REEXAMINING SOCIAL DISORGANIZATION
THEORY USING CALLS TO THE POLICE AS
A MEASURE OF CRIME*

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This study examines social disorganization theory using calls to the police during 1980 in 60 Boston neighborhoods. These data, based on complainant reports of crime rather than official police reports, allow further investigation of differences in findings based on victimization data and official crime data. The rates of assault, robbery, and burglary are regressed on poverty, mobility, racial heterogeneity, family disruption, and structural density. Interaction terms for poverty and heterogeneity, poverty and mobility, and mobility and heterogeneity are also explored. Results from this study support findings from recent victimization studies and earlier ecological studies using official counts of crime. Poverty and heterogeneity, along with family disruption and structural density, are found to be important ecological variables for understanding the distribution of crime rates among neighborhoods.

BACKGROUND

Social disorganization theory, with its emphasis on the geographical distribution of crime and the structural characteristics of neighborhoods related to this distribution, was one of the prominent theories explaining crime in the earlier part of this century. The ecological approach to the study of crime fell out of vogue in the 1970s, however, and was replaced by more social-psychological theories. There were several reasons for the decline of social disorganization theory (see, e.g., Bursik, 1988), but one early and particularly devastating criticism had to do with the reliance of this research on official measures of crime.

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OFFICIAL MEASURES OF CRIME

Even though many of the early empirical examinations of social disorganization theory found support for its main premises, they relied on official measures of crime (e.g., arrests, juvenile court referrals, or official counts of crime) for the dependent variable. The growing controversy in the 1960s and 1970s over what official measures of crime were actually measuring—crime or crime control—led to serious questioning of these results. Official crime measures, it was argued, were as likely to reflect biases in official reactions to crime as they were to reflect any true measure of crime.

Official measures of crime were viewed with particular skepticism when used in relation to structural characteristics of communities. Poor and non-white neighborhoods were suspected of being especially vulnerable to inflated measures of crime. Recent studies have provided empirical support for these criticisms. Studies of the size of police forces and municipal expenditures for policing have shown that both vary with the percentage nonwhite in an area (Jackson and Carroll, 1981; Liska and Chamlin, 1984), which increases the potential of discovered crimes as well as arrests in such areas simply because of higher levels of policing. In addition, it has been shown that police are more likely to make an arrest in a poor neighborhood, controlling for the type of crime and the characteristics of the offender (Sampson, 1986a; Smith, 1986). This measurement problem led Bursik (1988:534) to conclude that “to date the degree to which the relative distribution of neighborhood rates of crime and delinquency is an artifact of police decision-making practices has not been extensively examined due to the limited availability of the appropriate data.” Given only official measures of crime, social disorganization theory seemed doomed to being untestable.

VICTIMIZATION DATA

The promise of a more accurate examination of the effects of social structure on crime and a renewed interest in social disorganization theory came only with the advent of victimization data. These data allowed for counts of crime separate from any official responses to crime, and research examining social disorganization theory using these data began to appear in the early 1980s. Although early victimization studies examined cities rather than neighborhoods, which had been used for most of the earlier studies, their findings nonetheless raised questions about the conclusions based on official crime data. For example, Decker et al. (1982; also O’Brien, 1983) using the National Crime Survey (NCS) 26-city data, found that percentage nonwhite and poverty decreased, rather than increased, the assault rate. Sampson

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1. That is, measures of poverty (Beasley and Antunes, 1974; Quinney, 1964; Schmid, 1960), heterogeneity (Beasley and Antunes, 1974; Lander, 1954; Quinney, 1964), and mobility (Chilton, 1964) were found to be positively related to official rates of crime.
(1985:10) concluded that such results brought "an entire tradition of intraurban ecological research . . . into question."

Questions raised by the findings of early victimization studies fostered more precise tests of the theory. Research using NCS data moved from the city as the unit of analysis to the more appropriate level of the neighborhood and began to systematically test additional independent variables. Results from these studies provided only mixed support for the primary variables of social disorganization theory and particularly questioned the role of poverty. For example, Sampson (1985) found that racial composition and mobility were positively related to total personal victimization, but that measures of income (including poverty) had nonsignificant or weak effects when measures of family structure and density were controlled. Smith and Jarjoura (1988) also reported mixed support for social disorganization theory using victimization data. They found the original variables (poverty, heterogeneity, and mobility) were all positively and significantly related to burglary rates when they were the only predictors in the equation. However, when other variables were added to the equation, poverty became nonsignificant. Similarly, in predicting violent crimes, they found poverty and heterogeneity had positive effects when only these variables and mobility were in the equation, but the predictive values fell below significance when other terms were added.\(^2\)

These more recent studies using victimization data at the neighborhood level suggest that poverty positively affects crime rates only when other variables, particularly family structure, are not included.

The results of these studies, however, have not gone uncriticized either, for they have their own problems. Like studies using official data, many victimization studies do not use actual neighborhoods. As noted above, the earliest work (e.g., Decker et al., 1982; O'Brien, 1983) focused on cities rather than neighborhoods. More recently, studies have moved to smaller aggregations, but the extent to which they are actual neighborhoods is questionable. For example, Sampson's (1985, 1986b, 1986c) work based on the NCS used pseudo neighborhoods created by combining persons with similar neighborhood characteristics. Smith and Jarjoura (1988) defined neighborhoods on the basis of police beat boundaries.

Of more concern, however, have been reports of systematic bias in the willingness of respondents to report certain crimes to interviewers. Hindelang (1978) suggested that victims may not reveal assaults to interviewers with the same accuracy as property crimes, particularly when the assailant is a nonstranger. In that blacks are assaulted by nonstrangers at a higher proportion than are whites this is likely to lead to serious estimation errors (Hindelang, 1978:103). Hence, Sampson (1985:31) noted that "there are some potentially

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\(^2\) Smith and Jarjoura (1988) included an interaction term for low income and mobility, as well as measures of family structure, density, and percentage aged 12 to 20 years.
serious measurement problems when studying violent crimes in relation to race of victim, and by implication, racial composition of neighborhood.” In addition, there are the problems inherent in all surveys, such as nonresponse bias, memory loss, telescoping of events, and social desirability effects. (See Gove et al., 1985, for a discussion of these problems in relation to the NCS.)

