental coordination disorder</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Axis II:

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients with diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental retardation - Mild</td>
<td>39</td>
</tr>
<tr>
<td>Borderline intellectual function</td>
<td>4</td>
</tr>
<tr>
<td>Mental retardation - Moderate</td>
<td>2</td>
</tr>
<tr>
<td>Mental retardation - unspecified</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Total number of patients with diagnosis adds to more than 51 because most patients had more than one diagnosis.

The patients to gain secondary reinforcers in the form of plastic tokens. These included personal hygiene behaviors, such as having a clean shirt, pants, shoes, etc., making the bed and having a clean room, and appropriate behavior during meals, school and other activities. For most modules each patient earned up to three chips. One token was awarded for being on time, the second token rewarded completing the required task and the final token was given if the patient had not exceeded a specified limit of maladaptive behaviors during the activity. These tokens were then exchanged for primary (or backup) reinforcers, such as various snacks (cost: 5 to 35 tokens), access to TV, radio, movies, games, etc (most of these items were ‘rented’ at a cost of 2 tokens). Token exchanges occurred approximately once each hour (i.e., after each training module). At this time, patients were paid the tokens that they earned during the previous hour/module, paid all fines that occurred during that same time and were able to use their tokens to access the backup reinforcers. A maximum of 53 tokens could be earned each day. In addition, up to 12 bonus chips could be earned daily for meeting three requirements: earning all daily chips, having no fines (see below) and taking all medications as prescribed. Finally, a weekly bonus was earned for demonstrating consistency of each adaptive behavior for the week, such that it
was possible for a patient to earn an extra 65 chips each week if they had a "perfect" week.

The tokens were kept in a 'bank'. Each patient had his/her own bank which was kept within sight at the nursing station, but the patient only had access to the bank at the designated token exchange times. The patients made their token transactions with the staff and then the bank was returned to the nursing station. No patient was allowed to keep any chips on his/her person. This avoided issues related to stealing, bartering, and strong-arming. There was no limit to the amount of chips that a patient could accumulate in their bank. We have found that some patients derived significant reinforcement from collecting and keeping their tokens, such that the tokens then acted as the primary reinforcers. Thus, acquiring tokens was a sufficient motivation for the patient to display and maintain adaptive behaviors and avoid fines, so this process of hoarding tokens was not discouraged.

In addition to these rewards for appropriate behavior, there was also a graduated series of fines/penalties, which consisted of the loss of tokens, or loss of tokens and restrictions, for a variety of maladaptive behaviors. There were three categories of infractions. The least serious were termed House Rule Violations, which were minor penalties (a fine of 2 tokens) for such things as offensive language, violation of the dress code, inappropriate use of food or other objects, etc. In some situations, a prompt was given before any fines were assessed, i.e. the individual was first reminded of the rule and fined only if the violation occurred a second time. A second category of penalties was incurred by Minor Maladaptive Behaviors. These produced a larger fine (5 to 10 tokens) for more serious infractions, such as possession of potentially dangerous items, forbidden language, lying, etc. The third category, Major Maladaptive Violations, represented the most severe violations and included responses such as physical assault, property damage, inappropriate sexual behavior, stealing and/or cheating, use of illicit substances, etc. This level of fine cost 10 to 16 tokens for each infraction, plus restrictions. This system of graduated fines applied to all patients on the unit.

However, despite the extensiveness of the list of pre-determined fines, it was never possible to identify all of the possible maladaptive behaviors that were exhibited by patients. Therefore, the program had additional mechanisms for providing behavioral interventions for maladaptive behaviors that occurred that were not covered by the pre-determined system of fines described above.

