Tracking the Mobility of Crime

Tracking the Mobility of Crime: New Methodologies and Geographies in Modeling the Diffusion of Offending

By

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To Ciara and Jamirah

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

CHAPTER ONE

INTRODUCTION: FRAMING ISSUES WITHIN ECOLOGICAL CRIMINOLOGY

Highlighting Contemporary Issues

Recently, increased attention has fallen on the social and environmental context in which crimes occur, this attention including a revival of theories concerning social disorganization and increased usage of crime mapping techniques (Wells & Weisheit 2004). However, most of the attention given to the ecological context of crime has focused on only minute portions of the available geographical units of analysis, in many cases leaving vast portions of the population unaccounted for and less than adequately understood. Furthermore, the extreme heterogeneity that exists in many of the geographies used for the examination of crime, such as counties, states, etc. (Land 1990; Messner and Anselin 2004; Messner et al. 1999), makes evident the need for a better understanding of ecologically distinct units to further our understanding of reported crime.

Ecological studies of crime tend to focus only on urban settings while neglecting areas of a more rural or less-developed urban character (Clinard 1942; Wells and Weisheit 2004). This oversight has resulted in a failure to comprehend crime in the vast majority of place settlements in the U.S., as seventy-seven percent of all Census places are outside of urban areas and sixty percent are in places with a population of less than 2,500 people (the common Census definition of rural locality) (Wells & Weisheit 2004). Adding to the complexity of the examination of criminal offending at lower levels of geography, Census Designated Places, as with most sub-county level geographies, vary qualitatively based on the metropolitan status of the county in which they reside.

As an example, rates of all FBI UCR index crimes differ both qualitatively and quantitatively in urban versus rural places, suggesting that patterns, motivational factors, and types of crimes vary distinctly both within and between these localities (Glaeser & Sacerdaote 1999, Clinard

1942, Petee and Kowalski 1993, Wells & Weisheit 2004). Urban crime tends to concentrate in the downtown areas of cities because of high rates of unemployment and poverty, high concentrations of physical deterioration and minority populations, and a larger proportion of youth (Ackerman 1998). In contrast, rural crime lacks this concentration, with offenders characterized as extensively mobile, resulting in a detachment from any "home community" (Ackerman 1998).

Scholars have noted this urban skew in studies of crime. A half-century ago, Esselstyn (1953) called for the development of a "geographically non-urban" criminology. Esselstyn primarily focused on the development of a conceptualized space, creating the idea of "open country," a term used to describe any area not under some form of place-level police (and by inference, other city-based) jurisdiction. Since this early call for a better understanding of the geography of crime there has been substantial discourse on the constitution of urban and rural in relation to a number of demographically pertinent issues. Matters of debate include the methods by which space is incorporated into demographic analyses and the appropriate geography upon which to base demographic inquiries.

The demography of crime as a sub-discipline has adopted a number of approaches to the study of the patterns, motivations, and spatial spread of crime. A county-level study on the structural covariates of crime by Land (1990) led to growing fascination among criminologists, demographers, and other social scientists with the spatial distribution of criminal violence (Baller et al. 2001, Anselin et al. 2000). As Land (1990) pointed out, the most common trend in the literature at that time used states as the primary unit of analysis, due to the fact that state-level data were readily available and often required less data management. However, other studies have contended that the Metropolitan Area (MA) level is a more appropriate measure because MAs more readily represent community boundaries (Messner et al. 1999). However, the use of metro areas neglects substantial within-unit variability, often concerning both the structural covariates as well as the dependent variable of interest (usually crime) (Messner et al. 1999).

