

RESEARCH REPORT

Predicting Treatment Outcome and Recidivism among Patients in a Maximum Security Token Economy

Marnie E. Rice, Vernon L. Quinsey,
and Randerson Houghton

The relationship between program performance and outcome for patients in maximum security token economy programs has not been previously studied. We examined variables related to success in a token economy program and to postrelease failure for 92 men in a maximum security psychiatric hospital. Point earnings later in the program were best predicted by earlier point earnings. Variables that best predicted postrelease failure, defined in various ways, were similar to those found in other studies; youthfulness, having spent more time in institutions, a diagnosis of personality disorder or retardation rather than psychosis, not having been found not guilty by reason of insanity or unfit to stand trial, and having been referred from another psychiatric hospital. That program variables were generally unrelated to later outcome suggests that treatment programs for patients in maximum security settings must emphasize skills that are relevant to postrelease success.

Ideally, token economy programs, or any treatment programs for that matter, should be designed to shape the behavior of participants in such a way that they demonstrate more prosocial, and less antisocial, behavior both within the institution and later in the community. Good performance and improvement in the program, likewise, should be related to early release from the institution and to positive outcome after release. Unfortunately, with few exceptions (e.g., Liberman, Mueser, & Wallace, 1986; Paul & Lentz, 1977), there has been little empirical evidence that these goals are met for any institutional treatment program. More specifically, there have been no demonstrations that any of these ideals have been met in token economy programs in maximum security settings.

Marnie Rice, Ph.D., is the Director of Research at the Mental Health Centre in Penetanguishene. Vernon Quinsey, Ph.D., and Randerson Houghton, M.S.W., were both employed at the Mental Health Centre, Penetanguishene at the time of the study. Dr Quinsey is now at Queen's University, Kingston, Ontario. Mr Houghton is now with the Ministry of Community and Social Services, Toronto, Ontario. Please address reprint requests and correspondence to: Dr Marnie E. Rice, Mental Health Centre, Penetanguishene, Ontario, Canada L0K 1P0.

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The effectiveness of token economy programs requires the systematic study of patient characteristics for those who do and do not respond to treatment (Kazdin, 1982; Kazdin & Bootzin, 1972). Although some researchers have failed to differentiate nonresponders from responders (Ayllon & Azrin, 1965; Paul & Lentz, 1977), others have found individual differences related to treatment outcome (Atthowe & Krasner, 1968; Kowalski, Daley, & Gripp, 1976; Liberman, 1968). Indeed, a method of predicting which patients would not improve in a token economy would prevent them from receiving treatment from which they were unlikely to benefit and would encourage the development of alternative or supplementary programs.

Nevin (1970) reported that the judgment of nursing staff as to which patients would be more likely to benefit from a token program was as accurate as statistical predictions based on variables such as prehospital social achievement and diagnostic category. These results, although perhaps partly reflecting a self-fulfilling prophecy, are important because they indicate that the best predictive measure of future benefit from a token economy may be the patient's initial progress. One aim of the present study was to predict the responsiveness of male patients in a maximum security hospital to a token economy using measures of their initial progress in treatment, as well as demographic, historical, and diagnostic variables. The progress of each patient was followed through 12 weeks of treatment. In addition, patients who were low point earners in the first two weeks were examined as a special subgroup in an attempt to identify variables related to their improvement.

Many follow-up studies have employed demographic, historical and diagnostic variables to predict recidivism among maximum security hospital patients (e.g., Pruesse & Quinsey, 1977; Quinsey, Pruesse, & Fernley, 1975a, b; Quinsey, Warnford, Pruesse & Link, 1975). Despite this research, virtually no information exists about the ability of measures to predict future success or failure of a patient's performance in a maximum security token economy program. Paul and Lentz (1977) presented convincing data that good performance in a carefully designed and monitored social learning program for chronic psychiatric patients was positively related to adjustment outside the hospital and to readmission. However, patients within a maximum security institution differ substantially from those in a minimum security hospital (Rice, 1985); it is important to know whether performance in a maximum security token economy program is related to future recidivism.

