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Factors Influencing Criminal Behavior in Newark: A Local Study in Forensic Psychiatry

Numerous factors, environmental and others, have had an important influence on the scope and intensity of crime. To understand more fully the nature of crime in the state of New Jersey, the Office of the Attorney General recorded [1, pp. 11-28] a revised section entitled "Profiles of Incorporated Municipalities in New Jersey" in its Uniform Crime Reports of 1971. These profiles included the following factors: areas of population; density rates; population growth; urban, suburban, and rural characterizations; given land areas; and industrial populations. Even though these factors are out of police control, they can affect the crime rate, which can vary from town to town. It also is of interest that since the effects of these factors cannot be easily determined more aggressive research has not been conducted in attempts to decrease state and national crime rates. In New Jersey, during the calendar year 1971, a total of 224 709 crime index offenses were reported to state law enforcement agencies. This was a 14% increase in crime volume over 1970 and a 61% increase compared with the five-year period between 1967 and 1971. The crime index offenses referred to here represent the most common problems to law enforcement and the municipality. They include such violent crimes as atrocious assault, forcible rape, murder, and robbery, and such nonviolent crimes as auto theft, breaking and entering, and larceny of \$50 and over in value.

Crime rates relate the incidence of crime to the resident population. The Uniform Crime Reports of 1971 for New Jersey [1] declared that the risk of becoming a victim of crime in the state is increasing and that the growth in population alone cannot account for the rise. To further study other factors and their effects, we undertook the responsibility of exploring crime in Newark, N.J., and made an attempt to focus attention on some possible precipitating factors of criminal behavior in this enigmatic urban community. Our endeavors were enhanced by a recent interstate committee report of city mayors that announced that Newark, with a population of 382 000, had more major problems than any other urban area in the United States.

Methods

This study was undertaken in two parts. Part I was a twelve-month study of crime rates (homicides, atrocious assault and batteries, and total crimes reported) on a day-to-day basis, in the city of Newark, upon which we have superimposed certain variables. These variables come from a list of possible environmental factors precipitating crime, which we gathered from interviews with police and by personal observation. Officers and men of traffic, patrol, records, community relations, homicide, bandit, and tactical squad forces were contacted for this purpose. In addition, we went on several police patrols

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(daytime and night) with the regular patrol and with the tactical squad.³ The list of variables includes day of the week, barometric pressure, phase of the moon, dates of welfare and social security checks, weather conditions, and certain air pollution indexes. In choosing which of the suggested variables to put into this portion of the study, we were mainly concerned with those factors kept in record form and thereby readily available for input [2] (for example, the amount of narcotics and the number of narcotics addicts "on the street" probably has a tremendous effect on the crime rate in Newark but hardly lends itself to precise quantitative analysis).

Part II of the study was concerned with only homicide rates, over a 15-year period. A similar study, emphasizing correlation with phases of the moon, was done in Dade County, Florida and Cuyahoga County, Ohio [3]. The report suggested that the moon phase may be a factor but that it may vary with geographic location. In our study we added the variables of the day of the week and the dates of welfare checks received.

In Part I we ran a simple correlation matrix [4] using 26 variables taken over a period of 365 days (1 June 1971 through 31 May 1972). The factors were day of the week, total crimes reported for each day, homicides, atrocious assault and batteries,⁴ welfare and social security checks reception days,⁵ various moon phases [5], and maximums and daily averages of various air pollutants (sulfur dioxide, oxidants, aldehydes, carbon monoxide, hydrocarbons, and smoke shade) [6]. Our weather parameters (as per the National Oceanic and Atmospheric Administration station at Newark Airport) were daily temperatures (maximum, minimum, average, and deviation from normal), dew point, degree-days, precipitation, and barometric pressure [7]. With our sample size, if two factors had a correlation coefficient of 0.11 there would be a 95% chance that the two variables were related. Two variables with a coefficient of 0.14 would have a 99% chance.

As might have been expected, the relationship between assault and homicide was statistically significant (0.121). After all, a homicide may be an assault that got out of hand (or an assault an attempt at homicide that failed). That was the only significant homicide correlation. Other findings were more surprising. Sulfur dioxide levels were found to be inversely related to assaults (-0.11), while oxidants correlated to them directly (0.23). Yet sulfur dioxide and oxidants were related to each other (average to average 0.17 and maximum to maximum 0.25). Oxidants related to total crimes (0.18), aldehydes to total crimes (0.19), carbon monoxide to total crimes (0.13), smoke shade inversely to total crimes (-0.10), and smoke shade inversely to assaults (-0.20).

