APPLICATION OF LIFE TABLE TECHNIQUES TO CRIMINAL STATISTICS: PAROLE VIOLATION

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I wish to outline a way to study criminal statistics which involve follow-up over a period of time. Essentially, it is a simple application of ideas from life tables which restricts itself to an analogy with the "probability of death", or q_x column. We shall call this analogy the "probability of parole violation", or for brevity, "PV_x". My purpose is to propose what I hope may be a useful idea, illustrated with the data I have available, of all 1,325 men (or more exactly, adult male felons) paroled from the prisons of Illinois during 1960. The need to present several applications and also to be brief unfortunately makes for some superficiality and sets some limits. Although the PV_x idea can be applied to other populations such as probationers, or even men entering prison, we shall discuss only parolees. Also, our definitions of failure, Parole Violation Warrants, are complex administrative documents which can be equated with only rough justice to criminality. Technical ommissions are that life table functions other than q_x will not be discussed, and our time periods will be limited to unsmoothed monthly rates.

We shall proceed by considering first, usual measures of parole success or failure; second, the idea of the PV_x; third, the relationship of PV_x to social indicators such as unemployment; and fourth, a suggestion of how PV_x may be of use in evaluating some kinds of prison programs.

I. THE MEASURE OF PAROLE VIOLATION

This paper claims no great originality, for measures equivalent in concept to PV_x do exist.[1] However, the usual measure of parole success or failure is the percentage of parolees who are violators; that is, the number of persons initially released on parole divided into the number of those who violated during some time interval. Thus, of our 1,325 parolees in 1960, 508 or 38.3 percent violated parole. Of course our parolees could also be classified by various attributes; for example, by race, 353, or 41.8 percent of the 844 white parolees violated parole, as did 155, or 32.2 percent of the 481 Negro parolees. This oversimplifies existing scholarship, but the percent violators is by far the accepted measure.

An example of the manner in which the number of months actually on parole constitutes a problem can be seen in our own sample. Here, because the cut-off date for follow-up was July 1962, men paroled in January 1960 were followed for 24 months, while those paroled in December 1960 were followed for 18 months. The problem is compounded by the fact that some men were legally freed from parole during those time periods. We think PV_x allows for attrition of the original sample and also is useful in dealing with the problems of time in follow up. Breaking time periods into small units (as for example, the month) permits more equal measurement of time in follow-up. Moreover, as a practical matter, it may reduce the waiting period for results from years to months, no small matter to administrators who support research.

II. "PROBABILITY OF PAROLE VIOLATION"

The analogy to q_x is spelled out in Table 1 for the 100 men paroled during January 1960. Column 1 shows the monthly time periods used. Column 2, analagous to l_x, begins with the 100 men initially released, and decreases this number in each succeeding month by the numbers in Column 3, 4, 5. These columns show the number of parolees who, during each month, were legally freed from parole supervision (Column 3), died of natural causes while on parole (Column 4), or who were considered parole violators (Column 5). I have shown all three columns -- especially Column 4 which has no entries -- to illustrate the possibility of creating multiple decrement tables. For the present however, we shall focus on Column 5, the parole violators; when we divide the numbers in Column 5 by those of Column 2, the result in Column 6 is the number of parolees who violated parole during each month as a percent of those who began the month. This is our "probability of parole violation", or PV_x.

In another illustration of PV_x, Table 2 considers the entire year's parolees, according to each of the 18 months of supervision; that is, a January parolee who violated parole in two weeks and a December parolee who violated parole in three weeks would both be included in the 23 parole violators of Column 3, line 1. Column 4, the PV_x for all parolees illustrates one of several kinds of curves which may be characteristics of the PV_x statistic: in this case, a biomodal distribution with peaks around the third and twelfth months. Other different PV_x patterns are illustrated for whites and Negroes in Columns 7 and 10, and graphed in Figure 1.

III. THE PV_x IN RELATION TO UNEMPLOYMENT

If we wish to consider whether such social indicators as unemployment cause crime, and we wish to go beyond cross-sectional, survey data, the most precise procedure is to repeatedly interview a cohort of men over a period of time, something rarely attempted because it is difficult and expensive. A less precise, and cheaper, indirect way is to correlate unemployment rates with crime statistics. PV_x is a useful supplement to indirect correlation for two reasons: first, it is a more precisely defined rate; and second, it uses a shorter time period.