More recently, a number of researchers have examined *between*-county variations in crime rates (Messner et al. 1999, 2005; Messner and Anselin 2004; Baller et al. 2001; Baller and Richardson 2002). However, a certain level of *within*-county variation persists, along with a lack of agreement on the communities or neighborhoods associated with particular sub-county boundaries (Cohen & Tita 1999, Baller et al. 2001, Messner et al. 1999, Anselin 2000, Hipp 2007). Works addressing the spatial distribution of crime increasingly use GIS combined with spatial statistics, following a

general trend documented throughout the social sciences (Goodchild and Janelle 2004). The specification of the optimal unit of analysis figures prominently in debates on methods for spatial analyses of crime (Cohen & Tita 1999, Baller et al. 2001, Messner et al. 1999, Anselin 2000, Goodchild & Janelle 2004, Hipp 2007). Increasing knowledge on optimal geographies is thus extremely important and adds to our understanding of the spatial demography of reported crime and its patterns of change. Moreover, results are promising for the future implications of sub-county geographies in the analysis of many non-criminological issues, such as the more traditional demography subject of population dynamics (Howell et al. 2008).

Current Research

Following recent trends in the literature, this study introduces a new approach to understanding rural and urban sub-county geographies using existing Census place definitions. The study incorporates Census designated places in conjunction with areas not within an incorporated or Census designated place, Esselstyn's "open country" (or *non*-places). This method, essentially categorizing a locality as inside a legally-recognized place or "out in the county," allows for the development of a sub-county geography that holds substantive meaning for conceptualizing rural and urban in the demographic analysis of crime. Figure 1-1 is an illustrated example of the place/non-place territory geography in the Golden Triangle Area of Eastern Mississippi, a non-metropolitan area. Within the figure, one can see that each county is made up of a series of places and a non-place. In Oktibbeha County, the primary place is Starkville and the balance of the county is then referred to as the non-place.[1] This sub-county geography is used to designate the units of analysis in the study.

The use of exploratory and explanatory spatial analysis techniques allows for the examination of the inherently spatial phenomena of concern in this study, the differing patterns of urban and rural crime and the diffusion processes of urban crime to nearby rural localities. The explanatory examination considers arguably the two most prominent ecological theories of criminal offending, independently and in an integrated form. These theories are the structurally-centered social disorganization theory and the more agency-oriented routine activities theory.

Finally, the primary purpose of the study concerns the modeling of the mobility of crime associated with the fluidity of criminal behaviors between areas, based on their place or non-place territory classification.

The mobility of criminal offending is investigated through implementation of analytic techniques for identifying diffusion patterns in the spatial movement of social processes and behaviors. Of the two primary types of diffusion (Cohen and Tita, 1999), contagious rather than hierarchical diffusion applies here due to the contiguous nature of the units of analysis and the inherent 'downward' transmission of ideas, behaviors, and social processes between core place and periphery non-place territories (Agnew 1993; Lightfoot and Martinez 2005).

Contagious diffusion refers to the movement of phenomena through direct contact with neighboring entities, such as the physical relationship between places and their adjacent, often surrounding, non-place counterparts. Two main types of contagious diffusion, according to Cohen and Tita, are *relocation* diffusion and *expansion* diffusion. *Relocation* diffusion involves the movement of a phenomenon from a "seed" location to a contiguous neighbor. Within the field of criminology, this is often referred to as "displacement" (Paulsen and Robinson 2004). *Expansion* diffusion refers to the outward spread of a phenomenon from a central "seed" location and is more closely associated with the economic view of the spread of innovation, fads, and trends (Smelsner 1963).

There are a number of inherently spatial processes identified and introduced in the following literature review associated with the act of criminal offending, forming the basis of this research's spatial approach. Using a spatially-centered approach is important for both statistical and substantive reasons (Baller et al. 2001; Anselin 1995). Statistically, neglecting to use a spatial approach to examine phenomena in which spatial processes operate may lead to biased, inaccurate, and unreliable results (Anselin 2000, Baller et al. 2001). The implementation of a spatial approach allows for the implicit control of spatial autocorrelation concerning both the variable of interest and the structural-level determinants. This is explained in greater detail in the literature review and methodology sections. Essentially, causal processes may not work evenly across space and, therefore, the use of spatial analyses can help identify those areas where these processes differ (Baller et al. 2001). It is therefore important to examine the variation in criminal offending and in determinants of such behavior on a national scale but using a sub-county unit of analysis.