In addition to these schedules of rewards and fines, which applied to all patients, there were individualized treatment interventions for each patient, consisting of formalized behavioral contingencies. These were designated as Target Behaviors and Special Programs, and were applied when appropriate for a given patient. Examples of targeted behaviors included: denying responsibility (e.g., for an accident), oppositional statements or gestures, intimidating behavior, etc. These behaviors were defined as they occurred and only applied to the specific patient who exhibited them. Thus, most patients had a unique set of target behaviors. In addition, they all were fined using the pre-determined list of
program fines. The interventions for a target behavior were different than interventions used for the pre-determined fines. After a target behavior was defined, a baseline for that behavior was collected. After baseline, the next level of intervention was called Feedback. During this phase, each time the target behavior occurred the staff notified the patient that they had committed a target behavior and provided the patient with an alternative adaptive behavior that could be substituted for the maladaptive target behavior. No loss of tokens was associated with Feedback. If this was insufficient to reduce the frequency of the behavior, then the final level of intervention, called Response Cost, was applied. Under this condition, each time the patient committed a target behavior, they paid 8 chips, but they also received Feedback.

Special Programs were individualized behavior-consequence contingencies, similar to a contract, which provided the patient with a special or high potency reinforcer in exchange for changes in a specified behavior.

The program also provided training in adaptive behaviors. Patients attended a variety of classes that offered instruction in Social Skills, Anger Management, Coping Skills and several other types of living skills that were designed to improve the patient’s ability to succeed in the environment outside of the hospital.

To progress through the program and eventually be discharged, patients had to meet several successive criteria. For the first, or Acute, phase of the program, a patient had to successfully complete either a series of passes with family of successively increasing duration, or 10 excursions with staff. To be eligible for a pass/excursion, an individual had to have had (a) no restrictions for 72 hours; (b) no seclusion, restraints, aggression or property destruction for seven days; (c) must not have been on elopement or suicide precaution, and (d) must have had enough tokens to buy the amount of time desired for the pass/excursion (from 4 hours, at 25 tokens, to 48 hours for 100 tokens). After the Acute phase pass or excursion sequence had been completed, the patient entered the Transition phase of the program. After another sequence of passes or 10 excursions were accomplished in the Transition phase, the patient was considered to have completed the program (Completers) and was eligible for discharge. The minimal amount of time possible to complete the program was 5.5 months (22 weeks). Individuals were considered to be Non-Completers if they failed to show progress as determined by criteria established by the treatment team and were therefore discharged before meeting the entire pass/excursion sequence requirement. Some examples will serve to illustrate how termination decisions were made. In some cases, the team observed the behavior of the patient to be too dangerous to remain on the unit. These cases were usually terminated very early in the course of treatment and referred to a more secure setting. The next type of patient who would be considered for termination, were those patients who displayed primarily oppositional behaviors and accumulated a significant number of non-compliance fines. If, after attempting to modify their behavioral programs and seeking to find an appropriate set of motivators for them, the patients did not demonstrate a reduction in non-compliance fines and/or an increase in percentage of chips
earned on a weekly basis, then the team would establish discharge criteria for them. These criteria would establish a goal such that the patient would have to achieve a certain percentage of chips per week for a certain number of weeks, or they would have to show a specific reduction in the total number of non-compliance fines per week. If they failed to meet these criteria within a specified time frame, usually 3 to 4 weeks, then the team would determine that they were unlikely to respond to further programming and they were discharged. The final type of patient were those who displayed a high frequency of aggressive Major Maladaptive behaviors (threatening, property destruction, physical assault) which did not respond to the standard program fines or to any special programs that were established for that patient. Once again, a goal was established for the patient such that they had to demonstrate a specific reduction in the frequency of those Major Maladaptive behaviors by a cut-off date, or they would be discharged.

To provide treatment, monitor and record the behavior of the patients and oversee and supervise the program, there was a staff consisting of specially trained Behavior Shaping Specialists (BSSs), Registered Nurses (RNs), a Social Worker, a licensed Psychologist, an Associate to a Psychologist, a Psychiatrist and the Program Director, who is a licensed Psychologist. Hospital Clinical Support Services provided Occupational and Speech Therapy Services. Educational services for eligible patients were provided by a Certified teacher and Paraeducator of the local Special School District.

