RESEARCH REPORT NO. 7

ACTUARIAL PREDICTION OF PROBATION SUCCESS

September, 1978

Paul R. Gardner
University of Utah

THE PROBLEM AND ITS SETTING

The Statement of the Problem

This research proposed to identify variables found in the Division of Corrections Information System (See Appendix A) that could be used to develop three separate valid scales for predicting the success or failure of offenders on probation in the District Court, the Lower Court, and also for those convicted of drinking while driving.

The Research Questions

1. The first research question. What variables were found to exist in the Division of Corrections Information System that exhibited a significance greater than chance (.05 level) and that significantly differentiated successful from unsuccessful probationers?

2. The second research question. Can three separate scales, one for District Court, one for Lower Court, and one for those convicted of drinking while driving, be constructed from those variables that manifested a significance greater than chance? (.05 level)

3. The third research question. Can the three newly constructed scales (one each for District Court, Lower Court, and for those convicted of drinking while driving) predict successful from unsuccessful probationary terms with a predictive validity greater than chance? (.05 level)

THE REVIEW OF THE RELATED LITERATURE

A need for accurate prediction methods has arisen with the widespread usage of probation in the United States. Placement decisions about offenders are made at every step in the criminal justice process. However, among the most critical are those relating to probation, for they not only affect the lives of individual offenders, but also are intended to serve the larger society by imposing fair and effective means to control crime and delinquency. According to Don M. Gottfredson, (1967:171) "Prediction, a traditional aim of science, is a requisite to any effective crime and delinquency prevention or control program." He also indicated that if we seek to control delinquent and criminal behavior, then first we will need to predict it.

William James (1907) gave mankind a warning when he stated that we cannot hope to write biographies in advance. However, he did assert that we can establish general expectations. He also stated that we tend to live with our eyes in the future, while we really only understand what has happened in the past. William James also pointed out that any method of prediction merely provides a way of summarizing previous experience in the hope of finding a useful guide to future decisions.

Actuarial life tables have been in use for many purposes since the 17th century. According to Gottfredson et. al., (1974:1) "It is no new idea that aspects of human activity can be predicted (to a greater or lesser degree) and that the use of estimates of probability could help with decisions concerning individual persons."

The nature of the prediction problem in the field of corrections is the same as in many others. Gottfredson (1967:171) has noted that "A large body of literature is available concerning attempts to predict behavior in many sectors of social life. Examples are found in the prediction of social adjustment, of academic achievement, of vocational interest and performance, and of the outcomes of marriage."

Along with the above prediction studies in the various social problem areas, the literature addressing the theoretical and technical issues in prediction has grown. It now includes studies of the logic of prediction, of the role of prediction in the study of personality, of psychometric problems, and also the role of prediction methods in evaluating studies of different treatments.

Among the first prediction tables designed solely to be of use by criminal authorities were those developed in Massachusetts at the invitation of Mr. Sanford Bates extended to Professor S. B. Warner in 1923. Since that time hundreds of papers have been written discussing from various standpoints the construction of experience or prediction tables.

Although much has been written concerning the methods of prediction, C. H. Frank has noted in his article "Prediction of Recidivism Among Young Adult Offenders by the Recidivism-Rehabilitation Scale and Index" (1970) that a review of the methods and sources shows a distinct lack of predictive instruments that are adequate to meet the demand of the correctional systems.

Although many scales have been developed, they have either been too general in nature like the 'Law Encounter Severity Scale' (LESS) that was developed by the Experimental Manpower Laboratory for Corrections to help clarify the criterion used to determine maladaptive behavior, or they have dealt with prison parolees, like the 'Maladaptive Behavior Record' (MBR) that is used to predict parole outcome. Very little work has been done on probationers as a separate group that could be found, and the work that could be found dealt only in generalities. Some scales were indicated to be applicable to probationers, but in many articles only parolees were mentioned. In truth then, it appears that no scales have been developed that deal exculsively with probationers.

Of the scales that have been developed, only two appear to be of any value. These two scales were the 'Environmental Deprivation Scale' (EDS) that focused on environmental input, and the 'Maladaptive Behavior Record' (MBR) that focused on the individual's behavioral problems and deviances. The 'Law Encounter Severity Scale' (LESS), as reviewed by A. D. Witherspoon and E. K. Devalera (1973), was considered quite acceptable, which as was mentioned before, helps to clarify the criterion used to determine maladaptive behavior. Other scales have been developed, but they all have problems with their cross-validation studies, or else no success or level of significance is given.