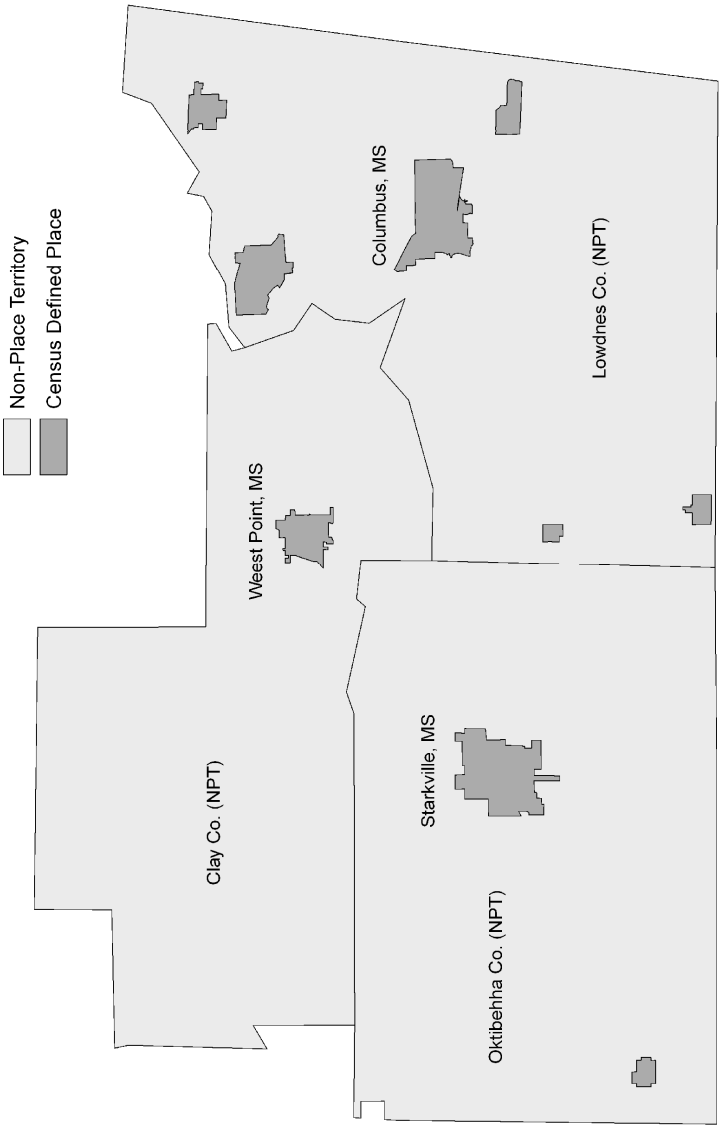

Figure 1-1. Place/Non-Place Territory Illustration, Golden Triangle Region, MS

This study extends the creative and resourceful work on the spatial diffusion of crime by Cohen and Tita (1999) by using multivariate spatial statistics (involving static LISA results; see Anselin 1995) for the time periods of 1990 and 2000. The study examines the spatial mobility of crime from core-city areas to periphery-hinterland areas based on an integrative approach to spatially-oriented theoretical frameworks. This process implements the Cohen and Tita (1999) method of detecting diffusion of spatial/temporal processes, grounded in the contagious nature of outward diffusion, identified by concentric zonal models and the core-periphery relationships between places and non-places (Agnew 1993; Park et al. 1925; Lightfoot and Martinez 1995; Alber et al. 1971).

The project has a number of important implications for the spatial demography of crime and beyond. First and foremost, the successful implementation and completion of this project could provide a rich, new resource for the examination and understanding of criminological processes at the sub-county level. Full, national-scale (continental) data sets for two decennial periods (1990 and 2000), with the associated sub-county geographies, would yield significant research potential beyond the current work.

