# AN ALTERNATIVE DATA BASE FOR THE DETERMINATION OF CRIME TRENDS IN AMERICAN CITIES: A RESEARCH NOTE

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## INTRODUCTION

One of the most basic questions posed to criminal justice researchers and decision-makers is whether or not crime has increased or decreased over time. Unfortunately, the answer is not at all straightforward. The Uniform Crime Reports (UCR), for example, indicate that the national rates of most forms of violent and property crimes have been steadily increasing since 1984 (Uniform Crime Reports, 1990). On the other hand, the data collected by the National Crime Survey (NCS) indicate that the rates of reported victimizations have been gradually, but steadily, declining since 1980 (Jamieson and Flanagan, 1989: 283).

Such apparent divergencies in reported criminal trends result from some widely discussed differences in the operational designs of the UCR and NCS, and in important inconsistencies in the definitions of offenses and the manner in which the rates are estimated (see, for example, O'Brien, 1985; Lynch and Biderman, forthcoming). Nevertheless, although it is relatively easy to account for these very different profiles, it still remains impossible to provide a definitive response to the deceptively simple question concerning trends. In this research note, we argue that an alternative form of data, drawn from records of calls for service from metropolitan police departments, may provide a more reliable means of estimating such trends, at least at the local basis. Data collected over a 22 month period from the Oklahoma City Police Department are used to illustrate how such trends might be estimated.

## CALLS-FOR SERVICE DATA AS RELIABLE INDICATORS OF THE VOLUME OF CRIME

One of the central comparability problems of the UCR and the NCS pertains to the degree to which they provide reliable estimates of the actual volume of

crime. Given the primarily reactive nature of policing (Black, 1970), it is obvious that the crime rates estimated by the UCR overwhelmingly represent those offenses that have been reported by citizens to their local departments. Thus, to the extent that nonreporting is prevalent within a jurisdiction, that many offenses will remain "hidden" from official records and not be reflected in the rates used to estimate crime trends. In addition, however, many citizen complaints are also not reflected in these rates through a failure of the police officers to file a formal written report on the complaint. Black (1970), for example, notes that police officers officially recorded only 64 percent of the complaints observed in his study of Boston, Chicago and Washington, D.C. in 1966. This ratio is similar to that observed by Sherman et al. (1989) in Minneapolis during 1986, where only 66 percent of all robbery-related complaints resulted in an official recording. Such discretionary practices make it difficult to derive reliable estimates of even the number of citizen complaints, much less the actual volume of crime that occurs in a locality during any particular time period.

As noted by O'Brien (1985: 39), these considerations were an important impetus in the development of the NCS, an annual self-reported survey of victimization that it was hoped would provide "more reliable measures of the absolute rates of serious crimes and more reliable series on which to base analyses of crime trends." Unfortunately, the NCS is characterized by problems common to all survey designs that make the reliability of any estimated rates or trends also open to question, such as the nonreporting of crimes to interviewers (Turner, 1972), a substantial amount of sampling error that leads to large confidence intervals around the estimates (Skogan, 1981), interviewer

effects (Bailey et al., 1978), and the use of a single individual to report all of the victimizations experienced by a household (Dodge, 1976). Nevertheless, O'Brien argues that since one might assume that response bias is relatively constant over time, the outlook for the measurement of crime trends using the victimization data is "optimistic" (p. 59).

Despite O'Brien's conclusion, we feel that the problems inherent to both the UCR and the NCS make the reliable estimate of trends very problematic. However, a relatively new form of criminal data collection has the potential to overcome many of these difficulties. Computers are increasingly being used to monitor the calls for emergency service placed to a centralized 911 switchboard (see the descriptions of Sherman et al., 1989 or Bursik et al. 1990). Such a system has several strengths over the UCR and NCS for the generation of the data used to estimate trends in criminal activity over time. First, the "gatekeeping" processes of police departments in the recording of citizen complaints are largely bypassed since the computer maintains a running record of the number and nature of all calls. Second, the interviewer and memory effects that are endemic to the NCS are also eliminated. Finally, since all calls received by a police department become part of the dataset, sampling effects are nonexistent.