A THIRD CRIME MEASURE

Fortunately, a third crime measure has recently become available for many cities and provides another avenue for examination of social disorganization theory. This measure, calls to the police, is based on requests for service made to the police. Calls-for-service data have recently been used as a measure of crime in several studies (Bursik et al., 1990; Pierce et al., 1988; Sherman et al., 1989; Taylor et al., 1981). Although excellent discussions of the general strengths and weaknesses of these data are available elsewhere (e.g., Pierce et al., 1988; Sherman et al., 1989), some brief comments are necessary.

The data used here are based on the complainant’s definition of events as coded by the 911 operator. Probably the greatest asset of these data is that, unlike official counts of crime, they are virtually unscreened and therefore not susceptible to police biases. In fact, Sherman et al. (1989:35) have stated that these data “provide the widest ongoing data collection net for criminal events in the city.” By using complainant definitions of events rather than the definition later established in police reports, one avoids any discretionary bias due to police decisions whether to file a report. This distinction is important because many of the calls identifying crimes go unrecorded by police. For a variety of reasons many incidents are written up as “services rendered” or “investigate person/premise” and thus are never officially recorded as crimes. A recent study comparing complainant descriptions of incidents of assault and larceny and police reports of those incidents found agreement levels to vary widely across neighborhoods (Warner and Pierce, 1992). For example, of 22,150 calls identified as larcenies by the complainant, only 63% were later recorded by police as larcenies. More important, the level of agreement varied dramatically across neighborhoods—from a low of 33% to a high of 82%. This suggests that some crimes may be “lost” when examining police reports and that the proportion of “lost” incidents may vary across neighborhoods. Thus, it seems important to analyze incidents in terms of the complainant’s definition (as is done in victimization surveys) to avoid any possible police bias.

Nonetheless, calls to the police are similar to other official measures of

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3. Although the coding of calls by 911 operators or police dispatchers may involve some interpretive work (Gilsinan, 1989), there is little evidence that operators refuse to code legitimate police calls or that their interpretation of calls involving crimes is significantly different from the meaning of the callers.
SOCIAL DISORGANIZATION THEORY

Crime because they reflect two of the three major elements of official counts of crimes known to the police: criminal behavior and citizen willingness to report that behavior. Only the third element—police discretion—is eliminated. It is this aspect of police discretion in official counts of crime that has been most criticized in ecological studies. As Sampson and Groves (1989:776) noted, "the major issue with respect to community research concerns the extent to which official delinquency rates reflect ecological biases in official reactions to delinquent behavior" (emphasis added). The other two elements—crime and citizen willingness to report crime—are both crucial elements in the definition of crime by a community. As Gove et al. (1985) have pointed out, the extent to which the victim and community define a behavior as "criminal" and believe that it is worthy of "outsider" intervention, is perhaps the true extent to which a behavior should be viewed as a crime. Ultimately, it is the citizens of the community who must live with crime and decide whether it is worthy of official action.

On the other hand, one potential problem with calls to the police, as Sherman et al. (1989) pointed out, is that they do not necessarily include the location of the actual occurrence of the event being reported; only the caller's location, or the location to which the police car is to be dispatched, is recorded. Although this may be a serious problem when analyzing blocks or specific "hot spots," it is not as much of a problem when studying neighborhoods. Only on the very perimeters of neighborhoods would it be likely that a caller's location or the dispatched location would be in a different neighborhood (e.g., across the street) than the actual neighborhood of the incident. This problem is further diminished by the fact that many neighborhoods are geographically bounded by such physical boundaries as major roadways, parks, or bodies of water.

Caution has also been advised because of the possibility of inflated crime rates as a result of multiple calls on the same incident. However, this is not particularly problematic for the data used here. As Pierce et al. (1988:6–7) reported regarding these data:

Whenever the dispatcher sees that more than one call has been received concerning the same problem he/she will void from the computer extra reports concerning that problem. This allows the dispatcher to avoid sending multiple cars to a single event but it also means that multiple reports are not recorded and computerized concerning a particular event. Of course, if the problem that generated the request persists and another call or set of calls is received concerning that problem at a later point in time (perhaps only an hour later) and another patrol car is dispatched, the information concerning that call will also be recorded and computerized.
Thus, we believe potential problems of using these data for ecological research are minimal and the potential strengths are yet to be fully explored.

In summary, results from early social disorganization theory were criticized and eventually virtually ignored because official measures of crime were believed to be biased due to police discretion in writing official crime reports or making arrests. Victimization studies that reexamined social disorganization theory raised questions regarding results based on official data, particularly in relation to poverty. Data on calls to the police, although still an "official" measure of crime, are not influenced by the most criticized element of official measures—police discretion—and therefore may be a valuable measurement tool for further reexamining social disorganization theory. To the extent that findings from these data correspond with findings using other crime measures, one may have more confidence in social disorganization theory. On the other hand, differences in findings among the three measures may point more specifically to some of the measurement issues and clarify which aspects of "crime" (i.e., the behavior, the definition of the behavior by the victim and/or community, or official reactions to the behavior) are most strongly related to social disorganization.

THE STUDY

The purpose of this study is to reexamine social disorganization theory using a relatively new measure of crime, calls to the police. The study attempts to specify the extent to which these data support earlier findings by presenting a three-stage analysis that first examines only the primary social disorganization variables (poverty, heterogeneity, and mobility) and then adds additional variables that have been identified as relevant in the more recent studies using victimization data.