In the first case, precision of rate, crime statistics typically consist of the annual number of crimes reported by the police, divided by an estimated mid-year population of whatever geographical area is being investigated. The numerator of official crime statistics is grie-

vously deficient; for example, not all crimes are reported. In addition, the denominator for these rates, the population at risk, is a usually imprecise mid-year population estimate for a State, (or city or metropolis). The PV_x is much more precisely defined.

In addition to this first problem, precision of definition as a rate, the PV_x makes it possible to compare monthly rates rather than annual ones. This is illustrated in Table 3 which shows the probability of parole violation during specific months in the follow-up period, classified by the month of initial release during 1960. Column 1, for January (that is, men released on parole during January 1960), is the PV_x already illustrated in Column 6 of Table 1; we have graphed these PV_x in Figure 2. We can see in Figure 2 that there is no simple way to summarize the patterns traced out by each of these succeeding month's cohorts - although using moving averages might help. Our immediate concern however is the relationship of PV_x to unemployment as shown in the graphs of Figures 2 and 3.

Figure 3 illustrates the pattern for unemployment, just one of many possible social indicators, in Illinois and the Chicago area by month during 1960-1962. The evidence of Figures 2 and 3 suggest the hypothesis that there is no correlation between unemployment and parole violation. For example, in Figure 3, the volume of unemployment steadily rises for six months between September 1960 and February 1961; and thereafter falls through October 1961. Yet neither of these six and eight month periods is reflected in the PV_x of Figure 2. For example, if we consider the men released in September or October 1960, we can see that these two month's patterns differ both from each other as well as from Figure 3.

IV. THE EVALUATION OF PRISON PROGRAMS

The way in which the PV_x might be a useful supplement to other means of evaluating correctional programs becomes apparent if we consider an oversimplified example of a research study. Here, a sample of men released during the calendar year are assigned to experimental and control groups and then are followed for another calendar year or longer; this sample is cross-classified by variables such as age, race, criminal history, or personality. Then the parole violation rate is calculated after the end of a year; that is, the number of violators is divided by the number initially released.

The end result may be interesting, but it is also a long time in coming, often two or three years. Some of the possible usefulness of PV_x may be illustrated if we turn back to Figure 1. But now instead of its actual tabulation by race, let us imagine that we have graphed the PV_x of experimental and control groups of parolees released during some month.[2] Suppose further that the broken (that is, Negro) line was the experimental group, while the solid (that is, white) line was the control group; in this case one could see that there was a great impact by the treatment (however defined) used in the ex-

perimental group in the early months of parole, diminishing after the first half-year. On the other hand, if we reversed our imaginary study, so the experimental group was the solid line, and the control group was the broken one, there would be an immediate feedback that the treatment accorded the experimental group was disastrous. Obviously, one does not expect an experimental group to show such extreme results, but it may not be difficult to work out a program of sequential analysis in which an experiment could be terminated if the experimental group did not consistently show some benefit, month by month.

CONCLUSION

In this brief presentation, I have been able only to sketch an approach which may (or may not) be a useful addition to ways of studying parole and similar programs. The PV_x is no replacement for other statistics, and has its own limitations. For example, among its disadvantages are the relatively large numbers needed during a short time period for the initial cohort. On the other hand, it appears to have some advantages; for example, it may enable us to create a finer, month-by-month evaluation of follow-up. Fortunately, a closer look at its usefulness should require little expense. All that is necessary is the secondary analysis of existing studies of parole violation or equivalent populations with three issues in mind. First, as in our own Figure 1 by race, do different groups show different characteristic curves; if they do, how is this related to the erraticness of Figure 2. Second, what is the correlation with monthly social indicators such as unemployment. Third, is the re-analysis of experimental and control groups. These secondary analyses should indicate whether we have an interesting but useless idea, or whether there is some practical wisdom in considering it further.

FOOTNOTES

*The data for 1960 Illinois State Penitentiary parolees were originally gathered to update Parole Prediction Tables; however, all statements made are the responsibility of the author. Illinois unemployment statistics were provided by Virginia Peyton, Chicago Association of Commerce and Industry.

