

# Predicting Outcome of Insanity Acquittees Released to the Community

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*This research developed a model for forensic release decisions that incorporated actuarial and psychiatric predictors. The model was based on research that compared 127 insanity acquittees in the State of Maryland with a matched control group of 127 convicted felons and a comparison group of 135 mentally disordered prison transfers. The three cohorts were followed for an average of 10 years after release from hospital or prison. Findings on two outcome indicators are reported in this article: rearrests within 5 years after release and overall functioning in the community during 2½ years after release. Discriminant analysis was performed on the outcome variable of rearrest; it was found to accurately predict the outcome of 75% of the subjects with the following six variables: adjustment in hospital, clinical assessment of hospital staff, Global Assessment Scale score at release, functioning prior to instant offense, heroin addiction, and birth order. A second discriminant analysis identified seven variables that accurately predicted the overall functioning of 80.4% of the insanity acquittees.*

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## INTRODUCTION

Prediction of successful outcome in the insanity acquittee population is crucial in facilitating patient release decisions. During the 1970s, there was heightened interest in the prediction of violent behavior due to the trend away from civil commitment based on a need for treatment and toward civil commitment based upon a standard of dangerousness to self or others (Monahan, 1984). By the end of the decade, however, a number of studies had suggested that mental health professionals possessed poor predictive abilities with regard to future violent acts (e.g., Coccozza & Steadman, 1976; Pfohl, 1978).

One major problem in prediction literature has been the overprediction of violence, that is, high false positive prediction rates (Wenk & Emrich, 1982; Wenk, Robinson, & Smith, 1972). One reason for this, suggested by Monahan (1978) is that violence has a low rate of occurrence and can easily be overpredicted. In addition, violence can be unreliable as an event, and there is little consensus on the definition of violence or reliability in verifying its occurrence.

A second problem in prediction research is to define what constitutes a successful outcome. Recidivism is frequently used as the sole criteria of outcome. However, its use has been criticized as overlooking the value of programs whose goals may be other than to alleviate an individual's proclivity toward criminality (Maltz, 1984; Gottfredson & Gottfredson, 1980). Further, there is little agreement among researchers as to a definition of recidivism. Maltz (1984) has identified nine different definitions of recidivism but advocates using rearrest rates as the most accurate, though limited, definition. In this research, we have chosen rearrest as our definition of recidivism as well.

A third major problem in prediction literature is the lack of agreement about which independent variables are significant in a prediction model. Some studies have used standardized psychiatric interviews, mental status findings, and other clinical parameters (Strauss & Carpenter, 1977). However, attempts at predicting adjustment on parole have relied largely on actuarial tables and have been somewhat more successful (Gottfredson, Wilkins, & Hoffman, 1978; Hoffman & DeGostin, 1974; Glaser, 1962). The Salient Factor Scale, used by the U.S. Parole Board (Gottfredson, Hoffman, Sigler, & Wilkins, 1975) consists of nine items: prior convictions, prior incarcerations, age at first conviction, offense involved auto theft, history of drug abuse, employment prior to arrest, high school graduate, prior parole revocation, and release plan to live with spouse and/or children. While nearly all of the items in the Salient Factor Scale are based on an individual's actions prior to incarceration, Monahan (1978) has suggested the importance of additional postinstitutional factors, such as with whom the subject would be working and living, family support, and the type of environment to which an individual is released.

Though actuarial methods have come to be recognized as the superior way of predicting behavior (Monahan, 1978), there has been little work conducted on developing actuarial models for mentally disordered offenders. Previous research has shown the need to combine dispositional information with clinical and cri-

minologic information into one model (Bieber, Bosten, Pasewark, & Steadman, 1983).

The objective of this study was to develop a model for forensic release decisions that incorporates actuarial and psychiatric predictors. Our model incorporates patient and family background, clinical and psychiatric symptoms, treatment, and criminologic variables. The study examined a large cohort of insanity acquittes compared to a matched control group of convicted felons, and a comparison group of mentally disordered prisoners transferred to in-patient psychiatric treatment. Earlier work on a segment of this NGRI population had been completed by Spodak, Silver, & Wright (1984).