Furthermore, as noted above, this project could aid in identifying the proper units of analysis necessary for better understanding of criminological processes. The new place-level geography is theory-driven, based on the definitions of Census places and the substantive meaning individuals give to city limit boundaries and the outer localities. This project explores the empirical use of the theory. If successful, the new geography has potential for studies of demographic processes far outside the demography of reported crime (i.e. diffusion of population, suburbanization).

Lastly, this project is one of the first to introduce the use of new spatial clustering techniques as a way of identifying patterns of crime mobility in a specified temporal period. As stated previously, this mobility is examined through the implementation of diffusion analyses most commonly associated with the movement of new trends, fads, ideas, and social processes to new geographic areas. Previous attempts at tracking diffusion geographically have built a good ‘jumping off point’ from which this research hopes to extend the current methodologies. Most recently, Cohen and Tita (1999) have implemented the use of the univariate LISA (Local Indicator of Spatial Association) statistic at different time periods as a crude measure of diffusion. This project introduces the use of the bivariate form of the same statistic in an attempt to uncover the same processes but with a joint test for statistical significance.

In summary, this project is interested in the implementation and testing

of the new place-level geography, both as a general ‘container’ of crime and as a substantively meaningful geography in which to measure the mobility of reported criminal offending. The ability to track crime across space and time continuously is expected to be an important application for researchers and those in the field. In fact, using the template provided in the text with more time-sensitive data will ultimately allow for almost the real-time tracking of crime across jurisdictionally meaningful geographies and thus should contribute to both our general knowledge of ecological criminology and our efficiency concerning the allocation of resources to combat type-specific crimes with time and space restrictions.

CHAPTER TWO

RECENT TRENDS IN CRIMINAL OFFENDING

Overview of Trends in Criminal Offending

Crime represents and has represented a significant concern in the United States throughout most of its history. The past quarter-century has seen a series of considerable fluctuations in crime rates (See Figure 2-1). Since 2000, however, crime in the United States has remained relatively stable, and rates for some types of crimes even declined. The Bureau of Justice Statistics (BJS) reports that over the last decade serious violent crime levels, including homicide, rape, robbery, and assault, continually declined (BJS 2007). Rates of property crime and firearm-related crime also declined at the national level (with the exception of a slight increase in firearm-related crime in 2005).

The Bureau of Justice Statistics further reports a steady *increase* in the reporting of crime, arrests, and convictions over the past decade (BJS 2007). As the percentage of crimes reported to policing agencies increased, the proportion of convictions in federal court and resulting prison sentences also increased. (Among cases concluded in federal district court since 1989, drug cases increased at the highest rate, due largely to the revival of the "War on Drugs" during the Regan administration.) The number of adults convicted of felonies overall and the number of those felons sentenced to prison or jail also rose. In the last decade, state courts in the U.S. sentenced over two-thirds of convicted felons to prison or jail (BJS 2007), resulting in increasing numbers of adults in the correctional system. (Over half of the increase in the state prison population since 1995 resulted from increases in violent offense convictions.) However, compared to sharp increases in the 1980s and 1990s, growth in incarceration rates has actually slowed in recent years.

In 2005, the number of those within the prison population sentenced to death increased for the fifth consecutive year. However, 2006 saw seven fewer executions than 2005. (Although most of those in prison are minorities, since the Supreme Court reinstated the death penalty in 1976, more than half of those sentenced to death have been white.) Meanwhile, suicide and homicide rates within state prisons and jails have declined,