2.3. Post-discharge variables

Because the long-term outcome of patients in any treatment facility will be influenced by factors in the community environment, an effort was made to measure the social support system available to the participants in this study. On the basis of information provided about the respective home environments, five variables were hypothesized to have an influence on a successful outcome: (a) the consistent presence of significant individuals in the patients’ life, and whether such individuals were considered to be (b) a positive influence on the patient, (c) involved in the patients’ treatment planning and in visits, during hospitalization, (d) involved in the pass sequences of the patient and if they (e) provided a stable environment outside of the hospital. Each of these factors was ranked, from 1 to 5, depending on the extent to which it applied to a given patient, by the following scale: 1 = did not apply at all; 2 = very little; 3 = about half the time; 4 = most of the time and 5 = all of the time. These ratings were made, for each of the five social variables, by the social worker associated with the Program. The sum of these five ranks constituted a “social support” score, which provided an index of the environmental support system available for each individual, with a larger score indicating a stronger social network.

An effort was made to remain in contact with and obtain information about the patients for as long as possible after they left the hospital. Regardless of whether or not they successfully completed the program, follow-up data were collected on
the status of each person that could be located. This information was examined and categorized to assess the long-term outcome of the patients and whether or not there was any relationship between successful completion of the program and the ultimate disposition of the participants in the community. Examination of the information resulted in the following categories: (a) patients who were lost to follow-up; (b) patients who were deceased; (c) patients in a prison, forensic facility, or correctional institution, which was defined as requiring a more secure setting; (d) patients in a hospital or nursing home and (e) patients in a group home, living with family, or otherwise in the community (Fullerton, Cayner, & McLaughlin-Reidel, 1978).

2.4. Data analysis

All data analyses were conducted using the SigmaStat statistical program published by the Jandel Corp. Differences among the groups for age, percentage of chips earned, total fines, house rules, minor fines, major fines, and social support scores were analyzed using the nonparametric Kruskal-Wallis One-Way Analysis based on the determination by the statistical program that criteria were not met for parametric analysis. Length of stay comparisons were analyzed using a one-way Analysis of Variance. Analyses of group data for completion rates, and success in the community were accomplished using the Chi-square statistic. All post-hoc analyses were performed by the statistical program using Neuman-Keuls comparisons. Significance level was set at $p < .05$ for all comparisons.

3. Results

Of the 51 individuals who entered the program between March, 1994, and June 1998, 20 were diagnosed with a Psychiatric Disorder (PD group) and 31 with a Behavior Disorder (BD group). An equal number of patients in each of these two groups, 17, successfully completed the BTP. Because the PD group was smaller than the BD group, this resulted in a borderline statistical difference in completion rate, favoring those individuals with a Psychiatric Disorder [17/20 (85%) vs. 17/31 (55%)], $\chi^2(1, N = 51) = 3.7, p = .054$.

Subsequent analyses were performed to compare the characteristics of those individuals who completed the program with those who did not. Because only three individuals in the PD group did not complete the program, those data were not considered a sufficient sample for statistical analysis and were not included further. Therefore, the final data set consisted of three groups: PD Completers (PDC, $n = 17$); BD Completers (BDC, $n = 17$) and BD Noncompleters (BDNC, $n = 14$).

As shown in Table 2, there was no difference among the groups in IQ, or in the ratio of female to male participants. There was an overall difference in age, Kruskal-Wallis $H(2) = 17.65, p < .001$, in that the PDC group was significantly older than either of the other two groups ($p < .05$ in each case). As
Table 2
Characteristics of the experimental groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>PDC</th>
<th>BDC</th>
<th>BDNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean IQ</td>
<td>64</td>
<td>64</td>
<td>68</td>
</tr>
<tr>
<td>Female/Male</td>
<td>4/13</td>
<td>3/11</td>
<td>1/16</td>
</tr>
<tr>
<td>Age (median years)*</td>
<td>38</td>
<td>20</td>
<td>18.5</td>
</tr>
<tr>
<td>Length of stay (weeks) ± S.E.*</td>
<td>35 ± 2.6</td>
<td>35 ± 2.6</td>
<td>23 ± 5.3</td>
</tr>
</tbody>
</table>