[1]For example: Joan Havel and Elaine Sulka, Special Intensive Parole Unit, Phase III, Research Report No. 3, Research Division, California Department of Corrections (1962), Figure 2; Nathan Kantrowitz, "Joliet-Menard 1960 Parolees", Illinois Department of Public Safety, Bulletin of the Sociologist-Actuary, Number 2 (April 5, 1963), Table 7; Frances H. Simon, Prediction Methods in Criminology, Home Office Research Studies Number 7, H.M.S.O. London (1971), Appendix I.

[2]Havel and Sulka illustrate what appears to be this approach.

318

Table 1. Probability of Parole Violation For Men Released in January 1960 from Illinois Prisons

(1) Number of Months Actually Under Parole Supervision in the Free Community		(2) Total Number of Parolees Remaining Under Supervision at the beginning of the Month	(3) (4) Number of Parolees, who this month:		(5) During	(6) Number of Parolees who violated Parole during a month as a Percent of those who began the month (Col 5/Col 2)
at least	but less than		were legally freed from Parole	died while on Parole	violated Parole	
0	1	100	0	0	2	2.0
1	2	98	0	0	1	1.0
2	3	97	1	0	7	7.2
3	4	89	0	0	1	1.1
4	5	88	0	0	5	5.7
5	6	83	0	0	4	4.8
6	7	79	3	0	2	2.5
7	8	74	0	0	3	4.1
8	9	71	1	0	3	4.2
9	10	67	1	0	1	1.5
10	11	65	1	0	2	3.1
11	12	62	0	0	3	4.8
12	13	59	0	0	1	1.7
13	14	58	2	0	2	3.4
14	15	54	3	0	2	3.7
15	16	49	0	0	1	2.0
16	17	48	3	0	1	2.1
17	18	44	5	0	1	2.3
18	29	38	10	0	4	-
30 and over		24	-	-	-	-

Table 2. Probability of Parole Violation (per 100) By Race, Illinois Parolees, 1960

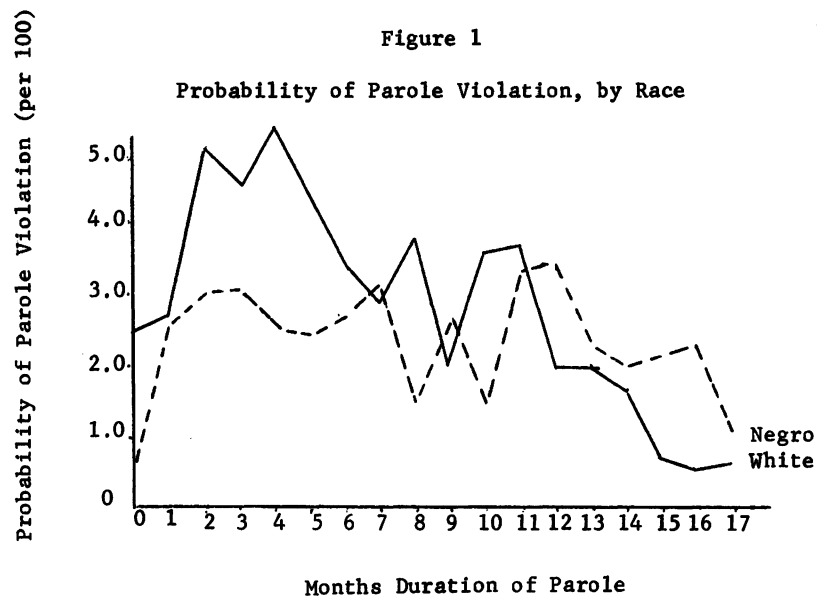| (1) Midpoint of Number of Months Successful on Parole	(2) (3) (4) All Parolees			(5) (6) (7) White			(8) (9) (10) Negro		
	Total who Began the Month	Number who violated During the Month	PV (3)/(2)	Total who Began the Month	Number who violated During the Month	PV (6)/(5)	Total who Began the Month	Number who violated During the Month	PV (9)/(8)
0.5	1325	23	1.7	844	21	2.5	481	2	0.4
1.5	1302	34	2.6	823	22	2.7	479	12	2.5
2.5	1267	54	4.3	801	40	5.0	466	14	3.0
3.5	1209	48	4.0	759	34	4.5	450	14	3.1
4.5	1155	49	4.2	722	38	5.3	433	11	2.5
5.5	1100	40	3.6	682	30	4.4	418	10	2.4
6.5	1045	33	3.2	644	22	3.4	401	11	2.7
7.5	991	30	3.0	615	18	2.9	376	12	3.2
8.5	930	27	2.9	585	22	3.8	345	5	1.4
9.5	867	20	2.3	538	11	2.0	329	9	2.7
10.5	835	23	2.8	522	19	3.6	313	4	1.3
11.5	786	28	3.6	486	18	3.7	300	10	3.3
12.5	738	19	2.6	456	9	2.0	282	10	3.5
13.5	700	15	2.1	440	9	2.0	260	6	2.3
14.5	655	12	1.8	410	7	1.7	245	5	2.0
15.5	614	9	1.5	389	4	1.0	225	5	2.2
16.5	582	8	1.4	370	3	0.8	212	5	2.3
17.5	543	5	0.9	344	3	0.9	199	2	1.0

