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THE SPATIAL DISTRIBUTION OF CRIMINAL OFFENSES BY STATES*

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Several earlier research projects have demonstrated that crime has a regional or sectional distribution in the United States. Stuart Lottier has related crime regions to cultural areas and more specifically to the mores as indexed by rates of selected offenses known to the police.¹ Lottier's analysis of offenses reported to the Federal Bureau of Investigation in 1934 and 1935 indicated that crime regions have an orderly gradient character, increasing in specific rates from states having low rates to states having high rates. For example, lines of contiguous states displayed increasing murder rates from North Dakota to Texas, New York to North Carolina, Utah to Virginia and New Mexico to Alabama. The distribution of robberies showed a concentration about a central axis running from east to west. Larceny was concentrated in western states with the states having the lowest rates appearing in the northeast.

This study re-examines the spatial distribution of criminal offenses by states, using offenses known to the police and reported to the Federal Bureau of Investigation for the years 1946 through 1952. A later study will test the basic hypothesis of Lottier and others that crime rates are related to cultural areas, that is, that the cultural background of different cities results in crime differences on a regional basis.

The basic data of this study were published in *Uniform Crime Reports*, 1946 through 1952.² These data actually represent reports to the Federal Bureau of Investigation of law enforcement authorities (chiefs of police) in urban areas com-

* The author is indebted to the following persons for their excellent suggestions and critical reading of a similar but earlier study using F.B.I. data for 1945 through 1948; any deficiencies in the present study are of course the responsibility of the author: Professor Calvin F. Schmid of the University of Washington, Professor Norman S. Hayner of the University of Washington and the Washington State Parole Board, Professor Clarence Schrag of the University of Washington and Professor Julius A. Jahn of the State College of Washington.

¹ STUART LOTTIER, *Distribution of Criminal Offenses in Sectional Regions*, *JOUR. OF CRIM. L. AND CRIMINOLOGY*, Volume XXIX, No. 3, 329-344.

² Federal Bureau of Investigation, United States Department of Justice, *UNIFORM CRIME REPORTS*, Vol. XVII, No. 2, 1946, Table 33, p. 97; Vol. XVIII, No. 2, 1947, Table 35, p. 94; Vol. XIX, No. 2, 1948, Table 35, p. 93; Vol. XX, No. 2, 1949, Table 36, p. 94; Vol. XXI, No. 2, 1950, Table 32, p. 90; Vol. XXII, No. 2, 1951, Table 31, p. 87; Vol. XXIII, No. 2, 1952, Table 34, p. 93.

prising about 60 million persons for the years 1946 through 1949 and about 68 million persons or almost 85 percent of all urban police departments since 1949.

The data have numerous deficiencies and inaccuracies. They do not comprise all crimes in the reporting area, but merely crimes known to the police and which the police have seen fit to report to the Federal Bureau of Investigation. Due to the relative newness of national crime reporting and differences in recording practice from one state to another there are certain inconsistencies in reporting.³ The rates for each state are based on offenses reported in urban places; urban crime, in some states more than in others, is probably not a picture of crime in the state as a whole. Some states have a greater percentage of urban areas reporting than others; this likewise may introduce error if the non-reporting urban areas differ from urban areas that have reported. Since crime, at least the type of crime that is reported to the Federal Bureau of Investigation, is largely male crime, those states having the greatest sex ratio, i.e., males per 100 females in the population, will have larger crime rates per 100,000 population than other states with a low sex ratio. This type of error will tend to favor eastern states and place at a disadvantage certain western states. If we define the sex ratio as a cultural phenomena, i.e., part of the cultural environment, it becomes a pertinent variable rather than another factor making for error in our crime rates.