All of the insanity acquittes and mentally disordered prisoners transferred for in-patient care had been treated at Clifton T. Perkins Hospital Center (CTPHC), a 250-bed maximum security hospital that provides pretrial psychiatric examinations for men and women accused of felonies in all judicial circuits of Maryland, as well as a comprehensive treatment program for men and women adjudicated not guilty by reason of insanity (NGRI) for violent offenses. At the time of their release, insanity acquittes are placed on a "5-year conditional release" as required by the Annotated Code of Maryland (1984). Conditional release provides the Mental Hygiene Administration with a legal mandate to monitor an insanity acquittee's compliance with certain treatment-oriented and other conditions imposed by court order when the patient is discharged. Specific requirements of each conditional release are developed over a period of several months by the treatment team in conjunction with the patient, his or her family, defense counsel, state's attorney, and any involved community support systems. At the end of the 5-year period, a formal evaluation is held to determine whether the conditional release period should be terminated or extended.

## METHOD

### Subjects

This study is based on a longitudinal investigation of 127 male insanity acquittes in the State of Maryland who had been released from Clifton T. Perkins Hospital Center (CTPHC) between January 1, 1967 and December 31, 1978. All patients had been charged with felonies, released on the hospital 5-year conditional release program, and had been living in the community from 7 to 17 years ( $M = 10.5$  years).

Each insanity acquittee in the study was matched with a control subject from the Maryland Department of Public Safety and Correctional Services. Subjects were matched on the basis of age, race, length of incarceration, and type of offense. In order to obtain reliable follow-up information, only matched subjects who had been released on parole were selected. The length of follow-up for the control group ranged from 7 to 16 years ( $M = 10.8$  years). The average age of the NGRI and control subjects was 31 years; 58.3 percent were minority members.

In both groups, 29.9% were charged with murder, 31.5% assault, and 7.9% rape.

The NGRI and control groups were found to be comparable on several variables on which they were not matched: marital status (43.3% of the NGRIs and 43.4% of the controls were never married), work history (55.8% of NGRIs and 63.4% of controls were working at the time of arrest), and prior arrest history (76% of NGRIs and 83.3% of controls had previous arrest records). However, the NGRI group was better educated: 36% of NGRIs had at least a high school education compared to 22% of the controls.

A third cohort of subjects consisted of 135 mentally disordered prisoners who were treated at CTPHC between 1969 and 1981 and returned to prison after treatment. To ensure that follow-up information would be available on this group, only those prison transfers who were subsequently released on parole were studied. It was not possible to match this group to the insanity acquittee population since most prison transfers served their entire sentences and terminated on mandatory release status rather than parole. The length of follow-up for the prison transfers ranged from 4 to 16 years ( $M = 7.9$  years).

Major differences were found between NGRIs and the comparison group of mentally disordered prison transfers. Prison transfers were younger ( $M = 28.7$  years), composed of more minority members (79.2%); significantly more were never married (68.1%), and fewer were working at the time of their arrest (43.5%).

### Measures

A 12-page, 120-item inventory of independent variables was developed and used to collect data in nine areas: (1) sociodemographic information, (2) prior psychiatric hospitalization, (3) childhood and family background, (4) history of juvenile delinquency, (5) psychiatric signs and symptoms exhibited at hospital admission, (6) clinical stay information (e.g., treatment, seclusion, medication), (7) prior adult criminal behavior, (8) postinstitutional outcome (employment, functioning, treatment, medication, rehospitalization), and (9) postinstitutional criminal involvement.

The data collection instrument incorporated several scales that were used to facilitate comparisons between pre- and posttime periods. A scale that categorized severity of the charges for which a subject had been arrested prior to institutionalization, at the time of institutionalization, and during the follow-up period was developed. The scale utilized six seriousness categories and was based on the Maryland Multijurisdictional Sentencing Guidelines (1981) adopted by the Department of Public Safety and Correctional Services.

A role functioning scale based on earlier work by McGlashan (1984) was constructed. The scale assessed a subject's functioning in four areas: as a wage earner, mate, parent, as well as globally. In order to measure the overall severity of psychiatric disturbance, Endicott, Spitzer, Fleiss, & Cohen's (1976) Global Assessment Scale (GAS) was used. In addition, the research team developed a

matrix based in part on the Derogatis (1976) Symptom Checklist 90 clinical scales and other work, which coded symptoms as neurotic or psychotic and inwardly or outwardly expressed.

The major sources of data were case records from Perkins Hospital and from the Department of Public Safety and Correctional Services. The initial instrument went through six stages of revision. Interrater reliability testing was undertaken on a pretest of 25 NGRI cases. Item by item reliability testing was conducted on 98 items for 25 pairs of cases using measure of agreement (k) values. Kappa coefficients for 74.4% of the items were in the .5 to 1.0 range. As a result of this reliability testing, questions with low Kappa coefficients were eliminated or revised.

