

THE DEVELOPMENT OF VALIDATED BASE EXPECTANCY TABLES

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ABSTRACT

The use of Base Expectancy Tables is an important factor in correctional research, especially when evaluating the effectiveness of a particular treatment program. Therefore, it is important to understand the construction, application and implications of such predictive devices.

The present paper explains the process of constructing a Base Expectancy Table using the sample of 1975 releasees from Massachusetts Correctional Institutions as a data base. Two tables were produced as a result: one based on information known when an individual is released to the street (Post-Incarceration Table) and one including information known when an individual is first committed to prison (Pre-Incarceration Table).

When these tables were applied to the 1976 releasee population, both the Pre-Incarceration Table and the Post-Incarceration Table validated. These tables will be used as controls in future research done by the Massachusetts Department of Correction.

INTRODUCTION

An important part of correctional research, particularly in evaluating the treatment effects of a particular program, is the use of a control group. One means of accomplishing this is the construction of a Base Expectancy Table. In general, this device classifies individuals into groups estimating the degree to which they are at risk of continuing their criminal careers after release into the community. Once constructed, the Base Expectancy Table can be used as a means of comparison for individuals who have participated in a particular treatment program.

One common criticism in program evaluation is that success of treatment programs may be due to the fact that low risk individuals are placed into these samples. One way of controlling for this problem is to randomly assign subjects to treatment and control groups. However, random allocation is often not possible in a correctional setting, particularly in view of administrative guidelines and eligibility requirements of certain programs. If a Base Expectancy Table is being used as a control in a particular study, it may also control for the possibility of a non-random selection process.

Therefore, the ability to construct a Base Expectancy Table, to validate it with a given data sample, and to interpret those results is an invaluable skill in correctional research.

The purpose of this report, therefore, is twofold. Section I provides a general description of base expectancy prediction devices. Section II demonstrates how this device can be applied to a data sample.

SECTION I

Overview of Base Expectancy

The first step in the construction of a base expectancy table is the analysis of a given sample of data to determine categories of risk potential. These categories are mutually exclusive and exhaustive. Once these categories are identified, the table must be validated by applying the categories to another data file (e.g., another year) and computing X^2 statistics between categories of the new data file. If these X^2 values are significant, the split is validated.*

The Development of Base Expectancy Risk Categories of Recidivism for 1975 Releases

The data base chosen for the purposes of this report is comprised of all individuals released from Massachusetts Correctional Institutions during the year 1975. Chi square statistics were computed on each of 36 variables available in the data base (see Appendix I) to determine their relationship to recidivism. In each case, chi square was computed on every possible dichotomization of each variable. For example, consider the variable "Age at Incarceration", whose values range from 17 to 63. Chi square statistics were computed on the following dichotomizations: 17 years old vs. 18 years or older; 18 or younger vs. 19 or older; 19 or younger vs. 20 or older; 20 or younger vs. 21 or older; ... 61 or younger vs. 62 or older; and 62 or younger vs. 63 years old. The largest value of these chi square statistics is recorded.

This procedure results in 36 chi square values (one for each variable) which are then analyzed for statistical significance. The variables which are not found to be statistically significant are eliminated from consideration. The variable with the largest chi square value is chosen as the basis for dividing the sample. For example, in applying this procedure to the sample of 1975 releases, the variable "number of Successful Furloughs" had the largest chi square value. The dichotomy for this variable occurs for 1 or less successful furloughs vs. 2 or more successful furloughs, and the sample was divided in two accordingly. The whole procedure is repeated on both of these sub-samples resulting in another (secondary) largest chi square value for each of the two sub-samples. The sub-samples are then sub-divided once again, and so on. The procedure continues until there is less than 10% of the total sample in a particular sub-sample, and then it is terminated.

*For a more detailed explanation, see LeClair, Daniel, "Development of Base Expectancy Prediction Tables for Treatment and Control Groups in Correctional Research", Mass. Dept. of Correction Publication No. 134, 1977.

Two base expectancy tables were produced for the 1975 data base. One table contained all variables in the sample and is called the Post-Incarceration Table since it includes information known when an individual is released to the street. The second table is called the Pre-Incarceration Table since it includes only those variables which are known when an individual is first committed to prison. These tables are presented in Tables I through IV in the following pages as well as the risk categories identified in each table.