The errors that may be present in the data of this study are parsimoniously summarized as follows:

1. Some crimes are not reported to the police.
2. Some crimes are not reported by the police to the Federal Bureau of Investigation.
3. Some urban areas do not report to the Federal Bureau of Investigation.
4. Crimes may be inconsistently reported by different urban areas.
5. Crime in urban areas reporting may not be representative of crime in the state as a whole.
6. The population of reporting areas is constantly changing, resulting in erroneous rates as computed by the Federal Bureau of Investigation.
7. The variable sex ratio from state to state is not taken into consideration in computing crime rates by states.

The original data taken from *Uniform Crime Reports* were used in computing the mean for each state for each crime in Part I offenses for the seven year period. These mean rates for the various crimes are shown in Table I.⁴ These rates are not strictly

³ For a description of the data and methods of securing it, see UNIFORM CRIME REPORTING, New York: Committee on Uniform Crime Records, International Association of Chiefs of Police, 1929. Error due to inconsistency in reporting crimes should be at a minimum if the detailed instructions presented in the above mentioned volume are followed. The fundamental penal codes of all United States' jurisdictions have their origin in the common law of England. Each category of offense is described in detail in this volume, pages 217 to 438, with an analysis of the statutes of each state indicating the relationship of these statutes to the various categories of crime set up for the purposes of uniform crime reporting.

⁴ In addition to Mean Rates, Median Rates and Mean Ranks for each state and each offense were computed for the seven year period. Since the rank order of the states varied somewhat depending on which of the three rates was used, Spearman's rank order coefficient of correlation was computed for each offense for Mean Rates and Median Rates, Mean Rates and Mean Ranks, and

TABLE I
 MEAN CRIME RATES BY STATES PER 100,000 POPULATION FOR URBAN AREAS REPORTING
 OFFENSES KNOWN TO POLICE, 1946-1952, F.B.I. UNIFORM CRIME REPORTS

State	Murder and Non-Negligent Homicide	State	Aggravated Assault	State	Robbery
North Dakota	.35	New Hampshire	3.8	Vermont	4.4
New Hampshire	.78	Vermont	3.8	New Hampshire	4.5
Vermont	.88	South Dakota	6.5	Wisconsin	10.0
South Dakota	1.01	North Dakota	6.51	South Dakota	12.5
Rhode Island	1.05	Minnesota	8.1	Maine	12.6
Massachusetts	1.17	Iowa	8.3	Iowa	15.6
Maine	1.22	Maine	8.6	North Dakota	15.7
Minnesota	1.27	Massachusetts	9.7	Rhode Island	17.0
Wisconsin	1.31	Wisconsin	10.3	Massachusetts	18.2
Iowa	1.82	Rhode Island	17.5	Connecticut	19.0
Connecticut	1.85	Delaware	20.9	New York	23.9
Utah	2.16	Utah	22.8	Nebraska	26.9
Montana	2.37	Connecticut	23.3	Minnesota	28.4
New York	2.58	Idaho	23.4	Mississippi	30.4
New Jersey	2.64	Washington	25.1	New Jersey	31.1
Nebraska	2.98	Kansas	28.8	South Carolina	33.0
Oregon	3.08	Nebraska	29.7	Idaho	33.7
Pennsylvania	3.39	Pennsylvania	32.2	Kansas	34.1
Washington	3.44	New York	34.1	New Mexico	34.8
Idaho	3.52	Montana	35.2	North Carolina	38.4
Kansas	3.91	Colorado	38.8	Pennsylvania	38.4
Michigan	4.29	Wyoming	39.5	Montana	39.6
Colorado	4.59	Oklahoma	42.2	Utah	40.8
Wyoming	4.74	Ohio	44.6	Oklahoma	44.3
California	4.77	Oregon	46.7	Alabama	46.6
Ohio	5.00	Indiana	47.1	Arkansas	48.5
West Virginia	5.07	New Jersey	49.5	West Virginia	48.8
Indiana	5.21	West Virginia	56.5	Indiana	49.1
Illinois	5.70	Nevada	57.2	Georgia	50.3
Oklahoma	6.00	Illinois	68.9	Louisiana	50.4
Delaware	6.04	New Mexico	76.1	Texas	52.3
Arizona	6.53	California	87.2	Ohio	55.9
New Mexico	6.53	Louisiana	95.0	Maryland	56.9
Nevada	7.24	Arizona	102.3	Wyoming	59.1
Missouri	7.79	Tennessee	112.5	Delaware	59.4
Maryland	9.06	Texas	114.0	Tennessee	65.0
Louisiana	11.05	Michigan	117.6	Oregon	71.4
Kentucky	11.40	Arkansas	121.0	Missouri	77.2
Arkansas	11.46	Maryland	125.7	Virginia	78.5
South Carolina	12.43	Kentucky	130.9	Florida	80.1
Virginia	12.95	South Carolina	132.8	Michigan	83.9
Mississippi	13.18	Florida	135.4	Washington	87.4
Florida	13.93	Missouri	139.4	Colorado	89.1
North Carolina	14.15	Georgia	142.3	Kentucky	104.1
Texas	14.23	Mississippi	142.3	Arizona	106.1
Tennessee	17.10	Alabama	198.7	Illinois	109.9
Alabama	20.14	Virginia	227.0	California	128.5
Georgia	21.35	North Carolina	474.5	Nevada	134.7