For each subject, an extensive search for arrest data was undertaken by a review of the FBI arrest histories, Maryland State Police arrest records, and relevant information contained in the hospital and/or parole case records. Data on prior and subsequent mental hospitalization episodes were obtained from the four Maryland state mental hospitals and St. Elizabeths Hospital in Washington, D.C.

To ensure that outcome after release was measured by more than recidivism alone, eight outcome indicators were used: (1) rearrests within 5 years after release, (2) rearrests during entire follow-up period, (3) severity of rearrests, (4) rehospitalizations during follow-up, (5) employment during follow-up, (6) Global Assessment Scale score during follow-up, (7) overall functioning during follow-up, and (8) compliance with release rules.

Outcome data on each subject was collected at three points in time after release from hospital or prison: (1) 2.5 years after release, (2) 5 years after release, and (3) during the entire follow-up period (up to 17 years). Several follow-up periods were necessary because while the average length of follow-up for an insanity acquittee was 5 years, the average length of time on parole was just over 2 years. Therefore, it was possible to measure outcome variables such as working after release or level of functioning after release only at 2½ years for control group subjects. The rearrest rate after 5 years is reported in order to afford a common cut-off time at which all subjects could be compared, though rearrests and mental hospitalizations after release were also collected for the length of the entire follow-up period.

### Analysis

Chi square tests of independence were performed to analyze the relationships between outcome indicators and independent variables. For discussion purposes, independent variables have been grouped as follows: sociodemographic data, background data, functioning prior to the instant offense, prior arrests and hospitalizations, and clinical information. A comprehensive analysis of the data through a stepwise discriminant analysis was also performed and will be discussed in detail later in this article.

The analysis between independent variables and outcome focused on two representative outcome variables: rearrests during the 5-year period after release and functioning during the first 2½ years after release. These two outcome variables were selected out of the eight collected because they were felt to be the most important overall descriptors of a subject's success after release from prison or hospital.

All subjects in each group were divided into successful and unsuccessful outcome groups. On the rearrest variable, those who were rearrested were placed in the "unsuccessful" group, and those not rearrested were placed in the "successful" group. On the variable of overall functioning after release, those who had been rated on the role functioning scale as functioning "well" or "very well" after release were placed in the "successful" group, and those rated "poor" or "fair" were placed in the "unsuccessful" group.

## FINDINGS

Table I presents a summary of the results on the two outcome variables for the three groups compared to their arrest records and functioning prior to the instant offense. All three groups had significantly fewer arrests during the five year follow-up period compared to prior to their instant offense. Overall functioning rating scales showed that the NGRI group experienced a significant improvement in their level of functioning from the before to after time period; prison transfers showed no change in the percent functioning well before versus after. Comparable data was not available for the entire control group (see footnote on Table I).

### Sociodemographic Variables and Outcome

Tables II through VI present summaries of chi square relationships found between independent variables and the outcome indicators of rearrests within 5 years after release and functioning during the first 2½ years after release. Significant chi square scores are designated with an asterisk (\*) when  $p \geq .05$  and double asterisk (\*\*) when  $p \geq .01$ . Independent variables that were found to be the

TABLE I Summary of Pre- and Post-Arrests and Pre- and Post-Level of Functioning

	Arrested		Z	Functioning Well		Z
	Prior %	Post %		Prior %	Post %	
NGRI	76.0	54.3	3.5**	18.8	49.6	5.2**
Control Group	83.3	65.4	3.3**	Not available*		
Prison Transfers	90.4	73.3	3.6**	17.7	18.4	.06

\* Data on the adequacy of parolees functioning prior to imprisonment were not available for the majority of the control group (N = 89 missing cases). However, of the 38 parolees on whom comparable before/after data were available, there was no significant change in their level of functioning: 47.4% were rated as functioning well prior to incarceration and 55.3% were functioning well on parole (Z = .67, N.S.).

\*\* =  $p \leq .01$ .