Note. * Significant difference among the groups, see text for details.

would be expected, there was a significant difference in the length of stay among the groups. \( F(2, 45) = 4.08, p = .024 \), showing that the Noncompleters spent less time in the program (approximately 6 months) than either of the other two groups of Completers \( (p < .05 \text{ in each case}) \). The two groups of Completers were not different, and finished the requirements in approximately 9 months. Even though this was a significant difference, it should not be overinterpreted. The shorter stay of the BDNCs was more a function of case-by-case decisions by the treatment team, rather than stipulated program criteria. Clinically it reflected the treatment team’s decision, based on their behavioral data, that there was no indication that those in the BDNC group would ever reach the necessary program criterion for completion.

The performance of the groups under the contingencies of the TE program is summarized in the next three figures, in which the average weekly data are summarized for the first 8 months (32 weeks). This interval was chosen first, because only two individuals remained in the BDNoncompleter group after 8 months (they were not terminated until 15 and 16 months, respectively) and second, because the two groups of Completers did not differ in their respective length of time in the program, and would not be differentiated by additional time points. These figures show, in succession, the results for the Earnings, the Total amount of points lost in fines (Figure 1), the points lost for each category of fines, i.e. the House Rules, Minor fines (Figure 2) and Major fines (Figure 3). (Note the change in scale among the graphs). In the case of the Earnings, the data for each patient was normalized to the maximum of 371 tokens per week (i.e., without including bonuses), so that the results could be expressed and analyzed as a percentage.

Analysis of each of these variables showed that the three groups did not differ on any of the measures in the first week of the program. To determine if the groups differed after undergoing their respective treatments, the last value obtained from each individual, on each of the five measures, was retrieved. This score constituted the Last Observation Carried Forward (LOCF). A separate analysis was performed for each of these five measures. The results, seen in Figure 3, showed a significant effect among the groups in each case, with the Noncompleters earning less or being fined more tokens than either of the other two groups \( (p < .05 \text{ in each case}; df = 2 \text{ for all comparisons}) \): Earnings, \( H = 20.31, p < .001 \); Total Fines, \( H = 18.80, p < .001 \); House Rules, \( H = \).
Fig. 1. Top panel: Mean percent of total earnings for each of the three groups, on each of their first 32 weeks in the Behavior Treatment Program. Bottom panel: Mean total number of tokens lost, for all categories of fines combined, for each of the three groups, on each of their first 32 weeks in the Behavior Treatment Program. The number of patients remaining in the respective groups were: 10 (BD Completers), 8 (PD Completers) and 2 (BD Noncompleters).
Fig. 2. Top panel: Mean number of token fines imposed for violations of the House Rules, for each of the three groups, on each of their first 32 weeks in the Behavior Treatment Program. Bottom panel: Mean number of token fines imposed for Minor Maladaptive behaviors, for each of the three groups, on each of their first 32 weeks in the Behavior Treatment Program.
Fig. 3. Top panel: Mean number of token fines imposed for Major Maladaptive behaviors, for each of the three groups, on each of their first 32 weeks in the Behavioral Treatment Program. Bottom panel: Comparisons of the Last Observation Carried Forward, for each experimental variable, among the three groups. The left axis indicates (a) the mean number of token fines imposed, for the Total, House Rules, Minor and Major fine categories or (b) the mean percent of tokens earned, for the group Earnings.
21.49, \( p < .001 \); Minor Fines, \( H = 10.09, p = .006 \) and Major Fines, \( H = 12.42, p = .002 \).

It was appreciated that this pattern of effects, in which the performance of the Noncompleters was consistently worse than the two groups that completed the program, might have been an indirect result of the fact that the Noncompleters spent, on average, significantly less time in the program (6 months) than the other two groups (9 months). For this reason, the groups were also compared at an earlier time point. The third week was chosen for this comparison because none of the values at this point in time were included in the LOCF analyses, i.e. none of these values were also the Last Observation for any subject. This was not the case for the second week, which was the final time point for three of the BDNoncompleters. (These three individuals were not terminated by the treatment staff for lack of progress: two of these patients left because their families requested a discharge, and one was removed because he presented a serious danger to the staff and required a more secure facility).