Temperature correlated highly with assaults (0.33). Precipitation had an inverse relationship to total crimes (-0.156) and to assaults (-0.188).

In Part II, on tabulating the homicide rates, for practical purposes we used all homicides recorded. Because of the nature of the homicides record keeping by police and for the sake of simplicity, we did not sort out multiple homicides, arson victims, victims of police shootings, or other categories. We do not expect, therefore, that our figures precisely reflect changes in antisocial behavior. Assaults are approximately 15 times more common than homicides and should be a better indicator of such behavior, for a given time period. Over an extended period, however, it is interesting to see that homicides and assaults do show the same pattern for the weekly cycle (Fig. 1).

Discussion

Our findings suggest some air pollutant factors may affect criminal activity. Part of this apparent correlation is probably related to the day of the week (that is, more pollution

³The tactical squad is a highly trained, highly mobile, plainclothes patrol force.

⁴Crime files of the Newark Police Department.

⁵Welfare checks and social security checks are received on the first day and on the fourth day of the month, respectively, unless the day is a Sunday or legal holiday. This is the basis upon which we assigned these two factors to a day of the month.

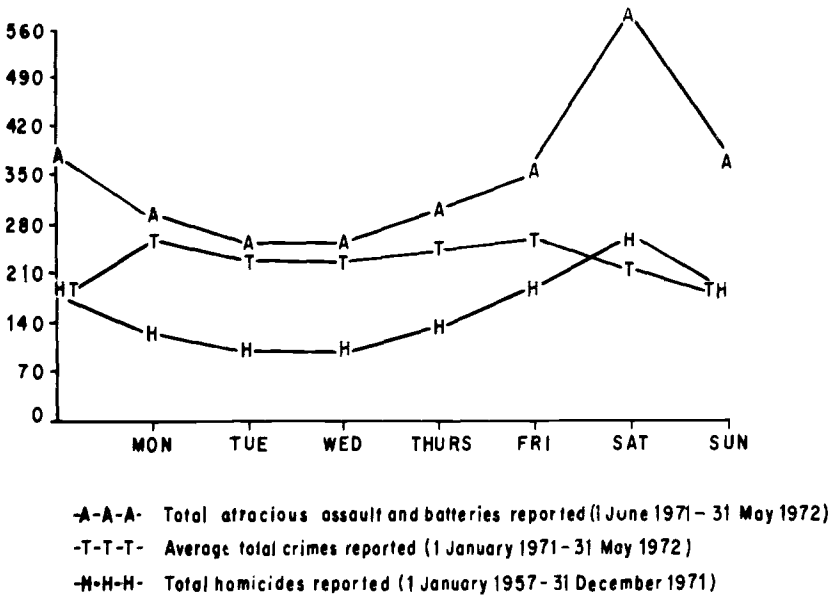


FIG. 1—Crime rate by day of the week in Newark, N.J.

on weekdays secondary to industrial and transportation activity). Yet not all of the findings can be explained in this way (Fig. 2). We may be experiencing a phenomenon similar to the *foehn* wind in Germany that comes from North Africa in the winter. Its high temperature and high anion content are credited by some with making the Bavarians act bizarrely when this wind blows. Perhaps we are dealing with neurological chemical irritants. At any rate, it seems that we have another facet to the growing concern about air pollution that ought to be explored more deeply [8].⁶

A study on homicide rates in Dade County, Florida (which suggested that there might be a geographic factor) showed an increase on the second and third day after the full moon. We chose five phases (full moon; first, second, and third day after full moon; and new moon) to analyze because they were the most significant in the Florida study. Our small study also showed a slight increase in homicides on the first day after the full moon. The significance, however, is questionable (40.0 versus 36.6) [9-12]. Of greater significance proved to be the day of welfare check reception (45.0 versus 36.6).