Some studies have also been conducted using personal characteristics as a basis for classifying (predicting) outcomes of parolees. However, these studies have not been consistent in their findings as

to just what variables are significant, and in fact nothing is mentioned as to what consideration is given in determining if in fact they are significant. Just about every characteristic has at one time or another been used to determine the probability of a parolee committing another crime or predicting the success or failure of his parole, but no statistical proof has been offered to back up the author's claims. Therefore, it seems reasonable to assume that much more work is needed in the field of predictive studies.

THE METHODOLOGY

The Problem

What variables exist in the Division of Corrections Information System that could be used to develop three separate valid scales for predicting the success or failure of offenders on probation in the District Court, the Lower Court, and also for those convicted of drinking while driving?

Research Questions.

1. What variables were found to exist in the Division of Corrections Information System that exhibited a significance greater than chance (.05 level) and that significantly differentiated successful from unsuccessful probationers?

2. Can three separate scales, one for District Court, one for Lower Court, and one for those convicted of drinking while driving, be constructed from those variables that manifested a significance greater than chance? (.05 level)

3. Can the three newly constructed scales (one each for District Court, Lower Court, and for those convicted of drinking while driving) predict successful from unsuccessful probationary terms with a predictive validity greater than chance? (.05 level)

The first question. What variables were found to exist in the Division of Corrections Information System that exhibited a significance greater than chance (.05 level) and that significantly differentiated successful from unsuccessful probationers?

In order to consider the question of whether the right factors (variables) were used to determine or differentiate success from failure, the primary variables had to be found. In order to determine them, an .05 level of significance was chosen to be the cutting point between those variables considered important and those just slightly affecting the individual.

The sample used to identify variables related to the successful completion of probation supervision consisted of all those who left supervision between January 1 and July 1, 1977. The sample on which cross-validation was conducted consisted of those who left probation supervision between January 1, 1977 and January 1, 1978. The data was in existence on tape as part of the Utah Division of Corrections Information System. Those who successfully completed each of the three types of supervision (District Court, Lower Court, and Drinking Drivers) were contrasted with those whose probations were revoked.

Significant differences (.05 level) on discrete variables were determined using the chi square test of independence in the cross

tabs routine of the Statistical Package for the Social Sciences (SPSS).

The continuous variables were broken down into discrete variables and

then the significant differences (.05 level) were determined again by

using the chi square test. All data analyses were done utilizing the

Univac 1108 computer system located at the University of Utah.

The second question. Can three separate scales, one for District

Court, one for Lower Court, and one for those convicted of drinking

while driving, be constructed from those variables that manifested a

significance greater than chance? (.05 level)

Fifteen variables were considered to be the ideal minimum number

necessary to construct each scale to be used in the prediction study.

The variables that met the .05 level of significance were used to

construct the scales. (One scale each for District Court, Lower Court,

and for those convicted of drinking while driving was planned.)

The third question. Can the three newly constructed scales (one

each for District Court, Lower Court, and for those convicted of

drinking while driving) predict successful from unsuccessful pro-

bationary terms with a predictive validity greater than chance? (.05 level)

A second sample was divided into two further groups using the

criterion of success or failure while on probation. These cases

were then socred using the scale previously constructed. A T-test

of difference between means for each of the three groups was then

calculated to determine if the scale predicted better than chance.

(.05 level)

The Definition of Terms

Success. Success is defined as the completion of probation.

Failure. Failure is defined as having one's probationary term revoked and being sent to jail, or having the individual abscond from the system.

Misdemeanor. Misdemeanor is as defined in the Utah Penal Code (Section 76).

Probation. Probation is defined as the method of treating a convicted delinquent whereby he is released on a suspended sentence under supervision and upon specified conditions, or he is given probation in lieu of a sentence, also, the status of a convicted person so released, as, placed on probation.

Lower Court. Lower Court is defined as a court (City, County, or Municipal) that falls under the jurisdiction of the District Court.

District Court. District Court is defined as a court that is one of seven assigned in the State of Utah over a specified area. It is a court of record that handles felony cases and supervises Lower Courts in its specific area.

Drinking Driver. A drinking driver is defined as one who has been so sentenced by a judge. (Driving while under the influence of alcohol.)

Assumptions

The first assumption. The first assumption was that there existed a need for the scales to be developed.

The second assumption. The second assumption was that there existed variables which could indeed predict failure.

The third assumption. The third assumption was that such scales could be developed or created to fill the need that existed.