One of the greatest problems in attempting to make comparisons across various social disorganization studies is not only the differences in how "crime" has been measured, but also the differences in the type of crime examined, the independent variables included, the specific measurements of those variables, the type of analysis used (e.g., bivariate vs. multivariate), and the form of the model tested (additive or multiplicative). We attempt to minimize these problems by analyzing three commonly examined crimes, first in relation to only the three primary variables (poverty, heterogeneity, and mobility) and then adding other variables to the model in the two following steps. In choosing other independent variables to examine, we selected those variables that have received theoretical attention in the most recent literature. Recent studies have focused on interaction terms, family structure, and structural density as important additional independent variables.
INTERACTION EFFECTS

Shaw and McKay's (1942) work suggested that poverty, heterogeneity, and residential instability may not only have additive effects, but multiplicative effects as well. Evidence of interaction effects has been found in a few studies. Clinard and Abbott (1976), for example, examined two areas in Kampala, Uganda, both of which were impoverished but only one of which had a high crime rate. They found that residential mobility and tribal heterogeneity were higher in the high-crime slum compared with the low-crime slum, which suggests that it is not poverty in itself that causes crime but its interaction with heterogeneity and mobility.

Using court referrals for delinquents, Willie and Gershenovitz (1964) also found that racial heterogeneity had an increased effect in poorer neighborhoods; they observed that racial heterogeneity increased juvenile delinquency and that “differences between racial areas are greatest in the lower socio-economic areas” (p. 743). More recently, using victimization data, Smith and Jarjoura (1988) found that the interaction between mobility and low income significantly affected violent crime rates. In this study we examine interaction terms for poverty and heterogeneity, poverty and mobility, and mobility and heterogeneity.

ADDITIONAL INDEPENDENT VARIABLES

Recent attention to ecological theories of crime has led researchers to refine and expand social disorganization theory by focusing on aspects of informal social control (see, e.g., Bursik, 1988; Byrne and Sampson, 1986; Greenberg et al., 1985; and Kornhauser, 1978). Moving away from Shaw and McKay's emphasis on the cultural transmission aspect of social disorganization theory and the impact of neighborhood characteristics on the development of delinquent and criminal groups, recent researchers have focused on neighborhood levels of guardianship and informal control against resident and nonresident offenders. As measures of informal control, recent studies have tended to incorporate a specific measure of family disruption and/or measures of the "criminogenic characteristics of the physical environment" (Byrne and Sampson, 1986:5).

Family disruption has been viewed as undermining traditional forms of informal control within the community. Sampson (1985:11–12) argued that areas with pronounced family disorganization are less able to provide an effective network of social controls. In contrast, communities with a strong familial base are likely to be areas where families know each other and provide mutual support; consequently there is a functional youth social control. . . . As families and marital relations are disrupted, however, the social control functions of the community are attenuated.
Results from studies using some measure of family disruption (generally, percentage divorced/separated or percentage of female-headed households with children) tend to show a positive relationship with crime measures (Sampson, 1985, 1986c; Sampson and Groves, 1989; Smith and Jarjoura, 1988, 1989).

Sampson (1985, 1986c) pointed to the importance of these findings for the interpretation of past research. He argued that due to the strong relationship between family structure and both percentage black and poverty, previously reported effects of racial composition and poverty on crime may be due to model misspecification, that is, due to the lack of inclusion of measures of family disruption:

Both percent black and poverty are positively related to rates of divorce/separation and female-headed households. There is a strong possibility, then, that causal inferences attributed to race and poverty are in fact due to underlying patterns of family disruption, an issue which has not been fully explored (Sampson, 1986c:25).

In his own research he found that percentage divorced and percentage female-headed families have significant effects on measures of personal theft and violence and that those effects were greater than the effects of racial composition or income variables (Sampson, 1985, 1986c).

Based on the idea that physical design may affect informal surveillance (Newman, 1972) and the importance of guardianship as stated in opportunity theory (Cohen and Felson, 1979), some researchers have begun to examine structural density (the percentage of structures with five or more units) within the social disorganization model. This research argues that by increasing anonymity and decreasing surveillance, structural density impedes informal social control (Bursik, 1988; Byrne and Sampson, 1986; Sampson, 1983, 1985, 1986b). In a series of papers, Sampson found structural density to be positively related to assault and robbery victimization rates (1983) as well as composite measures of theft and violent victimization (1985, 1986b). However, the findings on structural density do not go undisputed. Smith and Jarjoura (1989) found that the percentage of multiple dwelling units within a neighborhood did not affect burglary victimization when other household and neighborhood characteristics were controlled. We examine family disruption and structural density in relation to crime rates in this study.

**RESEARCH PROCEDURES, DATA, AND MEASURES**

This study examines social disorganization theory using calls to the police for assault, robbery, and burglary as the dependent measures of crime in 61 Boston neighborhoods. Boston is particularly relevant for a study of neighborhoods because it has long-standing, identifiable neighborhoods, which residents generally recognize by name. The physical boundaries of the neighborhoods used in this study were defined by the Boston Redevelopment
Authority and are each represented by one neighborhood association.\textsuperscript{4} Social disorganization is defined "in terms of the capacity of a neighborhood to regulate itself through formal and informal processes of social control" (Bursik, 1988:527). Early social disorganization theory hypothesized that poverty, heterogeneity, and mobility were the exogenous factors that affected this capacity for social control and thereby affected the level of crime (Kornhauser, 1978).\textsuperscript{5} Recent revisions to social disorganization theory also demand consideration of the interaction between poverty and heterogeneity, poverty and mobility, and mobility and heterogeneity, as well as measures of family disruption and structural density.

The measures for these variables were drawn from 1980 census data, which were aggregated into neighborhoods by the Boston Redevelopment Authority in conjunction with the Bureau of the Census. The poverty measure used is the percentage of the population in each neighborhood living below the poverty level. This variable ranged from 1.3\% to 45\%.