Table 3

Probability of Parole Violation for Specific Months,
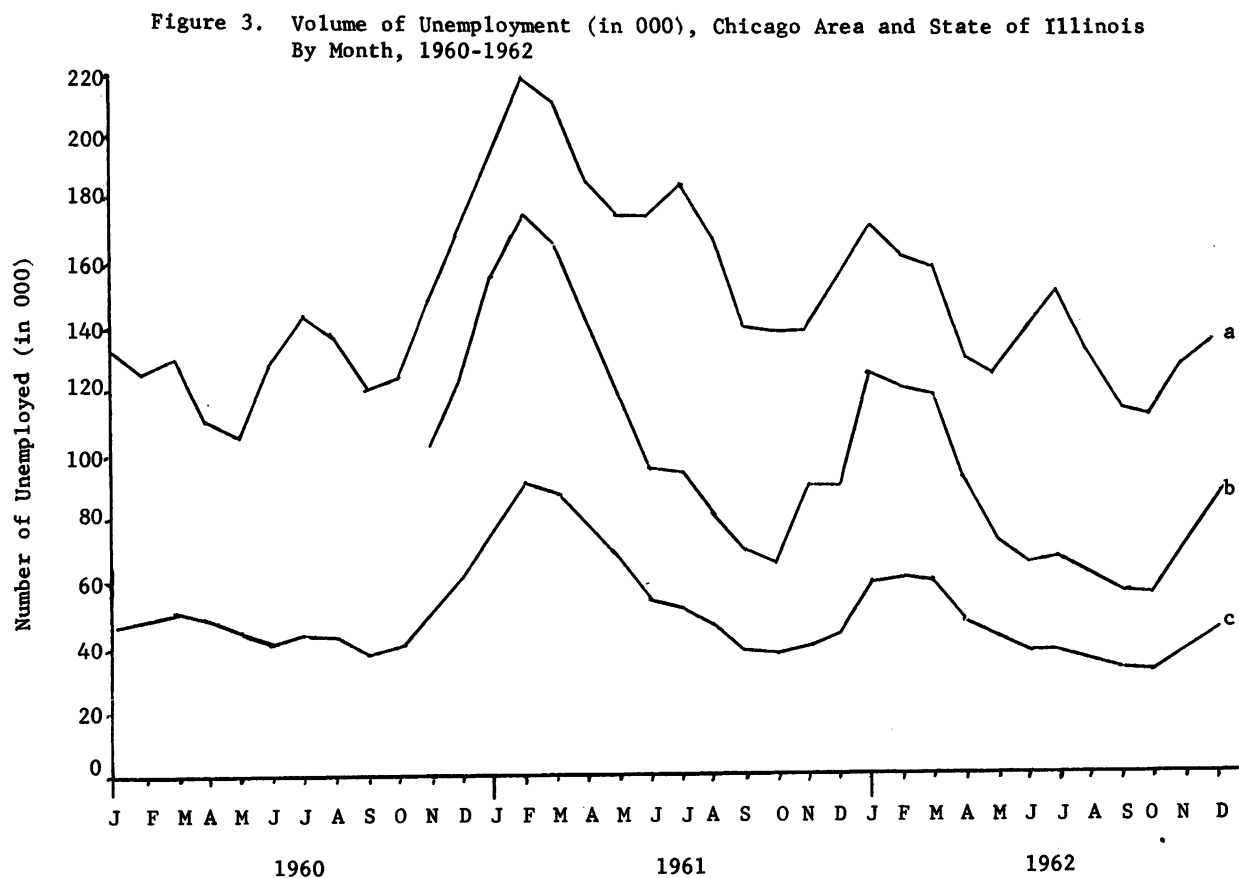by Month of Initial Release (per 100)