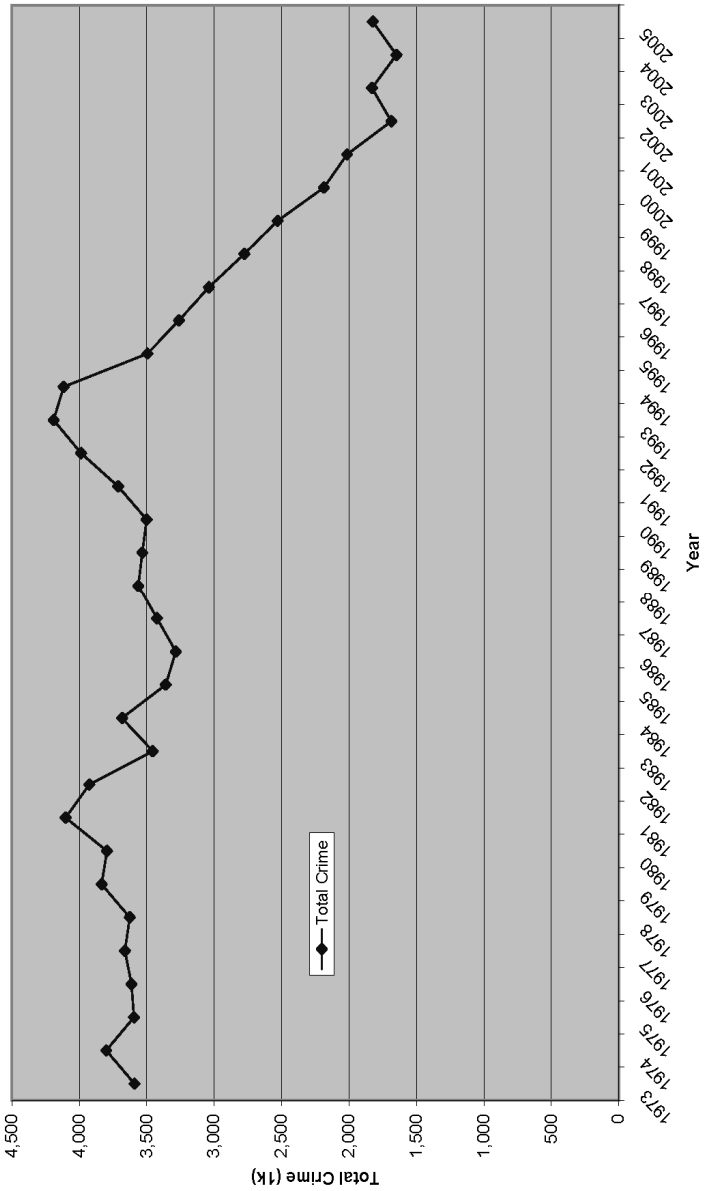

Figure 2-1. U.S. Total Crime Reported, 1973 – 2005

coinciding with an increase in direct expenditures for each of the major criminal justice functions.

While the information above accurately reflects overall crime trends in the United States as a nation, it also represents a large loss of information. Crimes and criminal activity vary both geographically as well as demographically, and focus on overall trends typically obscures these extremely meaningful variations.

Crime rate trends vary widely with regards to size of place and rate of growth. According to Brennan-Galvin (2004), two of the largest metropolitan areas in the world, Tokyo and Shanghai, have remained among the safest cities in the world. On the other hand, a number of Latin American cities have seen homicide rates significantly related to both city size and urban population growth. Other factors, such as population density and age structure, were also important predictors (Brennan-Galvin 2004). Meanwhile, Ackerman (1998) found that small U. S. cities (those with a population under 100,000) experienced roughly sixty-seven percent increases in violent crime and close to thirteen percent increases in property crime during the 1980s. (Violent crimes included murder, robbery, assault, and rape, while property crimes included burglary, larceny, and auto theft.) In comparison, medium-sized cities (100,000 – 500,000) and large cities (> 500,000) saw slower increases in crime (Ackerman 1998).