Racial heterogeneity refers to "the chance expectation that two randomly chosen persons do not belong to the same group, which takes both number of groups and the distribution of the population among them into account" (Blau, 1977:78). Racial heterogeneity is calculated by subtracting from 1 the sum of the squared proportion of persons in each group in each neighborhood \((1 - \Sigma p_i^2)\). The U.S. census identifies five racial categories: white; black; American Indian, Eskimo, Aleut; Asian and Pacific Islander; and other. All five groups were used to calculate racial heterogeneity. Values for heterogeneity across the neighborhoods ranged from .01 to .67.\textsuperscript{6}

Population movement is the third of the primary variables thought to affect social disorganization. Although Shaw and McKay (1942) focused on decreases in population as the most important aspect of population movement, Kornhauser (1978:64) suggested that what they "really sought . . . was an indicator of population mobility or turnover." Kornhauser went on to state that "social disorganization is to an important extent a consequence of the institutional disruption that results from succession and high rates of mobility into and out of communities" (p. 64). More recently, mobility has

\textsuperscript{4} The Boston Redevelopment Authority has identified 62 neighborhoods, but one, Harbor Islands, is geographically distinct and has few residents and was, therefore, not included in the analysis. Neighborhoods ranged in size from 2,111 to 31,491 residents. The mean neighborhood size was 9,249 residents.

\textsuperscript{5} Unfortunately, direct measures of social disorganization or capacity for social control are difficult and costly to collect and no actual measure of this construct is available for inclusion in the models tested here, as is the case in the majority of research on social disorganization theory.

\textsuperscript{6} In studies in which percentage black in all neighborhoods is below 50\%, this measure is often not substantively different from a measure of percentage black. This is not the case for the neighborhoods studied here, however. Percentage black varied from 0\% to 94\%, and its correlation with the heterogeneity measure was only .45.
been viewed as influencing crime because of its effect on the stability of personal relationships and the anonymity it engenders, which in turn decrease informal social control (see, e.g., Sampson, 1985). We follow much of the recent literature, which operationalizes mobility in terms of the percentage of neighborhood residents five years of age or older who have not lived in the same house for the past five years. Although this measure does not capture neighborhood change due to out-migration, it does capture the proportion of new residents to old residents and in this sense, the lack of neighborhood stability. In this study, mobility ranged from 23.5% to 83.2%.

The interaction terms were calculated using Smith and Sasaki's (1979) method to minimize the collinearity of the interaction term with its lower-order terms. That is, a minimizing coefficient was subtracted from each of the lower-order terms before forming the multiplicative terms. Centering, or subtracting a constant from the source variables before multiplying them to create the interaction term, allows the original variables to account for all of the variance in the dependent variable that they can, and the multiplicative term then accounts for any residual variance in the dependent variable that is due to conditional effects. Nonetheless, centering the interaction term does not affect the substantive interpretation of any of the conditional relationships (Tate, 1984; also see Aiken and West, 1991: Ch. 3). All second-order interaction terms for the above three variables were included in the model.

The percentage of households headed by a female householder (no husband present) with children under 18 years of age was used to measure family disruption. This measure ranged from less than 1% to 49.4%. Structural density was measured as the percentage of structures in each neighborhood with five or more units and ranged from 2.9% to 99.9%.

The dependent variables were drawn from all requests for assistance made to the Boston Police Department through 911 calls in 1980. These data are from the Boston Police Department's Computer Aided Dispatching (CAD) system. The CAD system collects and stores on magnetic tape several pieces

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7. We also created a proxy for out-migration based on a sum of vacant houses, boarded-up houses, places for rent for more than two months, and houses for sale for more than six months. This measure was negatively correlated with the measure of mobility used in this study \( r = -.18 \) but was not statistically significant in any of the analyses.

8. The conditional effects, or what Tate (1984) refers to as the simple main effects, of each of the component variables are identical regardless of whether the data are centered or uncentered. Readers interested in the centering of interaction terms are referred to Aiken and West (1991), Jaccard et al. (1990), Smith and Sasaki (1979), and Tate (1984).

9. The percentage of persons 15 years of age or over who were separated or divorced was also examined as a measure of family disruption. It had no significant effects and therefore is not included in the analyses presented here.

10. Although requests for service may enter the CAD system through a variety of sources (such as station house calls and police officers providing on-site service), the vast majority of requests are through the 911 telephone system.
of information on each call received, including the location and original categorization of the request for service as entered by the 911 operators. The original classification by 911 operators as they respond to citizens' requests for assistance was used as the dependent measure. This minimizes official discretion by keeping the data as close as possible to the event itself. The measures of crime used here were therefore based on descriptions of the event as provided by the complainant, and not on police definitions of those complaints later filed in police reports.11

Calls to the police can be identified by street address, census block, and census tract. This information was used to locate each call in one of the 61 neighborhoods and to calculate aggregate rates at the neighborhood level for three crimes: robbery, burglary and assault. The average rate per 1,000 residents for robbery was 12.59, the average assault rate was 19.63, and the average burglary rate per 1,000 households was 116.8.

Assault, robbery and burglary rates were chosen as dependent variables for a variety of reasons. Assault is a crime for which the findings using official measures (UCR) and survey data (NCS) are quite divergent. Also, assault is often included in studies as a component of violent crime (Sampson, 1985, 1986b, 1986c; Sampson and Groves, 1989; Smith and Jarjoura, 1988). The assault measure used here includes simple assaults, assault and battery, and assault and battery in progress.

Robbery, on the other hand, is a crime for which UCR and NCS measures tend to be more closely associated. It, too, has been used in composite measures of crime in recent studies (Sampson, 1985, 1986b, 1986c; Sampson and Groves, 1989; Smith and Jarjoura, 1988). The robbery measure includes the categories of armed robbery, robbery, and attempted robbery.12 Finally, burglary is included because it is also frequently used, and some recent studies of burglary have shown results different from studies using other crimes (cf. Sampson and Groves, 1989, and Smith and Jarjoura, 1988, 1989). Burglary includes breaking and entering, breaking and entering in progress, attempted breaking and entering, possible breaking and entering, and breaking and entering reported.