Unfortunately, calls-for-service (CFS) datasets are characterized by problems that also make them less than perfect for the estimation of rates and trends. First, and most obviously, a criminal complaint has to be made to the department before it is reflected in the system. Therefore, an undetermined amount of "hidden" crime will still not be reflected in the data, as is the case with the UCR. However, as emphasized by Bursik et al. (1990: 437), the

extent of this hidden crime "exclusively represents the likelihood that citizens will contact the police department, rather than the outcomes of decision-making practices of the department or patrol officers." A second, and not so obvious problem, involves the over-reporting of criminal behavior, which would occur when multiple citizen complaints are received for a single incident or when false reports are made. However, many police departments have instituted a two-stage process to minimize the effects of such over-reporting. The police officers dispatched to the scene of the crime immediately report back to headquarters whether the complaint seems to be founded or unfounded. Then, after eliminating the unfounded complaints, the calls-for-service datasets are restructured to represent discrete events, with the number of calls received for each event noted in the file.

Overall, CSF appear to provide a much broader representation of the number of criminal events that occur within a jurisdiction than the UCR, and are not subject to the same limitations that make trends estimated on the basis of NCS data problematic. In the next section, the use of such data in the estimation of crime trends is illustrated.

## TRENDS IN OKLAHOMA CITY CRIME, 1986-1988

The data reported in this paper represent calls for service received by the Oklahoma City Police Department over a 22 month period (July, 1986 through April 1988). All events have been corrected for multiple calls, and unfounded reports have been eliminated from the analysis.

As shown in Table 1, the use of the CFS data provides a very different representation of the distribution of crime in Oklahoma City during 1987 (the only complete year in our dataset) than provided by the UCR. While the

estimates for the violent offenses are fairly close (with the important exception of rape complaints), there is a major disparity in the estimates of the two property offenses. As can be seen in Table 1, over twice as many

(Table 1 about here)

burglary events were reported to the CFS system than are reflected in the UCR.

The findings of Table 1 significantly call into question the degree to which trends estimated on the basis of the UCR system actually reflect the dynamics characterizing the city. Table 2 presents the yearly trends reported by the UCR for Oklahoma City. Each of the five offense types is characterized

(Table 2 about here)

by a decrease in its incidence over time, with drops of at least 10 percent reported for rape, burglary and motor vehicle theft. To compare these trends with those derived on the basis of the CFS data, autoregressive models that allowed for the existence of one and two month lags were estimated for each of the offenses; due to the differential number of days that occur in each month, the data were transformed into the average number of offenses per day during the particular month. In addition, a dummy variable was included in the model to represent the Summer months of June, July and August.

Table 3 indicates that the trends derived on the basis of the CFS data are, for the most part, significantly different than those based on the UCR. The only offense for which similar patterns are observed is aggravated assault, which the UCR data indicated had the smallest percentage decrease of the five offenses and the CFS data indicated had no significant declining trend over the 22 month period. On the other hand, while the UCR estimates indicate that there was a drop of over 11 percent in reported rapes between 1986 and 1988,

the CFS estimates fail to find and evidence of a significant decline.

Most interesting are the findings for robbery, burglary and motor vehicle theft, all of which are characterized by a significantly decreasing trend over time. For example, the UCR data estimates a decline of 8 percent over the three year period. However, net of the effect of the SUMMER dummy variable, the trend derived on the basis of the CFS data estimates that the average number of reported robberies declined from 5.75 per day to 2.35 per day, a decrease of 39 percent. Similar trends are found for burglary (falling from an estimated 109.97 per day to 81.10, a decline of over 26 percent) and to a lesser extent for motor vehicle theft (falling from an estimated 28.78 per day to 24.8, a decline of almost 14 percent). Thus, as suggested in the opening sections of this research note, very different impressions concerning the trends in these offenses are derived from the CFS and UCR data sources.