Some researchers suggest the U.S. is an anomaly among Westernized countries due to large increases in rates and indicators of crime over the past thirty years. From 1969 to 1998, violent crime increased from 860 cases per 100,000 people to 1,218 per 100,000, fear of crime indicators increased from thirty-one percent of people expressing hesitancy to walk alone at night to forty-one percent, and individuals in U.S. cities became over twenty times more likely to have a firearm than residents of cities in the U.K. (Body-Gendrot 2001). However, these national increases were not truly a new development. According to the President's Commission on Law Enforcement and Administration of Justice, crime rates in the late sixties rose faster than the population (Beasley & Antunes 1974). Moreover, recent reports suggest that crime rates in the United States, especially violent crime rates, have started to stabilize and, in some cases, even decline (BJS 2007).

Within the United States, researchers have also reported consistent regional variations in crime rates by type of crime committed. Paulson and Robinson (2000) found that, as of 2000, the highest rates of violent crime occurred in the West and the highest rates of serious property crime occurred in the South, while other types of non-violent crime were much

less prevalent in the South relative to other regions. However, within those larger trends, high variability existed. While the West saw the highest rate of violent crime overall, the highest rates of the sub-categories murder and assault actually occurred in the South (Paulson & Robinson 2004: ch.2). Note that, while typically higher in the South than the rest of the country, homicide trends still vary persistently across the entire U.S. (Paulson & Robinson 2004: ch.2).

To fully understand the variations in crime by place, it is important to understand reporting and calculation of crime rates. Crime *rates* are most commonly reported as the number of reported crimes per 100,000 residents of the population. The crime rate usually consists of index crimes per 100,000 residents; the results are computed either as a total group of reported crimes or broken down into specific index crimes (Grogger & Willis 2000). Using this conventional method, Grogger and Willis (2000) found that the introduction of crack cocaine drove Metropolitan Area crime rates up ten percent compared to the national averages in the early 1980s.

Problems with use of these crime rates typically center on either a small number of occurrences or a small population base at-risk for victimization or reporting (Waller and Gotway 2005; Bailey and Gatrell 1995; Anselin 2002). Small numbers that produce unreliable and highly variable estimates can be improved via the introduction of a Bayesian statistical approach, in which the statistical estimation is supplemented by prior knowledge about the parameters of interest (Bailey and Gatrell 1995). For instance, in a spatial analysis of cancer risk and prevention, a risk estimate was deemed to be unstable because the variation did not follow the variation in the population, meaning that a high rate did not necessarily mean a high risk (Anselin 2006). In order to adjust for this issue, Anselin (2006) borrowed "prior" information on rates in order to smooth the current rates used in his analysis. Other approaches used Poisson-based regression modeling techniques to examine the actual counts of rare events, such as crime, as opposed to the conversion of those events to rates (Osgood 2000; Osgood and Chambers 2000). Our study implements a spatial regression approach to test the utility of place-level geography on two leading ecological theories of criminal offending.

Rural-Urban Crime Patterns

The preceding section introduced some of the most basic points of criminal offending and the academic study of such behaviors. This section of the review uses and builds on these basic tenants to examine the

relationship between criminal offending and rural vs. urban classification. The section focuses on the identification of the urban and rural determinants of crime, taking into account the importance of ecological space, an inherent component of rural/urban differences in criminal offending.

As recognized by some of the earliest sociologists such as Emile Durkeim and Max Weber, city life is almost always associated with higher crime rates (Crutchfield 2007). However, while there exists "general consensus among criminologists that urban areas have higher rates of crime than rural areas, not all cities or neighborhoods experience similar levels of crime and violence; there is widespread variation in crime levels across urban spaces" (Crutchfield 2007: 77). A number of factors may contribute to this variation, including poverty, poor living conditions, high levels of disruption, high concentrations of minorities, population density, city size, and so forth. Contemporary criminologists continue to debate trends in and determinants of urban and rural crime.