RESULTS

We begin the analyses by examining the effects of the primary social disorganization variables (poverty, racial heterogeneity, and mobility) on our measures of assault, robbery, and burglary rates. Due to the small sample size (N = 61) and the possibility that one or two influential neighborhoods could strongly affect the results, we examined three diagnostic measures for

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11. Further discussion of these data can be found in Pierce et al. (1988).
12. Because the robbery variable was found to be highly skewed (skewness = 2.45) we use a log transformation in the analysis.
outliers. Specifically, we examined studentized residuals, DFFITS and DFBETAS (see Belsley et al., 1980). For each of the three equations, the size-adjusted critical value for each of the three measures was exceeded by one neighborhood (Downtown). Because that neighborhood was also qualitatively different from the other, more residential neighborhoods, it was dropped, which left 60 neighborhoods for these analyses.

The results for the basic social disorganization model using the 60 neighborhoods appear in Table 1, model 1.13 Poverty had a positive and significant effect on all three crimes.14 This finding is consistent with much other research on social disorganization theory using official measures of crime, and it is similar to Smith and Jarjoura’s (1988) recent findings using victimization data. In addition, racial heterogeneity positively affected the rate of burglary, although it did not have a significant impact on assault or robbery rates. The significant effect of heterogeneity on burglary is consistent with Smith and Jarjoura’s (1988) findings using victimization data but in contrast to our results, they also found racial heterogeneity to be related to violent crime (robbery and assault).

Mobility affected assault and robbery, but in opposite directions. For robbery, the findings are in line with the predictions made by social disorganization theory: Neighborhoods with high rates of mobility experience higher robbery rates, ceteris paribus. Rather than increasing assaults, however, mobility decreases them. Although it is tempting to discuss these divergent findings in terms of causal differences among crimes, we advise caution. Careful examination of these data shows that the differing effect of mobility on assaults and robbery is due primarily to five contiguous neighborhoods that are the center of Boston’s medical, cultural, and educational institutions, as well as a large retail area with shops, hotels, theaters, convention facilities, and so on. Although mobility and robbery rates are both high in these five neighborhoods, we believe that this relationship may be due to the multipurpose nature of the neighborhoods. For example, because the five neighborhoods house several colleges and medical centers, they are the home of many mobile students and young professionals. And because they include many retail and cultural establishments, they attract a large number of nonresidents and tourists, which makes the area attractive for robberies. Thus, the relationship between mobility and robbery in the five neighborhoods may be due primarily to their multipurpose nature.

13. The correlations among the independent variables can be found in the appendix.
14. The effects of poverty may actually be underestimated in all equations because poverty is positively correlated with the percentage of households without telephones. Neighborhoods with a high percentage of households without telephones might be expected to generate fewer calls, which would decrease our measure of crime. Thus, the positive effect of poverty on crime found in these analyses may actually be an underestimate of its effect.
Table 1. OLS Regression Equations for Assault, Robbery, and Burglary Rates in 60 Boston Neighborhoods

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Assault</th>
<th>Robbery†</th>
<th>Burglary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Poverty</td>
<td>.887**</td>
<td>.958**</td>
<td>.655**</td>
</tr>
<tr>
<td>(S.E.)</td>
<td>(.121)</td>
<td>(.115)</td>
<td>(.151)</td>
</tr>
<tr>
<td>Mobility</td>
<td>-.308**</td>
<td>-.343**</td>
<td>-.506**</td>
</tr>
<tr>
<td>(S.E.)</td>
<td>(.080)</td>
<td>(.076)</td>
<td>(.094)</td>
</tr>
<tr>
<td>Heterogeneity†</td>
<td>.082</td>
<td>.036</td>
<td>.105</td>
</tr>
<tr>
<td>(S.E.)</td>
<td>(.064)</td>
<td>(.063)</td>
<td>(.061)</td>
</tr>
<tr>
<td>Poverty X</td>
<td>-.019*</td>
<td>-.011</td>
<td>-.001*</td>
</tr>
<tr>
<td>Mobility</td>
<td>(.008)</td>
<td>(.007)</td>
<td>(.000)</td>
</tr>
<tr>
<td>Poverty X</td>
<td>-.012*</td>
<td>-.016**</td>
<td>-.000</td>
</tr>
<tr>
<td>Heterogeneity</td>
<td>(.006)</td>
<td>(.006)</td>
<td>(.000)</td>
</tr>
<tr>
<td>Mobility X</td>
<td>.002</td>
<td>.000</td>
<td>-.006</td>
</tr>
<tr>
<td>Heterogeneity</td>
<td>(.006)</td>
<td>(.000)</td>
<td>(.021)</td>
</tr>
<tr>
<td>Percent Female-</td>
<td>.130</td>
<td>.025*</td>
<td>1.31**</td>
</tr>
<tr>
<td>headed Household</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Children</td>
<td>(.128)</td>
<td>(.111)</td>
<td>(.449)</td>
</tr>
<tr>
<td>Structural Density</td>
<td>.187**</td>
<td>.014**</td>
<td>-.081</td>
</tr>
<tr>
<td>(S.E.)</td>
<td>(.057)</td>
<td>(.005)</td>
<td>(.184)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.52</td>
<td>15.21</td>
<td>19.48</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>.577</td>
<td>.654</td>
<td>.708</td>
</tr>
</tbody>
</table>

* Robbery rates are logged.
† Metric coefficient.
‡ Heterogeneity was multiplied by 100 in these analyses to make it consistent in magnitude with the other independent variables.
* Coefficient is significant at .05 level.
** Coefficient is significant at .01 level.