The results of the analysis for the third week of the program were essentially the same as that of the LOCF, with some slight differences. The groups still differed significantly among themselves on all five indices: Earnings, \( H = 11.26, p = .004 \); Total fines, \( H = 9.15, p = .01 \); House Rules, \( H = 6.46, p = .04 \); Minor Fines, \( H = 9.26, p = .01 \) and Major Fines, \( H = 11.81, p = .003 \). Unlike the outcome of the LOCF, the post-hoc results of the Earnings, Total Fines and House Rules, showed a difference between the BD Noncompleters and the BD Completers only, i.e., not the PD Completers. However, with respect to the more serious infractions, the Minor and Major fines, the performance of the Noncompleters was still significantly worse than both of the other two groups.

Because the criteria to qualify for passes/excursions required that an individual refrain from engaging in property damage or other aggressive acts for at least seven days, before each weekly pass/excursion, it was expected that Noncompleters would have more of these types of fines than Completers. This was supported by the results summarized in Figure 2, which show a gradual increase in the Minor fine category that, although evident in all groups, was particularly large in the Noncompleter group, especially during the first 6 months. There was also a brief increase during weeks 19 and 20 in the behavior of the PD Completer group. This might be related to the fact that the shift from Acute to Transition status often occurred at this time, which could have caused some disruption of behavioral control with the availability of new privileges (Baker, 1974).

It was not surprising that the behavior of Noncompleters would be characterized by an escalation of Minor fines in concert with a high rate of House Rule violations (Figure 2). However, the situation differed with respect to the Major fines, which did not show such a clear difference among the groups during the second 4 months (Figure 3). Accordingly, the Major Fine patterns were examined for additional information regarding the nature of the violations exhibited by each group.

The results of this evaluation showed that, of the 12 types of infractions that
Fig. 4. Distribution of the mean weekly frequency for each of four Major Maladaptive behaviors (Physical Assault, Noncompliance, Property Damage and Threatening), for each of the experimental groups, during the first 32 weeks in the Behavior Treatment Program.

were included in this category, only four occurred at a rate averaging more than 0.5 tokens per day for any group. These were (a) physical assault, (b) noncompliance, (c) property damage and (d) threatening. To compare these four behaviors among the three groups, the total number of times each infraction occurred was determined for each patient that remained in the program for up to 32 weeks. This total was divided by the number of weeks the patient was in the program, to produce an average weekly frequency for each of the four Major Maladaptive Behaviors. As shown in Figure 4 it can be seen that for the majority of patients in the two groups of Completers, the frequency of these four infractions was low, i.e. 0.5 or less. In contrast, the Noncompleters showed a greater frequency of occurrence. When these data were combined, as in Figure 3, the average among the groups appeared similar. But the differences in type and frequency of infraction shown by the Noncompleters might be more likely to indicate a lack of improvement, especially if these occurred after being in the program for an extended period of time, and to lead the treatment team to consider eventual termination from the program.

To consider the influence of the nonprogrammatic variables on the outcome of the BTP, a Social Support score was derived, incorporating information about the social environment of each patient, such as the presence of significant individuals and their involvement in the patients' treatment. Although this score was not obtained for every subject, an analysis was performed on the available data for each group (BDC, n = 14; BDNC, n = 13; PDC, n = 6). The result indicated
an overall effect of social support (BDC mean = 16, BDNC mean = 11, PDC mean = 18; $H = 7.37, p = .025$), however, none of the groups was statistically different from any other. This is consistent with previous research that showed a positive effect of social support, in general, on outcome (Beasley. 1998; Corrigan. 1995b; Dickerson, Ringel, & Parente. 1999).