It is important to note the operational delineation of urban and rural often falls on the metropolitan status of the unit of analysis, i.e. county. However, recent studies examining criminological processes have begun to observe that counties tend to be heterogeneous in terms of rural and urban characteristics. The following review on urban and rural crime reports on a number of research findings, many of which directly identify rural and urban crime rates as synonymous with metropolitan and non-metropolitan crime rates. For example, Ackerman (2001) suggests that high crime typically concentrates in the downtown area of cities because of high rates of unemployment and poverty, high concentrations of physical deterioration, large percentages of minorities, and a larger proportion of youth. Due to the distance decay effect, the concentration of these structural covariates create a higher crime rate in the inner city, which continually decreases as one moves away from the downtown area (Ackerman 1998). Similarly, Mandenka and Hill (1976) found that for personal crimes, consistently strong relationships exist between crime rate and poverty, population density, and the percent black.

Wilson (1983) points out that urban crime, along with many of the ills that face the inner city, was often viewed as largely a problem of race. Wilson argued that, instead of problems of race and racial discrimination plaguing these areas, it was the products of previous discrimination that perpetuated the problems of the inner city today. In seeking a solution, Wilson suggested that the high rates of unemployment and the increasingly shrinking pool of marriageable men (due to unemployment, high mortality and incarceration rates) in those areas needed to be

confronted, not race per se. The suggestion of a relationship between poverty and urban crime is long-standing, yet not uncontested.

As mentioned above, numerous aggregate studies have empirically supported the existence of this relationship (Crutchfield 2007). However, other researchers such as Messner and Anselin (2004), Messner et al. (1999) and Blau and Blau (1982) have challenged this conception and found that "areas with high populations of poverty do not necessarily have corresponding higher rates of violent crime" (Crutchfield 2007). They, like Wilson, point to the consequences of living in underclass neighborhoods characterized by isolation and a high concentration of poverty (Crutchfield 2007). Research on the link between race and urban crime has had more consistent results, with findings of a strong positive relationship between racial composition and criminal violence (Crutchfield 2007). These, however, are certainly not the only correlates of urban crime.

Many researchers have suggested that crime is associated with city size and population density and, as mentioned previously, some findings support this theory. Brennan-Galvin (2004) believed that, as the world continued to urbanize, the relationship between city size, growth rate, and crime rates would grow stronger. Previously, however, Spector (1975) found that neither population density nor unemployment significantly affected the rates of urban crime. On the other hand, Danzinger (1976) found that both unemployment and population density are significantly influential in predicting urban crime rates.

Urban crime not only affects high-crime areas but can negatively impact surrounding areas as well. Burnham et al. (2004) found that the effects of central city crime directly impacted the economic health of suburbs, with that effect more negative the closer the suburb was to the central city. Violent crime tended to have the greatest effect, with a significant degree of distance decay evident. Similarly, Schmidt (1960a) examined the significant economic, demographic, and social determinants of urban crime using a principal components approach to reduce the vectors of data. This study ultimately identified eight factors, which measured low family status, low occupational status, low economic status, population mobility, low mobility groups, and race. Following up earlier work (1960b), Schmidt came to the major hypothesis that the spatial distribution of crime in urban locales followed natural areas, a concept developed originally by Park and Burgess of the Chicago School, and that these distributions could be readily analyzed via gradient maps and isopleths. In 1965, Boggs published a study on urban crime and brought to light two factors of extreme import. First, the importance of familiarity

with victims depended on the types of crime that occur in high crime areas. Specifically, familiarity often serves as an important factor in homicide, rape, robbery, and residential burglary. Second, profitability often influenced the types of crime occurring in high-rank social neighborhoods. These crimes were usually less violent in nature and included auto theft, business burglary, other non-residential day and night burglary, and grand larceny (Boggs 1965).