TABLE I—Continued

State	Burglary	State	Larceny	State	Auto Theft
Wisconsin	156.7	Pennsylvania	367.1	New Hampshire	53.2
New Hampshire	172.1	New Hampshire	496.1	Vermont	91.9
Vermont	185.9	New Jersey	533.3	South Dakota	95.0
Pennsylvania	208.1	Massachusetts	562.3	Wisconsin	102.5
North Dakota	217.3	New York	575.7	Maine	108.1
Minnesota	233.6	Illinois	581.5	Connecticut	114.9
New York	235.5	Louisiana	632.2	Pennsylvania	115.7
Massachusetts	240.6	West Virginia	637.4	New York	118.4
South Dakota	240.6	Maryland	644.5	North Dakota	119.9
Maine	246.5	Vermont	670.4	Minnesota	124.2
Iowa	250.1	Connecticut	698.0	Rhode Island	124.7
Maryland	276.2	Tennessee	698.3	New Jersey	126.0
Louisiana	288.2	Rhode Island	705.9	Mississippi	130.2
Nebraska	293.0	Maine	719.5	Illinois	130.3
New Jersey	307.1	Mississippi	733.0	Iowa	131.2
Illinois	310.2	Alabama	745.4	Massachusetts	135.0
Connecticut	314.3	Minnesota	746.5	Ohio	139.5
West Virginia	318.0	Arkansas	759.9	West Virginia	149.4
Rhode Island	336.5	Iowa	800.7	Arkansas	150.3
Ohio	336.8	Missouri	829.3	Kansas	152.7
Montana	340.8	South Dakota	836.6	Missouri	172.7
Mississippi	341.0	Wisconsin	843.5	Michigan	181.5
Arkansas	370.6	North Carolina	915.5	Nebraska	186.7
Wyoming	380.5	Ohio	941.0	North Carolina	190.7
Missouri	388.7	Kentucky	952.7	Indiana	197.3
Kansas	393.5	North Dakota	970.8	Louisiana	199.2
New Mexico	398.2	Nebraska	983.8	Alabama	200.7
Georgia	401.0	Georgia	992.5	Oklahoma	203.7
Indiana	402.5	Kansas	1011.4	South Carolina	214.3
Tennessee	416.1	Indiana	1015.0	Montana	224.0
South Carolina	421.5	South Carolina	1161.1	Wyoming	227.0
Michigan	437.2	Oklahoma	1225.0	Colorado	228.6
North Carolina	459.5	New Mexico	1263.4	Idaho	231.9
Alabama	476.3	Delaware	1270.7	Delaware	232.4
Delaware	476.3	Michigan	1335.3	Utah	233.9
Idaho	488.2	Texas	1400.8	Florida	240.4
Utah	499.8	Virginia	1404.5	Tennessee	241.4
Oklahoma	502.5	Montana	1435.0	Georgia	243.3
Virginia	553.8	Florida	1457.7	Texas	265.2
Kentucky	578.2	Colorado	1551.8	Virginia	268.5
Texas	589.9	Wyoming	1611.2	Oregon	276.2
Washington	605.9	Utah	1706.0	New Mexico	293.9
California	626.8	Oregon	1741.8	Kentucky	308.7
Oregon	629.5	Washington	1788.6	Maryland	316.7
Colorado	661.3	Idaho	1802.6	California	342.4
Arizona	756.9	California	1888.1	Washington	347.6
Florida	802.8	Nevada	2315.2	Nevada	357.1
Nevada	903.8	Arizona	2504.4	Arizona	458.3