The Importance of the Study

Placement decisions about offenders are made at every step in the criminal justice process. Among some considered critical are those relating to probation, for they not only affect the lives of individual offenders, but also are intended to serve the larger society by imposing fair and effective means to control crime and delinquency.

To make rational probation decisions, accurate information about offenders is essential, and where available, appropriate prediction tools should be used.

The Delimitations

The study limited the variables to those used in the Division of Corrections Management Information System.

The study dealt only with those probationers who resided in the state of Utah.

The study covered only the period extending from January 1, 1977 through January 1, 1978, and concerned itself only with those probationers that were terminated, had their probation revoked, or who absconded while on probation.

The study developed simple scales that could be used by the Division of Correction agents directly in the field.

RESULTS

<u>Research Question 1.</u> What variables were found to exist in the

Division of Corrections Information System that exhibited a significance

greater than chance (.05 level) and that significantly differentiated

successful from unsuccessful probationers?

The twenty-seven variables that exhibited a significance greater

than the .05 level and that significantly differentiated the success or

failure of offenders on probation in the District Court are presented

in Table 1.

Insert Table 1

Some variables found to be of significance were purposefully left

off Table 1 because they did not significantly differentiate successful

from unsuccessful probationers. These variables were: Resident, Ninety-

Day Evaluation, Race, Drug-Related, Judicial, Sentence (length of), Year

Received, Exit Type, Supervision (type of), History (Drug and Alcohol),

Religion, Prison (Had the probationer been in one before?), Previous Pro-

bation, and Previous Parole. Some of the above variables, it was felt,

were biased, some were not included because the sample size was too small,

some were left off because of previously set delimitations, and othere were

not noted because they were artifacts of the correctional system.

The thirteen variables that exhibited a significance greater than

the .05 level and that significantly differentiated the success or failure

of offenders on probation in the Lower Court are presented in Table 2.

Insert Table 2

As in Table 1, some variables were purposefully left off Table 2 even though they were found to be of significance at the .05 level. These variables included: Race, Year Received, Exit Type, History (Drug and Alcohol), Religion, Prison (Had the probationer been in one before?), and Previous Probation. The above variables were left off for the same reasons as before; some were biased, some had a sample size that was too small to rely upon, and others were again artifacts of the correctional system.

The ten variables that exhibited a significance greater than the .05 level and that significantly differentiated the success or failure of offenders on probation for drinking while driving are presented in Table 3.

Insert Table 3

Again, as in the previous two tables, some variables were purposefully left off. Those variables left off because they were thought to be biased, artifacts of the system, or because they had a sample size too small to rely upon were: Race, Exit Type, Previous Probation and Previous Parole.

Research Question 2. Can three separate scales, one for District
Court, one for Lower Court, and one for those convicted of drinking
while driving, be constructed from those variables that manifested a
significance greater than chance? (.05 level)

The three separate scales that were developed using the variables
found to be significant at the .05 level or better are presented in
Tables 4, 5, and 6. Table 4 presents the District Court scale. Table
5 presents the Lower Court scale, and Table 6 presents the Drinking
Driver scale. It should be noted that a weight of one was given to
those variables that exerted a negative influence upon the offender, and
a weight of minus one was given to the variables that exerted a positive
influence upon the offender. By doing this, the positive one would
add to the probability of failure, while the minus one would add to
the probability of success.

Insert Tables 4,5,6

Research Question 3. Can the three newly constructed scales (one
each for District Court, Lower Court, and for those convicted of drinking
while driving) predict successful from unsuccessful probationary terms
with a predictive validity greater than chance? (.05 level)

The predictive validity for each of the three scales (District
Court, Lower Court, and Drinking Drivers) as statistically derived by

using the T-test of differences between means for each of the three
groups is presented in Table 7.

Insert Table 7

It should be noted that for each of the three probation groups, the
level of significance is beyond the .05 level. Therefore, each of the
three scales do predict successful from unsuccessful probationary terms
with a predictive validity greater than chance.

Table 8 presents the possible total scores with their corresponding
predicted chance of success or failure for the probationer.

Insert Table 8

Again, as with the T-test, the level of significance was found
to be greater than the .05 level that was said to be needed in order
for the results to be considered valid.

DISCUSSION

Since the need for predictive studies has been shown to exist, this
predictive study was undertaken. The general aim of this project was
to develop, test, and demonstrate a program of improved information for
decision making by providing objective, relevant information for indi-
vidual case decisions, and hopefully to be used to set some kind of
standard for all decisions. Three predictive scales (one each for

District Court, Lower Court, and for those convicted of drinking while driving) were created and tested. Inner and outer limits were set and the guidelines were followed. The conclusion is that the three scales do have predictive qualities and that these predictive qualities are significant at the predetermined level of .05. In fact, the three scales are significant beyond the .05 level as determined by the T-test of differences between means.