TABLE I

NON-VALIDATED POST-INCARCERATION BASE EXPECTANCY TABLE

<p>1975 Releases</p> <p>N = 806</p> <p>RR = 20%</p>	<p>1 or Fewer Successful Furloughs</p> <p>N = 379</p> <p>RR = 28%</p>	<p>Time Served</p> <p>13 Months or More</p> <p>N = 105</p> <p>RR = 44%</p>
		<p>Time Served</p> <p>12 Months or Less</p> <p>N = 274</p> <p>RR = 23%</p>
	<p>2 or More Successful Furloughs</p> <p>N = 427</p> <p>RR = 12%</p>	<p>Age at Release</p> <p>30 Years or Younger</p> <p>N = 303</p> <p>RR = 16%</p>
		<p>Age at Release</p> <p>31 Years or Older</p> <p>N = 124</p> <p>RR = 2%</p>

TABLE II

POST INCARCERATION BASE EXPECTANCY RISK CATEGORIES

CATEGORY NUMBER	DESCRIPTION	RECIDIVISM RATE
I	One or Fewer Successful Furlough and Time Served 13 months or More	44%
II	One or Fewer Successful Furloughs and Time Served 12 Months or Less	23%
III	Two or More Successful Furloughs at Release 30 or Less	16%
IV	Two or More Successful Furloughs and Age at Release 31 or More	2%

TABLE III

NON-VALIDATED PRE-INCARCERATION BASE EXPECTANCY TABLE

<p><u>1975 Releases</u></p> <p>N = 806</p> <p>RR = 20%</p>	<p>Age at 1st Arrest 18 Years or Younger</p> <p>N = 596</p> <p>RR = 24%</p>	<p>Prior Drug Use</p> <p>N = 309</p> <p>RR = 30%</p>	<p>Age at Incarceration 24 Years or Younger</p> <p>N = 215</p> <p>RR = 36%</p>
			<p>Age at Incarceration 25 Years or Older</p> <p>N = 94</p> <p>RR = 18%</p>
	<p>Age at 1st Arrest 19 Years or Older</p> <p>N = 210</p> <p>RR = 8%</p>	<p>No Prior Drug Use</p> <p>N = 287</p> <p>RR = 18%</p>	<p>Time on Job of Longest Duration 4 Months or less</p> <p>N = 57</p> <p>RR = 16%</p>
			<p>Time on Job of Longest Duration 5 Months or More</p> <p>N = 153</p> <p>RR = 5%</p>

TABLE IV

PRE-INCARCERATION BASE EXPECTANCY RISK CATEGORIES

CATEGORY NUMBER	DESCRIPTION	RECIDIVISM RATE
I	Age at 1st Arrest 18 or Less and Prior Drug Use and Age at Incarceration 24 or Less	36%
II	Age at 1st Arrest 18 or Less and Prior Drug Use and Age at Incarceration 25 or More	18%
III	Age at 1st Arrest 18 or Less and No Prior Drug Use	18%
IV	Age at 1st Arrest 19 or More and Time on Job of Longest Duration 4 Months or Less	16%
V	Age at 1st Arrest 19 or More and Time on Job of Longest Duration 5 Months or More	5%

SECTION II

Application of Base Expectancy Tables to 1976 Data

The Base Expectancy Tables constructed in Section I from the 1975 data must then be validated by applying them to the 1976 releasee population, which is accomplished as follows. The number of recidivists and non-recidivists in the 1976 releasee population are determined for each category (box) in the non-validated Base Expectancy Tables. Chi-square statistics are then computed for each split. These X^2 values are summarized in the Experience Tables (Table V and VI) in the following pages.

As can be seen in Experience Table V, the Post-Incarceration Table did validate since all of the resulting X^2 values were significant.* The validated Post-Incarceration Base Expectancy Table appears in Table VII, while the risk categories identified in that table are depicted in Table VIII.

Similarly, in the Pre-Incarceration Table (Table VI), all splits validated except for the split on Age at Incarceration, which resulted in a X^2 value of 1.2, which was not significant. This split was therefore dropped from the table, resulting in the Validated Base Expectancy Table (Pre-Incarceration) depicted in Table IX. The risk categories identified in this table can be seen in Table X.

* In the first attempt at validation the variable Age at Release was split at 24 or Younger and 25 and Older, resulting in a X^2 value of 1.89, which was insignificant. Normally this category would have been dropped from the sample. However, when Age at Release 25 Years or Older was split into 30 or Younger and 31 or Older, the resulting X^2 was significant (4.38). Based on the significance of this secondary split and the fact that the split of Age at Release was so close to the original sample, the table was redone using the secondary split, and this table validated.

POST-INCARCERATION EXPERIENCE TABLE APPLIED TO VALIDATION SAMPLE

<p>Validation Sample 1976 Releasees</p> <p>N = 925</p> <p>RR = 16%</p>	<p>1 or Fewer Successful Furloughs</p> <p>N = 497 RR = 24%</p> <p>$\chi^2 = 48.1$</p>	<p>Time Served 13 Months or More N = 128 RR = 37%</p> <p>$\chi^2=14.9$</p>
	<p>2 or More Successful Furloughs</p> <p>N = 428 RR = 7%</p>	<p>Time Served 12 Months or Less N = 369 RR = 20%</p>
		<p>Age at Release 30 Years or Younger N = 292 RR = 9%</p> <p>$\chi^2=5.49$</p>
		<p>Age at Release 31 Years or Older N = 136 RR = 3%</p>