comparable to the indices computed by Lottier but they are accurate in seriatim in a manner similar to those of Lottier. Two maps constructed from the data of Table I are presented on the pages to follow and show the spatial distribution of crime, murder and burglary rates by states for 1946 through 1952. The ranked states were divided into six equal groups, each group including eight states.

MURDER AND NON-NEGLIGENT HOMICIDE

It is immediately noted upon examination of Table I and the murder map that the highest rates for murder and non-negligent homicide usually occur in the southeast; i.e., Virginia, Mississippi, Florida, North Carolina, Texas, Tennessee, Alabama and Georgia. Although it cannot be said that the murder rate gradually decreases outward in an orderly gradient fashion as described by Lottier, several tiers of contiguous states show regularly increasing murder rates as one moves toward southern and southeastern states. The lowest homicide rates are found in the New England, Middle Atlantic and West North Central states. South Atlantic, East South Central and West South Central sections of the United States have the highest murder rates. The sectional scheme referred to in this paper follows that of the Federal Bureau of Investigation and is generally accepted as an adequate sectional scheme for statistical purposes.⁵

AGGRAVATED ASSAULT

With aggravated assault, as in the case of homicide, we find a concentration of the offense in the southeast, i.e. in South Carolina, Florida, Missouri, Georgia, Mississippi, Alabama, Virginia and North Carolina. Actually, we find that homicide and aggravated assault are correlated $+ .903$. The relationship of each type of crime to each other type that we have examined in this research is shown in Table II. It is immediately noted that homicide, robbery and larceny are representative

Median Rates and Mean Ranks. These coefficients are presented below and show the great similarity in rank orderings of states, regardless of the measure used for ranking.

Rank Order Correlations of \bar{X} Rates, Median Rates and \bar{X} Ranks of Crimes by States

	Murder	Robbery	Aggravated Assault	Burglary	Larceny	Auto Theft
r_r \bar{X} Rates—Median Rates	$+ .993$	$+ .994$	$+ .996$	$+ .994$	$+ .996$	$+ .985$
r_r \bar{X} Rates— \bar{X} Ranks	$+ .997$	$+ .998$	$+ .997$	$+ .998$	$+ .999$	$+ .995$
r_r Median Rates— \bar{X} Ranks	$+ .992$	$+ .993$	$+ .995$	$+ .991$	$+ .996$	$+ .986$

⁵ New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
Middle Atlantic: New Jersey, New York and Pennsylvania.

East North Central: Illinois, Indiana, Michigan, Ohio and Wisconsin.

West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota.

South Atlantic: Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia and West Virginia.

East South Central: Alabama, Kentucky, Mississippi and Tennessee.