CONCLUSION

It is necessary to emphasize the fact that CFS data are characterized by some important limitations, most notably relating to the unknown degree to which offenses are not reported by citizens to the emergency 911 system. Yet it is also clear that a much broader picture of the extent of crime in an urban area is provided by such data since they effectively bypass all of the "gatekeeping" recording practices of metropolitan police systems. To the best of our knowledge, such data have not been utilized previously to examine temporal trends in criminal behavior. However, the fact that they present a much different depiction of these trends in Oklahoma City than the UCR data indicates that they deserve some careful attention as an important alternative source of cross-sectional and longitudinal data. In that respect, we

wholeheartedly agree with Sherman et al.'s statement (1989: 34) that "one can even imagine a new series of federal crime statistics derived from local call data."

At the very least, such data provide an excellent opportunity to easily incorporate multiple indicators of crime rates into trend analyses. This is not generally feasible with NCS data, for as O'Brien (1985: 58) cautions, the sample size in these national surveys is too small to provide a reliable base for the computation of city-specific victimization estimat
s. On the other hand, computerized calls-for-service systems are becoming commonplace throughout the United States. With such an alternative indicator of crime rates becoming increasingly available, it will be possible to make major progress in addressing the serious problems of measurement error that have consistently plagued criminological research.

TABLE 1

COMPETING ESTIMATES OF THE NUMBER OF SELECTED CRIMINAL ACTIVITIES
OKLAHOMA CITY-1987

| | UCR | CFS | % DIFFERENCE |
|---|---|---|---|
| RAPE | 381 | 501 | 31.5 |
| ROBBERY | 1,322 | 1,561 | 18.1 |
| AGGRAVATED ASSAULT | 2,047 | 2,301 | 12.4 |
| BURGLARY | 17,345 | 36,703 | 111.6 |
| MOTOR VEHICLE THEFT | 6,755 | 10,122 | 49.8 |

TABLE 2

UCR ESTIMATES OF THE NUMBER OF SELECTED ACTIVITIES: 1986-1988

| | 1986 | 1987 | 1988 | % CHANGE 1988-1986 |
|---|---|---|---|---|
| RAPE | 425 | 381 | 377 | -11.3 |
| ROBBERY | 1,484 | 1,322 | 1,365 | - 8.0 |
| AGGRAVATED ASSAULT | 2,270 | 2,047 | 2,184 | - 3.8 |
| BURGLARY | 17,048 | 17,345 | 14,693 | -13.8 |
| MOTOR VEHICLE THEFT | 6,703 | 6,755 | 5,707 | -14.9 |

TABLE 3

AUTOREGRESSIVE TREND ANALSIS FOR FIVE OFFENSES, 7-86 THROUGH 4-88
(YULE-WALKER ESTIMATES)

| | RAPE | ROBBERY | AGG. ASSAULT | BURGLARY | MOTOR THEFT |
|---|---|---|---|---|---|
| Intercept | 1.380 | 5.854 | 6.710 | 111.349 | 28.966 |
| S.E. | 0.192 | 0.406 | 0.729 | 4.212 | 1.298 |
| Month | 0.002 | -0.107 | -0.022 | -1.375 | -0.188 |
| S.E. | 0.013 | 0.029 | 0.051 | 0.296 | 0.091 |
| Summer | 0.167 | -0.123 | 1.299 | 15.221 | 4.028 |
| S.E. | 0.188 | 0.424 | 0.674 | 4.836 | 1.590 |
| Lag1 | -0.074 | 0.038 | -0.230 | -0.171 | -0.046 |
| S.E. | 0.242 | 0.242 | 0.242 | 0.237 | 0.233 |
| Lag2 | -0.067 | -0.045 | -0.033 | 0.211 | 0.281 |
| S.E. | 0.242 | 0.242 | 0.242 | 0.237 | 0.233 |
| Total $R^2$ | 0.094 | 0.465 | 0.360 | 0.726 | 0.468 |

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