In the present study, variables reflecting performance in a maximum security token economy program, as well as demographic, historical and diagnostic variables, were used to predict later performance in the program, length of stay, and subsequent recidivism. It was hypothesized that good performance early in the program would be related to good performance later in the program, and that overall performance in the program would be related to shorter stay and lower recidivism upon release.

METHOD

Subjects

One hundred and thirteen men admitted to the admission ward of the maximum security Oak Ridge Activity Treatment Unit between March 1975 and April 1976 were included in the study. These men comprised all those admitted for treatment except for 17 patients who remained on the unit for less than seven weeks.

Treatment Program

The program was conducted on one unit of the maximum security Oak Ridge Division of the Mental Health Centre at Penetanguishene, Ontario, Canada. The hospital served all those male psychiatric patients in the province of Ontario who had been deemed too dangerous to be held in the province's less secure hospital units. Many of the patients in the hospital were held on Warrants of the Lieutenant Governor (WLGs) after having been found not guilty by reason of insanity or unfit to stand trial, usually for serious offenses against persons. Many other patients, certified as mentally ill, were in Oak Ridge because they had been violent or unmanageable in other psychiatric hospitals. Still other patients were in Oak Ridge after having been sent for an assessment prior to trial and were undergoing a course of treatment before being returned to trial. Finally, a few patients had been sent to Oak Ridge for treatment from correctional institutions where they had been serving sentences for various offenses.

The Activity Treatment Unit was a four-ward unit that operated as a token economy system. The admission ward served as a screening ward where patients were put on a program in which they accumulated points over a one-week period. The points determined their privileges for the following week. Patients who did poorly in this program were sent to another high security ward where the program and point system were almost identical, except that points were exchanged for privileges on a daily rather than weekly basis. The programs on these wards were similar in most respects to that described by Quinsey and Sarbit (1975). Patients who did well on either of these wards were transferred to one or two higher privilege wards with less security.

Upon arrival to the unit, each patient was assessed informally by the ward staff and assigned to confined or semiconfined status based on whether his initial behavior towards staff members was co-operative or not, and the staff member's assessment as to whether that patient was too dangerous to let out on the corridor. Patients earned points for daily assessments of their ward work, mood and co-operation, room and self-care, and for weekly attendance at a ward meeting. The points were accumulated weekly and determined the patient's privilege category for the next week. Privilege categories determined how much time a patient was allowed to spend out of his room, his yard privileges, his attendance at the off-ward dining room and paid work areas, and his access to material reinforcers such as cigarettes, candies, lighters, books, etc. Patients were fined according to a fixed schedule for various misbehaviors. Fines resulted (if large enough) in an immediate drop in privilege category and were also subtracted from the total accumulated towards the next week's privilege category. Certain acts (such as assaults) resulted in the loss of all points, plus time in confinement.

Behavioral Ratings

Inter-rater reliabilities for the attendants' daily ratings of room and self-care were sampled twice during the time of the study under non-blind conditions. The reliability estimates were excellent for room care (Pearson r s of 0.82 and 0.84) and self care (0.83 and 0.78). The mood and co-operation scales employed in the study were derived from Ellsworth's (1971) *MACC Behavioral Adjustment Scale* and resulted in moderate reliability estimates of 0.50 and 0.56.

Records were also kept of the number of assaults for each patient during his 12 weeks in the program. Assaults were defined as incidents of patient-initiated forceful physical contact, or attempted physical contact against one or more persons. A reliability check conducted during the time of the study revealed 100% agreement on assaultive incidents (see Quinsey & Varney, 1977 and Harris & Varney, 1986 for a discussion of these data).

Follow-up Data

Data regarding recidivism were gathered for all subjects by examining their criminal arrests (according to records of the Royal Canadian Mounted Police) after release and also by examining their readmissions to Oak Ridge. Subjects in the follow-up sample included all subjects who failed or who had had at least five years of opportunity to fail.