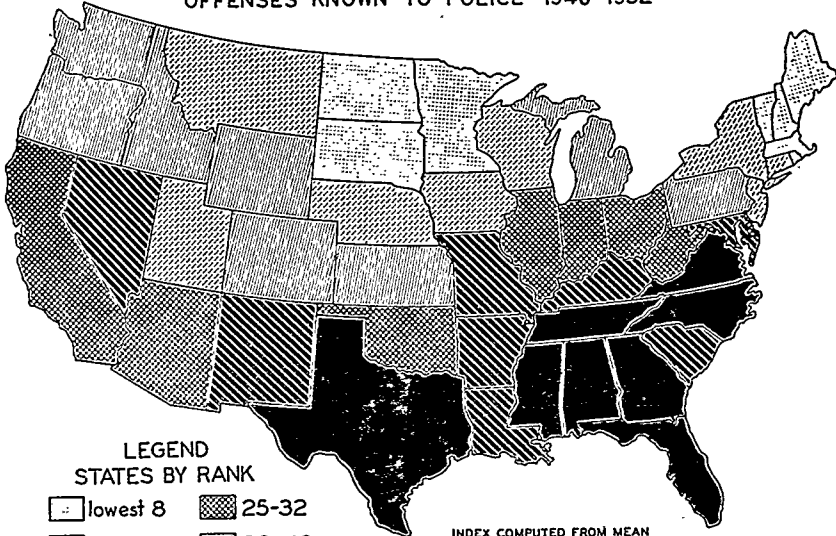
West South Central: Arkansas, Louisiana, Oklahoma and Texas.

Mountain: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming.

Pacific: California, Oregon and Washington.

MURDER

OFFENSES KNOWN TO POLICE 1946-1952

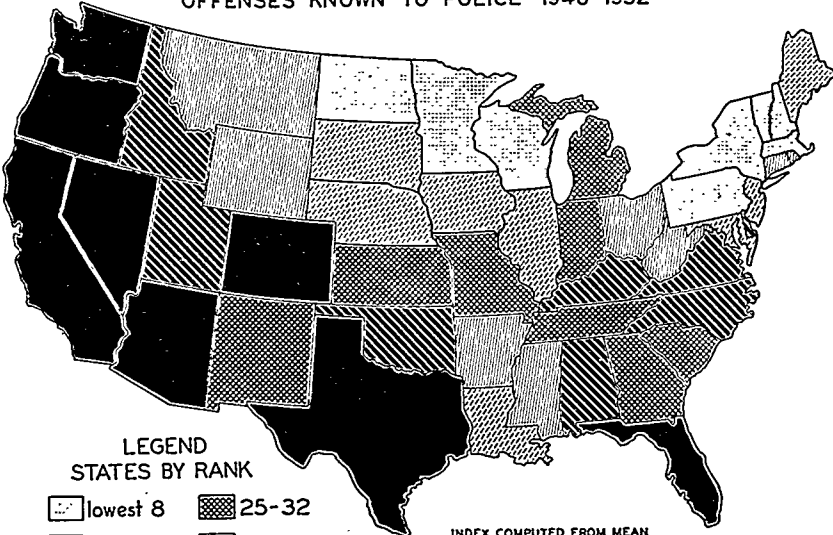


- LEGEND
STATES BY RANK
- | | |
|----------|-----------|
| lowest 8 | 25-32 |
| 9-16 | 33-40 |
| 17-24 | highest 8 |

INDEX COMPUTED FROM MEAN RATES PER 100,000 POPULATION, OFFENSES KNOWN TO POLICE, F.B.I. UNIFORM CRIME REPORTS

BURGLARY

OFFENSES KNOWN TO POLICE 1946-1952



- LEGEND
STATES BY RANK
- | | |
|----------|-----------|
| lowest 8 | 25-32 |
| 9-16 | 33-40 |
| 17-24 | highest 8 |

INDEX COMPUTED FROM MEAN RATES PER 100,000 POPULATION, OFFENSES KNOWN TO POLICE, F.B.I. UNIFORM CRIME REPORTS

TABLE II
 INTER-CORRELATIONS OF RANKED STATES BETWEEN OFFENSES KNOWN TO THE POLICE
 FOR URBAN PLACES REPORTING TO THE FEDERAL BUREAU OF
 INVESTIGATION, AVERAGE RATES FOR 1946-1952*

	Assault	Robbery	Burglary	Larceny	Auto Theft
Murder.....	+.914	+.622	+.592	+.217	+.616
Assault.....		+.612	+.540	+.168	+.546
Robbery (holdup).....			+.754	+.514	+.771
Burglary (breaking and entering).....				+.786	+.835
Larceny (theft).....					+.714

* Calculated from the basic data shown in Table I using Spearman's rank order coefficient of correlation.

of the various spatial patterns of crime. The intercorrelations in Table II are similar to those obtained by Lottier.