Finally, data were collected on the disposition of the patients after they left the hospital. At the time of last contact, the average post-discharge period for the total group was 2.7 years. Of the 48 individuals whose data were analyzed in this study, eight were lost to follow-up (three in the BDC group, four in the BDNC group and one in the PDC group); two had died (one in each of the BD groups); and five were in facilities with stronger security than the BTP (two from each of the BD groups and one from the PD group). Of the remaining 33 individuals, a comparison was made of the number who were out in the community (at home, in a group home, or living independently) and those who were still in an institution or hospital. For the BDC group, 9 were in the community and 2 were hospitalized; for the PDC group the corresponding values were 12 and 3, and for the BDNC group, 3 and 4. A Chi-square analysis of these data showed no significant difference among the groups, which may reflect the small size of the BDNC group. It should also be considered that while six patients in the PDC group were admitted directly to the BTP from the community, 10 of the other 11 had spent an average of 3.6 years (range 0.2–15 years) as inpatients in the hospital. The additional, eleventh, patient had spent over 45 years in the hospital before entering the BTP. Nevertheless, after an average of only 9 months of treatment, 75% were still in the community almost 3 years after discharge, including the individual who had spent most of his life as a psychiatric inpatient.

4. Discussion

The primary objective of this study was to evaluate the effectiveness of a TE system, administered on a single hospital unit, to two different inpatient populations. This was accomplished by analyzing the data obtained from 51 dually diagnosed inpatients, who either completed or were terminated from the Behavior Treatment Program (BTP) at the Jackson Campus of the Eastern Louisiana Mental Health System. All these patients presented with mild/moderate mental retardation and a DSM-IV Axis I diagnosis of either a severe behavioral disorder or a serious and persistent psychiatric disorder.

The results showed that individuals from both clinical groups, BD and PD, were able to complete the program and successfully meet the criteria for discharge. Combining these two groups (which also differed significantly in age as well as diagnosis), within one TE program did not prevent the majority of participants from reaching the criteria for completion. As proposed by McLaughlin and colleagues (1989), the TE system was successfully applied to individuals with a dual diagnosis of mental retardation and a behavioral disorder.
At the same time, the likelihood of success was not comparable for these two clinical conditions. Although the outcome of this comparison was statistically borderline, the evidence suggested that individuals with a behavior disorder were less likely to finish, and more likely to be terminated from the program, than those with a psychiatric disorder. These results were consistent with the literature, in that the 85% success rate of the PD group was similar to that reported by others for such populations (Butler, 1979; Carlson, et al., 1972; Fullerton, et al., 1978; Glynn, 1990) and the lower, 55% rate for the BD group was also comparable to previous results (Day, 1988).

When the number of weeks spent in the program was analyzed, there was a significant difference between those who did and those who did not complete. For the completers in both the Psychiatric and Behavior Disorder groups, the average time to discharge was about 9 months. In contrast, the average length of stay for the BD Noncompleters was about 6 months. This result indicated that even though individuals with a Behavior Disorder were less likely to complete the program, those who did finish did so in the same amount of time as patients in the Psychiatric Disorder group. Having a behavior disorder may have reduced the likelihood of, but not the amount of time required for, completion.

It is possible that the length of stay might have been different if the groups had not both been treated on the same unit. However, previous studies of more homogeneous populations have reported similar values. Baker (1988) reported a mean length of stay, for a small group of chronic schizophrenic inpatients who progressed in that program, of 15.25 months. Butler (1979) described three different categories of outcome, based on time course, in a group of chronic schizophrenic inpatients. One group reached the target behavior goal in 5 weeks, and were designated “immediate responders”, a second required 6 to 23 weeks, and were termed “gradual responders”, while a third group failed to reach the target and were considered “non-responsive.” Studies of adolescents and young adults with behavior disorders (often more severe than in the present study), have reported durations of from 2 to 4 months up to 1 year (Aitchison & Green, 1974); 6 to 13 months (Denkowski, Denkowski, & Mabli, 1984; Sandford et al., 1987); 11 months (Rice, et al., 1990) or 17.5 months (with a range of 2 months to 7.5 years; Day, 1988).