Data Analyses

Predicting Success in Treatment

An attempt was made to predict patient adjustment in the 7th through 12th weeks of treatment from behavior in the first two weeks and background variables. The criterion measure was the average number of points per week earned in weeks 7 through 12.¹

Program variables included points earned in the second week for mood, co-operation, room care, self care, and work, as well as gross points earned in the second week and number of days confined in the first two weeks. The intercorrelations among the mood, co-operation, room care, self-care, work scores and gross point earnings for the second week of treatment exceeded 0.75. As expected, the number of days confined in the first two weeks was negatively correlated with the remainder of the program predictor variables. Because of the high correlations among the program variables, only gross point earnings and number of days confined were retained in the subsequent analyses.

The intercorrelations among the nonprogram and program predictor variables tended to be much lower. For example, the diagnosis of psychosis correlated negatively with the various program variables except for number of days confined (Pearson r s from -0.22 to -0.33 , all p s < 0.05). In addition, the legal status of unfit to stand trial or not guilty by reason of insanity was correlated positively with all program variables except for work and for number of days confined (Pearson r s from 0.23 to 0.30 , all p s < 0.05). Because of problems in distribution, nonprogram variables were recategorized as dichotomous and other variables were eliminated. This resulted in a revised set of 12 predictors (see variables 1–12 in Table 1).

Hierarchical multiple regression analyses were conducted in order to predict average point earnings in weeks 7 through 12. In the first analysis, only those variables

¹ Patients who earned a transfer to the higher privilege wards within the 12 weeks of their participation in the study were assigned maximum points until, or unless, they were transferred back to one of the two lower privilege wards, in which case their actual point earnings were recorded from the date of their transfer back. Patients who improved enough to be transferred out of the unit within 12 weeks ($N = 29$) were assigned points for only those weeks that they were in the hospital.

that pertained to the patient's pre-admission history were used as predictors (total previous months in institutions, age, completion of grade 8, employment, and marital status). In the second analysis, only those variables that pertained to the patient's current admission were considered. These variables included (a) the severity of the offense that resulted in the patient's admission (Akman & Normandeau, 1967); (b) whether the patient had charges leading to admission; (c) whether the patient had been found not guilty by reason of insanity or unfit to stand trial; (d) whether he was referred from another psychiatric hospital; and (e) whether he was diagnosed as psychotic. In the third analysis, only program variables (points earned in the second week of the program, and number of days confined in the first two weeks) were included. In each of the above analyses, a stepwise procedure was followed in order to determine up to two variables from each set to include in a final simultaneous regression analysis using predictors from all three sets. In the stepwise analyses, the alpha to enter or remove was 0.15. The data were analysed using SYSTAT (Wilkinson, 1986).

Predicting Improvement in the Program

In order to ascertain which factors were related to improvement among that subgroup of patients who started off poorly in the program, the second criterion measure was dichotomous and assigned persons who scored fewer than 101 points in their second week of treatment to 'improve' or 'not improve' groups, according to whether the difference between their average point earnings for weeks 11 and 12 and their earnings for week 2 were above or below the average difference for these subjects. Only those patients who remained in hospital for the entire 12 weeks were considered in these latter analyses. Because there were only 37 subjects in this group, only univariate analyses were used.

Predicting Months until Discharge

Hierarchical multiple regression analyses were conducted to try to predict months until discharge for the follow-up sample ($N = 92$). The variables were divided into the same three sets described above, except that three additional variables were included in the set of program variables—average points for weeks 7 through 12, number of weeks in which the patient was confined at least once in weeks 7 through 12, and number of assaults during the first 12 weeks. The first two variables from each set to enter the stepwise analyses were then entered into a simultaneous regression analysis.