When the five neighborhoods are dropped from the analysis, the effect of mobility on robbery becomes trivial ($t = .73$), but mobility remains significant in its effect on assault ($t = -2.88$) and nonsignificant in its effect on burglary ($t = -.384$). The statistical significance of the other variables (poverty and heterogeneity) remains unchanged for all three crime equations. Thus, it appears that the effect of mobility on robbery is due to the relationship between them within a unique cluster of neighborhoods, but the negative effect of mobility on assault is due to a more general process.

The negative effect of mobility on assault rates, although unexpected is not unprecedented in past research. Hagan et al. (1978) also found a negative effect for residential mobility on victimization and official delinquency rates. They suggested that these findings raise the possible need for reconsideration of the meaning of mobility in today's society. Also, Sampson and Groves
(1989) found that mobility (stability) decreased (increased) robbery, total victimization, and burglary, although all three of the direct effects were nonsignificant.

It should also be noted that the measure of mobility used here refers to the percentage of persons not living in the same house five years previously and is insensitive to whether residents are moving within or between neighborhoods. Thus, neighborhoods in which residents move from apartment to apartment within the same neighborhood would appear to have high mobility rates, when in fact they do not. We postpone further discussion of this effect until we examine the interaction of poverty and mobility in model 2.

In the next stage of the analysis, we added interaction terms to the equations (Table 1, model 2). Two of the interaction terms were significant, which suggests that the effects of the three primary variables must be viewed as conditional. In the assault and robbery equations, mobility decreased the effect of poverty; in the assault and burglary equations, heterogeneity also decreased the effect of poverty.\textsuperscript{15} For example, when we examined the effect of poverty on assault at one standard deviation above and below the mean of mobility and heterogeneity, the effect of poverty was strongest when mobility and heterogeneity were one standard deviation below the mean (s.m.e. = 1.35, s.e. = .167) and weakest when mobility and heterogeneity were one standard deviation above the mean (s.m.e. = .286, s.e. = .189).\textsuperscript{16} The same pattern appeared for robbery. The effect of poverty on the logged robbery variable was .065 (s.e. = .00956) when mobility was one standard deviation below the mean, .042 (s.e. = .008) when mobility was at the mean, and nonsignificant when mobility was one standard deviation above the mean (s.m.e. = .018, s.e. = .013).\textsuperscript{17} For burglary, the effect of poverty was strongest when heterogeneity was low. The simple main effects of poverty were highest when heterogeneity was one standard deviation below the mean (s.m.e. = 3.892, s.e. = .54), remained significant at the mean (s.m.e. = 2.49, s.e. =

\begin{itemize}
\item \textsuperscript{15} When the robbery equation is reexamined without the five multipurpose neighborhoods, the results are the same as those reported here.
\item \textsuperscript{16} The simple main effects (s.m.e.) for variables with interaction effects are calculated based on the first-order partial derivative of \(Y\) with respect to each \(X\) (Tate, 1984). The equation for the s.m.e. of poverty for the assault equation (in which minimizing coefficients were used) is s.m.e. \(X_1 = b_1 + b_2(x_2 - d) + b_3(x_3 - e)\), where \(b_1\) is the regression coefficient for poverty, \(b_2\) is the regression coefficient for the interaction term between poverty and mobility, \(b_3\) is the regression coefficient for the interaction term of poverty and heterogeneity, \(d\) is the minimizing coefficient for the mobility term (in this case, 37.72), \(e\) is the minimizing coefficient for heterogeneity (in this case, 19.88), and \(x_2\) and \(x_3\) are chosen values for mobility and heterogeneity, respectively.
\item \textsuperscript{17} The simple main effects for the robbery equation were calculated on a reestimated model in which the nonsignificant interaction terms and heterogeneity were deleted in order that the effects of poverty could be discussed independently of the nonsignificant heterogeneity terms.
\end{itemize}
.415), and became nonsignificant at one standard deviation above the mean (s.m.e. = 1.16, s.e. = .65). Thus, for each of the three crimes, the positive effects of poverty were decreased in more heterogeneous and/or mobile neighborhoods. The general effects of the two interactions are in the opposite direction of previously reported findings and warrant discussion. Turning first to the interaction of poverty and mobility, we further investigated this relationship by categorizing neighborhoods into high and low categories of poverty and mobility (see Table 2). When we examined the four neighborhoods in the high poverty-low mobility category, we found that three of the neighborhoods had the highest concentration of public housing in Boston (above 50%) and the fourth neighborhood also had a substantial amount of public housing (it was among the six neighborhoods with the highest proportion of public housing). These are neighborhoods of last resort, neighborhoods where people remain, perhaps not because they choose to, but because they have no other option. The urban dynamics suggested by Shaw and McKay, wherein the poor move into low-income neighborhoods as way stations en route to better living conditions, are replaced by new waves of immigrants or migrants, and thereby create high mobility rates, may not be accurate in some urban areas today. Neighborhoods in which public housing predominates may be neighborhoods that provide few avenues of escape; neighborhoods where people remain because they have no choice. This type of stability appears to have an impact on crime in a very different way. Rather than building cohesiveness, it may build resentment, frustration, and isolation.

Investigation of the poverty and heterogeneity relationship prompts a similar interpretation. Examining the cross-tabulation of poverty and heterogeneity presented in Table 3, in neighborhoods with low levels of poverty, heterogeneity increased assault and burglary; in high-poverty neighborhoods, heterogeneity decreased crime. One could argue that this finding is due to the nature of the measure—calls to the police—used here. That is, heterogeneity (rather than decreasing crime in poor neighborhoods) makes norms less clear and residents more hesitant to call the police, either out of fear of retaliation by the offender or belief that the police are unlikely to do anything. However, that probably is not the case. Previous research (Warner, 1992) on the reporting of crime has shown that heterogeneity (as measured by the percentage nonwhite) in a neighborhood actually increases reporting in poor neighborhoods. It appears that for the neighborhoods studied here, low heterogeneity (homogeneity) in poor neighborhoods actually increases assault and burglary rates.