However, this study is seen as a pilot project. It is felt that the three separate scales could be possibly condensed into one single scale, and that that scale could be used to help predict all three kinds of probation outcomes. Probation in the state of Utah, whether it involves the District Court, Lower Court, or is for those convicted of drinking while driving, is basically organized and supervised the same. Therefore, one scale would be applicable in all three situations. Some modifications would have to be made, but it is felt that this could be done and that the level of significance would still be high. It is also felt that the single scale would be of use to probation officials.

Table 1

DISTRICT COURT

Variables Found to Differentiate Successful from Unsuccessful Probation

Variable Name	Proportion Successful	Proportion Unsuccessful	X^2	Sig. Level
Age 1977 (Under 22)	.18	.25	18.61	.0009
Sex (Female)	.18	.11	13.25	.0003
Weapon (Used)	.05	.08	4.10	.0429
Marital Status	.47	.54	24.70	.0000
Crime (Burglary)	.12	.22	162.78	.0000
(Forgery)	.04	.08	162.78	.0000
(Robbery)	.01	.03	162.78	.0000
(Agg. Robbery)	.002	.01	162.78	.0000
(Drugs-Dist. Value)	.10	.05	162.78	.0000
(Drugs-Dist. no Value)	.01	.006	162.78	.0000
(Drugs-Poss.)	.11	.03	162.78	.0000
Degree (2nd)	.08	.16	60.71	.0000
(3rd)	.23	.45	60.71	.0000
District (Central)	.47	.59	21.81	.0000
Education (1-11)	.45	.56	32.86	.0117
Tattoo (Yes)	.19	.37	60.55	.0000
Occupation (None)	.19	.23	21.93	.0249
Rap Entry (More than 2)	.33	.54	46.96	.0000
1st Arrest (Before Age 18)	.48	.62	41.20	.0000
Children (1-3)*	.08	.15	30.95	.0003
Juvenile Institution (Yes)	.12	.28	9.35	.0020
Escaped	.02	.09	6.19	.0128
Absconded	.02	.09	5.20	.0226
Runaway (As a Juvenile)	.06	.18	7.99	.0047
Living with Mother or no Parent at Age 14	.25	.46	15.29	.0016
Previous Probation	.34	.47	6.09	.0136
Previous Parole	.03	.09	4.22	.0399

* When the computer run was made, the variable 'Mental Hospital' was inadvertently included in place of children. However, the affects of this mistake were insignificant.

Table 2

LOWER COURT

Variables Found to Differentiate Successful
From Unsuccessful Probation

Variable Name	Proportion Successful	Proportion Unsuccessful	X^2	Sig. Level
District (Central)	.33	.45	15.01	.0006
Education (1-11)	.40	.55	36.19	.0100
Tattoo (Yes)	.15	.28	21.46	.0000
Occupation (None)	.18	.27	29.26	.0021
Rap Entry (More than 2)*	.23	.36	11.47	.0748
1st Arrest (Before Age 18)	.23	.41	32.26	.0007
Mental Hospital (Yes)	.04	.13	20.32	.0000
Juvenile Institution (Yes)	.08	.19	20.34	.0000
Previous Probation (Yes)	.23	.31	4.37	.0367
Crime (Soliciting Sex)	.004	.02	105.80	.0001
(Deprived Owner of Veh.)	.007	.02	105.80	.0001
Runaway (As a Juvenile)	.04	.10	10.55	.0012
Living with No Parent at Age 14	.06	.15	18.70	.0003

* When the computer run was made, this variable was inadvertently added. However, the affects of this mistake were insignificant.

Table 3

DRINKING DRIVER

Variables Found to Differentiate Successful
From Unsuccessful Probation

Variable Name	Proportion Successful	Proportion Unsuccessful	X^2	Sig. Level
District (Central)	.34	.50	23.67	.0000
Education (1-11)	.40	.52	33.67	.0201
Tattoo (Yes)	.17	.30	23.57	.0000
Occupation (None)*	.13	.19	13.03	.2916
1st Arrest (Before Age 18)	.17	.28	38.95	.0001
Previous Probation (Yes)	.23	.34	6.06	.0138
Previous Parole (Yes) ·	.02	.06	8.43	.0037
Age 1977 (22-30)	.33	.46	33.56	.0000
Marital Status (Divorced)	.20	.31	20.71	.0001
Rap Entry (More than 1)	.55	.64	20.12	.0026

* When the computer run was made, this variable was inadvertently added. However, the affects of this mistake were insignificant.