Recidivism Analyses

For the recidivism analyses, the predictor variables were the same as those used in the above analyses, plus number of months until discharge. There were four criterion variables. For the first, failure was defined as any subsequent arrest (as recorded on the subject's record from the Royal Canadian Mounted Police) or any subsequent readmission to Oak Ridge. The second was violent failure. A violent failure was any arrest that involved actual physical assault, or any readmission to

Oak Ridge that was precipitated by the patient's physical aggression.² The third criterion variable was later readmission to Oak Ridge and included all those patients who were readmitted to Oak Ridge in the five year follow-up. The final criterion variable was later charges. All those patients who were rearrested within the five-year period for any offense were counted as failures. For each of the four measures of recidivism, hierarchical discriminant analyses were run in which the variables were categorized as preadmission, admission, or program variables as shown in Table 1. The first two variables (or, in some cases, zero or one variable if none or only one entered the stepwise equation) from each of these sets to enter the stepwise discriminant analysis were then entered into a simultaneous discriminant analysis along with months until discharge to yield an overall prediction equation.

RESULTS

Description of Sample

The 113 patients averaged 34 years of age ($SD = 11.3$) upon admission to the program. They had spent a mean time of 46 months ($SD = 64.4$) in correctional or psychiatric facilities prior to their current admission. The average educational level was approximately grade eight. Only 26 of the 113 men had ever been married or lived common-law. Eighty were diagnosed as psychotic (26 of whom were paranoid schizophrenics), 10 were diagnosed as retarded, 21 received a primary diagnosis of personality disorder or sexual deviation, and two had other diagnoses. Thirty-three of the men had no criminal charges leading to admission, 47 had charges outstanding, 14 were under sentence, 15 had been found not guilty by reason of insanity, and four unfit for trial. Eighteen of the patients included in the study were patients transferred to the admission ward from other wards within the hospital.

The intercorrelations among all the variables used in the study are shown in Table 1. The correlations shown are those obtained for the follow-up sample ($N = 92$). The correlations for the sample used in predicting success in the program ($N = 113$) were essentially identical to those shown in Table 1.

Predicting Success in the Program

There was a significant improvement in point earnings during the study. A comparison of the point earnings in the second and last weeks in the program yielded a $t(112)$ value of 9.38 ($p < 0.001$). Patients earned an average of 105 points in week 2 ($SD = 67.0$), and an average of 177 points in week 12 ($SD = 64.3$).

The variables that were significantly correlated with average point earnings in weeks 7 through 12 are shown in Table 1. In the multiple regression analysis using only preadmission variables, the only variable that entered the equation was whether or not the patient had ever been married (multiple $R = 0.187$), with married patients earning higher points in weeks 7 through 12. Having had charges leading to admission, and having been found not guilty by reason of insanity or unfit for trial entered

² Two raters independently rated the patient files to determine the reliability with which the assignment to violent failure could be made. In cases of disagreement ($N = 4$), a third rater made the decision as to which group the individual should be assigned.

Table 1. Intercorrelations among variables for follow-up sample (N = 92)