As shown in Table 3, the six neighborhoods that were high in poverty and low in heterogeneity had the highest assault and burglary rates. Four of those neighborhoods were almost entirely black, and two were almost entirely white ethnic (Irish). Similar findings are discussed by Heitgerd and Bursik
Table 2. Average Assault and Robbery Rates for Neighborhoods, by Mobility and Poverty

<table>
<thead>
<tr>
<th>MOBILITY</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\bar{x}) Robbery = 16.95</td>
<td>(\bar{x}) Robbery = 22.57</td>
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<tr>
<td>POVERTY</td>
<td>(\bar{x}) Assault = 25.01</td>
<td>(\bar{x}) Assault = 43.78</td>
</tr>
<tr>
<td>High</td>
<td>(N = 13)</td>
<td>(N = 4)</td>
</tr>
<tr>
<td>Low</td>
<td>(\bar{x}) Robbery = 14.50</td>
<td>(\bar{x}) Robbery = 6.36</td>
</tr>
<tr>
<td></td>
<td>(\bar{x}) Assault = 19.46</td>
<td>(\bar{x}) Assault = 12.21</td>
</tr>
<tr>
<td></td>
<td>(N = 21)</td>
<td>(N = 22)</td>
</tr>
</tbody>
</table>

NOTE: The minimizing coefficients used in the interaction term define the high and low categories in this table. Specifically, neighborhoods with greater than 28.77% of the residents below the poverty level are in the high category of poverty and neighborhoods with a rate of mobility greater than 37.72% are in the high mobility category.

(1987) in a paper exploring the effects of surrounding communities on a community's delinquency rate. They discussed their finding of a relationship between high homogeneity and high crime rates in terms of Suttles's (1968) "defended community." They argued that the high levels of crime in homogeneous neighborhoods "did not represent internal social disorganization but organized responses to perceived external threats" (p. 785, emphasis in original) of which the residents of the community were supportive. Although this explanation may be plausible for assault rates, it seems less plausible for burglary rates.

An alternative explanation for these findings can be found in Wilson's (1987) discussion of "concentration effects" of the urban ghetto. Wilson suggests that the changing class structure of racial and ethnic neighborhoods over the past few decades has left these neighborhoods, which at one time included working- and middle-class families, with higher concentrations of the most disadvantaged of the urban populace. As the working and middle class moved out of racial and ethnic ghettos, taking their resources and institutional support with them, the growing concentration of poverty in these
Table 3. Average Assault and Burglary Rates for Neighborhoods, by Poverty and Heterogeneity

<table>
<thead>
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<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( \bar{x} ) Assault = 26.83</td>
<td>( \bar{x} ) Assault = 32.01</td>
<td>( \bar{x} ) Burglary = 155.69</td>
<td>( \bar{x} ) Burglary = 161.27</td>
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<tr>
<td>Poverty</td>
<td>Low</td>
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<td></td>
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<tr>
<td></td>
<td>( \bar{x} ) Assault = 20.64</td>
<td>( \bar{x} ) Assault = 11.28</td>
<td>( \bar{x} ) Burglary = 121.79</td>
<td>( \bar{x} ) Burglary = 77.38</td>
</tr>
<tr>
<td></td>
<td>N = 12</td>
<td>N = 25</td>
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</tr>
</tbody>
</table>

NOTE: The minimizing coefficients used in the interaction term define the high and low categories in this table. Specifically, neighborhoods with greater than 24.33% of the residents below the poverty level are in the high category of poverty and neighborhoods with heterogeneity scores above 19.88% are in the high heterogeneity category.

areas has led to increased social isolation from mainstream society and corresponding increases in norm violation. Thus, poor neighborhoods that are highly homogeneous may be the most socially isolated of socially disadvantaged groups and have the least access to legitimate opportunity structures. The everyday experiences of failure within these neighborhoods may result in high levels of aggression and property crime.

Turning to the final step of the analyses, we dropped variables that were not significant in the preivious equation and were not part of significant interaction terms and added family structure and structural density (Table 1, model 3). Family disruption had a positive effect on robbery and burglary rates. These effects are consistent with earlier findings (Sampson, 1985; Smith and Jarjoura, 1988, 1989). However, our findings for burglary do not confirm Sampson's (1985) suggestion that the effects of racial heterogeneity are due solely to differences in family structure. Sampson (1985) found that the main effect of racial composition was no longer significant when controlling for family structure, which we did not find here. Racial heterogeneity remained significant in the burglary equation and continued to condition the effect of poverty.
Structural density had a positive effect on assault and robbery rates, but not on burglary rates. These findings are consistent with earlier findings based on victimization data. Sampson examined the impact of structural density on robbery and assault (1983) and composite crime measures of theft and violence which included robbery and assault, respectively (1985, 1986b), and found a positive effect for structural density. Likewise, Smith and Jarjoura (1989) examined burglary rates and did not find a significant effect for multiple dwelling units. This suggests that the effect of structural density may vary depending on the crime being examined.

The addition of family structure and structural density variables changed earlier findings only slightly. In the assault equation, the interaction term for mobility and poverty became nonsignificant, which left the effect of poverty conditioned only by heterogeneity. In the robbery equation, the effect of poverty was reduced to just below the significance level, although the interaction of poverty and mobility remained significant.18 Further analysis of the interaction term showed that the effect of poverty is significant only when mobility is lower than one standard deviation below the mean. The addition of these variables in the burglary equation had little effect on the earlier findings.

Finally, in that the neighborhoods we examined are all within the same city, the possibility of spatial autocorrelation exists. That is, the level of crime in a neighborhood may be systematically related to the level of crime in contiguous neighborhoods, thereby violating the ordinary least squares (OLS) assumption that the error terms are independently distributed. As Doreian (1980:30) pointed out, the methodological problems hinge upon the issue of whether or not observations for a variable at one point of geographical space are interdependent with other observations for that variable at other points in geographical space. If there is such an interdependency, then the conventional methods for estimating linear equations become problematic and, in such instances, alternative procedures have to be sought.