All of these correlations are positive. Murder is representative of crimes against the person while larceny shows quite a different pattern and is representative of crimes against property. Although robbery has a relatively high correlation with burglary and auto theft, it has a spatial pattern sufficiently different to place it in a class by itself. The highest correlations are listed below:

Murder and assault.....	+.914
Burglary and auto theft.....	+.835
Burglary and larceny.....	+.786
Auto theft and robbery.....	+.771
Burglary and robbery.....	+.754
Larceny and auto theft.....	+.713

ROBBERY

The east-west axis for robbery described by Lottier does not appear in our data. One robbery area is found in the Pacific and Mountain sections, i.e. Nevada, California, Arizona, Oregon and Washington, and another scattered group of states appear in the eastern third of the United States centering in the East North Central section but ranging from Michigan in the north to Florida in the south and Delaware to Missouri. States in the lowest robbery category are found in the same section and adjacent to those in the highest robbery category. The general pattern of relationships and gradients described for robbery by Lottier is not present. The New England Middle Atlantic and West North Central states have low rates for this offense as well as for most other offenses.

LARCENY

Larceny rates by states show a spatial regularity more readily than any other crime against property and have a pattern similar to that found by Lottier. With a concentration in the Pacific and Mountain sections of the United States, i.e., Wyoming, Utah, Oregon, Washington, Idaho, California, Nevada and Arizona, we find

lower rates extending eastward to another moderately high rate area, an area running from the South Atlantic states up to Michigan in the East North Central section. The New England and Middle Atlantic sections of the United States have the lowest rates for larceny. In general, the spatial pattern is irregular east of the Mississippi, following the findings of Lottier.

BURGLARY

Table I and the burglary map indicate that the New England, Middle Atlantic states and West North Central states have the lowest burglary rates. The highest rates fall in the Pacific and Mountain states and extend across the south through the West South Central and East South Central sections to the South Atlantic states. The eight states having the highest burglary rates are: Texas, Washington, California, Oregon, Colorado, Arizona, Florida and Nevada.

AUTO THEFT

The spatial distribution of auto theft is similar to that of burglary and larceny. The highest rates are found in the Pacific and Mountain states of Oregon, New Mexico, California, Washington, Nevada and Arizona, and in some of the East South Central and South Atlantic states, including Kentucky and Maryland. The New England and Middle Atlantic states have the lowest rates of auto theft.

In order to present a more rigorous comparison of Lottier's findings for 1934-1935 with our own data for 1946-1952, rank order coefficients of correlation were computed for each type of crime except auto theft. Lottier's index of auto theft was not comparable to ours since it was based on the number of auto thefts in relation to the number of automobiles in the state. The correlations are shown in Table III.

An examination of crime rates by states leads one to conclude that the patterns of offenses in sectional regions described by Lottier remain in varying degrees ten years later. Our findings, wherein they appear to differ from those of Lottier, may be ascribed to numerous factors, among them: stepped up interstate migration currents during the intervening period so as to change the population composition of the various states to a considerable extent, the shift of industry in the United States and attendant changes in the characteristics of some cities and states, the differential rate of urbanization from state to state during the period between the two studies, and the possibility of variable amounts of progress in crime prevention programs from state to state.