Total crimes were up on welfare check days (266 versus 240) but not on social security check days. A large percentage of the population of Newark is on welfare, and "check day" is a busy time for thieves. As the first day of the month, it is also a day when many debt payments are received. Total crimes are actually lower on Saturdays than the daily average (223 versus 240), yet assaults and homicides are up by more than 50% (9.3 versus 6.3, and 0.68 versus 0.40) (Fig. 1). Robbery rates were not analyzed in our study, but it seemed to be the general consensus of police officers questioned that total crimes were down on Saturdays because people were for the most part in their homes and off the streets. They were, therefore, less apt to be robbed. The increase in social activity on Saturday nights probably leads to the increase in homicides and assaults, with most victims being attacked by relatives or friends, according to police opinions.

At this point, we can only speculate as to the causes for high crime rates on Monday. Perhaps it is related to a letdown feeling after the weekend or to desire to regain money

⁶I. H. Kornbluh, personal communication.

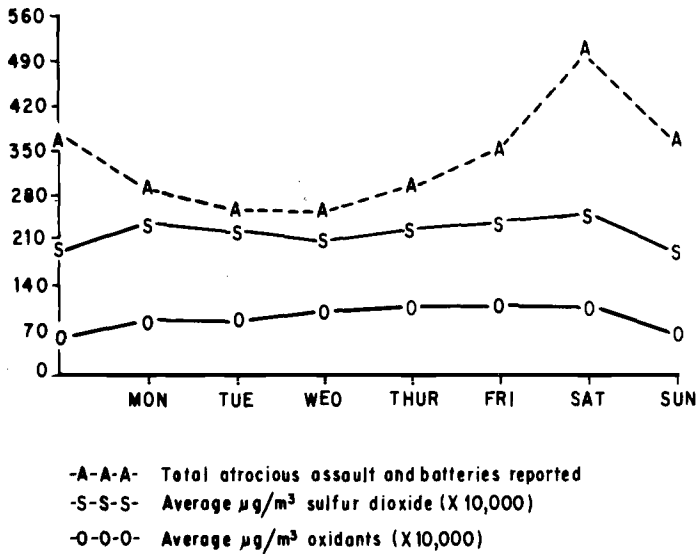


FIG. 2—Atrocious assault and batteries, sulfur dioxide levels, and oxidant levels by day of the week in Newark, N.J., 1 June 1971 through 31 May 1972.

spent, thus leading to robberies. Total crimes and assaults drop markedly between December and January (from 263/day to 225/day and from 8.0/day to 2.9/day, respectively). This monthly change is seen throughout the state and is generally credited to Christmas shopping, Christmas neurosis, and the onset of inclement weather [1, pp. 40-41].

Figure 1 shows very well the cyclical homicide rate during the week; it reaches a high point on Saturdays and an ebb on Tuesdays and Wednesdays. It was also interesting (albeit not very heartening) to find that there were more homicides in the last five years studied (1967 to 1971) than in the ten years prior to 1967 (595 and 511, respectively). The homicide detectives interviewed attributed this increase to the rise in narcotics use in the city.

All environmental factors which may affect crime rate were not included in our study because of time limits and the fact that there may be some influential environmental conditions which we did not think to include. For example, if a high pollen count were associated with a high homicide rate, no one would know if no one thought to ask that question. There may well be thus-far-hidden influences more important than the ones we studied. We did not attempt to input the effects of slums, poor street lighting, narcotics, and other factors because such information did not lend itself to our type of study.

We did not deal with a large variety of crimes. We would like to have had input rates on robberies, sex offenses, animal bites, family disputes, and other events, but we were limited by the crime record system from which we compiled our data. As such, we may have missed some interesting correlations.

The entire question of any effect of the moon phase was not thoroughly explored in our project. Almost all police interviewed believed that the full moon brings all the "lunatics" out. If this were true, our study would not necessarily demonstrate it. There might be a small minority of people so affected, but their actions and their numbers might not influence our data enough to be noticed. Inadequate records are kept on complaints that come into the police and are handled over the phone. No reports are filed and tabulated on the type of person who calls into the police because he thinks "that Martians are coming down his chimney." A study of such occurrences is possible; however, data on

missing persons, AWOL soldiers, historically bizarre nights, and other incidents would be interesting but were not within the realm of our project. Any such studies should take into consideration the cultural and environmental backgrounds of the subjects involved.