Table 4

DISTRICT COURT

Scale to Determine the Score of an Offender on Probation

Condition	Weight
Age is less than 22 years old	1
Sex is female	-1
Current crime involved a weapon	1
Client has never married	1
Current crime was a burglary or forgery	1
Current crime was a robbery or aggravated robbery	1
Current crime was drug possession or distributing	-1
Sentenced as a felony	1
Will be supervised in Central District	1
Has not completed high school	1
Has been tattooed	1
Has no occupation	1
Has more than 2 entries on rap sheet	1
Was first arrested before the age of 18	1
Has one to three children	1
Has been in a juvenile institution	1
Has escaped or absconded	1
Had runaway as a juvenile	1
Was living with mother or neither parent at age 14	1
Has previous probation or parole	1
Total Score	------

Table 5

LOWER COURT

Scale to Determine the Score of an Offender on Probation

Condition	Weight
Will be supervised in Central District	1
Has not completed high school	1
Has been tattooed	1
Has no occupation	1
Has more than 2 entries on rap sheet	1
Was first arrested before age 18	1
Has been in a mental hospital	1
Has been in a juvenile institution	1
Has previous probation	1
Crime was soliciting sex or depriving owner of vehicle	1
Had runaway as a juvenile	1
Was living with neither parent at age 14	1
Total Score	-------

Table 6

DRINKING DRIVER

Scale to Determine the Score of an Offender on Probation

Condition	Weight
Will be supervised in Central District	1
Has not completed high school	1
Has been tattooed	1
Has no occupation	1
Was first arrested before age 18	1
Has previous probation or parole	1
Is between 22 and 30 years of age	1
Marital Status is Divorced	1
Has more than 1 entry on rap sheet	1
Total Score	------

Table 7

T-TEST RESULTS

Differences Between Means for each of the Three Groups:
District Court, Lower Court, Drinking Drivers

District Court

Group	N	Mean Successful	Mean Unsuccessful	T Value	Sig. Level
1	520	3.8642			
				-7.23	.000
2	125		5.5680		

Lower Court

Group	N	Mean Successful	Mean Unsuccessful	T Value	Sig. Level
1	909	2.2101			
				-6.71	.000
2	132		3.2879		

Drinking Drivers

Group	N	Mean Successful	Mean Unsuccessful	T Value	Sig. Level
1	758	2.1649			
				-4.39	.000
2	88		2.8977		

Table 8

Total Scores with their Corresponding Predicted Chance pf Success or Failure for the Probationer

District Court

-1	0	1	2	3	4	5	6	7	8	9	10	11	12
100.0%	81.8%	93.1%	89.3%	87.5%	81.7%	85.7%	80.3%	61.4%	54.5%	50.0%	60.0%	50.0%	0%

Lower Court

0	1	2	3	4	5	6	7	8	9
95.8%	91.9%	88.9%	85.5%	81.5%	77.4%	73.7%	73.3%	50.0%	0%

Drinking Drivers

0	1	2	3	4	5	6	7
97.1%	93.9%	89.0%	86.9%	88.5%	77.8%	80.0%	75.0%

REFERENCES

Frank, C. H. "Prediction of Recidivism Among Young Adult Offenders
by the Recidivism-Rehabilitation Scale and Index." University
Microfilms, Ann Arbor, Michigan. 1970.

Gottfredson, Don M., "Assessment and Prediction Methods in Crime
and Delinquency." Task Force Report: Juvenile Delinquency and
Youth Crime; Report on Juvenile Justice and Consultant's Papers.
1967. pp. 171-187.

Gottfredson, Don M., Wilkins, Leslie T., Hoffman, Peter B., and Singer,
Susan B., "The Utilization of Experience in Parole Decision Making."
Summary Report. U. S. Department of Justice, Law Enforcement
Assistance Administration, National Institute of Law Enforcement
and Criminal Justice. 1974. pp. 1-22.

James, William "Pragmatism. A New Name for Some Old Ways of Thinking,"
1907, reprinted as "Pragmatism's Conception of Truth," in Essays
in Pragmatism, New York, Hafner, 1955.

Witherspoon, A. D. and Devalera, E. K. "Law Encounter Severity Scale
(LESS) - A Criterion for Criminal Behavior and Recidivism."
Rehabilitation Research Foundation. 1973. pp. 1-73.

APPENDIX A

CARD-#1

CARD #2