The stability of sectional patterns in crime is even more clearly seen if we observe

TABLE III

RANK ORDER CORRELATIONS BETWEEN LOTTIER'S (1934-1935) RANKING OF STATES FOR VARIOUS CRIMES AND SHANNON'S RANKING OF STATES (1946-1952)

Murder and Non-Negligent Homicide.....	+ .936
Larceny.....	+ .859
Burglary.....	+ .770
Aggravated Assault.....	+ .774
Robbery.....	+ .607

TABLE IV
RANK ORDERING OF MEAN CRIME RATES BY SECTIONS FOR URBAN AREAS REPORTING, OFFENSES KNOWN TO POLICE, 1946-1952, UNIFORM CRIME REPORTS

Offense	Murder						Robbery						Assault						Burglary						Larceny						Auto Theft							
	1946	1947	1948	1949	1950	1951	1946	1947	1948	1949	1950	1951	1946	1947	1948	1949	1950	1951	1946	1947	1948	1949	1950	1951	1946	1947	1948	1949	1950	1951	1946	1947	1948	1949	1950	1951		
New England...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2		
Middle Atlantic...	2	2	2	2	2	2	2	2	2	2	2	4	2	2	2	2	4	4	1	1	1	1	1	4	1	1	1	1	1	2	2	1	1	1	1	2		
East No. Central...	4	5	6	6	6	6	5	6	8	8	8	8	5	5	5	6	5	5	4	4	4	4	4	3	5	5	5	5	5	5	3	3	4	3	3	4		
West No. Central...	3	3	3	5	4	5	3	3	3	3	3	3	3	3	4	4	5	3	3	3	3	3	3	2	3	3	4	4	4	4	4	4	3	4	4	3		
South Atlantic...	7	8	8	8	8	7	7	5	7	6	5	5	9	9	9	9	9	9	5	6	7	6	6	7	6	6	6	6	6	6	6	6	6	5	5	8		
East So. Central...	9	9	9	9	9	9	8	7	5	7	6	4	8	8	8	8	8	8	6	5	5	5	5	5	4	4	3	3	3	3	7	7	7	6	6	5		
West So. Central...	8	7	7	7	7	8	4	4	4	4	4	2	7	7	7	7	7	7	7	7	6	7	7	6	7	7	7	7	7	7	5	5	5	7	7	6		
Mountain...	5	4	5	4	3	4	6	8	6	7	6	6	4	4	3	3	3	2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7		
Pacific.....	6	6	4	4	3	5	3	9	9	9	9	9	9	6	6	6	6	5	4	6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

the variation in crime rates in nine different sections as delineated by the Federal Bureau of Investigation in its Uniform Crime Reports for the period already observed. The relative rank of each section for each year for each crime is shown in Table IV.

The relatively low crime rates per 100,000 population for New England and Middle Atlantic states are consistent, although under-reporting in New York City is recognized as a factor in the generally low rates for the entire state. The relatively high rates of Mountain and Pacific states for crimes against property are also consistent. The South Atlantic, East South Central and West South Central states are consistently high on crimes against the person.

This research lends additional emphasis to the contention that crime, as reported and recorded in the United States, is largely a function of social and cultural factors rather than biological, psychological or entirely chance factors. In the absence of significant biological variations or significant differences in basic mental processes on a regional or sectional basis, all other things being equal, one would expect a rather even crime rate from state to state. Since vast differences in crime rates on a sectional basis are found to persist over a period of time, one may hypothesize that subcultural variations of a regional or sectional nature are responsible for these regional or sectional patterns of crime.

Even if this hypothesis cannot be accepted due to underreporting of crime, the least that the data may be said to demonstrate is a distinctly sectional variation in reporting and recording practices, indicating great disparities in sectional reactions to various types of human, or more specifically, criminal behavior.

In testing the proposition that crime rates vary with the cultural background of sections and regions it will be necessary to obtain certain indices of cultural variation and relate them to the regional and sectional crime patterns that have been found. This approach will take us a step beyond the somewhat more subjective tests that have prevailed up to this time.