	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Pre-admission history variables</i>															
1. Total previous months in institutions	-0.288*	-0.408*	-	0.305*	-0.262	-	-	-	0.465*	-	-	0.295*	0.303*	0.217	0.234
2. Age	0.502*	0.256	-	-0.267*	0.270*	-	-	-	-0.213	-0.336*	-	-0.252	-	-0.241*	-
3. More than grade 8 education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Employed	0.286*	0.226	-	-	-	0.215	-0.226	-	-	-	-	-	-	-	-
5. Ever married	-	0.214	0.304*	-0.301*	-	-	-	-	-	-	-	-	-0.265*	-	-
<i>Admission variables</i>															
6. Seriousness of offense	-	-	0.242	-	-	-	-	-	-	-	-	-	-	-	-
7. Charges leading to admission	-	-	0.235	-0.645*	-	-	-	0.249	-0.386*	-0.294*	-0.226	-	-	-	-
8. Unfit to stand trial or insane	-	-	-	-	-	0.247	-0.263	0.295*	-	-	-	-0.263	-	-0.235	-0.228
9. Referred from a psychiatric hospital	-	-	-	-	-	-	-	-	0.325*	0.256	0.396*	0.209	-	-	0.277*
10. Psychotic	-	-	-	-	-	-0.326*	-	-	-	-	-	-0.207	-0.288*	-0.237	-
<i>Program variables</i>															
11. Points earned in week 2	-	-	-	-	-	-	-0.753*	0.346*	-	-	-	-	-	-	-
12. Days confined in first 2 weeks	-	-	-	-	-	-	-	-0.231*	-	-	-	-	-	-	-
13. Average points in weeks 7-12	-	-	-	-	-	-	-	-	-0.469*	-0.318*	-	-	-	-	-
14. Confinement in weeks 7-12	-	-	-	-	-	-	-	-	-	-	0.214	0.209	-	-	-
15. Assaults	-	-	-	-	-	-	-	-	-	-	0.232	-	-	-	0.259
16. Months until discharge	-	-	-	-	-	-	-	-	-	-	-	0.239	-	-	0.325*
<i>Follow-up variables</i>															
17. Subsequent failure	-	-	-	-	-	-	-	-	-	-	-	-	0.549*	0.698*	0.647*
18. Subsequent violent offense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.355*
19. Subsequent offense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20. Subsequent readmission	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes. Only significant correlations ($p < 0.05$) are shown. Variables that were not significantly correlated with any others are omitted from the vertical columns. Correlations marked by an asterisk are significant at the 0.01 level.

the multiple regression equation for the admission variables (multiple $R = 0.364$), with both variables having positive correlations with point earnings. The use of the program variables from the first two weeks (points earned in week two, and days confined during the first two weeks) yielded a multiple R of 0.347. Patients who earned more points, and were confined less in the first two weeks, earned more points in weeks 7 to 12. A multiple R of 0.487 was obtained in the simultaneous multiple regression analysis using all of the above variables.

Predicting Improvement in the Program

A comparison of the 37 patients who started poorly in the program with the remaining 47 patients who did not start poorly but stayed all 12 weeks revealed that those who started off poorly were less likely to ever have been married ($\chi^2(1) = 4.28$, $p < 0.05$), less likely to have been employed prior to admission ($\chi^2(1) = 4.28$, $p < 0.05$), and younger ($t(82) = 1.98$, $p < 0.05$). Not surprisingly, those who started poorly, in addition to having earned fewer points, had also spent more days in confinement ($t(82) = 8.51$, $p < 0.01$) in the first two weeks than the other patients.

Considering only those patients who started off poorly, the only variables that discriminated the 19 patients who improved from the 18 who did not were whether they had been referred from another psychiatric hospital, with psychiatric hospital referrals being less likely to improve ($\chi^2(1) = 4.94$, $p < 0.05$); and whether they had ever been married, with those who had never been married being less likely to improve ($\chi^2(1) = 4.25$, $p < 0.05$).

Predicting Months until Discharge

The average length of stay in the hospital was 11 months ($SD = 15.1$), with a median stay of four months. The stepwise multiple regression analysis using only preadmission variables yielded a multiple R of 0.200 and used only the total number of previous months in institutions. Of the admission variables, referral from another psychiatric hospital, in combination with psychosis and severity of offence, permitted significant prediction of length of stay (multiple $R = 0.432$). The stepwise multiple regression analyses using program variables yielded a multiple R of 0.296. Patients who stayed longer in Oak Ridge were more assaultive during the first 12 weeks of their stay and earned more points in week two than patients who stayed for a shorter time. The multiple regression analysis using the best predictors from the above analyses yielded a multiple R of 0.452.

Predicting Recidivism

Ninety-two subjects were included in the follow-up analyses. Of the original 113 subjects, 14 were excluded because they had never been discharged, or they had not failed and had not been at risk of failure for at least five years. In addition, three subjects were excluded because they had been deported upon discharge from Oak Ridge. A further three subjects were excluded because they were readmitted to either Oak Ridge, or prison, due to offenses that had occurred prior to their inclusion in the study. The average follow-up period was 6.6 years.