TABLE VI

PRE-INCARCERATION EXPERIENCE TABLE APPLIED TO VALIDATION SAMPLE

<p>Validation Sample 1976 Releases N = 925 RR = 16%</p>	<p>Age at 1st Arrest 18 Years or Younger N = 657 RR = 19%</p>	<p>Prior Drug Use N = 364 RR = 21%</p>	<p>Age at Incarceration 24 Years or Younger N = 267 RR = 23% $\chi^2=1.2$</p>
	<p>Age at 1st Arrest 19 or Older N = 268 RR = 11%</p>	<p>No Prior Drug Use N = 293 RR = 15%</p>	<p>Age at Incarceration 25 Years or Older N = 97 RR = 18%</p>
	<p>$\chi^2 = 8.4$</p>	<p>Time on Job of Longest Duration 4 months or less N = 71 RR = 20% $\chi^2=7.9$</p>	
		<p>Time on Job of Longest Duration 5 months or More N = 197 RR = 8%</p>	

TABLE VII

VALIDATED POST INCARCERATION BASE EXPECTANCY TABLE

<p>1976 Releases Total Sample RR = 16%</p>	<p>1 or Fewer Successful Furloughs RR = 28%</p>	<p>Time Served 13 Months or More RR = 44%</p>
		<p>Time Served 12 Months or Less RR = 23%</p>
	<p>2 or More Successful Furloughs RR = 12%</p>	<p>Age at Release 30 Years or Younger RR = 16%</p>
		<p>Age at Release 31 Years or Older RR = 2%</p>

TABLE VIII

POST-INCARCERATION

BASE EXPECTANCY RISK CATEGORIES

CATEGORY NUMBER	DESCRIPTION	RECIDIVISM RATE
I	One or Fewer Successful Furloughs and Time Served 13 Months or More	44%
II	One or Fewer Successful Furloughs and Time Served 12 Months or Less	23%
III	Two or More Successful Furloughs and Age at Release 30 Years or Younger	16%
IV	Two or More Successful Furloughs and Age at Release 31 Years or Older	2%

TABLE IX

VALIDATED PRE-INCARCERATION BASE EXPECTANCY TABLE

<p>1976 Releases Total Sample RR = 16%</p>	<p>Age at 1st Arrest 18 Years or Younger RR = 24%</p>	<p>Prior Drug Use RR = 30%</p>
		<p>No Prior Drug Use RR = 18%</p>
	<p>Age at 1st Arrest 19 Years or Older RR = 8%</p>	<p>Time at Job of Longest Duration 4 months or Less RR = 16%</p>
		<p>Time on Job of Longest Duration 5 months or More RR = 5%</p>

TABLE X

PRE-INCARCERATION

BASE EXPECTANCY RISK CATEGORIES

CATEGORY NUMBER	DESCRIPTION	RECIDIVISM RATE
I	Age at 1st Arrest 18 Years or Younger and Prior Drug Use	30%
II	Age at 1st Arrest 18 Years or Younger and No Prior Drug Use	18%
III	Age at 1st Arrest 19 Years or Older and Time on Job of Longest Duration 4 Months or Less	16%
IV	Age at 1st Arrest 19 Years or Older and Time in Job of Longest Duration 5 Months or More	5%

The Base Expectancy Tables constructed in this report, based on the 1975 releasee population from Massachusetts Correctional Institutions, can now be used in future research by the Massachusetts Department of Correction Research Unit. This table will be used in assessing the treatment effects of various correctional programs in facilities throughout the state for populations subsequent to 1975 and 1976.

APPENDIX

VARIABLES USED IN CHI SQUARE ANALYSIS

- 1) Sex
- 2) Minimum Sentence
- 3) Maximum Sentence
- 4) Race
- 5) Marital Status
- 6) Military Discharge
- 7) Occupation
- 8) Time at Most Skilled Position
- 9) Time on Job of Longest Duration
- 10) Last Grade Completed
- 11) Drug Use
- 12) Court Appearances
- 13) Number of Charges for Person Offenses
- 14) Number of Charges for Property Offenses
- 15) Number of Charges for Sex Offenses
- 16) Number of Charges for Narcotic Offenses
- 17) Number of Charges for Drunkenness Offenses
- 18) Number of Charges for Escape Offenses
- 19) Number of Juvenile Incarcerations
- 20) Number of House of Correction Incarcerations
- 21) Number of Prior State or Federal Incarcerations
- 22) Total Number of Prior Incarcerations
- 23) Number of Juvenile Paroles
- 24) Number of Adult Paroles
- 25) Total Number of Paroles
- 26) Age at First Arrest
- 27) Age at First Drunk Arrest
- 28) Age at First Drug Arrest
- 29) Institution Committed to
- 30) Age at Incarceration
- 31) Time Served
- 32) Age at Release
- 33) Number of Furloughs
- 34) Number of Successful Furloughs
- 35) Institution Released From
- 36) Present Offense