Subsequent analyses of our data were conducted to determine if the performance of those who completed could be distinguished from that of those who did not, while they were in the BTP. The data showed that while the groups did not differ during the first full week in the program, there was a clear difference after that initial period. While the BD Noncompleters generally earned less tokens than the BD Completers, the most striking differences among the groups occurred in regard to the fines imposed for maladaptive behaviors. After the first week there was a rapid and persistent increase in the number of tokens fined for those BD patients who did not complete the program, relative to the PD and BD Completers. This result was statistically significant by at least the third week, and was maintained in the analysis of the scores for the last observation of each patient.
These data indicated first, that the behavior of those individuals who eventually completed the requirements of the BTP was effectively controlled by the contingencies of the program within the first couple of weeks. In spite of the fact that all patients had some degree of mental retardation, they were capable of understanding and adhering to the rules, and did so relatively quickly. In fact, examination of the data shows that, out of 17 individuals in each group, eight of the PD and seven of the BD patients completed the program by the 28th week. Furthermore, six of those seven BD patients were discharged between 22 and 24 weeks, which is essentially equal to the 22-week minimum length of stay necessary for a “perfect” performance.

Second, within the same time period (28 weeks) 11 of the 14 BDNNoncompleters had also been terminated. This indicates that sufficient time was provided for evaluation before the decision was made to terminate a patient. The difficulty of modifying the behavior of young adults with behavioral disorders, with or without mental retardation, has long been appreciated (Aitchison & Green, 1974; Burchard, 1967). Even when progress was made, backsliding was common in those who had extensive criminal records, emotional disturbance or institutional experience (Denkowski et al., 1984; Rice et al., 1990). Consequently, the usefulness of identifying the individual characteristics of those who will fail to improve and those who will be successful has often been acknowledged (Dickerson, Ringel, Parente. & Boronow, 1994; Gripp & Magaro, 1974; Kowalski et al., 1976; Rice et al., 1990). Our data was consistent with previous studies in showing that the difference between Completers and Noncompleters appeared very early in the program, i.e. within weeks (Butler, 1979; Dickerson et al., 1994; Rice et al., 1990). The results summarized in Figures 1–3 show that within a month the Noncompleters could be distinguished from those who would be successful.

Inspection of the data also supported prior research in regard to the type of behavior associated with a poor outcome. Several investigators have noted that “combative patients” (Gripp & Magaro, 1974, p. 213), those who had an “inability to control aggressive behavior” (Dickerson et al., 1994, p. 169), and those who were property offenders (as opposed to sex offenders and assaulters; Day, 1988) had a poorer outcome than their cohorts. Our data supported these previous observations (Figure 4), but also showed that Noncompleters had a substantially greater number of less severe House Rule violations than the other groups, even while earning a high proportion of tokens. In summary, those who failed to make progress were resistant to all of the punishment contingencies, and this became evident very quickly.

This raised the question of whether the likelihood of success could be increased by making revisions to the program. The decision to terminate a patient could be modulated by making the pass/excursion criterion easier, i.e. by reducing the number of days prior to each pass/excursion required for “good” behavior from seven to five or three. If this criterion change was successful in allowing the more difficult patients to earn passes/excursions and make satisfactory progress, then the criterion could be gradually lengthened again to seven days. In this way, the acquisition of appropriate behavior might be shaped. It would also be
interesting to see if this modification had any generalized effect on the less serious House Rules violations.

It was appreciated that the performance of patients in the program might be influenced by the social support system available to them in their home environment. This factor was evaluated by the development of a rating scale that provided a quantitative, although somewhat subjective, estimate of the social resources for at least some of the patients in each group. Analysis of the total scores across groups showed a significant but not a differential effect of this variable. Apparently, the environmental milieu of those who completed the program was not substantially better than that of those who were terminated.