The results of the recidivism analyses are summarized in Table 2. For each of

the four measures of recidivism, the table shows the number of subjects who failed, the canonical correlations for each set of variables in the hierarchical discriminant analyses along with the variables that contributed significantly to the discriminant function, and the canonical correlations for the final simultaneous solution for each of the outcome measures.

Table 2. Summary of results of discriminant analyses of recidivism data

	Outcome Measure			
	Failure	Violent Failure	Subsequent Charges	Subsequent Readmission
Number with poor outcome	47	22	31	28
<i>Preadmission variables^a</i>	0.381	0.374	0.319	0.290
Total months in institutions	*	*	*	*
Age	*		*	*
Employed		*		
<i>Admission variables^a</i>	0.345	0.336	0.327	0.332
Unfit to stand trial/insane	*		*	*
Psychiatric hospital referral	*	*		*
Psychotic		*	*	*
<i>Program variables^a</i>	—	0.209	—	0.259
Confinement in weeks 7-12		*		
Assaults				*
Months until discharge ^b	0.239	—	—	0.325
Final simultaneous analysis ^a	0.477	0.437	0.389	0.430

Notes. Variables that did not contribute significantly to the solution for any outcome measure are omitted. Asterisks represent variables that contributed significantly to the discriminant function.

^aNumbers in these rows represent the canonical correlations where significant.

^bNumbers in this row represent Pearson *r*s.

Predicting Later Failure

There were 47 patients who were later arrested, or readmitted to Oak Ridge, resulting in a 51% failure rate. The discriminant analysis using only preadmission variables yielded the highest canonical correlation of the three sets of predictor variables, with a canonical correlation of 0.381 (see Table 2). The simultaneous discriminant analyses using the best variables from each set yielded a canonical correlation of 0.477, and used the following variables: total months in institutions, age, whether fit for trial or not guilty by reason of insanity, and whether referred from another psychiatric hospital.

A kappa statistic was used to evaluate the magnitude of the improvement over chance (using the proportional chance criterion) obtained by using the discriminant function coefficients to assign group membership (Huberty, 1984). The resulting kappa was highly significant ($\text{kappa} = 0.392, z = 4.08, p < 0.01$).

Predicting Later Violent Failure

Twenty-two of the 92 patients committed a violent offense subsequent to their release from Oak Ridge or returned to Oak Ridge for a violent offense against persons,

yielding a 24% violent failure rate. Twelve patients incurred subsequent charges for violent offenses and 13 committed acts of violence in other hospitals for which they were not charged. The majority of the violent acts were assaults or sexual assaults; there was one charge of robbery with violence and one charge of murder.

The discriminant analysis using only preadmission variables yielded the highest canonical correlation ($R = 0.374$) of the three sets of predictor variables (see Table 2). The simultaneous discriminant analyses using the best variables from each set yielded a canonical correlation of 0.437, and used total months in institutions, whether employed, whether referred from a psychiatric hospital, whether psychotic, and confinement in weeks 7 to 12. The improvement over chance obtained by using the discriminant function coefficients to assign group membership was significant ($\kappa = 0.337, z = 2.32, p < 0.05$).

Predicting Subsequent Charges

Thirty-one of the 92 patients were charged with at least one criminal offense during the follow-up period, yielding a failure rate of 34%. Most of the charges were for nonviolent offenses such as mischief, breaking and entering, and theft.

As shown in Table 2, the discriminant analysis using only admission variables yielded the highest canonical correlation ($R = 0.327$) of the three sets of predictor variables. The simultaneous discriminant analysis using the best variables from each set included the variables total months in institutions, age, whether unfit for trial or not guilty by reason of insanity, and whether psychotic, and yielded a canonical correlation of 0.389. The improvement over chance obtained by using the discriminant function coefficients was highly significant ($\kappa = 0.365, z = 3.00, p < 0.01$).