Prob. of PV for Month of:		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1960	Jan.	2.0											
	Feb.	1.0	0.8										
	Mar.	7.2	0.0	1.7									
	April	1.1	4.2	2.6	4.0								
	May	5.7	2.6	5.3	3.1	0.0							
	June	4.8	2.7	4.7	6.5	0.8	5.7						
	July	2.5	8.4	4.9	4.7	4.0	4.3	0.9					
	Aug.	4.1*	3.1	1.0	4.9	4.2	1.8	2.8	2.0				
	Sept.	4.2	1.1	3.2	1.3	4.4	1.8	1.0	2.0	0.0*			
	Oct.	1.5	1.1	4.6	2.7	3.8	1.9	1.0	5.2	3.5	0.7		
	Nov.	3.1	2.2	0.0	5.6*	3.0	1.9	5.9	5.5	3.6	5.1	1.8	
	Dec.	4.8	4.8	1.3	1.5	4.2	4.0	2.1	2.4	5.7	4.6	2.7	0.8
1961	Jan.	1.7	3.9	4.1*	6.3	4.7	4.3	7.8	7.2	2.0	2.4	3.7	3.4
	Feb.	3.4	4.1*	1.4	3.3	2.7*	3.5	0.0	2.6	4.2#	2.5	7.8	4.4
	Mar.	3.7	2.9	0.0	3.7	2.8	1.2	3.9	1.4*	4.3	3.4	4.2	7.3
	April	2.0#	3.2	1.6	3.9	1.5	1.3	4.3*	0.0	6.8	3.5	2.2	8.9
	May	2.1	0.0	1.7	2.0#	1.6	1.4	0.0	0.0	5.0	1.9	1.1	3.3
	June	2.3	0.0	0.0	2.2	1.6	2.8	3.1	3.2	0.0	2.9	1.2	0.0
	July		0.0	1.9	2.3	1.7	1.5	4.8	3.4	2.8	1.1	4.9	3.5
	Aug.			0.0	5.3	0.0	0.0	3.4	5.6	8.8	3.3	2.6	3.8
	Sept.				0.0	0.0	4.8	1.9	2.1#	0.0	5.7	0.0*	4.0
	Oct.					0.0	1.7	0.0	4.3	7.1	2.5	4.2	4.2*
	Nov.						0.0	2.0#	0.0	0.0	2.6	1.5	2.9
	Dec.							4.4	0.0	0.0	1.4*	0.0	1.6
1962	Jan.								0.0	0.0	1.6	1.6	0.0
	Feb.									0.0	1.7	1.7	0.0
	Mar.										1.8	1.8	3.8
	Apr.											1.9	0.0
	May												0.0#
Number beginning Cohort		100	121	119	100	127	123	107	100	57	139	113	119

* = N_x fell below 75 for this month
# = N_x fell below 50 for this month

320

Figure 1

Probability of Parole Violation, by Race

Probability of Parole Violation (per 100)

Months Duration of Parole

Source: Table 2

Figure 3. Volume of Unemployment (in 000), Chicago Area and State of Illinois By Month, 1960-1962

Number of Unemployed (in 000)