TABLE II Summary of Chi Square Relationships between Sociodemographic Characteristics and Outcome

Sociodemographic Variables	Outcome Variables	
	Rearrests Five Years after Release	Functioning 2½ Years after Release
Age		
NGRI	1.0	1.5
Prison transfers	5.4	2.8
Controls	7.6*	1.9
Race		
NGRI	1.3	.2
Prison transfers	4.7*	2.3
Controls	4.5*	.8
Marital Status†		
NGRI	1.3	6.3*
Prison transfers	1.3	3.4
Controls	3.9	1.2

\* =  $p \leq .05$ .

† = Predictor variable.

best predictors of outcome in the discriminant analysis are noted in the tables with a dagger (†). The narrative below discusses trends found in significant chi square relationships.

#### *NGRI Group*

Table II shows that marital status was associated with functioning after release for the NGRIs: Married insanity acquittes functioned more successfully after release than never married or divorced subjects. Over half (54.1%) of single NGRIs functioned poorly after release compared to 21.3% of married subjects and 24.6% of divorced subjects. There was no relationship between marital status and being rearrested and there is also no association between either outcome indicator and age or race.

#### *Prison Transfer Group*

In the mentally disordered prison transfer group, age was associated with being rearrested within 5 years after release: Significantly more of those prison transfers rearrested were under 25 (30.3%) compared to those not rearrested (11.1%).

Race was associated with rearrests after release: Significantly more minority group members (77.6%) were rearrested compared to whites (57.1%). Neither age, race, nor marital status was associated with functioning after release.

#### *Control Group*

Significantly more of those under 25 (76.5%) and those 26 to 35 (72.3%) were rearrested compared to those over 35 (50%). Race was associated with rearrests in that significantly more minority group members (73%) were rearrested

compared to 54.7% of whites. None of the sociodemographic variables was associated with level of functioning after release in this group.

### Background Variables and Outcome

#### *NGRI Group*

Table III shows that there was a trend ( $p = .06$ ) for more NGRI patients who were arrested as juveniles to be rearrested within 5 years after release (65.2%) compared to those with no juvenile arrests (48.1%).

There was also a trend for oldest and middle children to be rearrested more compared to youngest or only children. Only 5.9% of only children and 13.2% of youngest children were rearrested compared to 38.2% of middle children and 42.6% of oldest children.

School adjustment and experiencing traumatic events as a child were not related to outcome in the NGRI group, and none of these variables were related to level of functioning after release.

#### *Prison Transfer Group*

Significantly more of those who were arrested as a juvenile were rearrested within 5 years and during the entire follow-up period: 82.2% of those arrested as a juvenile were rearrested compared to 62.9% of those without juvenile arrests.

Experiencing traumatic events as a child was associated with rearrest for the prison transfer group more often than for the other two groups. Significantly

**TABLE III** Summary of Chi Square Relationships between Background Variables and Outcome

Independent Variables	Outcome Variables	
	Rearrests Five Years after Release	Functioning 2½ Years after Release
Arrested as Juvenile		
NGRI	3.4	2.0
Prison transfers	6.4**	.9
Controls	1.3	3.9*
Birth Order†		
NGRI	6.7	3.7
Prison transfers	1.3	.4
Controls	2.1	3.4
School Adjustment		
NGRI	.2	.0
Prison transfers	.2	.7
Controls	4.4*	2.9
Traumatic Event in Childhood		
NGRI	1.2	.0
Prison transfers	5.5**	.0
Controls	.4	1.2

\* =  $p \leq .05$ .

\*\* =  $p \leq .01$ .

† = Predictor variable.



TABLE IV Summary of Chi Square Relationships between Functioning Prior to Instant Offense and Outcome

Independent Variables	Outcome Variables	
	Rearrest Five Years after Release	Functioning 2½ Years after Release
Prior Alcoholism		
NGRI	3.5	.1
Prison transfers	2.9	.1
Controls	.0	.9
Prior Drug Abuse†		
NGRI	5.4*	3.2
Prison transfers	1.1	2.7
Controls	.5	.4
Prior Employment History†		
NGRI	8.7**	11.5**
Prison transfers	5.8**	.1 **
Controls	5.4**	5.6**

\* =  $p \leq .05$ .

\*\* =  $p \leq .01$ .

† = Predictor variable.

more of those who experienced trauma (90%) were rearrested within 5 years compared to those without trauma (68.6%).

School adjustment and birth order were not related to outcome in this group. None of these variables were related to level of functioning after release.

### Control Group

Juvenile delinquency arrests were not associated with rearrests within the first 5 years after release; however, they were associated with rearrests during the entire follow-up (not shown on table). Significantly more of the control subjects arrested as juveniles were rearrested as adults during the entire follow-up period (88.9%) compared to those with no juvenile arrests (70%).