Predicting Later Readmission

Twenty-eight (30%) of the 92 patients had at least one further admission to Oak Ridge during the follow-up period. About half of these re-admissions were for reasons such as threatening or setting fires that did not involve any actual physical violence, and half were for assaultive behavior.

The correlation between later re-admission and months until discharge (0.325) was higher than the canonical correlation for any of the three sets of predictor variables (see Table 2). The simultaneous discriminant analysis using the best variables from each set plus months until discharge yielded a canonical correlation of 0.430, and included total months in institutions, age, whether referred from a psychiatric hospital, whether psychotic, number of assaultive incidents, and months until discharge. The improvement over chance obtained by using the discriminant function coefficients to predict group membership was significant ($\kappa = 0.234, z = 1.94, p < 0.05$).

DISCUSSION

Predicting Success in the Program

The data support the contention that the best predictor of future point earnings are points earned during the initial exposure to the program. Somewhat surprising,

however, was the finding that the various ratings of patient behaviors taken in the first two weeks were very highly intercorrelated. It would seem that they all tapped the same dimension, one that might be labelled 'general psychiatric disturbance', because the patients who were low point earners in the second week tended to be diagnosed as psychotic ($r = -0.33, p < 0.01$), and because of the variety of behaviors included (room care, self care, work behavior, mood, and co-operation). One dimension, no matter how relevant, cannot provide enough information to adequately assess patient progress or to be used in planning individual treatment programs. These results point to the importance of developing distinct, behaviorally specific, target behaviors for inclusion in a ward token economy and of ensuring that the behavioral variables selected do indeed show some independence from one another.

Those patients who had been found not guilty by reason of insanity or unfit to stand trial were underrepresented in the failure group. This finding is extremely interesting in view of the fact that these patients stay longer in the hospital than any other group of patients (Quinsey, Pruesse, & Fernley, 1975b). Given the results of the present study it is difficult to justify keeping them for an extended period in order to receive the behavioral ward treatment described in this paper. If the problems that brought these patients into the hospital are in fact suited to treatment in a token economy at all, the program might profitably be directed towards consequating individualized behaviors of greater clinical relevance.

Predicting Improvement in the Program

It is interesting that more than one-half of the patients entering the program started off well. The patients who started off well in the program were older, more likely to be or have been married and more likely to have been employed than those who started off poorly. The cut-off point of less than 101 points was chosen because this was the number that determined whether or not the patient would have a privilege card. Those patients who earned cards were generally seen as not being security risks on the ward, were not committing any serious offenses, and were at least doing an adequate job of performing the tasks expected of admission ward patients. Those patients who began the program performing at this level had less chance of showing improvement over time than those patients who did not earn a card in their first two weeks. Moreover, as we have seen, those who started off well in the program in their first two weeks generally continued to do well in the second half of their first 12 weeks. This finding suggests that many of the patients were not benefitting from the programs in a way that could be demonstrated in their point-earning behavior.

Previous investigators (Atthowe & Krasner, 1968; Kowalski *et al.*, 1976; Liberman, 1968) have commented upon the group that does not respond to the token economy in terms of those patients who continue to do poorly. The present study suggests that one should also consider the group that does not change during their stay in the token economy and who start off well. When looking at just those patients who did start off poorly, and examining those factors that were related to improvement, nonprogram variables became more important in predicting subsequent performance, than when all 113 patients were considered, because of the resulting homogeneity in initial program performance.

Patients who did not improve tended to be those transferred from other psychiatric

institutions and those who had never been married. That is, they were patients with histories of previous psychiatric hospitalizations during which they had exhibited institutional adjustment problems. These results corroborate those of other Oak Ridge studies that have shown that the most assaultive patients within the institution tend to be those who have been management problems in other institutions and not those who have committed serious crimes outside an institution (Quinsey & Varney, 1977; Harris & Varney, 1986). The results of the present study suggest that those patients who are transferred in from other psychiatric hospitals should be considered for alternative treatment programs, or put into intensive, probably individualized, pretraining programs (e.g., anger control programs), in addition to the ward token economy.