1960   1961   1962
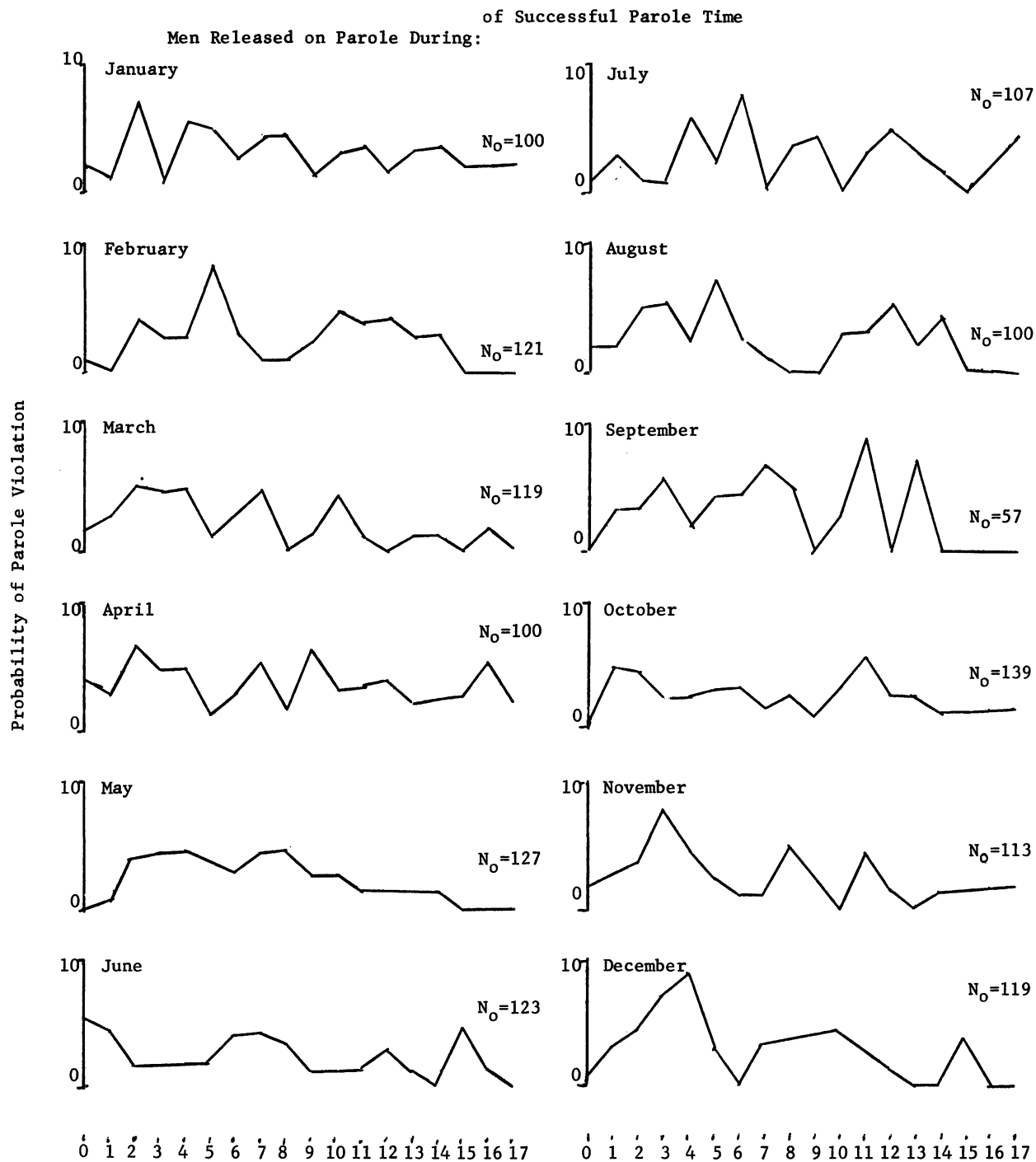
a. Total Unemployment, Cook and DuPage Counties (Illinois) and Lake County (Indiana)
b. Insured Unemployment, State of Illinois
c. Insured Unemployment, Cook and DuPage Counties, Illinois

Source: Research and Statistics Division, Chicago Association of Commerce and Industry
(from data provided by U.S. Dept. of Labor-Bureau of Labor Statistics, Illinois State
Bureau of Employment Security, and Indiana Employment Security Division)

Figure 2

Probability of Parole Violation, By Month Released and Duration (per 100)

of Successful Parole Time

Men Released on Parole During:

Source: Table 3