Absence of delinquent activity in this group was also associated with satisfactory functioning after release: 69.7% of those not arrested as juveniles were functioning well compared to 45.2% of those with juvenile records.

Adjustment in school proved to be strongly associated with rearrests in the control group. Significantly more of those with poor school adjustments were rearrested within 5 years (75.9%) compared to those with good school adjustments (50%). Birth order and experiencing traumatic events as a child were not associated with outcome in this group.

### Functioning Prior to Instant Offense and Outcome

Table IV shows that for all three cohorts, the historical employment pattern subjects exhibited 3 to 5 years prior to the instant offense was the independent variable most frequently associated with successful outcome. In all three groups,

significantly more of those who had been unemployed prior to the instant offense were rearrested within 5 years after release. The proportion of subjects who were *unemployed and rearrested* compared to those who were *employed and rearrested* in each group were: NGRIs, 66.2% versus 39.2%; prison transfers, 77.5% versus 53.6%; and controls, 78.3% versus 53.1%.

#### *NGRI Group*

In the NGRI group, a prior pattern of employment (either full-time or part-time) before hospitalization was also associated with higher Global Assessment Scale scores after release, better overall functioning after release, and continued employment after release.

There was a trend for chronic alcoholism problems to be associated with more rearrests in the insanity acquittee group ( $p = .06$ ). Alcoholics were arrested more (64.2%) compared to nonalcoholics (47.3%). Alcoholics were also arrested for less severe crimes than nonalcoholics.

Similarly, drug dependence (heroin addiction) was associated with more rearrests among insanity acquittes as well as poorer functioning after release. Significantly more heroin addicts were rearrested (84.6%) compared to nonaddicts (52.3%). Fewer addicts were reported to be functioning well during release (25%) compared to nonaddicts (52.3%).

#### *Prison Transfer Group*

Chronic alcohol problems were associated with more rearrests in the prison transfer group: More nonalcoholics were rearrested within 5 years (78.8%) compared to alcoholics (65.5%). Drug abuse was not associated with rearrests or functioning after release.

#### *Control Group*

While no association was found between alcoholism and rearrests in this group, significantly more alcoholics were rearrested for less severe crimes than nonalcoholics. Drug abuse was not associated with rearrests or functioning after release.

### **Prior Hospitalizations, Prior Arrests, and Outcome**

#### *NGRI Group*

Table V shows that there was a strong association between the severity of prior arrests and being rearrested during the 5 years following release. In the NGRI group, 79.4% of those who had prior arrests in the most severe categories (e.g., murder, rape, assault with intent to murder, or robbery) were rearrested after release compared to a rearrest rate of 47.3% for those with prior arrests in the less severe categories.

While there was no statistically significant association between the number of prior arrests and rearrests within 5 years, there was a strong association between prior arrests and rearrests during the entire follow-up period. Nearly three-quarters

TABLE V Summary of Chi Square Relationships between Prior Arrests and Prior Hospitalizations and Outcome

Independent Variables	Outcome Variables	
	Rearrests Five Years after Release	Functioning 2½ Years after Release
Number of Prior Arrests		
NGRI	1.9	.5
Prison transfers	2.8	1.5
Controls	3.5	2.8
Prior Hospitalizations		
NGRI	3.6*	7.1**
Prison transfers	.0	2.2
Controls	.0	3.6*
Severity of Prior Arrests		
NGRI	9.0**	.3
Prison transfers	1.7	.0
Controls	1.6	2.8
Type of Instant Offense		
NGRI	3.5*	11.0**
Prison transfers	9.7**	2.4
Controls	.8	3.4

\* =  $p \leq .05$ .

\*\* =  $p \leq .01$ .

of the NGRI patients with prior arrests were rearrested compared to 50% of NGRIs without prior arrests.

The more serious the crimes for which subjects had been arrested, the more serious the rearrests, and the more rearrests during follow-up. Nearly all (91.2%) of those who had been arrested for murder, rape, arson, or assault were rearrested during the follow-up compared to 58.2% of those with less serious prior arrests.

Significantly more subjects who were hospitalized previously for mental illness were rearrested and functioning poorly after release. Two-thirds of subjects who had prior hospitalization for mental illness were rearrested compared to one-third of those without prior hospitalization. Nearly three-quarters (70.5%) of those who had prior hospitalization were functioning poorly after release compared to 29.5% of those without prior hospitalization.