Predicting months until discharge

Program variables were significantly related to months until discharge, but added little predictive power beyond that possible from preadmission or admission variables. This was a disappointing finding. Our results were similar to those of Cyr and Haley (1983) who obtained a multiple R of 0.55 (compared to our 0.45) when they predicted length of stay for psychiatric patients using both demographic and clinical variables. We concur with their conclusion that consideration needs to be given to variables having to do with political factors, such as transfer and discharge policies, and availability of aftercare programs, in addition to the types of variables considered in the present study.

Predicting Recidivism

The failure rates obtained in the present study were high, ranging from 24 to 51%, depending on the definition of failure. These failure rates were higher than those obtained in earlier follow-up studies at the same institution (Pruesse & Quinsey, 1977; Quinsey, Pruesse, & Fernley, 1975a, b; Quinsey *et al.*, 1975). The present study, however, included a longer (6.6 years average) follow-up and used arrests, rather than convictions, as one of the criteria for failure. Of particular concern was the 24% rate of violent failures. This was considerably higher than the rates of violent failure found in the above studies at the same institution. However, in a more recent study at our institution, a 55% violent failure rate was obtained for a small group of patients who had been released from hospital after stays that had been very lengthy due to clinicians' opinions that these individuals were very dangerous (Quinsey & Maguire, 1986). Although distressing, a high rate of violent failure has the advantage of reducing the prediction problems posed by low base rates so often cited by those who study the prediction of dangerousness (Quinsey, 1980). The discriminant analyses for failure, no matter how defined, all yielded significant improvements over chance. Of course, because the estimates of true hit rates were based on obtained sample data (an internal classification analysis; see Huberty, 1984), they are likely to be somewhat positively biased. Nevertheless, the sizes of the effects are impressive.

The variable most consistently related to failure in all the recidivism analyses was total previous months in institutions, with failures having spent more time in

correctional or psychiatric facilities than successes. In addition, youthfulness, not having been found unfit to stand trial or not guilty by reason of insanity, never having been married, not being diagnosed as psychotic, having been referred from a psychiatric hospital, and staying more months before discharge on the index admission were frequently related to failure. Most of the nonprogram variables found to be related to failure in the present study are the same or similar to variables found to be important in the previous follow-up studies at our institution, as well as studies using other, similar, populations (Bowden, 1981; Nuffield, 1982; Pruesse & Quinsey, 1977; Quinsey *et al.*, 1975a; Quinsey *et al.*, 1975). Similarly, the canonical correlation coefficients were in the same range as those obtained in another study of patients released from our institution (Quinsey & Maguire, 1986).

Perhaps the most noteworthy, if disappointing, finding of the present study was the general lack of relationship between the program variables and outcome. This finding has serious implications for the design of programs in maximum security settings. The only program performance variables that were related to later outcome were the time spent in confinement in weeks 7 through 12 (related to subsequent violent acts) and number of assaultive incidents (related to subsequent readmission). These data support the findings of Tong and Mackay (1959) who found a positive relationship between misbehavior in the institution and subsequent conviction or return to hospital. The data from another study at our institution (Quinsey & Maguire, 1986) suggest that clinicians, when making release decisions about patients, consider patients who do poorly in treatment programs to be poor risks. However, our data suggest that program variables are currently so weakly related to later outcome that they should not be given much weight in making release decisions. Ross and Fabiano (1985) found that token economies generally have been ineffective in correctional settings, especially token economies like the one described in this paper, that rely primarily on behaviors that are standard for all clients, and that do not include cognitive components. In the future, programs in maximum security settings should target skills that are more strongly related to those that are relevant to postrelease success. In addition to behavioral programs such as social skills training, cognitive skills such as self control, and interpersonal problem-solving show particular promise (Ross & Fabiano, 1985).

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