Our second goal was to examine post-discharge outcome. For those individuals who were located within the subsequent 2.7 years, there was no difference among the groups between the number who were still in the community and those who were rehospitalized. Interpretation of this long-term outcome was not obvious. The fact that 9 out of 11, and 12 out of 16 individuals from the BD and PD Completer groups, respectively, were still in the community was a positive result, especially considering the relatively brief period of time, on average, they were in the program. This compared favorably with the 72% of chronic psychiatric patients, reported by Fullerton et al. (1978), who were still living in the community after an average of 3 years post-discharge. Among eight other studies cited by Fullerton, the discharge rate varied from 68% to 23%, which further supported the success of our program. The fact that our PDC patients were in the hospital for an average of 3.6 years before achieving discharge from the BTP provided additional evidence of the programs' effectiveness. The average length of prior hospitalization in Fullerton et al. was 10 years, and varied from 6 to 18 years among the articles cited in that study.

There was not much information about the long-term outcome of populations similar to our BD groups. Although Day (1988) and others (Denkowski et al., 1984; Sandford et al., 1987) concluded that mentally retarded young adults with behavior disorders benefited greatly from the application of a hospital-based TE program, this methodology was not so successful in a maximum security setting, with older males (Rice et al., 1990). In that case, program variables were generally unrelated to later outcome.

With this consideration, the fact that three, out of the seven individuals in the BDNoncompleter group who could be located, were still in the community after nearly 3 years, suggested that the experience provided by the BTP might have been useful in preventing a subsequent rehospitalization, even though they did not complete the program. Moreover, only two of the Noncompleters (and two BD Completers) were in a more secure facility. It has been reported that even if a TE by itself does not significantly improve the performance of inpatients, it may, as adjunct treatment, result in lower rehospitalization rates and better socialization in the community (Claeson & Malm, 1976; Rimmerman et al., 1991). In the absence of a matched group, which had no exposure to the TE (Birky et al., 1971), it is difficult to fully appreciate the outcome. We also did not know the situation of those who were lost to follow-up. Finally it is worth noting
that, as with any other treatment, a positive outcome cannot be maintained if a patient is not compliant (Corrigan, 1995a). Those individuals who were terminated from the program might not be expected to participate in environmental interactions that would maintain appropriate, adaptive behavior.

Overall, the results of this study added to the body of literature that supports the efficacy of a TE program. It provided evidence that diverse populations of patients could be treated within the same program thereby improving cost-effectiveness. Our data also showed that those patients who resisted the program or who did not respond to this structure could be distinguished relatively early in the course of treatment, but that even those individuals derived some benefit from the experience as evidenced by their post-discharge survival in the community.

With further modifications, we believe the TE system can continue to be a very effective and efficient treatment intervention for a wide variety of patient populations. In particular, it would be important to make these programs as cost-effective as possible. Modifications that permit the use of the key elements of the TE program while maintaining a reasonable staff-to-patient ratio would improve their appeal. Future research focusing on which elements of the entire “package” are the most salient would assist in streamlining the program to make it easier for fewer staff to administrate. Another area for improvement would be to apply computer technology to the data collection process reducing the time needed for data inputting by staff. For example, using bar codes and optical readers to instantly record and store behavioral data for downloading directly to databases has recently been shown to be very efficient and accurate (Kahng & Iwata, 1998). Greater use of the application of specific reinforcers to each patient may help to improve the potency of rewards which in turn would maximize the probability of response to the TE program. The ability to be broad-based and flexible in choosing reinforcers would be helpful, as well (see Lecomte, Liberman & Wallace, 2000 for a discussion of this issue).

We believe the findings contained in the current paper should encourage others to continue using some form of TE system as a treatment intervention.

Acknowledgments

The authors would like to thank the staff of the Behavior Treatment Program, at Eastern Louisiana Mental Health System, Jackson Campus, for their cooperation and assistance in collecting the data for this study. In particular, we would like to express our appreciation to Mr. Carl Kahn. SSC/OMH, for his contribution of the Social Support scale, and information regarding the outcome and post-discharge disposition of the participants in this study.

References