#### *Prison Transfer Group*

Prior arrests showed a slight trend ( $p = .06$ ) toward being associated with rearrests 5 years after release in this group. Three-quarters of the prison transfers with prior arrest records were rearrested compared to 53.8% without prior arrests.

Significantly more of those previously hospitalized were hospitalized after release compared to those without previous hospitalizations: 69.5% versus 43.6%.

#### *Control Group*

Similar associations between these variables were found in the control group as were seen in the transfer group. Prior arrests showed a weak trend ( $p = .09$ )

with postarrests: 68.9% of controls were rearrested compared to 47.6% without prior arrests. Although fewer control subjects had hospitalizations for mental illness, significantly more of those who were previously hospitalized were rehospitalized after release: 21.7% versus 5.8%.

### Clinical Variables and Outcome for NGRIs and Prison Transfers

#### *NGRI Group*

The use of seclusion during hospitalization was closely associated with poorer outcomes. Significantly more of the insanity acquittees who were secluded during their hospitalization were unemployed after release, readmitted to mental hospitals, arrested for more severe offenses after release, and did more poorly in overall functioning.

Hospital adjustment (the degree to which patients adjusted to their hospital stay as evidenced by number of rule breakings, revoked privileges, and program failures) was also strongly associated with patient outcome. Significantly more of those with poor adjustments were rehospitalized, unemployed, and had poorer overall functioning after release than those with better adjustments. In addition, Table VI shows that significantly more of those with poor hospital adjustments were rearrested within 5 years after release (82.8%) compared to those with good adjustments (46.3%).

Similarly, a patient's clinical assessment (a rating of their improvement at the time of discharge as a result of treatment) was found to be associated with outcome in the NGRI group, though not with prison transfers. NGRI patients assessed as not improved were rearrested more (62.2%) compared to those rated as improved (40.5%).

**TABLE VI** Summary of Chi Square Relationships between Clinical Variables and Outcome

Independent Variables	Outcome Variables	
	Rearrests Five Years after Release	Functioning 2½ Years after Release
Seclusion		
NGRI	.8	4.7*
Prison transfers	.1	1.4
Adjustment to Hospital†		
NGRI	11.9**	15.7**
Prison transfers	5.1*	5.9**
Clinical Assessment of Patient Progress†		
NGRI	5.3*	8.1**
Prison transfers	1.9	3.7*
GAS at Discharge†		
NGRI	.8	12.3**
Prison transfers	1.5	.3

\* =  $p \leq .05$ .

\*\* =  $p \leq .01$ .

† = Predictor variable.

The score a subject received on the Global Assessment Scale was significantly associated with outcome after release: over 75% of those with low GAS scores at discharge had poor functioning after release compared to 42% of those with high GAS scores.

### *Prison Transfer Group*

Similar associations were found between hospital adjustment and outcome in this group as in the NGRI group: Significantly more of those with poor adjustments were rearrested and were functioning poorly after release.

Clinical assessment of a patient's progress was associated with functioning after release: 33.3% of those rated as improved were functioning well compared to 10.6% of those rated not improved. The use of seclusion and the Global Assessment Scale score were not associated with any outcome indicators in this group.

## Predicting Outcome among Insanity Acquittees

Each of the significant variables just reviewed were used in two stepwise discriminant analyses in order to determine which variables are the best predictors of successful outcome among insanity acquittees. Characteristics of the group of patients who were successful after release were compared with the characteristics of the group of unsuccessful patients. Those variables found to be significant in the chi square tests and proportional reduction in statistics tests (lambda statistics) were considered to be of value in a prediction context. Significant variables were used in a stepwise discriminant analysis to determine which variables collectively differentiated between the two groups.

### *Overall Functioning*

Table VII presents the results of the discriminant analysis on the outcome variable overall functioning after release. The following seven variables (listed with their standardized canonical coefficients) were found to correctly predict outcome in 80.4% of the cases (Lambda = .639;  $p = .0001$ ): (1) severity of instant offense (.630), (2) working prior to hospitalization (.510), (3) Global Assessment Scale score at release (-.445), (4) functioning prior to instant offense (.277), (5) adjustment in hospital (-.269), (6) clinical assessment of patient's improvement (-.255), (7) marital status (.190).