Summary

Several suspected influential factors were quantitated. Homicides and assaults were up on weekends (highest on Saturdays) and ebbed on Tuesdays and Wednesdays. There was a significant increase in all crimes studied on days that welfare checks were received. Assaults dropped sharply after the first of the year (believed to be the result of the end of holiday shopping and the onset of inclement weather, as well as the end of the holiday neuroses).

Other findings were more surprising and less easily explained. Total crimes, homicides, and assaults showed a questionable increase on the third day following the full moon. Over a 15-year period, homicides showed a very slight increase during the first full day following a full moon (as was shown in the Dade County study). Assault rates were up 19% over the monthly average on days of the full moon (7.5 versus 6.3) for the period 1 Jan. 1971 through 31 May 1972 (approximately 3000 assaults tabulated).

Precipitation showed a high inverse correlation with total crimes and with assaults.

The most surprising correlations were with air quality factors. Sulfur dioxide levels were inversely related to assaults (with no relation to total crime), while oxidant levels tended to rise and fall together with the assault rate. Other pollutant levels correlated in an unusual pattern. Smoke shade varied inversely with assaults. Total crimes also rose and fell with the levels of oxidants, aldehydes, and carbon monoxide. One might think that the apparent results of these air pollutants were simply a coincident effect related to the day of the week, that is, the highest air pollution on Fridays and Saturdays, the end of an industrial week. This is not the case, however; Saturday has the second lowest total

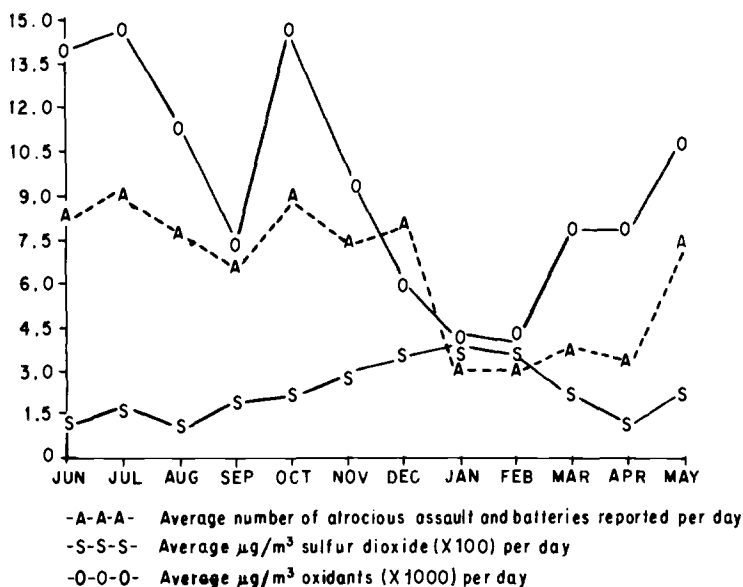


FIG. 3—Atrocious assault and batteries, sulfur dioxide levels, and oxidant levels by month in Newark, N.J., 1 June 1971 through 31 May 1972.

crime rate for the week (Sunday is the lowest), while Monday has the highest rate (Figs. 1 and 2).

A multiple regression analysis of our twelve-month study showed that temperature variables (including degree-days and dew point) were the most important prognosticators of total crime and assault rates. This was not surprising since it was expected that crime rates would tend to rise with more clement weather. It would be extremely difficult to give relative values to all factors at work here: children home from school, more people on the streets, more hours of daylight, plus the possible effects of the variables which we studied. Though these factors are almost inseparable (except under laboratory conditions) we could be missing the significance of one or more of them.

Our biggest surprise, by far, in this study was the very high degree of parallelism between the levels of oxidants in the air (which arise primarily from automobile emissions, and are for the most part ozone) and the rates of assaults ($P < 0.001$) (Fig. 3). The pattern holds for all months, except December, and it would have been maintained there if it were not for Christmas Eve, Christmas Day, the day after Christmas, and New Year's Eve, at which times assaults averaged twelve per day (50% above the monthly average for December).

Clearly, air pollutants must be further scrutinized in regard to their possible effects on human behavior.

We are not trying to claim that the variables that proved to be of statistical significance in our analysis are the factors that cause crime (people were assaulting one another long before automobiles were emitting ozone). We are simply postulating that these factors may play an important part in precipitating antisocial behavior.

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