Urban areas were not the only places that coped with criminal activity and its consequences. When one thinks of rural areas, one usually does not think of high crime rates. Most often, one thinks of small towns, farming, and friendly people. Reported crime statistics paint a different picture. While urban areas see higher incidence of criminal offending, the National Center on Rural Justice and Crime Prevention (NRJCP) finds that the falling crime rates have benefited urban and suburban areas more than rural areas (NRJCR 2007). Of course, due to the sheer magnitude of criminal offending in more urban areas, they did have more room for improvement.

Because urban areas seemingly have the majority of reported crime, researchers have tended to focus their efforts on studying crime patterns in urban areas. As a result, research on rural crime is much sparser and much less conclusive. According to Esselstyn (1953), the field of criminology neglects rural crime. He called for the study of what he termed "open country," which described any area not under some form of place-level police jurisdiction. An "open country" crime was any crime in which an "open country" officer must take action. Historically, the most consistent and well-known open country officers were those affiliated with the county's local sheriff. In open country, the sheriff symbolized local control over local problems and often held power to handle crime, or what they deemed to be crime, in any way they saw fit (Esselstyn 1953). Esselstyn's half-century old call for significant research on rural crime largely went unheeded, with the exception of work by a very few rural-centric researchers (Donnermeyer and Barclay 2005; Donnermeyer et al 2006; Donnermeyer 2007). In 1949, Bloch (1949) also noted the paucity of research on crimes and criminals in areas labeled or defined as being of rural character. In fact, according to Bloch, most criminology focused solely on the urban offender. Results of the time suggested that economic depression induced criminal activity, controlling a number of other socioeconomic covariates (Bloch 1949). Clinard (1944) also noted that criminal research, to a great extent, neglected rural crime offenders. To understand the criminal behavior of the rural offender in relation to the more generally understood urban offender, he analyzed sixty Iowan

inmates from the "open country." This study characterized rural offenders as extensively mobile, resulting in a detachment from any "home community" and thus leading to irresponsible patterns of criminal activity (Clinard 1944). Other research on crime in the "hinterlands" found that improvements in record keeping for reported crimes and arrests actually accounted for the "crime-wave" of the early 1970's (Gibbons 1976). Makeshift record-keeping techniques in many rural sheriffs' offices suggested that the primary purpose of such positions was peacekeeping as opposed to punishment of law-breakers (Gibbons 1976).

As is evident from the literature, a number of differences exist between urban and rural crime patterns. The National Center on Rural Justice and Crime Prevention (NCRJCP 2007) found that the majority of arrestees in rural (non-metropolitan) counties were white (79%). Also, unlike in urban areas, rural violent crime victims were less likely to be victimized by a stranger and most likely to be victimized was in their homes, compared to on the street or public transportation in urban and suburban areas. Furthermore, rural offenders had extensive contacts outside of their home communities and exhibited more mobility in terms of frequency of moves than non-offenders, resulting in a relative detachment from any home locality (Clinard 1942). Rural offenders, on average, also participated in fewer community organizations but were increasingly likely to be involved in a network of criminal relationships as urbanization increased.

Among urban offenders, participation in gangs was prevalent. As a result, urban offenders much more readily took on the persona of the "criminal social type," a persona largely non-existent among rural offenders and minimally existent among offenders from areas of low to moderate urbanization. Criminal techniques, criminal argot, and a progressive criminal life history characterize the criminal social. Rural offenders, on the other hand, did not regard their actions as crimes or themselves as criminals. Overall crime patterns suggest that the influence of urban areas and the detachment of offenders from personal relationships drove the development of the "criminal social type" (Durkheim 1893; 1895).

Clinard (1942) further found quantitative differences in incidence of crime between areas, based on the degree of urbanization. Similarly, Glaeser and Sacerdote (1999) reported that crime rates tended to be higher in large cities when compared to small cities and rural areas. In 1994, metropolitan areas reported seventy-nine percent more crime than smaller-sized American cities and three hundred percent more than rural areas. More recent findings suggest that the relationship between city size and crime rates could be explained primarily by the presence of more female-