The analysis showed that released patients who functioned well after release were those who had been married; working (either full or part-time) at the time

**TABLE VII** Predicted Results versus Actual Outcome on Functioning after Release

	Actual Outcome	Correctly Predicted	Incorrectly Predicted
Unsuccessful	54 (51%)	40 (74%)	14 (26%)
Successful	53 (49%)	46 (87%)	7 (13%)
Total	107	86 (80%)	21 (20%)

TABLE VIII Predicted versus Actual Rearrest Outcomes

	Actual Outcome	Correctly Predicted	Incorrectly Predicted
Not Arrested	58 (46%)	44 (76%)	14 (24%)
Arrested	69 (54%)	51 (74%)	18 (26%)
Total	127	95 (75%)	32 (25%)

of arrest for the instant offense; arrested for less severe offenses; functioned "well" or "very well" prior to hospitalization; adjusted well to their hospitalization (i.e., few seclusions or incidents of rule breaking); been assessed by clinical staff as considerably improved; and had a release GAS score of 50 or better.

### *Recidivism*

Discriminant analysis was also used to predict which patients would be rearrested within 5 years after release and which would not be rearrested. As shown in Table VIII, 46% of the patients were not rearrested and 54% were. Of the 58 patients who were not rearrested, the discriminant analysis correctly classified 76% and of those arrested, 74% were correctly classified. Overall, 75% were classified correctly ( $\Lambda = .624$ ;  $p = .001$ ).

Six variables (listed with standardized canonical coefficients) were found to be of greatest strength in the recidivism discriminant analysis: (1) birth order ( $-.645$ ), (2) adjustment in hospital (.60), (3) clinical assessment of patient's improvement (.537), (4) Global Assessment Scale score at release ( $-.512$ ), (5) functioning prior to instant offense (.49), and (6) heroin addiction ( $-.349$ ).

The prediction equation showed that successful patients who were not rearrested after release were less likely to be heroin addicts; had adjusted well in the hospital (few seclusions or incidents of rule breaking); had been assessed by clinical staff as considerably improved at the time of discharge; had a GAS score at release of 50 or better; had functioned "well" or "very well" prior to arrest for the instant offense; and were only children or the youngest child in their family.

## SUMMARY

### **Independent Variables and Outcome**

The independent variables associated with successful outcome after release differed somewhat between the insanity acquittes and prison groups. For example, the traditional variables that are associated with criminality were found to hold true for the control group of felons: age, race, prior employment, prior arrests as a juvenile and adult, and poor school adjustment. However, while all of these variables were significantly associated with criminality in the prison transfer group, the associations were weaker, and the variables of trauma as a child, alcoholism, type of instant offense, GAS score, and hospital adjustment were all related to rearrests as well. In the NGRI group, fewer of the variables traditionally related to criminality were found to be associated with rearrest, though several

were: prior arrests as a juvenile and adult, alcoholism, unemployment, and type of instant offense. Equally strong associations were found in this group, however, with the variables of prior hospitalization for mental illness, hospital adjustment, and clinical assessment of hospital adjustment. Therefore, the correlates of criminality put forth by Monahan and Steadman (1984) were found to hold true for the control group of felons, but were somewhat less applicable for the mentally disordered prison transfers and insanity acquittees. In these two groups, these variables are overshadowed by several correlates of mental illness, that is, prior hospitalization, alcoholism, drug dependence, and adaptation to the hospital environment.

### Predicting Outcome

The two discriminant analyses showed that it is possible to develop a statistical model that can combine actuarial data, clinical data, and criminologic data to determine the likelihood of success after release. Several variables were particularly valuable in both prediction models and therefore show the most utility for incorporation into a release readiness table that could be used by hospital staff to assist in release decisions. These variables are: adjustment in hospital, clinical assessment of patient improvement, Global Assessment Scale score at release, and functioning prior to instant offense. The first three variables are the only ones that relate to a patient's progress at the hospital. The remaining variables that predict outcome, i.e., marital status, severity of instant offense, working prior to hospitalization, birth order, and heroin addiction, are not related to patient stay.

The variables in the prediction equation can be used by hospital staff to assess patients for release readiness along with patients' clinical course and other variables. The Office of Program Evaluation and Hospital Information Systems is currently developing a methodology whereby the data needed for the prediction model could be systematically collected and made available to clinical staff in the form of a discharge readiness score. The scores might then be placed into success and failure ranges in support of clinical release decision-making. Further research on this model will then be undertaken on a prospective basis to determine its reliability in predicting outcome.

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