We tested each of the final equations for spatial autocorrelation using Moran's I (Jones and Foster, 1991; Odlan, 1988). Moran's I was significant only for the assault equation (the values of z for assault, robbery, and burglary were 2.49, .89, and 1.15, respectively). We then reanalyzed the assault equation using a spatial effects model (Doreian, 1980, 1981). The results from that model provide the same substantive interpretation as those presented above. That is, poverty, mobility, structural density, and the poverty-heterogeneity interaction term remained statistically significant and all other variables were nonsignificant.

18. In the analysis of the robbery equation without the five multipurpose neighborhoods, poverty remained significant but the poverty-mobility interaction term dropped to a nonsignificant level. Findings for the other variables remained the same.
DISCUSSION

This study reexamined social disorganization theory in a large northeastern city with relatively distinct neighborhoods using a different measure of crime: calls to the police. The findings provide strong support for the effect of neighborhood poverty on crime and raise questions concerning the effect of mobility and heterogeneity, particularly in interaction with poverty.

The variable that has been most controversial within social disorganization theory has been poverty. Studies based on official counts of crime often found poverty rates to be positively associated with crime rates, but those results were questioned when early victimization studies failed to confirm them. It was argued that the early positive findings using official crime data were biased due to discretion in police decision making, or that the effects of poverty could be explained by controlling for such variables as female-headed households. Our findings contradict that argument. Using a measure of crime that is based primarily on citizen reports of crime, and controlling for the percentage of female-headed households and structural density, we found that poverty had a positive and significant effect on assault and burglary rates, and a significant effect on robbery rates when mobility was low.

Although the data used here are “official” data rather than surveys of victims, they are not based on police definitions of, or reactions to, crime but rather on citizen reports of crime to the police. Thus, if these official measures are biased, they are biased not due to official responses to crime, but rather to citizen responses to crime. To the extent that the crime measures used here do not reflect “true” crime rates, they at least reflect the residents’ desire for police to bring order into a community where they themselves may not be able to come together to create order.

Our findings in regard to racial heterogeneity are also noteworthy. Although racial heterogeneity had a positive effect on burglary rates, which remained significant after we controlled for measures of family disruption and structural density, its effects were conditional on the level of poverty. For example, in the burglary equation the simple main effects of heterogeneity were 1.28 (s.e. = .346) when the percentage below the poverty level was one standard deviation below the mean, .63 (s.e. = .213) when poverty was at the mean, and −.02 (s.e. = .245) when poverty was one standard deviation above the mean. Thus, heterogeneity increased crime when poverty was low, but it decreased crime when poverty was high. This finding, along with the similar findings on mobility, raises theoretical questions about the role of heterogeneity and mobility within social disorganization theory.

Social disorganization theory suggests that homogeneity and residential stability should allow residents to come together to establish and enforce norms more easily and, in fact, should decrease the effect of poverty on crime rates. Our findings suggest that the dynamics of urban areas may not be the
same now as they were earlier in the century. In particular Shaw and McKay presented a picture in which economically deprived neighborhoods are neighborhoods of high mobility and high heterogeneity. Today, economically deprived neighborhoods tend to be comprised of families and individuals that cannot move out of public housing and urban ghettos, where racial and ethnic groups are becoming increasingly socially isolated from one another as well as from other economic groups. It is in such neighborhoods that we found the highest crime rates.

The effects of structural density also warrant comment. Structural density was positively associated with assault and robbery rates, but it was not associated with burglary rates. Structural density's lack of effect on burglary rates raises theoretical questions. Sampson (1983) argued that structural density decreases surveillance and increases anonymity, thereby decreasing social control. However, if structural density decreases guardianship, it does not decrease guardianship of households, only persons. Yet, it seems that the number of households within a structure would most likely affect household crimes, such as burglary. Otherwise, it seems that the appropriate concept would be the density of the population in an area. Smith and Jarjoura (1989) raised the same question. They found that individual household burglary victimization rates were not related to the percentage of multiple dwelling units in the neighborhood and that people living in apartments did not have higher rates of victimization:

"defensible space" arguments would seem to require that, all else equal, either apartments have a higher victimization risk than detached single family housing units, or that household victimization risk will increase with the percentage of multiple dwelling units in an area. Neither of these predictions is supported by the current analysis (p. 634).

To clarify the theoretical relevance of structural density further, research should address why it affects assault and robbery, but not household victimization crimes, such as burglary.

CONCLUSION

In several ways, the results of this study suggest that data on calls to the police are valuable data for the study of ecological theories. Unlike the majority of victimization data, call data can be easily aggregated to the neighborhood level and they are not biased by respondents' unwillingness to report certain types of incidents to interviewers. Unlike UCR data, the call data used here are not influenced by biases introduced by police definitions of, and responses to, crime. To the extent that these data present a biased picture of crime, they are biased only by citizens' willingness to report crimes.

It appears, therefore, that the determinants of the reporting of crime are the next pivotal measurement issue. Do neighborhoods with high poverty
rates have increased levels of crime, or does the breakdown of informal social control generated by high levels of poverty lead to increased demand for formal social control, as demonstrated through higher likelihoods of calling the police? Although social disorganization theory focuses on the breakdown of informal social control, there is continual balancing between informal and formal social control. Thus, as informal social control breaks down, it is likely that it not only leads to higher levels of crime, but also to higher proportions of crimes being reported to the police.

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Glenn L. Pierce is Director of the Center for Applied Social Research and the Division of Academic Computing at Northeastern University in Boston. His research interests cross a broad range of policy areas. Currently, he is developing a data base on children and families and has completed a report on disinvestment in children and youth in the United States. He has also directed efforts to develop social indicators to evaluate such issues as the social and economic status of American families, domestic violence, and factors associated with violent crime trends.
## Social Disorganization Theory

### Appendix. Correlations, Means, and Standard Deviations for Independent Variables

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<th></th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
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